The Status of EU Protected Habitats and Species in Ireland

Species Assessments Volume 3

An Roinn
Ealaíon, Oidhreachta agus Gaeltachta

Department of
Arts, Heritage and the Gaeltacht

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Contents

Overview

Every six years, Member States of the European Union are required to report on the conservation status of all habitats and species listed on the annexes of the Habitats Directive. The conservation status assessment uses a format agreed at a European level. For background information on how these assessments were derived please visit:

http://bd.eionet.europa.eu/article17/reference_portal.

A Notes form is also included to provide more detail on elements of each assessment.

Species assessments

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1013**
0.2.2 Species name	**Vertigo geyeri**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	Geyer's Whorl Snail

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Complete survey/Complete survey or a statistically robust estimate (3)
1.1.3 Year or period	1994-2012
1.1.4 Additional map	Yes
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published sources

Buckle, P. (2012) Identifying British Vertigos. Conchological Society of Great Britain and Ireland. http://www.conchsoc.org/aids_to_id/vertbase.php (last updated Jan 2012)
Byrne, A., Moorkens, E.A., Anderson, R., Killeen, I.J. & Regan, E.C. (2009) Ireland Red List No. 2 – Non-Marine Molluscs. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.
Cameron, R.A.D., Colville, B., Falkner, G., Holyoak, G. A., Hornung, E., Killeen, 1.J., Moorkens, E.A., Pokryszko, B.M., Proschwitz, T. von, Tattersfield, P. & Valovirta, 1. (2003). Species accounts for snails of the genus Vertigo listed in Annex II of the Habitats Directive: In: Speight, M.C.D., Moorkens, E.A. & Falkner, G. (Eds) Proceedings of the Workshop on Conservation Biology of European Vertigo Species. Dublin, 2002. Heldia 5: 151-170.
Cuttelod, A., Seddon, M. and Neubert, E. (2011). European Red List of Non-marine Molluscs. Luxembourg: Publications Office of the European Union.
Falkner, G., Obrdlik, P., Castella, E. & Speight, M. C. D. (2001) Shelled Gastropoda of Western Europe. Friedrich Held Gesellschaft, Munchen.
Holyoak, G.A. (2005) Widespread occurrence of Vertigo geyeri (Gastropoda: Vertiginidae) in north and west Ireland. Irish Naturalists' Journal 28: 141-150.
Kerney, M. & Cameron, R.A.D. (1979) A field guide to the land snails of Britain and north-west Europe. Collins, London.
Killeen, I.J. (2003) A review of EUHSD Vertigo species in England and Scotland (Gastropoda: Pulmonata: Vertiginidae) In: Speight, M.C.D., Moorkens, E.A. & Falkner, G. (eds) Proceedings of the Workshop on Conservation Biology of European Vertigo species. Heldia 5: 73-84. Natura 2000 rivers Ecology Series No. 6. English Nature, Peterborough.
Long, M., & Brophy, J. (2013) Survey, habitat and population assessments for two species of Vertigo snail and two red-listed mollusc species Unpublished report to National Parks and Wildlife Service.
Moorkens, E.A. (2007) Conservation assessment of Geyer's whorl snail (Vertigo geyeri) (1013) in Ireland. Report for Department of Environment, Heritage and Local Government.
Moorkens, E.A. & Killeen, I.J. (2011) Monitoring and Condition Assessment of

Populations of Vertigo geyeri, Vertigo angustior and Vertigo moulinsiana in Ireland. Irish Wildlife Manuals, No. 55. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland. [This reports on the monitoring and condition assessment for the species undertaken for NPWS between 2008 and 2010 on 22 sites for the species. The bibliography includes a complete listing of the reports and papers written on this species in Ireland since 1996.]
Pokryszko B. M. (1987) On the aphally in the Vertiginidae (Gastropoda: Pulmonata: Orthurethra) Journal of Conchology 32: 365-375.
Pokryszko B.M. (1990) The Vertiginidae of Poland (Gastropoda: Pulmonata: Pupillidea) – a systematic monograph. Annales zoologici 43: 133–257.
Sharland, E. (2000) Autecology of Vertigo angustior and Vertigo geyeri in Wales. CCW Contract Science Report 392. Countryside Council for Wales.
Speight, M.C.D., Moorkens, E.A. & Falkner, G. (Eds.) (2003). Proceedings of the Workshop on Conservation Biology of European Vertigo species. Heldia. 5. Munich.

2.3 Range

2.3.1 Surface area - Range (km²)	3400	
2.3.2 Method - Range surface area	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	decrease (-)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	3600
	operator	N/A
	unknown	No
	method	The Favourable Reference Range is calculated at 3600km2 which is the sum of the current range (3400km2) and the genuine losses (200km2) recorded by Moorkens and Killeen (2012). The Favourable Reference Range is considered to encompass all ecological and geographical variation.
2.3.10 Reason for change	Genuine Improved knowledge/more accurate dataUse of different method	

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	area covered by population in m2 (area)		
	min	130000	max	130000
2.4.2 Population size (other than individuals)	Unit	N/A		
	min		max	
2.4.3 Additional information	Definition of locality			
	Conversion method			
	Problems	The species is very difficult to identify in the field and recording it requires specialist knowledge. The sites it occupies are often small and sensitive to damage, so sampling has to be done at an appropriate scale and effort. There has to be a balance between confirming presence and overuse of destructive sampling. The		

	habitat assessment covers a wide area of potential habitat but the snail's presence is not confirmed from this entire area. The figures for population in Moorkens and Killeen (2011) are being reviewed for possible measurement errors. These may result in a modification of the population estimates but do not alter the direction of trends or interpretation.
2.4.4 Year or period	2008-2010
2.4.5 Method – population size	Estimate based on partial data with some extrapolation and/or modelling (2)
2.4.6 Short-term trend period	2001-2012
2.4.7 Short term trend direction	decrease (-)
2.4.8 Short-term trend magnitude	min max confidence interval
2.4.9 Short-term trend method	Estimate based on partial data with some extrapolation and/or modelling (2)
2.4.10 Long-term trend period	
2.4.11 Long term trend direction	N/A
2.4.12 Long-term trend magnitude	min max confidence interval
2.4.13 Long-term trend method	N/A
2.4.14 Favourable reference population	number 140000 operator N/A unknown No method The current population is less than the favourable reference population due to genuine losses. The difference is the estimate for the area of habitat/population for the sites that are in unsuitable status for population. Moorkens and Killeen (2011) calculated this additional figure as 1ha. The recovery of 1ha occupied by the species would contribute towards the long term viability of this species.
2.4.15 Reason for change	Genuine Improved knowledge/more accurate data

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	0.13
2.5.2 Year or period	2001-2010
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Moderate
2.5.4 b) Quality of habitat - method	Habitat quality was assessed semi-quantitively using estimates of area of occupancy within three habitat categories - optimal, sub-optimal and unsuitable (see Moorkens & Killeen (2011) for further detail).
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	decrease (-)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	
2.5.10 Reason for change	Genuine Improved knowledge/more accurate data

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
abandonment of pastoral systems, lack of grazing (A04.03)	high importance (H)	N/A
intensive grazing (A04.01)	medium importance (M)	N/A
Water abstractions from groundwater (J02.07)	medium importance (M)	N/A
surface water abstractions for public water supply (J02.06.02)	low importance (L)	N/A
roads, motorways (D01.02)	low importance (L)	N/A

2.6.1 Method used – pressures	based exclusively or to a larger extent on real data from sites/occurrences or other data sources (3)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
abandonment of pastoral systems, lack of grazing (A04.03)	high importance (H)	N/A
intensive grazing (A04.01)	medium importance (M)	N/A
Water abstractions from groundwater (J02.07)	medium importance (M)	N/A
surface water abstractions for public water supply (J02.06.02)	low importance (L)	N/A
roads, motorways (D01.02)	low importance (L)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant Information	Vertigo geyeri is listed as a qualifying feature for 12 SACs. There are no known extant populations on three of these SACs (Clonaslee Eskers & Derry Bog, Lough Hoe Bog and Clew Bay). The losses from Clonaslee Eskers & Derry Bog and Lough Hoe Bog were of established populations. Habitat conditions remain suitable on parts of both sites. There is uncertainty of the status of the population in Clew Bay Complex. There are populations on two SACs for which it is not a qualifying interest Vertigo geyeri is considered to be under threat in Ireland. It was assessed as Vulnerable on the Irish Red List (Byrne et al. 2009)
2.8.3 Trans-boundary assessment	

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment Inadequate (U1) qualifiers declining (-)
2.9.2. Population	assessment Inadequate (U1) qualifiers declining (-)
2.9.3. Habitat	assessment Inadequate (U1) qualifiers stable (=)
2.9.4. Future prospects	assessment Inadequate (U1) qualifiers declining (-)
2.9.5 Overall assessment of Conservation Status	Inadequate (U1)
2.9.6 Overall trend in Conservation Status	declining (-)

3. Natura 2000 coverage and conservation measures - Annex II species

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

3.1 Population

3.1.1 Population Size	Unit	area covered by population in m2 (area)		
	min	122800	max	122800
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3 Trend of population size within	decrease (-)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Inside	Enhance

Field label	Note
Species: 1013	**Geyer's Whorl Snail**
0.2.01 Species code	Vertigo geyeri is one of 8 species of whorl snail (genus Vertigo) living in Ireland. The whorl snails are amongst the smallest of the country's land molluscs with a size ranging from 1.7 to 2.7mm in height and 1 to 1.5mm in width. Illustrations, descriptions and photographs can be found in Kerney & Cameron (1979), Pokryszko (1990) and on the Conchological Society web site (Buckle, 2012). All whorl snails favour damp or wet habitats, where they live mostly in moss, leaves and decaying vegetation. They feed on bacterial films and decaying vegetation. Vertigo geyeri is consistent in where it lives, within the saturated and decaying roots of small sedges (particularly Carex viridula ssp. brachyrrhyncha), associated fen mosses (particularly Drepanocladus revolvens and Campyllium stellatum). It is stringent in its requirement of saturated water conditions in calcareous, ground water fed flushes. This microhabitat is generally found in mosaics of suitable patches that are often limited in size to a few metres square within wider fen macro-habitats, which in Ireland can themselves fall within wider site habitats as diverse as raised bog laggs, transition mires, lake shores, hill or mountain slopes, and wetlands associated with coastal dunes and machair (Moorkens & Killeen 2011). It requires an openness of habitat that prevents succession by shade loving plants and more competitive shade loving snails. There is a general requirement for stable conditions and Vertigo geyeri is particularly sensitive to changes in hydrology. Within its macro-habitat, V.geyeri needs constancy of hydrological conditions, but with enough variation to provide refugia for the meteorological extremes that the habitat must endure. This species is hermaphrodite but may often be self-fertilising with some cross fertilisation (Pokryszko, 1987). One to ten uncalcified, separated eggs are produced which have a 2 week development period (Falkner et al. 2001). The main reproductive period may vary considerably from site to site and depending upon meteorological conditions. At some sites the main period appears to be March/April and the species reaches sexual maturity in less than a year, with maximum numbers of adults observed in the autumn (September/October) (Cameron et al. 2003). However, at a site in Anglesey Sharland (2000) found that there was an extended and variable breeding season with no clear annual cycle. Individuals may live for somewhat more than a year, but less than two years. Population densities seem frequently to be low, but up to 200 individuals/m² have been recorded (Killeen 2003). Dispersal mechanisms are uncertain, but hypotheses include transport by charadriiform birds and/or grazing animals (including wild ungulates), dependent upon circumstance (Cameron et al. 2003). The ability of the species to self-fertilise makes it possible for a single coloniser to establish a new population. Vertigo geyeri is considered to be under threat in Ireland. It was assessed as Vulnerable on the Irish Red List (Byrne et al. 2009), However in Europe the assessment in the latest Red List was Least Concern (Cuttelod et al. 2011)

Field label	Note
Species: 1013	**Geyer's Whorl Snail**
1.1.02 Method used - map	Historic and recent distribution records have come from the following sources The All-Ireland non-Marine Mollusca database (last updated on 17 July 2012) supplied to NPWS and available on the MolluscIreland (www.habitas.org.uk/molluscireland) and National Biodiversity Data Centre web sites (maps.biodiversityireland.ie). Moorkens, E.A. (2007) Conservation assessment of Geyer's whorl snail (Vertigo geyeri) (1013) in Ireland. Report for Department of Environment, Heritage and Local Government. Moorkens, E.A. & Killeen, I.J. (2011) Monitoring and Condition Assessment of Populations of Vertigo geyeri, Vertigo angustior and Vertigo moulinsiana in Ireland. Irish Wildlife Manuals, No. 55. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland. Holyoak, G.A. (2005) Widespread occurrence of Vertigo geyeri (Gastropoda: Vertiginidae) in north and west Ireland. Irish Naturalists' Journal 28: 141-150. Long, M., & Brophy, J. 2013 Survey, habitat and population assessments for two species of Vertigo snail and two red-listed mollusc species. Unpublished report to National Parks and Wildlife Service. The records were compiled into a spreadsheet for error-checking and cross-referencing. The quality of the data varies. Pre 1970 data is generally at hectad level. The post 1970 records apart from a single exception are at 1km square resolution or finer. Over 90% of the available records have been gathered since 1996 and these are all at 100m resolution or finer. There were extensive surveys for this species from the mid-1990s to identify potential SACs (see Moorkens & Killeen 2011 for a full list of the relevant reports). Monitoring on the SACs with the species started on most sites in 2005. Between 2008 and 2010, 22 sites for the species throughout Ireland were included in a condition assessment survey (Moorkens & Killeen 2011). Each site was surveyed according to a standardised monitoring protocol. This protocol included assessment of area of occupancy and quality of habitat and survey along repeatable monitoring transects.
1.1.03 Year or period	The records cover the entire period from 1935 to the present day. The updated database containing 243 records is mostly a modern one with over 93% of the records gathered since 1994. The current distribution is taken from 1994 as in the previous assessment.
1.1.04 Additional distribution map	All verified records were intersected with the ING 10 square grid.
2.3.01 Surface area - Range	This figure has been derived from the range map referred to in 1.1.5.
2.3.02 Method used - Surface area of Range	As described in 1.1.2.
2.3.03 Short-term trend - Period	The default trend period was used.

Field label	Note
Species: 1013	**Geyer's Whorl Snail**
2.3.04 Short term trend - Trend direction	The number of occupied hectads in the current distribution (24) is greater than in the previous assessment. This increase is due to more information and better recording effort. The species has been recorded in 5 additional hectads (G32, G51, O06, N14, N20) since the last assessment. The populations in G32 and N20 were discovered in 2007, O06 and N14 in 2009 and G51 in 2010. There is no reason to assume that these were not established populations and are not recent colonisations. Two uncertain records (in M24 and M18) were checked in 2012 and these were both confirmed during a contracted survey (Long & Brophy 2013). On the negative side there have been apparent losses since the last assessment from three hectads L98, G31 and N21. The species could still be present at all sites at levels below detectability but these sites are not included in the current range. The site in L98 at Rossmoney (Co Mayo) is a very marginal one for the species with limited habitat. There is no evidence that the site supported a substantial population in the recent past. The site at Lough Talt (Co Sligo, G31) has apparently been lost although habitat conditions remain good on the site. The species was present in 2005 but could not be found in 2008 and in 2011. The Clonaslee Esker site (Co Offaly, N21) has not been seen since 1998. Searches in 2005 and 2008 failed to locate the species. There is some habitat at the site in favourable condition.
2.3.09 a) Favourable reference range - In km2	The current range calculated by the tool is 3400km2 which is less than the range calculated in the previous assessment (4300 km2). The difference is due to a combination of all three factors, genuine change, better information and use of different method. In the previous assessment the range was calculated on expert opinion including hectads adjacent to confirmed hectads that also contained suitable habitat (alkaline fen and tufaceous springs). This methodology was not used in this assessment due to the uncertainty of the species relationship to these habitats and a change in the assessment of the fen and spring habitats. Also none of the five additional hectads added to the current distribution since 2007 were within the predicted range envelope suggesting the previous methodology was inappropriate. There are three losses from individual hectads, L98, G31 and N21. The site in L98 at Rossmoney is viewed as very marginal for the species. The only positive record from this site is the original one in 2003 (Holyoak 2005) and it was not found during site surveys in 2006 and 2009. The site is considered marginal for the species as habitat is extremely limited and of poor overall quality (Moorkens & Killeen 2011). The occurrence of the species in such marginal habitat is not understood but expert judgment is that sites like this should not be treated as part of the favourable reference range or included in the population estimates. The losses from Lough Talt (G31) and Clonaslee Esker (N21) are losses of established populations so are added to the current range to produce a Favourable Reference Range of 3600km2.
2.3.10 a) Reason for change - genuine change?	There are three losses from individual hectads, L98, G31 and N21. The site in L98 at Rossmoney is viewed as very marginal for the species. There has been one record from this site in 2003 and it was not found in 2006 and 2009. The site was considered marginal for the species as habitat is extremely limited and of poor overall quality. The occurrence of the species in such marginal habitat is not understood and expert judgment is that sites such as this should not be treated as part of the range or included in the population estimates. The losses from Lough Talt and Clonaslee Esker were of established populations.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	The species is very small and restricted to small areas of habitat so its sites are easy to miss and it is easy to overlook. Recording of the species requires specialist knowledge. Moorkens & Killeen (2011) provided current data for 22 V. geyeri populations in 2008-2010. The species was recorded in 2012 at two previously reported but unconfirmed sites (Long & Brophy, 2013). Additional records were acquired from other surveys.

Field label	Note
Species: 1013	**Geyer's Whorl Snail**
2.3.10 c) Reason for change - use of different method?	The range tool was different from that used in the previous assessment. In the previous assessment the range was calculated on expert opinion including hectads adjacent to confirmed hectads that also contained suitable habitat (alkaline fen and tufaceous springs). This refinement was not used in this assessment. None of the five additional hectads added to the current distribution since 2007 were within the predicted range envelope produced in the 2007 assessment, supporting this change
2.4.01 a) Population size estimation (using individuals or agreed exceptions where possible) - Unit	Population size cannot be estimated for Vertigo snails so the agreed exception for these species is to use area of habitat as a surrogate measure. The methodology for determining population is described in Moorkens & Killeen (2011). Habitat patches were assessed for suitability for the species and assigned to one of three categories, optimal, sub-optimal or unsuitable. These habitats did not occur uniformly so polygons were categorised into one of 5 combinations of habitat — optimal, optimal and sub-optimal, sub-optimal, sub-optimal and unsuitable, or unsuitable. The current population was estimated as the area of occupancy of the snail based on an average of 50% occupancy within optimal habitat, 10% occupancy of sub-optimal and optimal habitat, 2% occupancy of sub-optimal, and 0.5% occupancy of suboptimal and unsuitable habitat. An area of occupancy (1ha) was added as an estimate for nonsurveyed sites. In 2012 the species was confirmed on two uncertain sites (Long & Brophy 2013). The habitat area at both sites is limited and of low quality and so there is no reason to increase the estimate for the unsurveyed sites given in Moorkens & Killeen (2011). The final area/population estimate for Vertigo geyeri is 13 hectares.
2.4.01 b) Population size estimation (using individuals or agreed exceptions where possible) - Minimum	13ha calculated by Moorkens & Killeen (2011) is taken as the minimum.
2.4.04 Year or period	All population estimates were carried out between 2008 and 2010 (Moorkens & Killeen 2011).
2.4.06 Short-term trend - Period	The default trend period was used.
2.4.07 Short-term trend - Trend direction	The 2008-2010 surveys were baseline at most of the sites. Most sites had been visited at least once since 2001 as part of surveys for SAC selection but as full quantitative assessments were not done at all sites, direct comparison between the two periods is not possible. Trends in the population are therefore semi-quantitative and a mixture of expert opinion and measured changes. The figures for population in Moorkens and Killeen (2011) are being reviewed for possible measurement errors. These may result in a modification of the population estimates but do not alter the trends or interpretation. Of the 22 sites surveyed in 2008-2012, the population at 14 sites was at least stable. Declines in populations were noted at Pollardstown (Co Kildare), Brackloon (Co Mayo) and Lough Talt (Co Sligo). At Pollardstown the species is widespread but the total area of occupancy has reduced due to decline in habitat quality. At Lough Talt the habitat remains in good quality but the species was not seen in 2008 nor subsequently. The habitat at Brackloon is of low overall quality and the population at the site is low. Moorkens and Killeen (2011) estimated that the net effect of the decline in population is equivalent to a value of 1ha. The trend in population is a decline.
2.4.14 b) Favourable reference population - Indicate if operators were used	The Favourable Reference Population is estimated at 14ha which is the sum of estimate of the current population (13ha) and the estimate (1ha) from Moorkens & Killeen (2011) for the lost and declining populations.
2.4.15 a) Reason for change - genuine change?	There has been a measured and documented decline in population in some of the occupied sites.

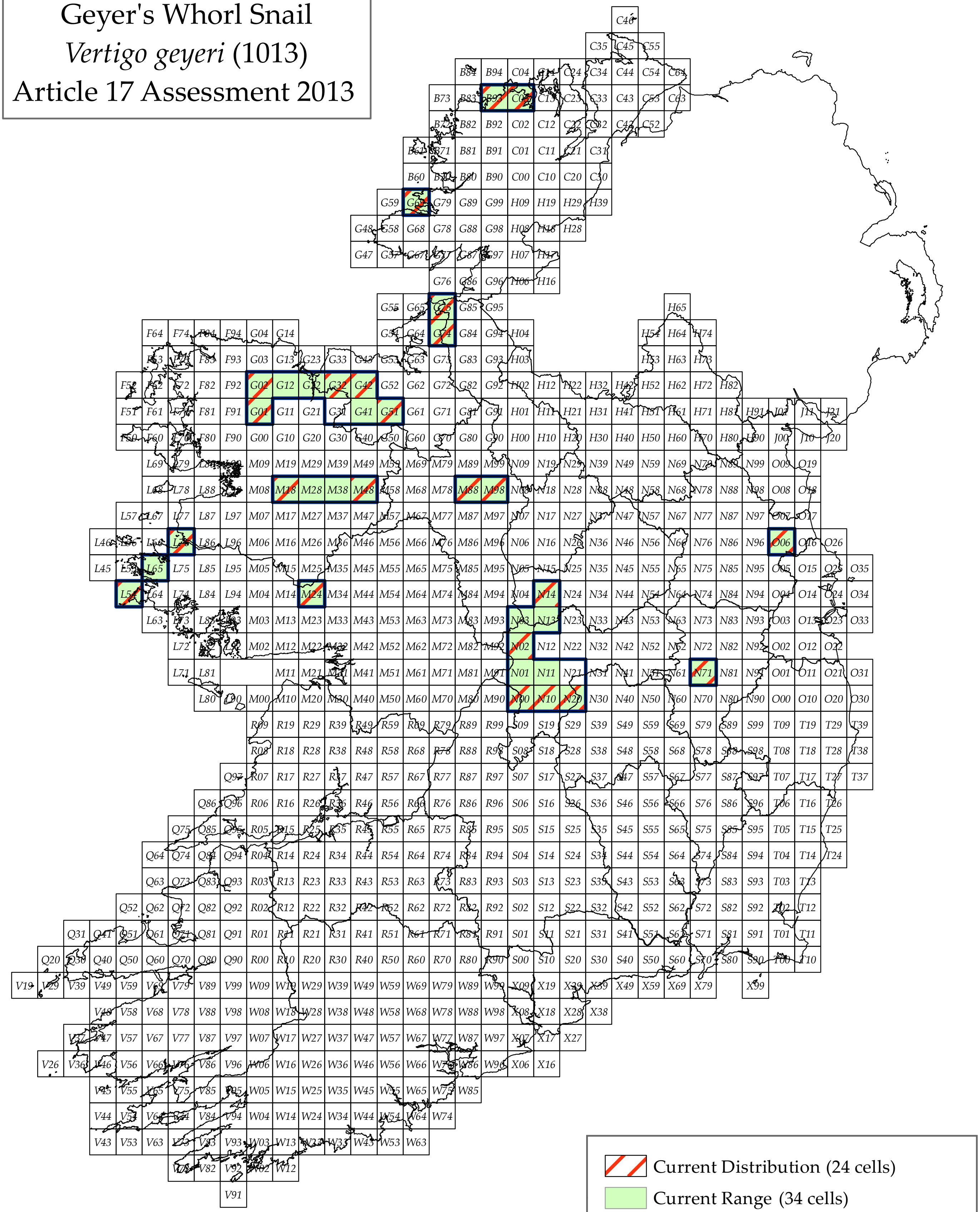
Field label	Note
Species: 1013	**Geyer's Whorl Snail**
2.4.15 b) Reason for change - improved knowledge/more accurate data?	Additional populations have been discovered since 2007 and more complete and accurate estimates of populations have been produced for many sites. There is no reason to suppose the recently recorded populations were not already in existence in 1994. The population estimate in Moorkens & Killeen (2011) included a figure (1ha) for the unsurveyed and unknown sites. The additional survey by Long & Brophy (2013) has confirmed two populations (Carrowmoreknock and Cooley Lough) but they are considered to be small and there is no reason to amend the estimate given in Moorkens & Killeen (2011).
2.5.01 Area estimation	The total area of habitat that contains suitable conditions for the snail is at least 180ha. This is the figure from the sites surveyed by Moorkens & Killeen (2011) and is a minimum as there is no estimate for the other sites. These however are not considered to be substantial.
2.5.02 Year or period	All habitat values were estimated between 2008 and 2010 (Moorkens & Killeen 2011).
2.5.04 a) Quality of the habitat - Good / moderate / bad / unknown	Suitable Vertigo geyeri habitat is very restricted in Ireland. The condition assessment by Moorkens & Killeen (2011) determined that overall habitat quality was good at 15 of the 22 sites. These sites included 72% of the habitat resource. Optimal habitat was present on 15 sites mostly in a mosaic with sup-optimal conditions. Four sites had areas that were defined in this highest category. Declining habitat was apparent at 2 sites, Pollardstown (Co Kildare) and Brackloon (Co Mayo). The remaining sites are all sites with very poor quality habitat and there is no evidence that they have declined to that state. Habitat quality is therefore assessed as Moderate in view of the large proportion which is not in favourable condition.
2.5.04 b) Quality of the habitat - Explain how the quality was assessed	Quality of habitat was assessed by measuring habitat attributes on site surveys as described in Moorkens & Killeen (2011).
2.5.05 Short-term trend - Period	The default trend period was used.
2.5.06 Short-term trend - Trend direction	There is a declining trend in area of habitat for the species, and a decline in the quality of the habitat for the species at some sites. While the habitat quality of 15 of the 22 sites was assessed by Moorkens & Killeen 2011) as Good and likely to be sustainable, there has been a decline in quality at 2 sites. This may have an impact on the long-term sustainability of these populations. The habitat quality on the remaining site was considered poor, but there was no evidence that this was not the natural state of these sites.
2.5.09 Area of suitable habitat for the species (km2)	As there is no understanding of why this species does not occur in habitat that appears suitable the Area of suitable habitat is set as the current Area of habitat occupied by the species.
2.5.09 Area of suitable habitat for the species (km2)	Sum of all optimal, suboptimal and unsuitable habitat polygons
2.5.10 a) Reason for change - genuine change?	There was a measured decline in both the area of habitat and the quality of the habitat at some sites surveyed by Moorkens & Killeen (2011). While 15 of the geyeri sites were assessed as having habitat in favourable condition and likely to be sustainable, there were 3 sites which should have better quality habitat in order to ensure their sustainability.
2.5.10 b) Reason for change - improved knowledge/more accurate data?	The estimate in the previous assessment period was 44ha. More thorough and complete surveys were done during 2008-2010.

Field label	Note
Species: 1013	**Geyer's Whorl Snail**
2.6 Main pressures - Pressure	The information on the pressures currently affecting the species and its habitat comes from the site condition assessment surveys from 2008-2010. The pressures are listed in the site reports and their impacts and significance discussed. The information is also summarised in the main summary report (Moorkens & Killeen 2011). This summary list includes active pressures, pressures that were affecting sites in earlier assessment periods and before the Habitats Directive was implemented and threats that may be significant in the future. The information has been reassessed to filter out only the pressures which have been significantly impacting sites in the 2007-2012 assessment period and these are what are listed here. Some of the pressures given in Moorkens & Killeen (2011) were reclassified into a more appropriate category or several similar ones merged into a more generic type. This was considered appropriate as some of the pressures were often very site specific and some were clearly related to a similar pressure on another site. The specific threats to V. geyeri sites are inadequately covered by the predetermined list of pressures. It is difficult to assess the significance of these pressures on the basis of single or infrequent visits and it will only be through further monitoring that the scale of these negative impacts will become apparent. Much (57%) of the V. geyeri habitat is maintained by natural wetness of the site and is essentially unmanaged. The remaining V. geyeri sites are managed by some form of grazing and sheep grazing is the most suitable type of stock. Most of the habitat was not affected by any significant pressure. The most common pressures are those which affect the hydrology of the wetlands and changes to the grazing intensity. The snail requires open, short habitat and favourable habitat is strongly correlated with sheep grazing (Moorkens & Killeen 2011). Changes in grazing which can impact on the geyeri habitat include abandonment, intensification (e.g. by heavier stocking) and the change from sheep to cattle or other stock. The quality and constancy of the flushes that V. geyeri is associated with are also important habitat attributes and reductions in flow in particular can have negative consequences. This pressure is inadequately covered by any of the listed choices, but would appear to be described best by J02.07. The specific causes of the changes in the groundwater fed systems is often difficult to ascertain but possible causes implicated on V. geyeri sites are planting of open ground, construction of wind farms and peat extraction. A04.03 Abandonment of pastoral systems, lack of grazing High this is impacting a significant proportion of the total habitat resource A04.01 intensive grazing Medium; this is the most widespread pressure on V. geyeri sites J02.07 Water abstractions from groundwater Medium. This has been implicated in the decline at one site and an ongoing issue at another J02.06.02 surface water abstractions for public water supply. Low This has been implicated in the decline at one site D01.02 Roads,motorways. Low Several of the new sites are along the route of planned roads.
2.7 Threats - Threat	The pressures are also listed as threats as there is no evidence that they will be reduced in the future. A04.03 Abandonment of pastoral systems, lack of grazing High A04.01 intensive grazing Medium J02.07 Water abstractions from groundwater J02.01.02 water absstractions from surface waters Low D01.02 Roads,motorways. Low

Field label	Note
Species: 1013	**Geyer's Whorl Snail**
2.8.02 Other relevant information	Vertigo geyeri is listed as a qualifying feature for 12 SACs. There are no known extant populations on three of these SACs (Clonaslee Eskers & Derry Bog, Lough Hoe Bog and Clew Bay). The losses from Clonaslee Eskers & Derry Bog and Lough Hoe Bog were of established populations. Habitat conditions remain suitable on parts of both sites. There is uncertainty of the status of the population in Clew Bay Complex. There are populations on two SACs for which it is not a qualifying interest Vertigo geyeri is considered to be under threat in Ireland. It was assessed as Vulnerable on the Irish Red List (Byrne et al. 2009)
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Populations of V. geyeri are very dispersed across the midlands and the north and west of Ireland. The midlands populations are mainly in Offaly and Kildare but there is a newly recorded site in Co Meath which marks the easternmost site. There are more sites in the north west of its range which stretches from Killary Harbour to northern Donegal. There have been two documented losses from the range so the assessment is Unfavourable-Inadequate.
2.9.01 b) Range - If CS is U1 or U2, use of qualifiers is recommended	There have been losses since the Directive came into force and one certainly within this assessment period therefore the qualifier is set as declining.
2.9.01 b) Range - If CS is U1 or U2, use of qualifiers is recommended	The trend is assessed as stable on the basis of the stable assessment for future prospects and habitat.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The population as expressed by the area of occupancy has shown a measured decline on three sites. The species has also disappeared from at least one site although habitat remains in good condition. As the Favourable Reference Population of the species is greater than the Current Population, it is assessed as Unfavourable-Inadequate.
2.9.02 b) Population - If CS is U1 or U2, use of qualifiers is recommended	Due to the ongoing decline in the area of occupancy the qualifier is set as declining.
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Vertigo geyeri habitat is very rare in Ireland but most of the habitat is in good condition. Improvement in the habitat quality was noted on 3 sites as compared with one site which showed a deterioration within this assessment period. As the Favourable Reference Habitat of the species is greater than the Current Habitat, it is allocated Unfavourable – Inadequate conservation status
2.9.03 b) Habitat for the species - If CS is U1 or U2, use of qualifiers is recommended	The qualifier was set as stable to reflect a balance between improvements and deteriorations recorded in Habitat during the reporting period.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	Most of the sites for V. geyeri were considered in favourable condition and future prospects for many sites are good. Habitat for the species is however very rare and moreover the fragility of its habitat means that even a small change in habitat condition or management can negatively impact the species. The species is largely found in SACs. The pressures on the sites are largely from grazing and changes in hydrology and these are as likely to happen in the future as they are currently. The future prospects are assessed as Unfavourable – Inadequate.
2.9.04 b) Future prospects - If CS is U1 or U2, use of qualifiers is recommended	Due to ongoing declines in population the qualifier for future prospects has been set as declining. Although the habitat qualifier is assessed as stable there is still uncertainty regarding the reasons for the loss of one population.
2.9.05 Overall assessment of Conservation Status	The assessment for all the attributes are amber, therefore the overall assessment is Unfavourable-Inadequate.
2.9.06 Overall trend in Conservation Status	Due to ongoing declines in population and the uncertainties surrounding the loss of one population the qualifier for the overall assessment has been set as declining.

Field label	Note
Species: 1013	**Geyer's Whorl Snail**
3.1.01 a) Population size - Unit	Vertigo geyeri is present in 13 SACs according to Moorkens & Killeen (2011) and Long & Brophy (2013). The percentage of the population that is estimated as being present within the SACs is 94.5% which equates to a population/area estimate of 12.28ha. These figures come from intersecting the SAC layer with the polygon layers submitted by the Vertigo monitoring survey (Moorkens & Killeen 2011). These area figures are currently under review for possible measurement inconsistencies.
3.1.03 Trend of population size within the network (short-term trend)	Most of V. geyeri resource is found in the SAC network and most of this is considered in favourable condition. The population on one SAC has been lost (Lough Talt) and there has been a decline in the population at Brackloon and habitat quality at Pollardstown. The conservation status of the species on three sites (Ballyness Bay, Dooaghtry and Fin Lough) has shown significant improvement since the previous assessment.
3.2 Conservation measures	Where Vertigo geyeri is listed as a qualifying features in SACs it is protected by the Habitat Regulations (S.I. No. 477/2011), this regulates any plans or projects that may negatively impact on the species. There is also an NPWS list of Activities Requiring Consent (ARCs) that are only granted if they do not negatively impact on the Qualifying features within an SAC. This species is also afforded protection by the Environmental Liability Directive, which prevents and remedies environmental damage to natural habitats and protected species. The Planning and Development (Amendment) (No. 2) Regulations, S.I 454 of 2011 and the European Communities (Amendment to Planning and Development Regulations) Regulations, S.I. 464 of 2011 require planning consent for any drainage or reclamation work that has the potential to impact an area of wetland of 0.1 ha or greater. EIA is mandatory under these Regulations where a wetland area of 2 ha or more could be affected. EIA and AA are also required for smaller areas of wetland, where the works would have a significant effect on the environment.

Geyer's Whorl Snail
Vertigo geyeri (1013)
Article 17 Assessment 2013



Current Distribution (24 cells)
Current Range (34 cells)
Favourable Reference Range (36 cells)

An Roinn Ealaíon, Oidhreachta agus Gaeltachta
Department of Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 10 20 30 40 50 km

N
Map - Léarscáil
V 2.0
Date - Dáta
25-06-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1014**
0.2.2 Species name	**Vertigo angustior**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	Narrow-mouthed Whorl Snail

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Complete survey/Complete survey or a statistically robust estimate (3)
1.1.3 Year or period	1994-2012
1.1.4 Additional map	Yes
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published sources

Buckle, P. 2012 Identifying British Vertigos. Conchological Society of Great Britain and Ireland. http://www.conchsoc.org/aids_to_id/vertbase.php (last updated Jan 2012)

Byrne, A., Moorkens, E.A., Anderson, R., Killeen, I.J. & Regan, E.C. (2009) Ireland Red List No. 2 – Non-Marine Molluscs. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.

Cameron, R.A.D., Colville, B., Falkner, G., Holyoak, G. A., Hornung, E., Killeen, 1.J., Moorkens, E.A., Pokryszko, B.M., Proschwitz, T. von, Tattersfield, P. & Valovirta, 1. (2003). Species accounts for snails of the genus Vertigo listed in Annex II of the Habitats Directive: In: Speight, M.C.D., Moorkens, E.A. & Falkner, G. (Eds) Proceedings of the Workshop on Conservation Biology of European Vertigo Species. Dublin, 2002. Heldia 5: 151-170.

Cuttelod, A., Seddon, M. and Neubert, E. (2011). European Red List of Non-marine Molluscs. Luxembourg: Publications Office of the European Union.

Falkner, G., Obrdlik, P., Castella, E. & Speight, M. C. D. (2001) Shelled Gastropoda of Western Europe. Friedrich Held Gesellschaft, Munchen.

Kerney, M. & Cameron, R.A.D. (1979) A field guide to the land snails of Britain and north-west Europe. Collins, London.

Killeen, I.J. (2003a) A review of EUHSD Vertigo species in England and Scotland (Gastropoda: Pulmonata: Vertiginidae) In: Speight, M.C.D., Moorkens, E.A. & Falkner, G. (eds) Proceedings of the Workshop on Conservation Biology of European Vertigo species. Heldia 5: 73-84.

Moorkens, E.A. (2007) Conservation assessment of the narrow-mouthed whorl snail (Vertigo angustior) (1014) in Ireland. Report for Department of the Environment, Heritage and Local Government.

Moorkens, E.A. & Gaynor, K. (2003) Studies on Vertigo angustior at a coastal site in western Ireland (Gastropoda, Pulmonata: Vertiginidae). Heldia 5 (7): 125-134.

Moorkens, E.A. & Killeen, I.J. (2011) Monitoring and Condition Assessment of Populations of Vertigo geyeri, Vertigo angustior and Vertigo moulinsiana in Ireland. Irish Wildlife Manuals, No. 55. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

This reports on the monitoring and condition assessment for the species

undertaken for NPWS on 21 sites including all those within SACs. The bibliography includes a complete listing of the reports on this species since 1994.
Pokryszko B. M. (1987) On the aphally in the Vertiginidae (Gastropoda: Pulmonata: Orthurethra). Journal of Conchology 32: 365-375.
Pokryszko B.M. (1990) The Vertiginidae of Poland (Gastropoda: Pulmonata: Pupillidea) – a systematic monograph. Annales zoologici 43: 133–257
Sharland, E. (2000) Autecology of Vertigo angustior and Vertigo geyeri in Wales. CCW Contract Science Report 392. Countryside Council for Wales.
Speight, M.C.D., Moorkens, E.A. & Falkner, G. (Eds.) (2003). Proceedings of the Workshop on Conservation Biology of European Vertigo species. Heldia. 5. Munich.

2.3 Range

2.3.1 Surface area - Range (km²)	5600	
2.3.2 Method - Range surface area	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	decrease (-)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	5800
	operator	N/A
	unknown	No
	method	The Favourable Reference Range is calculated at 5800km2 which is the sum of the current range (5600km2) and genuine losses (200km2) recorded by Moorkens & Killeen (2011). The FRR is considered to encompass all ecological and geographical variation.
2.3.10 Reason for change	Genuine Improved knowledge/more accurate dataUse of different method	

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	area covered by population in m2 (area)		
	min	1213900	max	1213900
2.4.2 Population size (other than individuals)	Unit	N/A		
	min		max	
2.4.3 Additional information	Definition of locality			
	Conversion method			
	Problems	The species is difficult to identify in the field and recording it requires specialist knowledge. The sites it occupies are occasionally small and sensitive to damage, so sampling has to be done at an appropriate scale and effort. There has to be a balance between confirming presence and overuse of destructive sampling. The habitat assessment covers a wide area of potential habitat but the snail’s presence is not confirmed from this entire area. The figures for population in Moorkens and Killeen (2011) are being reviewed for possible measurement errors. These may result in a modification of the population estimates but		

	do not alter the direction of trends or interpretation.
2.4.4 Year or period	2008-2010
2.4.5 Method – population size	Estimate based on partial data with some extrapolation and/or modelling (2)
2.4.6 Short-term trend period	2001-2012
2.4.7 Short term trend direction	decrease (-)
2.4.8 Short-term trend magnitude	min max confidence interval
2.4.9 Short-term trend method	Estimate based on partial data with some extrapolation and/or modelling (2)
2.4.10 Long-term trend period	
2.4.11 Long term trend direction	N/A
2.4.12 Long-term trend magnitude	min max confidence interval
2.4.13 Long-term trend method	N/A
2.4.14 Favourable reference population	number 1370000 operator N/A unknown No method The Favourable Reference Population is given as the current population (121.39ha) plus the figure for the lost and declining populations (15.61ha) recorded by Moorkens and Killeen (2011) which gives a figure of 137ha. The current population is less than the favourable reference population due to recorded losses. The difference is the estimate for the area of habitat/population for the sites that are in unsuitable status for population. Moorkens and Killeen (2011) calculated this additional figure as 15.61ha. The recovery of 15.61ha occupied by the species would contribute towards the long term viability of this species.
2.4.15 Reason for change	Genuine Improved knowledge/more accurate data

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	8.01
2.5.2 Year or period	2008-2010
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Moderate
2.5.4 b) Quality of habitat - method	Quality of habitat was assessed by measuring habitat attributes on site surveys as described in Moorkens & Killeen (2011).
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	decrease (-)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	8.01
2.5.10 Reason for change	Genuine Improved knowledge/more accurate data

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
intensive grazing (A04.01)	high importance (H)	N/A
intensive sheep grazing (A04.01.02)	high importance (H)	N/A
abandonment of pastoral systems, lack of grazing (A04.03)	high importance (H)	N/A
stock feeding (A05.02)	low importance (L)	N/A
car parks and parking areas (D01.03)	low importance (L)	N/A

paths, tracks, cycling tracks (D01.01)	medium importance (M)	N/A
camping and caravans (G02.08)	medium importance (M)	N/A
Modification of hydrographic functioning, general (J02.05)	low importance (L)	N/A

2.6.1 Method used – pressures	based exclusively or to a larger extent on real data from sites/occurrences or other data sources (3)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
intensive grazing (A04.01)	high importance (H)	N/A
abandonment of pastoral systems, lack of grazing (A04.03)	high importance (H)	N/A
camping and caravans (G02.08)	medium importance (M)	N/A
Modification of hydrographic functioning, general (J02.05)	medium importance (M)	N/A
paths, tracks, cycling tracks (D01.01)	low importance (L)	N/A
car parks and parking areas (D01.03)	low importance (L)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant Information	Vertigo angustior is listed as a qualifying interest on 13 SACs. The presence on 11 of these SACs was confirmed during the current assessment period. It is also recorded from 9 SACs for which it is not a QI It is considered to be under threat in Ireland and was assessed as Endangered on the Irish Red List (Byrne et al. 2009).
2.8.3 Trans-boundary assessment	

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment Inadequate (U1) qualifiers declining (-)
2.9.2. Population	assessment Inadequate (U1) qualifiers declining (-)
2.9.3. Habitat	assessment Inadequate (U1) qualifiers declining (-)
2.9.4. Future prospects	assessment Inadequate (U1) qualifiers declining (-)
2.9.5 Overall assessment of Conservation Status	Inadequate (U1)
2.9.6 Overall trend in Conservation Status	declining (-)

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit area covered by population in m2 (area) min 921000 max 921000
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)

3.1.3 Trend of population size within	decrease (-)

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Inside	Enhance

Article 17 - SPECIES NOTES

Field label	Note
Species: 1014	**Narrow-mouthed Whorl Snail**
0.2.01 Species code	Vertigo angustior is one of 8 species of whorl snail (genus Vertigo) living in Ireland. The whorl snails are amongst the smallest of the country's land molluscs with a size ranging from 1.7 to 2.7mm in height and 1 to 1.5mm in width. All whorl snails favour damp or wet habitats, where they live amongst moss, leaves and decaying vegetation. They feed on bacterial films and decaying vegetation. At a broad level, Vertigo angustior appears to be present in a wide range of habitat categories of dune and coastal grassland, fen, marsh, salt marsh and flood plain. This micro-habitat falls into two categories, called the "dune phase" and the "wet phase". The former micro-habitat, the root area of fixed dune grassland can extend over large areas and thus support enormous numbers of the snail. In contrast, the "wet phase" habitat tends to occur within a narrow band typically a few metres wide in the transition zone between grassland and fen, or between grassland and stream, in both cases within the decaying leaves of Iris plants. Vertigo angustior is mainly a European species but extends through Turkey and into Iran. It ranges from southern Scandinavia to the Mediterranean and from Ireland to the Caspian Sea (Cameron et al. 2003). It is considered to be under threat in Ireland and Europe and was assessed as Endangered on the Irish Red List (Byrne et al. 2009) and Vulnerable on the European Red List (Cuttelod et al. 2011).
1.1.01 Distribution map	The map shows the distribution based on data from Moorkens and Killeen (2011), the All Ireland non Marine Mollusca database on the NBDC (last updated 17/07/2012), the Irish red list of non-marine Molluscs (Byrne et al. 2009) and NPWS species databases.
1.1.02 Method used - map	Historic and recent distribution records have come from the following sources The All-Ireland non-Marine Mollusca database (last updated on 17 July 2012) supplied to NPWS and available on the MolluscIreland (www.habitas.org.uk/molluscireland) and National Biodiversity Data Centre web sites (maps.biodiversityireland.ie). Moorkens, E.A. (2007) Conservation assessment of the narrow-mouthed whorl snail (Vertigo angustior) (1014) in Ireland. Report for Department of the Environment, Heritage and Local Government. Moorkens, E.A. & Killeen, I.J. (2011) Monitoring and Condition Assessment of Populations of Vertigo geyeri, Vertigo angustior and Vertigo moulinsiana in Ireland. Irish Wildlife Manuals, No. 55. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland. The records were compiled into a spreadsheet for error-checking and cross-referencing. The quality of the data varies. Pre 1970 data is generally at hectad level. The post 1970 records apart from a single exception are at 1km square resolution or finer. Almost 90% of the available records have been gathered since 1994. There were extensive surveys for this species from the mid-1990s to identify potential SACs (see Moorkens & Killeen 2011 for a full list of the relevant reports). Monitoring on the SACs with the species started on most sites in 2005. Between 2008 and 2010, 21 sites for the species throughout Ireland were included in a condition assessment survey (Moorkens & Killeen 2011). Each site was surveyed according to a standardised monitoring protocol. This protocol included assessment of area of occupancy, quality of habitat, threats and pressures and survey along repeatable monitoring transects.
1.1.03 Year or period	The records cover the entire period from 1884 to the present day. The current distribution is taken from 1994. The NPWS database on the species contains 336 records of which almost 90% are post 1994.
1.1.04 Additional distribution map	All field verified records were intersected with the ING 10 square grid.
1.1.05 Range map	The range was calculated using the range tool, based on the current distribution derived from the latest survey data (Moorkens & Killeen, 2011).

Field label	Note
Species: 1014	**Narrow-mouthed Whorl Snail**
2.3.01 Surface area - Range	This figure has been derived from the range map referred to in 1.1.5.
2.3.03 Short-term trend - Period	The default trend period was used.
2.3.04 Short term trend - Trend direction	The number of occupied hectads in the current distribution (34) is greater than in the previous assessment. There have been additional records from 4 hectads but also losses from 2 hectads. The new records are from N04, G51, G64 and M98. There is no reason to suppose that these were not established populations. Moorkens & Killeen (2011) covered 21 sites for V. angustior throughout Ireland. There were positive records from 19 sites and negative results from 2. There were two negative sites, Glencolmcille (G58, Co Donegal) and Louisa Bridge (N93, Co Kildare) and these are not included in the current range. There have been losses of the species from parts of the Maharees peninsula, Co Kerry, but these do not affect the range. The Glencolmcille population could not be found in 2008 but it was present in 2006. Expert opinion was that habitat quality had declined probably due to a change in grazing practices. The Louisa Bridge population has not been seen since 1997 and habitat is now assessed as in poor condition. The species could still be present at both sites at levels below detectability but neither site is included in the current range.
2.3.10 a) Reason for change - genuine change?	The Favourable Reference Range is higher than the current range due to the apparent losses from Glencolmcille, Co Donegal and Louisa Bridge, Co Kildare (Moorkens & Killeen 2011). There has been a decline in habitat quality at Louisa Bridge caused it is thought by changes in the river channel which have altered the pattern and extent of flooding on the site and the wetness of the potential habitat. The reason for the decline in Vertigo angustior at Glencolmcille is not fully understood, but is likely to be one of two things operating separately or more likely a confounding effect of both. Although there is grazing present, the grazing may be too low to maintain ideal vegetation height. In addition, in recent years sheep appear to have been introduced to the site for winter grazing as well as summer cattle grazing.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Additions to the range have come about through additional survey and incidental records.
2.3.10 c) Reason for change - use of different method?	The range tool was different from that used in the previous assessment.
2.4.01 a) Population size estimation (using individuals or agreed exceptions where possible) - Unit	Population size cannot be estimated for Vertigo snails so the agreed exception for these species is to use area of habitat as a surrogate measure. The methodology for determining population is described in Moorkens & Killeen (2011). Habitat patches were assessed for suitability for the species and assigned to one of three categories, optimal, sub-optimal or unsuitable. These habitats did not occur uniformly so polygons were categorised into one of 5 combinations of habitat — optimal, optimal and sub-optimal, sub-optimal, sub-optimal and unsuitable, or unsuitable. The current population was estimated as the area of occupancy of the snail based on an average of 50% occupancy within optimal habitat, 30% occupancy of sub-optimal and optimal habitat, 5% occupancy of sub-optimal, and 1% occupancy of suboptimal and unsuitable habitat. An area of occupancy was added as an estimate for non surveyed sites. For Vertigo angustior this produced an area/population estimate of 121.39 hectares.
2.4.01 b) Population size estimation (using individuals or agreed exceptions where possible) - Minimum	The figure of 121.39 is a minimum based on best evidence and expert opinion

Field label	Note
Species: 1014	**Narrow-mouthed Whorl Snail**
2.4.01 c) Population size estimation (using individuals or agreed exceptions where possible) - Maximum	The figure of 121.39 is a minimum based on best evidence and expert opinion. A maximum cannot be calculated and the maximum is taken as the same as the minimum
2.4.04 Year or period	All population estimates were carried out between 2008 and 2010.
2.4.06 Short-term trend - Period	The default trend period was used.
2.4.07 Short-term trend - Trend direction	Moorkens and Killeen (2011) undertook condition assessment of angustior at 21 sites. These surveys were baseline at most of the sites. Most sites had been visited before (and since 2001) as part of surveys for SACs. However full quantitative assessments were not done at all sites on these earlier visits so direct comparisons are not possible. Trends in the population are therefore semi-quantitative and a mixture of expert opinion and measured changes. The species was located at 19 out of the 21 sites during the 2008-2010 surveys. In addition to the two negative sites, population was assessed as declining at three sites. Negative sites Louisa Bridge, Co Kildare (N93). The species has not been seen here since 1997 and is presumed extinct. Glencolmcille, Co Donegal (G58). No angustior were found here in 2008 although it was present in 2006. Sites with declining population Beal Point, Co Kerry (Q94). A decline in habitat quality and population of the snail has occurred at this site. Kinlackalagh, Co Donegal (C14). There is a declining trend in population at this site, caused by changes in grazing practices. Maharees, Co Kerry (Q61). The habitat on parts of this large dune system is overgrazed and there has been a reduction in the population. The area of occupancy in the extinct and declining sites is estimated at 15.61ha.
2.4.15 a) Reason for change - genuine change?	The species has apparently been lost from two sites and there was a measurable decline at three others.
2.4.15 b) Reason for change - improved knowledge/more accurate data?	Additional populations have been discovered since 2007. There is no reason to suppose these populations were not already in existence. The population estimate in Moorkens & Killeen (2011) included a figure (2.8ha) for these unsurveyed and unknown sites. These additional populations have not been assessed fully so this estimate is a minimum.
2.5.01 Area estimation	The total area of habitat that contains conditions that could support the snail is at least 801ha. (8.01km2). This is the figure from the sites surveyed by Moorkens & Killeen (2011) and is a minimum as there is no estimate for unsurveyed sites.
2.5.02 Year or period	All habitat values were estimated between 2008 and 2010 (Moorkens & Killeen 2011).
2.5.04 a) Quality of the habitat - Good / moderate / bad / unknown	Suitable Vertigo angustior habitat is very restricted in Ireland. The condition assessment by Moorkens & Killeen (2011) determined that overall habitat quality was good at 14 of the 21 sites. However the area of habitat within these unfavourable sites was just under 40% of the total area of habitat. Optimal habitat was present on 17 of the 21 sites mostly in a mosaic with sup-optimal conditions, but on four sites there were areas of habitat which were defined as being in the highest category of optimal condition. Declining habitat quality was apparent at 3 sites and the species could not be found at two others. Loss of habitat was implicated in the loss of the snail from these two sites. Habitat quality is therefore assessed as Moderate.
2.5.04 b) Quality of the habitat - Explain how the quality was assessed	Quality of habitat was assessed by measuring habitat attributes on site surveys as described in Moorkens & Killeen (2011).

Field label	Note
Species: 1014	**Narrow-mouthed Whorl Snail**
2.5.05 Short-term trend - Period	The default trend period was used.
2.5.06 Short-term trend - Trend direction	The habitat for the species has been assessed as Unfavourable – Inadequate because of a declining trend in area of habitat for the species, and a decline in the quality of the habitat for the species at some sites. While 14 of the sites have been assessed as having habitat in good condition and are likely to be sustainable, 5 other sites should have better quality habitat in order to ensure their sustainability, and 2 sites have had a severe decline in habitat quality.
2.5.06 Short-term trend - Trend direction	There is a measured decline in area of habitat for the species, and a decline in the quality of the habitat for the species at some sites. While 14 of the sites surveyed by Moorkens & Killeen (2011) were assessed as having habitat in good condition and are likely to be sustainable, 5 other sites should have better quality habitat in order to ensure their sustainability, and 2 sites have had a severe decline in habitat quality. These 7 sites contain almost 40% of the area of habitat for the species.
2.5.09 Area of suitable habitat for the species (km2)	As there is no understanding of why this species does not occur in habitat that appears suitable the Area of suitable habitat is set as the current Area of habitat occupied by the species.
2.5.10 a) Reason for change - genuine change?	There is a declining trend in area of habitat for the species, and a decline in the quality of the habitat for the species at some sites measured and observed by Moorkens & Killeen (2011). While 14 of the angustior sites were assessed as having habitat in good quality and likely to be sustainable, 5 other sites should have better quality habitat in order to ensure their sustainability.
2.5.10 b) Reason for change - improved knowledge/more accurate data?	The estimate in the previous assessment period was 87ha. More thorough and complete surveys have been done during 2008-2010. Additional populations have been reported since 2007. The area of occupancy on these newly reported sites has not been fully assessed using the methodology of Moorkens & Killeen (2011) and the estimated figures given need to be validated.

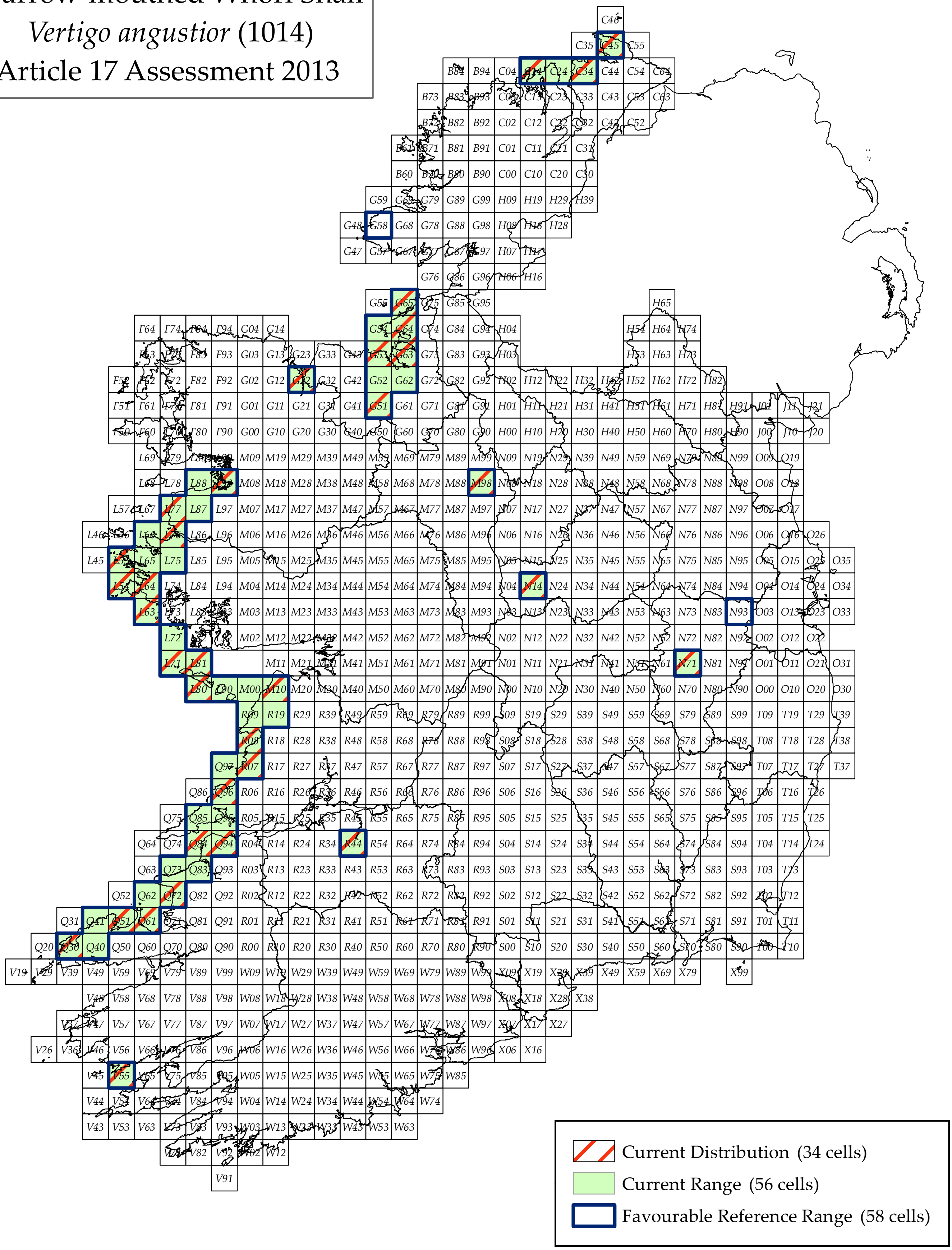
Species:	1014	Narrow-mouthed Whorl Snail

2.6 Main pressures - Pressure	The information on the pressures currently affecting the species and its habitat comes from the site condition assessment surveys from 2008-2010. The pressures are listed and their impacts and significance are discussed in the site reports. The information is also summarised in Moorkens & Killeen (2011). This summary list includes active pressures, pressures that were affecting sites before the Habitats Directive was implemented and in earlier assessment periods and threats that may be significant in the future. The information has been reassessed to filter out only the pressures which have been significantly impacting sites in the 2007-2012 assessment period and these are what are listed here. Some of the pressures given in Moorkens & Killeen (2011) were reclassified into a more appropriate category or several similar ones merged into a more generic type. The pressures which are considered most significant are those operating on sites with declining habitat quality which in the case of V. angustior are Glencolmcille, Maharees Peninsula, Louisa Bridge, Fanore, Curraghchase, Kinlacklagh Bay and Beal Point. The pressures fall into three main areas, grazing, recreation and hydrological changes. Grazing is an issue on a number of the large dune sites where the species has been lost or the habitat quality has declined. The ideal management for angustior on dune sites is non-intensive cattle grazing. Habitat quality can be affected by abandonment of grazing, intensification of grazing or a change in stock type. Abandonment of grazing can lead to a denser sward and successional changes which make the habitat at the ground level less suitable for the species. More intensive grazing may lead to a reduction in the area of the mossy litter layer that is the principal microhabitat for the species. A switch from cattle grazing to sheep grazing is likely to negatively impact the species because of the more close cropped sward that will result. It is known the species rarely survives for long when sites are grazed by sheep (Moorkens & Killeen, 2011) and the introduction of sheep grazing is thought to be a cause of the decline on at least one site. The list of pressures therefore includes the generic intensification of grazing (A04.01) and the specific pressure of intensive sheep grazing (A04.01.02) because it is implicated in the decline of the habitat at Glencolmcille. Some sites are being affected by recreational activities. Caravan parks are a concern on two sites and related to these are the impacts of trampling and informal recreation on potential habitat. Vertigo snails are found in wetland habitats and are intolerant of changes in hydrology e.g. drying of sites through drainage or excessive flooding. Pressures of this type have impacted some of the smaller wetland sites in the east. A04.01: intensive grazing High a pressure seen on many sites. A04.01.02: intensive sheep grazing High as implicated in the loss at Glencolmcille and affecting potential habitat in other sites. A04.03: Abandonment of pastoral systems, lack of grazing High as this is implicated in the loss of species at Louisa Bridge and Glencolmcille and a problem at several sites. A05.02: stock feeding Low a specific problem at two sites and only covering small area. D01.03: car parks and parking areas Low a specific problem at one site (Kinlackagh) but only covering a small area. D01.01: paths, tracks, cycling tracks Medium. This is a pressure on one site (Kinlackagh) but was considered severe G02.08: Camping and caravans This is considered to have had an impact on two sites (Kinlackagh and Fanore) and is rated as Medium as covers large area and there is a relationship to other recreational pressures J02.05. Modification of hydrographic functions. Low. Alteration of the wetland habitat by controlling flooding and levels of groundwater are implicated in the loss of species at Louisa Bridge and is the main pressure on inland habitats which require stable hydrological conditons.

Field label	Note
Species: 1014	**Narrow-mouthed Whorl Snail**
2.7 Threats - Threat	The pressures are all listed as threats as they are not anticipated to reduce in the near future, apart from the stock feeding that was not included as a threat due to its low incidence. Grazing is a key and widespread issue for the species as major changes in the type and intensity of grazing (increase or decreased) can potentially affect large areas of habitat. It is included just as a generic threat but this includes issues such as change of stock and increasing in stock rate. Wetland sites are small but easily damaged by changes in wetland functioning. The recreational pressures surrounding caravan parks are not likely to reduce. The threats listed are A04.01: intensive grazing High A04.03: Abandonment of pastoral systems, lack of grazing. High D01.03: car parks and parking areas Low D01.01: paths, tracks, cycling tracks. Low G02.08: Camping and caravans Medium J02.05. Modification of hydrographic functions. Medium
2.8.02 Other relevant information	Vertigo angustior is listed as a qualifying interest on 13 SACs. Its presence on 11 of these SACs was confirmed during the current assessment period. The sites with negative records are 000190 Slieve Tooey/Tormore Island/ Loughros (Glencolmcille site) and 000398 Rye Water Valley/Carton (Louisa Bridge site) It is also recorded from 9 SACs for which it is not a QI It is considered to be under threat in Ireland and was assessed as Endangered on the Irish Red List (Byrne et al. 2009).
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The range of V. angustior is strongly western and coastal from Kerry to Donegal where it occurs mainly on dune grassland. A small number of populations also exist inland on wetland sites across central Ireland reflecting the species' occurrence in both dune and wetland habitat. There has been a loss from two sites, one dune site on the coast and one inland wetland site since the Directive came into force. Range is consequently assessed as Unfavourable-Inadequate.
2.9.01 b) Range - If CS is U1 or U2, use of qualifiers is recommended	The losses in the two hectads have occurred within the assessment period so the qualifier is declining.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Population in this species is assessed by the surrogate measure of habitat area using a formula related to the quality of habitat polygons. The largest populations are on dune sites, the inland sites support smaller populations as the habitat is naturally more restricted. Some of the western populations of V. angustior are extremely large and apparently robust. Declines have been noted at five sites affecting over 10% of the population. The population is therefore assessed as Unfavourable-Inadequate
2.9.02 b) Population - If CS is U1 or U2, use of qualifiers is recommended	As the losses in population are significant and recent the qualifier is declining
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The best quality habitat for this species is naturally very rare and overall the quality of habitat is considered moderate. Habitat quality on a significant proportion of the total resource is in unfavourable condition. There also has been a decline in the area of the best quality habitat as reflected in the declining population on some sites. The assessment is Unfavourable-Inadequate.
2.9.03 b) Habitat for the species - If CS is U1 or U2, use of qualifiers is recommended	Ongoing losses in habitat extent and quality has resulted in the qualifier being set as declining.

Field label	Note
Species: 1014	**Narrow-mouthed Whorl Snail**
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	There are some significant pressures on the species on some of its sites. The main driver of decline is through changes in the intensity of grazing which can be either intensification (including change in type of stock) or abandonment. Recreational pressures are also a problem on some coastal sites and these are unlikely to decrease in the future. The significant pressure on inland wetland habitats is from changes in hydrological functioning. The overall assessment is Unfavourable –inadequate.
2.9.04 b) Future prospects - If CS is U1 or U2, use of qualifiers is recommended	The qualifier for Future prospects has been set as declining due to the ongoing losses in population and habitat extent and quality. There are no currently no measures that are in place that will reverse this trend.
2.9.05 Overall assessment of Conservation Status	The overall assessment of the species is Unfavourable Inadequate due to the ongoing losses in range, population and habitat quality. The decline in habitat quality is especially significant covering a large area of potential habitat.
2.9.06 Overall trend in Conservation Status	The qualifier has been set as declining due to the declining trends in the other attributes.
3.1.01 a) Population size - Unit	Vertigo angustior is found on 22 SACs according to Moorkens & Killeen (2011). The percentage of the population that is estimated as being present within the SACs is 75.9% which equates to a population/area estimate of 92.1ha. These figures come from intersecting the SAC layer with the polygon layers submitted by the Vertigo monitoring survey (Moorkens & Killeen 2011). These area figures are currently under review for possible measurement inconsistencies.
3.1.03 Trend of population size within the network (short-term trend)	Most of V. angustior resource is found in SAC network. The percentage of sites in overall favourable status was greater on sites within SACs than on sites outside SACs (Moorkens & Killeen 2011), however there are still reported declines within the network.
3.2 Conservation measures	Vertigo angustior populations that are listed as qualifying features in SACs are protected by the Habitat Regulations (S.I. No. 477/2011) which regulates any plans or projects that may negatively impact on the species. There is also an NPWS list of Activities Requiring Consent (ARCs) that are only granted if they do not negatively impact on the Qualifying features within an SAC. This species is also afforded protection by the Environmental Liability Directive, which prevents and remedies environmental damage to natural habitats and protected species. The Planning and Development (Amendment) (No. 2) Regulations, S.I 454 of 2011 and the European Communities (Amendment to Planning and Development Regulations) Regulations, S.I. 464 of 2011 require planning consent for any drainage or reclamation work that has the potential to impact an area of wetland of 0.1 ha or greater. EIA is mandatory under these Regulations where a wetland area of 2 ha or more could be affected. EIA and AA are also required for smaller areas of wetland, where the works would have a significant effect on the environment

Narrow-mouthed Whorl Snail
Vertigo angustior (1014)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 10 20 30 40 50 km

N
Map - Léarscáil
V 2.0
Date - Dáta
25-06-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1016**
0.2.2 Species name	**Vertigo moulinsiana**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	Desmoulin's Whorl Snail

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Complete survey/Complete survey or a statistically robust estimate (3)
1.1.3 Year or period	1994-2012
1.1.4 Additional map	Yes
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published sources

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Kerney, M. & Cameron, R.A.D. (1979) A field guide to the land snails of Britain and north-west Europe. Collins, London.

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Killeen, I.J. (2003b) The ecological requirements of Desmoulin's whorl snail Vertigo moulinsiana. Conserving Natura 2000 rivers Ecology Series No. 6. English Nature, Peterborough.

Long, M., & Brophy, J. 2013 Survey, habitat and populations assessments for two species of Vertigo snail and two red-listed mollusc species Unpublished report to National Parks and Wildlife Service

Moorkens, E.A. (2007) Conservation assessment of Desmoulin's whorl snail (Vertigo moulinsiana) (1016) in Ireland. Report for Department of Environment, Heritage and Local Government.

Moorkens, E.A. & Killeen, I.J. (2011) Monitoring and Condition Assessment of Populations of Vertigo geyeri, Vertigo angustior and Vertigo moulinsiana in Ireland. Irish Wildlife Manuals, No. 55. National Parks and Wildlife Service,

Department of Arts, Heritage and Gaeltacht, Dublin, Ireland. [This reports on the monitoring and condition assessment for the species undertaken for NPWS between 2008 and 2010 on 22 sites for the species. The bibliography includes a complete listing of the reports and papers written on this species in Ireland since 1996.]
Pokryszko B. M. (1987) On the aphally in the Vertiginidae (Gastropoda: Pulmonata: Orthurethra) Journal of Conchology 32: 365-375.
Pokryszko B.M. (1990) The Vertiginidae of Poland (Gastropoda: Pulmonata: Pupillidea) – a systematic monograph. Annales zoologici 43: 133–257
Speight, M.C.D., Moorkens, E.A. & Falkner, G. (Eds.) (2003). Proceedings of the Workshop on Conservation Biology of European Vertigo species. Heldia. 5. Munich.
Tattersfield, P. & McInnes, R. (2003) Hydrological requirements of Vertigo moulinsiana on three candidate Special Areas of Conservation in England (Gastropoda, Pulmonata: Vertiginidae) In: Speight, M.C.D., Moorkens, E.A. & Falkner, G. (eds) Proceedings of the Workshop on Conservation Biology of European Vertigo species. Heldia 5: 135-150.

2.3 Range

2.3.1 Surface area - Range (km²)	5300	
2.3.2 Method - Range surface area	Complete survey/Complete survey or a statistically robust estimate (3)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	decrease (-)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	5400
	operator	N/A
	unknown	No
	method	The current range calculated by the tool is 5300km2. There has been a loss from one hectad since the Directive came into force so the Favourable Reference Range (FRR) is 5400km2 The FRR is considered to encompass all ecological and geographical variation.
2.3.10 Reason for change	Genuine Improved knowledge/more accurate dataUse of different method	

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	area covered by population in m2 (area)		
	min	240000	max	288000
2.4.2 Population size (other than individuals)	Unit	N/A		
	min		max	
2.4.3 Additional information	Definition of locality			
	Conversion method			
	Problems	The species is very difficult to identify in the field and recording it requires specialist knowledge. The sites it occupies are often small and sensitive to damage, so sampling has to be done at an appropriate scale and effort. There has to be a balance between confirming		

presence and overuse of destructive sampling. The habitat assessment covers a wide area of potential habitat but the snail's presence is not confirmed from this entire area. The figures for population in Moorkens and Killeen (2011) are being reviewed for possible measurement errors. These may result in a modification of the population estimates but do not alter the direction of trends or interpretation.

2.4.4 Year or period	2008-2012
2.4.5 Method – population size	Estimate based on partial data with some extrapolation and/or modelling (2)
2.4.6 Short-term trend period	2001-2012
2.4.7 Short term trend direction	decrease (-)
2.4.8 Short-term trend magnitude	min max confidence interval
2.4.9 Short-term trend method	Estimate based on partial data with some extrapolation and/or modelling (2)
2.4.10 Long-term trend period	
2.4.11 Long term trend direction	N/A
2.4.12 Long-term trend magnitude	min max confidence interval
2.4.13 Long-term trend method	N/A
2.4.14 Favourable reference population	number
	operator: more than (>)
	unknown: No
	method: The current population is less than the favourable reference population due to recorded losses. The difference is the estimate for the area of habitat/population for the sites that are in unsuitable status for population. Moorkens and Killeen (2011) calculated this additional figure as 1.5ha. As the current population figure is uncertain between a minimum and maximum, a figure for the Favourable Reference Population cannot be calculated. The recovery of 1.5ha occupied by the species would contribute towards the long term viability of this species.
2.4.15 Reason for change	Genuine Improved knowledge/more accurate data

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	1.81
2.5.2 Year or period	2008-2012
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Moderate
2.5.4 b) Quality of habitat - method	Expert opinion based on condition assessment. Quality of habitat was assessed by measuring habitat attributes on site surveys as described in Moorkens & Killeen (2011).
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	decrease (-)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	1.81
2.5.10 Reason for change	Genuine Improved knowledge/more accurate data

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
abandonment of pastoral systems, lack of grazing (A04.03)	low importance (L)	N/A
Shipping lanes (D03.02)	low importance (L)	N/A
reclamation of land from sea, estuary or marsh (J02.01.02)	low importance (L)	N/A
species composition change (succession) (K02.01)	low importance (L)	N/A
infilling of ditches, dykes, ponds, pools, marshes or pits (J02.01.03)	low importance (L)	N/A
dredging/ removal of limnic sediments (J02.02.01)	low importance (L)	N/A
management of aquatic and bank vegetation for drainage purposes (J02.10)	low importance (L)	N/A
Landfill, land reclamation and drying out, general (J02.01)	low importance (L)	N/A

2.6.1 Method used – pressures	based exclusively or to a larger extent on real data from sites/occurrences or other data sources (3)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
abandonment of pastoral systems, lack of grazing (A04.03)	low importance (L)	N/A
Shipping lanes (D03.02)	low importance (L)	N/A
reclamation of land from sea, estuary or marsh (J02.01.02)	low importance (L)	N/A
infilling of ditches, dykes, ponds, pools, marshes or pits (J02.01.03)	low importance (L)	N/A
Landfill, land reclamation and drying out, general (J02.01)	low importance (L)	N/A
management of aquatic and bank vegetation for drainage purposes (J02.10)	low importance (L)	N/A
species composition change (succession) (K02.01)	low importance (L)	N/A
dredging/ removal of limnic sediments (J02.02.01)	low importance (L)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant Information	Vertigo moulinsiana is listed as a qualifying interest in 7 out of the 15 SACs in which it occurs. The species is absent from one of these sites. It is considered to be under threat in Ireland and was assessed as Endangered on the Irish Red List (Byrne et al. 2009).
2.8.3 Trans-boundary assessment	

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment Inadequate (U1) qualifiers declining (-)
2.9.2. Population	assessment Inadequate (U1) qualifiers stable (=)
2.9.3. Habitat	assessment Inadequate (U1) qualifiers declining (-)

2.9.4. Future prospects	assessment Inadequate (U1) qualifiers declining (-)
2.9.5 Overall assessment of Conservation Status	Inadequate (U1)
2.9.6 Overall trend in Conservation Status	declining (-)

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	area covered by population in m2 (area)		
	min	206000	max	247000
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3 Trend of population size within	decrease (-)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Inside	Long term

Field label	Note
Species: 1016	**Desmoulin's Whorl Snail**
0.2.01 Species code	Vertigo moulinsiana is the largest of 8 species of whorl snail (genus Vertigo) living in Ireland. The whorl snails are amongst the smallest of the country's land molluscs with a size ranging from 1.7 to 2.7mm in height and 1 to 1.5mm in width. All whorl snails favour damp or wet habitats, where they live mostly in moss, leaves and decaying vegetation. They feed on bacterial films and decaying vegetation. Vertigo moulinsiana lives on living and dead stems and leaves of tall plants in wetland situations. Sites are usually at the end of hydroseral succession and unmanaged allowing build up of litter (Killeen 2003a, b; Cameron et al. 2003). Populations of V. moulinsiana are found widely in central and southern Ireland. It is found mainly in calcareous, lowland wetlands especially swamps, fens and marshes bordering rivers, canals, lakes and ponds (Cameron et al. 2003). Vertigo moulinsiana is considered to be an Atlantic-Mediterranean species with a range extending from Ireland to Russia and south to North Africa, but the main populations are in western and Central Europe. It is considered to be under threat in Ireland and Europe and was assessed as Endangered on the Irish Red List (Byrne et al. 2009) and Vulnerable on the European Red List (Cuttelod et al. 2011).
1.1.02 Method used - map	Historic and recent distribution records have come from the following sources The All-Ireland non-Marine Mollusca database (last updated on 17 July 2012) supplied to NPWS and available on the MolluscIreland (www.habitas.org.uk/molluscireland) and National Biodiversity Data Centre web sites (maps.biodiversityireland.ie). Moorkens, E.A. (2007) Conservation assessment of Desmoulin's whorl snail (Vertigo moulinsiana) (1014) in Ireland. Report for Department of Environment, Heritage and Local Government. Moorkens, E.A. & Killeen, I.J. (2011) Monitoring and Condition Assessment of Populations of Vertigo geyeri, Vertigo angustior and Vertigo moulinsiana in Ireland. Irish Wildlife Manuals, No. 55. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland. Long, M., & Brophy, J. 2013 Survey, habitat and population assessments for two species of Vertigo snail and two red-listed mollusc species Unpublished report to National Parks and Wildlife Service The records were compiled into a spreadsheet for error-checking and cross-referencing. The quality of the data varies. Pre 1970 data is generally at hectad level. The post 1970 records apart from a single exception are at 1km square resolution or finer. Over 90% of the available records have been gathered since 1994. There were extensive surveys for this species from the mid-1990s to identify potential SACs (see Moorkens & Killeen 2011 for a full list of the relevant reports). Monitoring on the SACs with the species started on most sites in 2005. Between 2008 and 2010, 20 sites for the species throughout Ireland were included in a condition assessment survey (Moorkens and Killeen 2011). Each site was surveyed according to a standardised monitoring protocol. This protocol included assessment of area of occupancy and quality of habitat and survey along repeatable monitoring transects.
1.1.03 Year or period	The records cover the entire period from 1935 to the present day. The updated database containing 432 records is mostly a modern one with over 93% of the records gathered since 1994. The current distribution is taken from 1994.

Field label	Note
Species: 1016	**Desmoulin's Whorl Snail**
1.1.04 Additional distribution map	All verified records were intersected with the ING 10 square grid.
1.1.05 Range map	The range was calculated using the range tool, based on the current distribution.
2.3.01 Surface area - Range	This figure has been derived from the range map referred to in 1.1.5.
2.3.02 Method used - Surface area of Range	As described in 1.1.2.
2.3.03 Short-term trend - Period	The default trend period was used.
2.3.04 Short term trend - Trend direction	The number of occupied hectads (30) is greater than in the previous assessment (22). The reasons for this are better recording effort and more information. Compared to the distribution in the previous assessment there are additional records from 11 hectads. These new records have come about through new discoveries and better recording. Additional recording has added to the known distribution in areas close to existing populations at the north end of Lough Derg, Co Galway and Tipperary (M80, R89) (Long & Brophy 2013) and in Longford in the north west of its range (N06, N14, N16. N17) (Moorkens unpubl). The species was relocated at the Murrough, Co Wicklow (O30) and at Ballybeg Lough Co Clare (R37) (Moorkens & Killeen 2011). Two sites were found in the south east which greatly extend the range to Co Waterford at Strancally (X09) and Castletown (S60) (Long & Brophy 2013). There is no reason to believe that these populations were not established ones. There have been apparent losses from three hectads that were shown in the previous assessment. Mullaghmore, Co Clare (R39). Expert opinion is that the status of this record is uncertain (Moorkens & Killeen 2011) and it is not included in the current distribution or range. It is not considered a loss. Lisbigney Bog, Co Laois (S47). Found here in 1998 but not found in 2008 and 2010. Habitat is no longer suitable and species is presumed extinct. When the species was lost is not known. Fiagh Bog Co Tipperary (R99). The species was last seen here in 1995 but the species has not been looked for since but could well be still present. There have been other losses of populations on the Royal Canal in Co Longford in N06 and N07 when this was rewatered. These do not affect the range. The assessment of the range trend is Unfavourable-Inadequate because of the recorded losses.
2.3.10 a) Reason for change - genuine change?	There has been loss from one hectad since the Directive came into force.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Additional populations have been discovered since the last reporting round. This has resulted in a bigger range than that reported in 2007. There is no reason to assume that these populations were not present in 2007.
2.3.10 c) Reason for change - use of different method?	The range tool was different from that used in the previous assessment.

Field label	Note
Species: 1016	**Desmoulin's Whorl Snail**
2.4.01 a) Population size estimation (using individuals or agreed exceptions where possible) - Unit	Population size cannot be estimated for Vertigo snails so the agreed exception for these species is to use area of habitat as a surrogate measure. The methodology for defining area/population is described in Moorkens & Killeen (2011). Habitat patches were assessed for suitability for the species and assigned to one of three categories, optimal, sub-optimal or unsuitable. These habitats did not occur uniformly so polygons were categorised into one of 5 combinations of habitat — optimal, optimal and sub-optimal, sub-optimal, sub-optimal and unsuitable, or unsuitable. The current population was estimated as the area of occupancy of the snail based on an average of 50% occupancy within optimal habitat, 20% occupancy of sub-optimal and optimal habitat, 10% occupancy of sub-optimal, and 1% occupancy of suboptimal and unsuitable habitat. An area of occupancy (5ha) was added as an estimate for non-surveyed sites. For Vertigo moulinsiana this produced an area/population estimate of 24 hectares. Since Moorkens & Killeen (2011) completed their surveys, significant new populations of V. moulinsiana have been found (Moorkens unpublished, Long & Brophy, 2013). These have not been assessed in the same manner as the sites covered during 2008-2010 so area/population cannot be provided from these sites in the same way. The approximate estimates for the area of the new sites provided by Long & Brophy (2013) are Strancally 10.9ha (new site) Castletown 19.5 ha (new site) Murrough 28.9 ha (9.5ha estimate in Moorkens and Killeen (2011)) Lough Derg 11.2ha (3 ha estimate in Moorkens and Killeen (2011)) The species has also been found on the disused Longford branch of the Royal Canal (Moorkens unpublished). The total area of habitat is estimated at 3.5ha. This is based on a length of occupied habitat at 5.912 km (measured between the northernmost record at N121857355 and the junction with the Royal Canal at N0935769378). The width of the occupied habitat measured from ortho images is approximately 6m and it is assumed it is uniform along the whole measured length. The additional area of surveyed habitat on all these sites is 61.5 ha. The 24ha figure of Moorkens & Killeen included 5ha for unsurveyed sites but it is unlikely that this is sufficient to cover the new localities. The actual calculated habitat/population figure in Moorkens and Killen (2011) was 19ha derived from a total area of surveyed habitat of 119.5ha. Applying this ratio to the estimate of additional habitat at the new sites produces an estimated figure for habitat/population of 9.8 ha. This is more than the 5ha allowed for in Moorkens &Killeen for the unsurveyed sites and using this figure instead produces a habitat/population estimate of 28.8ha.
2.4.01 b) Population size estimation (using individuals or agreed exceptions where possible) - Minimum	24ha calculated by Moorkens & Killeen is taken as the minimum
2.4.01 c) Population size estimation (using individuals or agreed exceptions where possible) - Maximum	28.8 ha as calculated in the way shown in 2.4.1 is taken as the maximum
2.4.04 Year or period	All population estimates were carried out between 2008 and 2010 (Moorkens & Killeen 2011) with additional information from sites surveyed in 2012 by Long & Brophy (2013)
2.4.06 Short-term trend - Period	The default trend period was used.

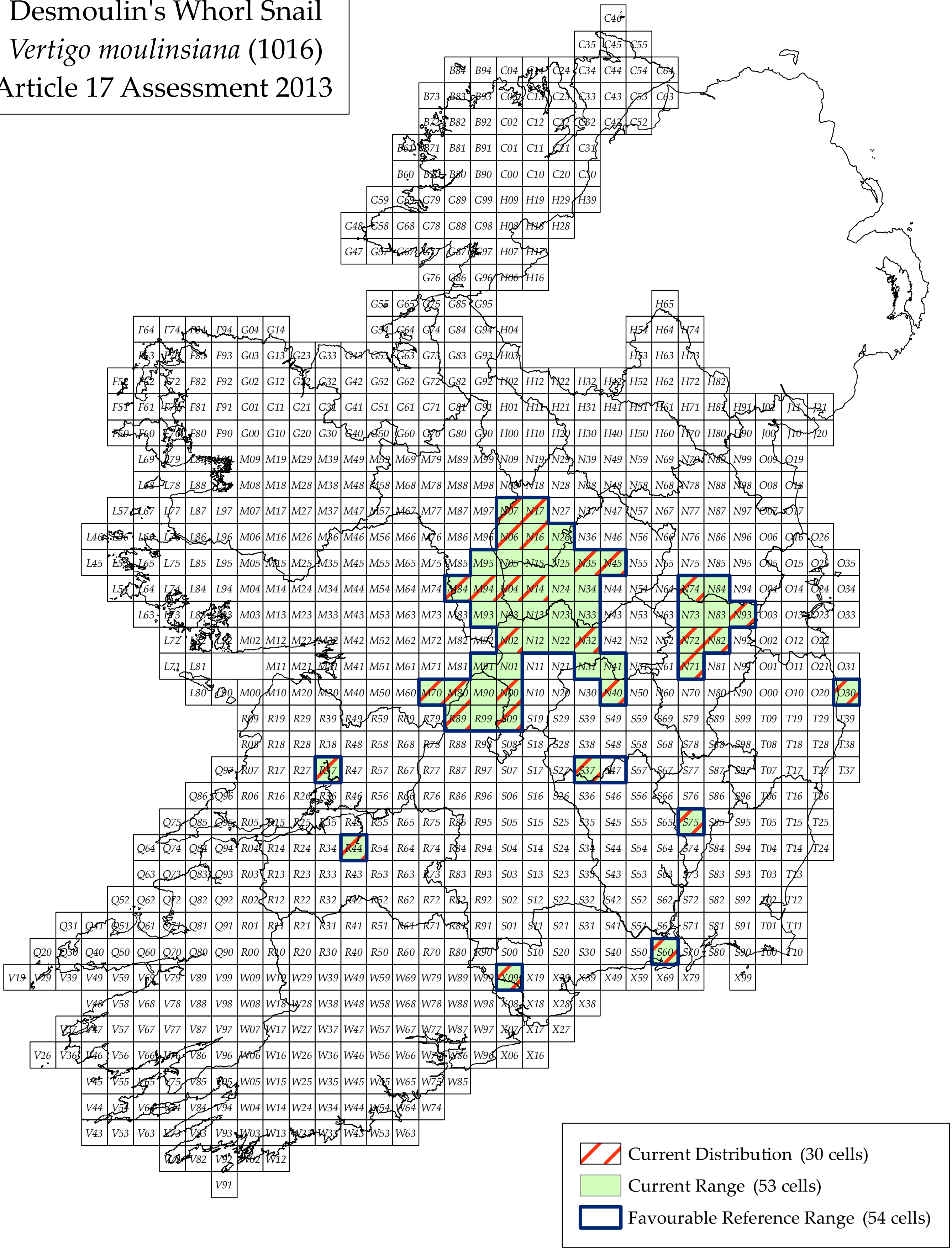
Field label	Note
Species: 1016	**Desmoulin's Whorl Snail**
2.4.07 Short-term trend - Trend direction	Moorkens and Killeen (2011) undertook condition assessment of V. moulinsiana at 20 sites. These surveys were baseline at most of the sites. Most sites had been visited before (and since 2001) as part of surveys for SACs. However full quantitative assessments were not done at all sites on these earlier visits so direct comparisons are not possible. Trends in the population are therefore semi-quantitative and a mixture of expert opinion and measured changes. The species was located at 17 out of the 20 sites during the 2008-2010 surveys (Moorkens & Killeen 2011). The negative sites were Dromkeen Bridge, Co Kerry (Q82). The only record from this site was in 1971. The 2008-2010 survey found that there was no habitat at this site and it is extinct. When this loss occurred is not known. Mullaghmore, Co Clare (R39). Expert opinion is that the status of this record is uncertain. It is not included in the current distribution. Lisbigney Bog, Co Laois (S47). Found here in 1998 but not found in 2008 and 2010. Habitat is no longer suitable and species is presumed extinct but when this happened is not known. The species has been lost since 2001 from sites along the Royal Canal in Co Longford. The population at Curragh Chase (R44, Co Limerick) and Borris Bridge (S75, Co Carlow) were assessed as being unfavourable in the last assessment. At both sites the habitat was in good condition and the reduced population may have been related to natural fluctuations. Moorkens & Killeen (2011) estimated that the area of habitat affected on these sites was 1.5ha. The trend in population is a decline.
2.4.14 b) Favourable reference population - Indicate if operators were used	The current population is less than the favourable reference population due to recorded losses. The difference is the estimate for the area of habitat/population for the sites that are in unsuitable status for population. Moorkens and Killeen (2011) calculated this additional figure as 1.5ha.
2.4.15 a) Reason for change - genuine change?	There has been a measured and documented decline in population with loss of sites along the Royal Canal and at Lisbigney Bog. In the current assessment period the population at Curragh Chase and Borris Bridge were assessed as being unfavourable. The species was found at low numbers at Borris but this was an improvement on the situation in 2006. The population at Curragh Chase had declined since 2005. However habitat remained in good condition and the observed decrease in population at this site may have been part of a natural fluctuation.
2.4.15 b) Reason for change - improved knowledge/more accurate data?	The population assessment carried out between 2008-2010 on many of the sites is considered to represent the baseline as a direct comparison is not possible with the earlier period. The mapping of the occupied habitat was more complete and thorough.
2.5.01 Area estimation	The total area of habitat that contains conditions that could support the snail is at least 185ha. This is the sum of the area (119.15ha) of the sites surveyed by Moorkens & Killeen (2011) and the additional area (61.5ha) estimated by Long & Brophy (2013) and the estimated area of the habitat on the disused Longford branch of Royal Canal (3.5ha) as described in 2.4.1a.
2.5.02 Year or period	All habitat values were estimated between 2008 and 2012 (Moorkens & Killeen 2011; Long & Brophy 2013).
2.5.04 a) Quality of the habitat - Good / moderate / bad / unknown	Suitable Vertigo moulinsiana habitat is very restricted in Ireland. The condition assessment by Moorkens & Killeen (2011) determined that habitat quality was good at 16 of the 20 sites. The other sites are either sites where the species is extinct and habitat no longer exists or sites where a permanent population was never confirmed. The additional sites visited by Long & Brophy (2013) and others appear relatively substantial sites. Habitat quality is therefore assessed as Moderate.
2.5.05 Short-term trend - Period	The default trend period was used.

Species: 1016	Desmoulin's Whorl Snail
2.5.06 Short-term trend - Trend direction	There is a declining trend in area of habitat for the species, and a decline in the quality of the habitat for the species at some sites. While 16 of the sites have been assessed as having habitat in good quality and are likely to be sustainable, 3 other sites have had a severe decline in habitat quality and are likely to be no longer sustainable for the species (Moorkens & Killeen 2011). The remaining site is considered an unconfirmed site.
2.5.09 Area of suitable habitat for the species (km2)	As there is no understanding of why this species does not occur in habitat that appears suitable the Area of suitable habitat is set as the current Area of habitat occupied by the species.
2.5.10 a) Reason for change - genuine change?	There has been loss of habitat on some sites and suitable habitat is no longer present on three sites.
2.5.10 b) Reason for change - improved knowledge/more accurate data?	The estimate in the previous assessment period was 147ha. More thorough and complete surveys have been done during 2008-2010. Additional populations have been reported since 2007. The area of occupancy on these newly reported sites has not been fully assessed using the methodology of Moorkens & Killeen (2011) and the estimated figures given need to be validated.
2.6 Main pressures - Pressure	The information on the pressures currently affecting the species and its habitat comes from the site condition assessment surveys from 2008-2010. The pressures are listed and their impacts and significance are discussed in the site reports. The information is also summarised in Moorkens & Killeen (2011). This summary list includes active pressures, pressures that were affecting sites before the Habitats Directive was implemented and in earlier assessment periods and threats that may be significant in the future. The information has been reassessed to filter out only the pressures which have been significantly impacting sites in the 2007-2012 assessment period. A significant proportion of the moulinsiana habitat remains in abandoned sections of canal and in wetlands at the end of hydroseral succession. The losses of populations along the Royal Canal and the Grand Canal corridor in the previous assessment period were caused by the reopening of the canals. Related to this is the potential for impact on sites such as Pollardstown which act as reservoirs to the canals. This pressure is included as there are still some significant populations on disused sections of canals and any rewatering of these would cause loss of population. Drainage of the habitat at Lisbigney resulted in the loss of habitat and this pressure remains relevant as there are a number of populations in small wetlands which could be easily impacted by drainage. Some dumping occurred at one site and there are issues over reduction in grazing at Pollardstown and The Murrough. All the pressures are assessed as Low as they are not widespread or impacting on a small area of habitat. Recent losses are due to pressures that occurred before this reporting period. A04.03 Abandonment of pastoral systems, lack of grazing Low D03.02 shipping lanes Low; this refers to the management and possible reopening of disused canals. J02.01.02 reclamation of land from sea, estuary or marsh Low; this refers to the drainage of land J02.01.03 infilling of ditches, dykes, ponds, pools, marshes or pits. Low. J02.02.01 dredging/ removal of limnic sediments Low J02.10 management of aquatic and bank vegetation for drainage purposes Low; this impact refers to the modification of stands of tall vegetation in small wetlands along river and canals K02.01 species composition change (succession) Low; this pressure is widespread
2.7 Threats - Threat	The list of threats is the same as the pressures as there is no evidence that these will cease in the next 12 years.

Field label	Note
Species: 1016	**Desmoulin's Whorl Snail**
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The range of moulinsiana is mainly in the midlands of Ireland and is especially associated with the Royal Canal. It occurs in natural wetlands along the canal corridor and colonised the canals as they became abandoned. Losses have occurred in the Royal Canal and wetlands along the canal route as it was reopened. It also occurs on the wetlands on the shore of Lough Derg and several other small lakes in the midlands. Recent records from the south east include some substantial populations including one on the Blackwater in Co Waterford. The assessment of range is Unfavourable inadequate due to a loss of a hectad since the Directive came into force.
2.9.01 b) Range - If CS is U1 or U2, use of qualifiers is recommended	Continued losses within the Range may cause a further decline in Range in the near future, therefore the qualifier is set as declining.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The populations of V. moulinsiana are generally small as the habitat is restricted. There has been a loss of some populations on the Royal Canal but this is balanced by the recent discoveries of new and substantial populations in Longford and the SE. The population at Lough Derg is also more extensive than previously thought. The assesement of population is however Unfavourable due to the loss at some sites.
2.9.02 b) Population - If CS is U1 or U2, use of qualifiers is recommended	There have been losses but this is balanced by the recovery in some sites so the qualifier is set as stable.
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The habitat for this species is rare in Ireland. The evidence from surveys is that the quality of it is declining and the area is also reducing due to the loss of some sites. There are large populations dependant on artificially created and managed sites. The assessment of habitat is Unfavourable.
2.9.03 b) Habitat for the species - If CS is U1 or U2, use of qualifiers is recommended	Ongoing losses in habitat extent and quality has resulted in the qualifer being set as declining.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	The species is known to be more widespread than previously thought. However many of the populations are dependant on habitats and sites that are artificial. These will require management to maintain favourable condition. There may also be pressure to open up sections of disused canal which could potentially have a negative impact on some large populations. Natural succession is also a threat to the species. In the past the species may have been able to move sites as conditions deteriorated but this connectivity is likely to be less than in the past. The overall assessment of future prospects in Unfavourable - inadequate.
2.9.05 Overall assessment of Conservation Status	The overall assessment of the species is Unfavourable due to the pressures on the habitat and population and the dependency on artificially created and maintained habitat.
2.9.06 Overall trend in Conservation Status	The qualifier has been set as declining due to the declining trends in the other attributes.
3.1.01 a) Population size - Unit	Vertigo moulinsiana is present in 15 SACs according to Moorkens & Killeen (2011) and Long & Brophy (2013). The percentage of the population that is estimated as being present within the SACs is 85.7% which equates to a population/area estimate of between 20.6ha and 24.7ha. These figures come from intersecting the SAC layer with the polygon layers submitted by the Vertigo monitoring survey (Moorkens & Killeen 2011). These area figures are currently under review for possible measurement inconsistencies.
3.1.03 Trend of population size within the network (short-term trend)	The population within the Natura 2000 sites has shown a decline but the rate is unknown.

Species:	1016	Desmoulin's Whorl Snail
3.2 Conservation measures	Vertigo moulinsiana is listed as a qualifying feature on 7 SACs which are protected by the Habitat Regulations (S.I. No. 477/2011). This regulates any plans or projects that may negatively impact on the species. There is also an NPWS list of Activities Requiring Consent (ARCs) that are only granted if they do not negatively impact on the Qualifying features within an SAC. This species is also afforded protection by the Environmental Liability Directive, which prevents and remedies environmental damage to natural habitats and protected species. The Planning and Development (Amendment) (No. 2) Regulations, S.I 454 of 2011 and the European Communities (Amendment to Planning and Development Regulations) Regulations, S.I. 464 of 2011 require planning consent for any drainage or reclamation work that has the potential to impact an area of wetland of 0.1 ha or greater. EIA is mandatory under these Regulations where a wetland area of 2 ha or more could be affected. EIA and AA are also required for smaller areas of wetland, where the works would have a significant effect on the environment.	

Desmoulin's Whorl Snail
Vertigo moulinsiana (1016)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 10 20 30 40 50 km

N

Map - Léarscáil
V 1.0
Date - Dáta
31-05-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1024**
0.2.2 Species name	**Geomalacus maculosus**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	Kerry Slug

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Complete survey/Complete survey or a statistically robust estimate (3)
1.1.3 Year or period	1980-2012
1.1.4 Additional map	Yes
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published sources

Byrne, A., Moorkens, E.A., Anderson, R., Killeen, I.J. & Regan, E.C. (2009) Ireland Red List No. 2 – Non-Marine Molluscs. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.
Forest Service (2009) Forestry and Kerry Slug Guidelines. Dept of Agriculture, Fisheries and Food
http://www.agriculture.gov.ie/media/migration/forestry/forestservicegeneralinformation/kerryslugandotter/091207ForestryandKerrySlugGuidelines211209.pdf
Kearney, J. (2010) Kerry Slug (Geomalacus maculosus Allman 1843) recorded at Lettercraffroe, Co. Galway. Irish Naturalists' Journal, 31, 68-69. This paper gives the first report from conifer woodland in Connemara. It should be interpreted in conjunction with Reich et al. (2012)
Mc Donnell, R.J. & Gormally, M.J. (2011a) Identification of a live trapping method for the protected European slug, Geomalacus maculosus Allman 1843 (Arionidae). Journal of Conchology 40: 483-485.
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MolluscIreland website www.habitas.org.uk/molluscs , accessed March 2012
NPWS (2010) Threat Response Plan - Kerry Slug Geomalacus maculosus. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin
O'Dwyer, M. (2012) Air quality in Ireland 2011. Environmental Protection Agency, Johnstown Castle, Co Wexford.
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Reich, I., O'Meara, K., Mc Donnell, R.J. and Gormally, M.J. (2012) An assessment

of the use of conifer plantations by the Kerry Slug (Geomalacus maculosus) with reference to the impact of forestry operations. Irish Wildlife Manuals, No. 64. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Ireland.
Scharff, R.F. (1893). Note on the geographical distribution of Geomalacus maculosus Allman, in Ireland. Journal of Molluscan Studies 1893, 17-18

2.3 Range

2.3.1 Surface area - Range (km²)	5400	
2.3.2 Method - Range surface area	Complete survey/Complete survey or a statistically robust estimate (3)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period	1988-2012	
2.3.7 Long-term trend direction	stable (0)	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	5400
	operator	N/A
	unknown	No
	method	The distribution and range value are derived from the survey by Mc Donnell & Gormally (2011b) and additional NPWS and other data. There is no evidence of any historical decline or change since the Directive came into force. The Favourable Reference Range is set as the same as the current range which is 5400km2
2.3.10 Reason for change	Improved knowledge/more accurate dataUse of different method	

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	N/A		
	min		max	
2.4.2 Population size (other than individuals)	Unit	number of map 10x10 km grid cells (grids10x10)		
	min	54	max	54
2.4.3 Additional information	Definition of locality			
	Conversion method			
	Problems	No comprehensive population estimate exists for this species nor is it likely that one could be produced. Mc Donnell & Gormally (2011b) did produce density figures for sites in SW Ireland but extrapolation should not be attempted from these. These figures only come from a few sites and types of habitat and there is no information on how the numbers of the species varies with key environmental, habitat and climatic conditions. Nor is it practical to assign estimates of numbers to rapidly reproducing, cryptic species of invertebrates.		
2.4.4 Year or period	2001-2012			
2.4.5 Method – population size	Complete survey/Complete survey or a statistically robust estimate (3)			
2.4.6 Short-term trend period	2001-2012			
2.4.7 Short term trend direction	stable (0)			

2.4.8 Short-term trend magnitude	min	max	confidence interval
2.4.9 Short-term trend method	Complete survey/Complete survey or a statistically robust estimate (3)		
2.4.10 Long-term trend period			
2.4.11 Long term trend direction	N/A		
2.4.12 Long-term trend magnitude	min	max	confidence interval
2.4.13 Long-term trend method	N/A		
2.4.14 Favourable reference population	number	54	
	operator	N/A	
	unknown	No	
	method	The population figure derived from the dedicated survey and other data up to 2012 (Mc Donnell et al. 2013) is considered to represent the population baseline. As there is no evidence of any significant decline in population size since the Directive came into force the current population estimate is set as the FRP.	
2.4.15 Reason for change	Improved knowledge/more accurate data		

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	3406
2.5.2 Year or period	2001-2012
2.5.3 Method used - habitat	Estimate based on expert opinion with no or minimal sampling (1)
2.5.4 a) Quality of habitat	Good
2.5.4 b) Quality of habitat - method	This is based on expert judgment.Although woodland habitat is degraded by Rhododendron the species is found extensively in other habitats and the recently acquired evidence on habitat use indicates it is not restricted to deciduous woodland.
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	stable (0)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	3504
2.5.10 Reason for change	Improved knowledge/more accurate data Use of different method

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
agricultural intensification (A02.01)	low importance (L)	N/A
forest planting on open ground (native trees) (B01.01)	low importance (L)	N/A
artificial planting on open ground (non-native trees) (B01.02)	low importance (L)	N/A
forest replanting (B02.01)	low importance (L)	N/A
forestry clearance (B02.02)	low importance (L)	N/A
invasive non-native species (I01)	low importance (L)	N/A

2.6.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
agricultural intensification (A02.01)	low importance (L)	N/A
forest planting on open ground (native trees) (B01.01)	low importance (L)	N/A
artificial planting on open ground (non-native trees) (B01.02)	low importance (L)	N/A

forest replanting (B02.01)	low importance (L)	N/A
forestry clearance (B02.02)	low importance (L)	N/A
invasive non-native species (I01)	high importance (H)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant Information	In the latest Red List of the Irish non-Marine Mollusca (Byrne et al., 2009), the Kerry Slug was assessed as Least Concern. Opinion was expressed that the population as being 'strong and viable'. The species was confirmed as present in all the SACs for which it is a Qualifying interest
2.8.3 Trans-boundary assessment	

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.9.2. Population	assessment	Favourable (FV)
	qualifiers	N/A
2.9.3. Habitat	assessment	Favourable (FV)
	qualifiers	N/A
2.9.4. Future prospects	assessment	Favourable (FV)
	qualifiers	N/A
2.9.5 Overall assessment of Conservation Status		Favourable (FV)
2.9.6 Overall trend in Conservation Status		N/A

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	number of map 10x10 km grid cells (grids10x10)		
	min	25	max	25
3.1.2 Method used	Estimate based on estimate based on expert opinion with no or minimal sampling (1)			
3.1.3 Trend of population size within	stable (0)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Adapt forest management (3.2)	Legal	high importance (H)	Both	Maintain Enhance
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Both	Maintain
Restoring/improving forest habitats (3.1)	Recurrent	high importance (H)	Inside	Maintain Enhance

Field label	Note
Species: 1024	**Kerry Slug**
0.2.01 Species code	The slug genus Geomalacus as currently recognised contains four species. They are characterised by their spotted appearance and woodland habitat. The genus has a very limited global range with all of the four recognised species being restricted to the Iberian peninsula with the exception of the Kerry Slug Geomalacus maculosus. This species, which was the first member of the genus to be formally described, is found in NW Spain, northern Portugal and SW Ireland. The Kerry Slug was discovered in 1842 at Caragh Lake, Co Kerry and it was formally named in 1843 (Platts & Speight, 1988). The species was then found in northern Spain in 1868 and in northern Portugal in 1873. The distribution of G. maculosus is often given as the classic example of a Lusitanian species, i.e. a species with a disjunct, Atlantic distribution in Iberia and Ireland (Scharff, 1893). The Kerry Slug is distinctive in comparison to the other Irish slugs and its alternative name of Spotted Slug describes its outward appearance well. The spots are well defined either round or elongate and may form poorly-defined bands running down each side of the body. Confusion is possible with two other Irish species, Limacus flavus and Limax maculatus (Mc Donnell & Gormally, 2011b; MolluscIreland website) but these species tend to be blotchy rather than distinctly spotty and have grey-blue antennae which are clearly different from the body colour. Adults of G. maculosus exist in two forms, either black with white spots or brown with cream spots. In Ireland, both varieties frequently occur together, the brown form being more frequent in woodland, while the black form is commoner on boulders in open country (Platts & Speight, 1988; Mc Donnell et al. 2013)). It has long been known to feed on lichens and mosses growing on tree trunks and boulders. Feeding experiments reported in Reich et al. (2012) have given the first indication of the specific species that are preferred. This showed a preference for foliose lichens on trees and crustose lichens on exposed boulders. Some liverworts and mosses were eaten but others were strongly avoided as were higher plants. The slug emerges to feed in humid conditions, on very cloudy warm damp days either during or after rain, or at dawn, dusk and during the night if it is not too cold or dry. In Iberia it is considered to be nocturnal in habits, and during sunny periods in Ireland it also rests in refugia during daylight hours (Platts & Speight, 1988). In Ireland, Kerry Slugs can remain active throughout the year if conditions are suitable. In a recent study (Mc Donnell & Gormally, 2011b) the number of slugs seen in open habitats was correlated to the amount of previous rainfall, with fewest seen when conditions were dry (in that study during the spring months). Peak numbers of slugs were detected during autumn in the open habitats. However even in the middle of summer, wet periods would allow slugs to become active. In woodland habitat, slugs could be seen throughout the year but highest numbers were recorded in spring. No correlation between temperature and the numbers of slugs detected was found. Published accounts associate the Kerry Slug with two main habitats, broad-leaved woodland and blanket bog and wet heathland (NPWS 2010). The presence of exposed non-calcareous boulders and rocks are essential for the species in bog and heath habitats (Platts & Speight, 1988). In the main range in the south-west the species is almost entirely confined to the Devonian Old Red Sandstone geology but in Spain it will also occur on granite (NPWS 2010; Platts & Speight 1988. Similarly it is found on granite in the recently discovered Connemara population (Kearney 2010). Platts & Speight (1988) say that the species ‘rarely occurs further than a few metres from standing or running water of some sort’. This association was not confirmed by the 2008-2010 survey (Mc Donnell et al. 2013) Within broad-leaved woodland the slugs live on the trunks of trees especially those with crevices and holes which are used as refuges. The species has been found on a number of tree species including Ash Fraxinus excelsior, Holly Ilex aquifolium, Rowan Sorbus aucuparia, Downy Birch Betula pubescens, Sessile Oak Quercus petraea and Douglas Fir Pseudotsuga menziesii (NPWS 2010). Mc Donnell & Gormally (2011b) found that there was a significant preference for oak over holly in Uragh Wood, Co Kerry, but

not for birch or rowan.
Prior to 2010, opinion was that Geomalacus was absent from closed canopy conifer plantations (NPWS 2010), but this is now known not to be the case following the discovery of slugs in plantation conifer woodland in Connemara by Kearney (2010). It is also known from conifer woodland in Co Cork and Kerry including both commercial high density plantation and open, amenity conifer plantations (Mc Donnell & Gormally 2011b). It has also been found on rock outcrops in areas of clear fell in the south and west and in Connemara and within low density conifer woodland but is not found within high density plantations (Mc Donnell & Gormally, 2011b; Reich et al., 2012). These results indicate a negative effect of conifer plantation on the Kerry Slug population that occurs on outcrops but the study did not look at the occurrence on the trees themselves. The study by Reich et al. (2012) and evidence from environmental impact assessments of potential windfarm sites have shown that Kerry Slug can be abundant on conifer trees within plantations, but it can also recolonise boulder habitat when the wood is clear felled. The distribution of slugs within the plantations is positively correlated with tree size (Reich et al. 2012). This is probably related to the availability of food as larger trees generally have more potential food in the form of lichens and bryophytes. Conifers that are used by Kerry Slug include Sitka Spruce Picea sitchensis and Lodgepole Pine Pinus contorta (Kearney 2010; Reich et al. 2012).
These recent investigations mean that habitat associations of the species have been revised since the previous assessment and in particular the association with additional woodland types. The main habitats in which the species was found by Mc Donnell & Gormally (2011b), Mc Donnell et al (2013) and Reich et al. (2012) as defined using Fossitt (2000) were

WN1 Oak-birch-holly woodland
WD1 (Mixed) broadleaved woodland
WD2 Mixed broadleaved/conifer woodland
WD3 (Mixed) conifer woodland
WD4 Conifer plantation
WS5 Recently-felled woodland

It also occurs on exposed siliceous rocks (ER1 in Fossitt and specifically boulders and exposed areas of old red sandstone). These rock exposures are mainly associated with the open habitats listed below but rocks within clearings and openings within the above woodland types may also be used. The precise conditions that make them suitable for the Kerry Slug are unclear, but favoured rocks are in relatively undisturbed areas with clean, humid air and with a suitable lichen flora.
HH1 Dry siliceous heath
HH3 Wet heath
PB2 Upland blanket bog 42
PB3 Lowland blanket bog 43
PB4 Cutover bog
A close association with water was referred to by Platt & Speight (1988). However the recent work does not suggest this is the case (Mc Donnell et al. 2013).

The Habitats Directive habitats that support the species are listed as (this list is from NPWS(2010), revised following McDonnell et al. 2013)

91A0 Old sessile oak woods with Ilex and Blechnum in the British Isles
91E0 Alluvial forests with Alnus glutinosa and Fraxinus excelsior
8220 Siliceous rocky slopes with chasmophytic vegetation
7130 Blanket bog
4030 European dry heaths
4010 North Atlantic wet heaths with Erica tetralix

Field label	Note
Species: 1024	**Kerry Slug**
	4060 Alpine and Boreal heaths
1.1.02 Method used - map	Historic and recent records were derived from the following sources. Mc Donnell & Gormally (2011b). This data is published also in Mc Donnell et al. (2013 in press) The All-Ireland non-Marine Mollusca database (last updated on 17 July 2012) supplied to NPWS and available on the MolluscIreland (www.habitas.org.uk/molluscireland) and National Biodiversity Data Centre web sites (maps.biodiversityireland.ie). Kearney (2010) Reich et al. (2012) a NPWS-funded study. Additional NPWS data from licence returns from contracted surveys and environmental impact assessments The records were compiled by the author into a spreadsheet for error-checking and cross-referencing. The quality of the data varies. Pre 1980 data is generally at hectad level. The post 1980 records apart from a single exception are at 1km square resolution or finer.
1.1.03 Year or period	The current distribution is taken from 1980. A complete resurvey of all the previous recorded squares was undertaken by Mc Donnell & Gormally (2011) and this is supplemented by older data from other recorders.
1.1.04 Additional distribution map	All Irish grid records were intersected with the Irish grid 10km grid map to derive this additional map.
1.1.05 Range map	The current distribution was used as the range. The decision was taken not to use the range tool. The species distribution is continuous within its occupied range and there are no significant gaps and therefore the use of the range tool was not considered appropriate. The additional squares added by the tool were squares with little or no appropriate habitat as they were largely coastal or not on correct geology. The record of the species in Connemara (hectad M23) is not included in the calculation of range as the best evidence is that this population is introduced (Reich et al. 2012). The occurrence in Q91 is included. Whilst this is slightly isolated from the main range the origin of the population is assumed natural in the absence of evidence to the contrary.

Field label	Note
Species: 1024	**Kerry Slug**
2.3.04 Short term trend - Trend direction	The number of occupied hectads (54) is greater than in the previous assessment. The reasons for this are better recording effort and more information. Compared to the 2007 distribution, there are additional records from 8 hectads. Most of these additional square records fill gaps in the previous distribution e.g. V97 in the centre of the range and four largely coastal squares (V48, V94, V93, V82) along the west and southern edges of the range. There are recently acquired records from Q70 and Q71 which show the species is present on north side of Dingle peninsula in natural woodland and heathland contiguous with existing occupied habitat. There is no reason to believe the species was not present in these squares but undetected. There are no records since 1980 from four hectads (V44, V45, V92, W02) shown in the previous range. All of these hectads are coastal squares along the southern and western part of the range that include very little land or just offshore islands. V44 contains very little land (less than 1km2 of the mainland). All of the area of land within V45 is on offshore islands and principally Dursey Island. There is a single unlocalised record from this hectad. V92 includes a small area of mainland and several islands including Clear. The record from this hectad is a published one from Clear Island in 1965. Clear and Dursey Island are both relatively well recorded by naturalists but there have been no additional reports of Geomalacus from either island. Apart from the record from Clear there are no other occurrences on offshore islands. The records from V45 and V92 are treated as unconfirmed in this assessment. The remaining hectad W02 contains apparently suitable habitat which was investigated by Mc Donnell & Gormally (2011b) without success. The only area where range expansion is likely, given the existing knowledge of the geological and habitat preferences of the species, is to the east of the current range in Co Cork. This was investigated by Mc Donnell & Gormally (2011b) who surveyed habitat in the three hectads (W25, W26 and W27) adjoining the current known limit. No Geomalacus were found in these squares and so the eastern limit remains unchanged from the previous assessment. The net effect of this assessment is that there has been no evidence for any natural loss or expansion of range and the short term range trend is therefore assessed as stable.
2.3.07 Long-term trend - Trend direction	Stable. The previous and this assessment indicate that the range of the Kerry Slug has remained stable compared to that shown in 1988 (Platts & Speight 1988) and before (Byrne et al. 2009).
2.3.09 a) Favourable reference range - In km2	The distribution and range value are derived from the survey by Mc Donnell & Gormally (2011b) and additional NPWS and other data. There is no evidence of any historical decline or change since the Directive came into force. The Favourable Reference Range is set as the same as the current range which is 5400km2.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	A full survey of the distribution of the Kerry Slug was carried out in 2008-2010 as part of a NPWS-funded research project by National University of Ireland, Galway (Mc Donnell & Gormally, 2011b). One of the aims of the study was to resurvey suitable habitats (i.e. oak-dominated woodland, unimproved oligotrophic open moor and blanket bog with sandstone outcrops) in West Cork and Kerry with the overall aim of providing an up-to-date database for G. maculosus. The survey approach was to visit all the hectads with previous records, hectads that are apparent gaps in the range and unoccupied hectads on the eastern limits of the range. This has produced comprehensive data on distribution of the species for the first time.
2.3.10 c) Reason for change - use of different method?	The range tool was not used. The species distribution is continuous within its occupied range and there are no significant gaps and the use of the range tool was not considered appropriate. The additional squares added by the tool were squares with little or no appropriate habitat as they were largely coastal or not on the correct geology.

Field label	Note
Species: 1024	**Kerry Slug**
2.4.02 a) Population size estimation (using population unit other than individuals) - Unit	Population estimates were calculated for the first time by Mc Donnell & Gormally (2011b). These came from trapping studies in a few sites in Kerry and Cork including heathland with boulders, broad-leaved and coniferous woodlands. It is unwise to use these to calculate population size as this would require excessive extrapolation and the use of many assumptions on extent and suitability of habitat features within its range (for example area and number of boulders and number of suitable trees within woodland). Population is therefore expressed as the number of occupied hectads in the absence of more detailed population or range data.
2.4.02 b) Population size estimation (using population unit other than individuals) - Minimum	The number of occupied hectads in the current distribution is 54.
2.4.07 Short-term trend - Trend direction	Comprehensive data is only available since 2008 in terms of systematic and comprehensive range surveys. There is no evidence of any decline in range and by inference and expert opinion there has also been no decline in population. The discovery that the species is often present at high density in conifer plantations may mean that the population has expanded where this habitat has been created on previously unsuitable habitat. However there is no data to assess this. The short term trend is considered stable.
2.4.09 Short-term trend - Method used	The trend estimate is based on expert opinion with minimal sampling as explained in 2.4.7.
2.4.14 a) Favourable reference population - Number of individuals/agreed exceptions/other units	The population figure derived from the dedicated survey and other data up to 2012 (Mc Donnell et al. 2013) is considered to represent the population baseline. As there is no evidence of any significant decline in population size since the Directive came into force the current population estimate is set as the Favourable Reference Population.
2.4.15 b) Reason for change - improved knowledge/more accurate data?	The species has been recorded in additional hectads since the last report due to the systematic recording effort carried out 2008-2010. Some of the 'new' hectad records are from the previous period but have only just come to light. There is no reason to believe that the other hectads do not represent long-established but overlooked occurrences.
2.5.01 Area estimation	Knowledge of the habitat of Kerry Slug has been improved by the recent research but there remains the difficulty of estimating the area of occupancy across its range. In the absence of data on, for example, the extent of sandstone boulders within suitable habitat or the number of occupied tree trunks within a woodland, it is not possible to determine a meaningful estimate for area of occupancy. The method used in the assessment is the same as in the previous period, taking the area of old red sandstone geology within the current range. The source of information on suitable macro-habitat is from the Geological Survey of Ireland Groundwater Bedrock Units shapefile (ROCKUNIT.shp) downloaded from GSI website on 10/12/12. This produces an estimate for the area of occupied habitat of 3504km2.

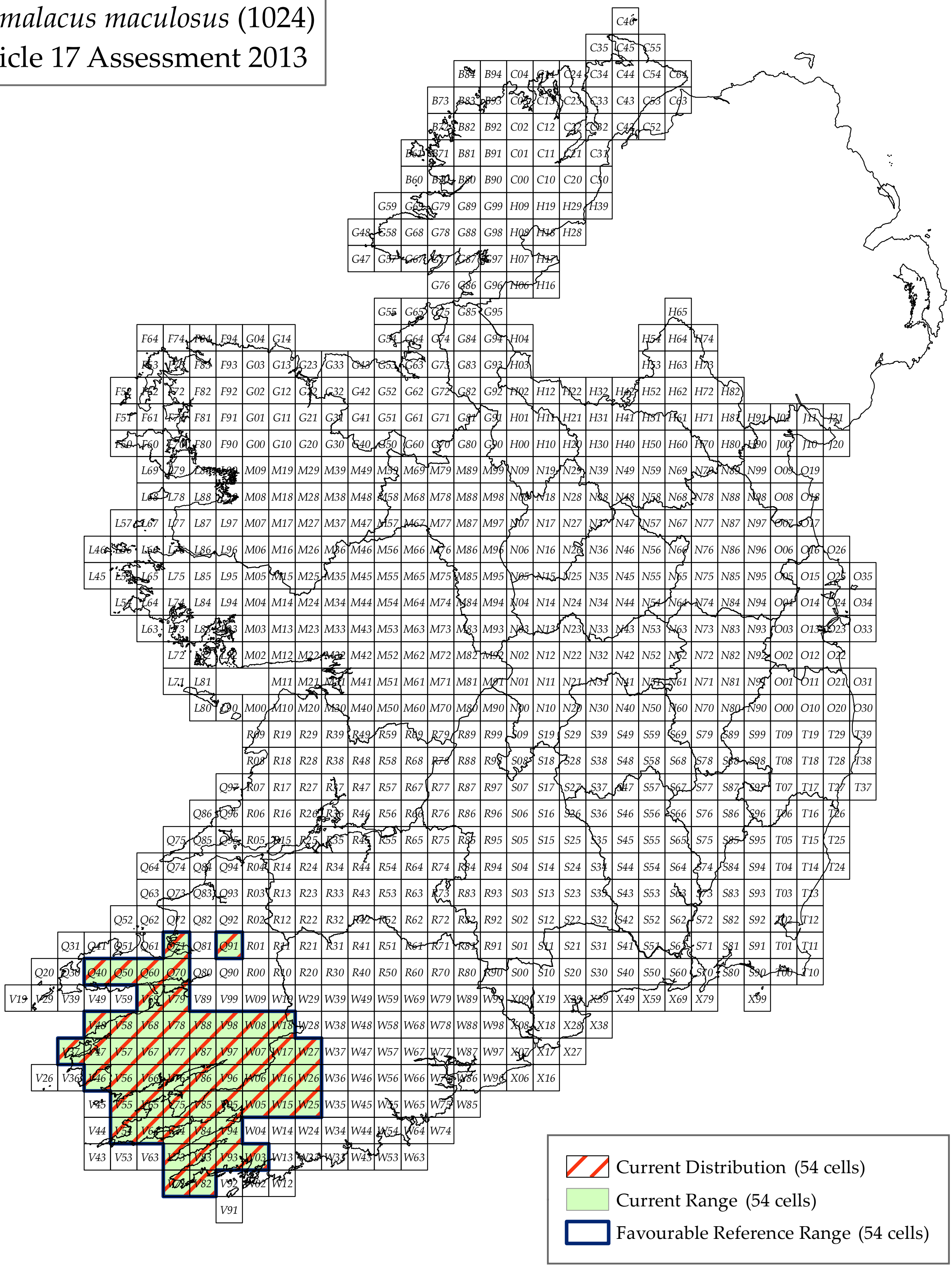
Field label	Note
Species: **1024**	**Kerry Slug**
2.5.04 a) Quality of the habitat - Good / moderate / bad / unknown	Habitat quality for Kerry Slug is not fully understood. However the additional information gathered by Mc Donnell & Gormally (2011b) and Reich et al. (2012) provides some data. The negative impact of Rhododendron on the population of Kerry Slug was demonstrated by Mc Donnell & Gormally (2011b) confirming previous opinion (NPWS 2010). The slugs were present in significantly lower numbers in woodland infested with Rhododendron compared to an uninfested site. The reason is likely to be due to the loss of the food plants due to the heavy shading. Reich et al. (2012) found a significant positive relationship between the numbers of slugs found along transects with size of the trees and coverage of bryophytes. The authors suggest that this is related to food supply. However there is insufficient data and understanding of the species to assess this aspect. Overall the quality of habitat is assessed as Good. Although woodland habitat is degraded by Rhododendron the species is found extensively in other habitats and the recently acquired evidence on habitat use indicates it is not restricted to deciduous woodland.
2.5.09 Area of suitable habitat for the species (km2)	The area of habitat is largely dictated by geological conditions in particular the association with the species and Old Red Sandstone geology. This was calculated at 3504km2 which is the area within the current range that is underlain by Old Red Sandstone. The calculation is based on the GSI Groundwater Bedrock Units shapefile (ROCKUNIT.shp) downloaded from GSI website (http://www.dcenr.gov.ie/Spatial+Data/Geological+Survey+of+Ireland/GSI+Spatial+Data+Downloads.htm) on 10/12/12.
2.5.10 c) Reason for change - use of different method (e.g. 'Range tool')?	The area is less than the previous assessment as the range tool has not been applied.

Field label	Note
Species: 1024	**Kerry Slug**
2.6 Main pressures - Pressure	The most signficant pressures on the species listed in the Threat Response Plan (NPWS 2010) were the following; Agricultural improvement (reclamation); Use of pesticides; Overgrazing by sheep; Removal of scrub; General forestry management; Artificial planting (gardens); Burning; Dispersed habitation; Routes/auto routes; Air pollution and Invasion by a species (Rhododendron ponticum) The relative significance of these pressures is still largely unknown but as the species relies on semi-natural habitat, the biggest threat to the species involves removal of its habitat. In open habitat, this will include reclamation of open habitats and conversion of semi-natural habitat to grassland, the removal of boulders and any activity that reduces the populations of lichens and mosses i.e. food availability. Some forms of air pollution are known to be deleterious to lichens particularly sulphur and nitrogen. Levels of these air-borne pollutants in Ireland are not of concern and trends of key pollutants have been stable or decreasing in the assessment period (O'Dwyer 2011). In woodland any activity that reduces the quality of the microhabitat conditions on the trunks of trees has the potential to impact the species. Mc Donnell and Gormally (2011b) did report a significant negative impact of Rhododendron on the numbers of slugs confirming other work and earlier opinion. In open habitats the burning of vegetation may affect the species by direct mortality or by inhibiting access to boulder habitat. Mc Donnell & Gormally (2011b) showed that there was a short-term impact of a burn on the species on one open heathland site. However there may be longer-term impacts if burns are regular or high intensity and this needs more research. Planting of trees on open habitats will undoubtedly have an impact locally on populations and in the short term this is likely to be negative. But with the new evidence that the species can occur in plantations it is uncertain what the overall impact will be and the point at which the woodland starts to act as a habitat in replacement to the original. Once the species is established in coniferous woodland, clearfelling will have a negative impact, but as with burning there is some evidence that the impact is short term. There is a need for more information on how the species occupies woodland through time and its responses to forest operations and woodland management. The list of pressures is therefore refined using expert opinion. A02.01 agricultural intensification B01.01 forest planting on open ground (native trees) B01.02 artificial planting on open ground (non-native trees) B02.01.01 forest replanting (native trees) B02.01.02 forest replanting (non native trees) B02.02 forestry clearance I01 invasive non-native species
2.7 Threats - Threat	There are no additional threats to the species to those already listed as pressures.
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The Kerry Slug has always been confined to the south-west of Ireland and in particular the area of Old Red Sandstone. The occupied range has been extended with more information and there is no evidence that any populations have been lost. The hectad distribution is continuous, any gaps in the earlier maps have been filled during this recording period with a net gain of 4 hectads. The previous occurrence in 4 hectads has not been confirmed in this recording period. However in three of these there is either very little habitat and/or the records are from offshore islands and require confirmation. Range is assessed as Favourable as there is no evidence of a decline in since the Directive came into force.

Field label	Note
Species: 1024	**Kerry Slug**
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The research project undertaken on the species provided the first density estimates for Kerry Slug. It showed that population density was reduced by Rhododendron. Burning was found to have a short-term impact of a few months. The species was found to occur in conifer woodlands and indeed the highest mean density was calculated for an area of amenity coniferous woodland. Populations on rock outcrops are impacted by conifer plantations, but the species can recolonise these areas after clear-felling and the conifer plantations can also support extensive and probably large Kerry Slug populations. In conclusion there is no evidence of any decline in population since the Directive came into force and the Population is assessed as Favourable.
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The Kerry Slug is found in a greater range of woodland habitat than previously thought. There is no evidence for a reduction in habitat that would threaten the long term survival of the species. It has been shown to be resilient to the burning of heathland (Mc Donnell & Gormally 2011b) and the clear-felling of forestry plantation (Reich et al. 2012). The most serious issue is the invasion of woodland and heathland by non-native Rhododendron which has been shown to have a negative impact on the population density of the slug. There will be loss of habitat when heathland is planted but the occurrence of the species in conifer plantations has been demonstrated, so this effect may be temporary over periods of decades. Uncertainty exists on the conversion of semi-natural heath, bog and grassland to farmland and the impact of isolation of populations. However the conclusion is that there is sufficient area and quality habitat for the assessment to be Favourable.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	In the latest Red List of the Irish non-Marine Mollusca (Byrne et al., 2009), the Kerry Slug was assessed as Least Concern. Opinion was expressed on the population as being 'strong and viable'. The most severe pressure the species appears to be facing is the impact of Rhododendron in woodland. This impact is being dealt with at least in national parks and nature reserves by removal and control efforts. However it will remain a threat in the future.
2.9.05 Overall assessment of Conservation Status	The overall assessment is Favourable as the species is still present throughout its range and there is no evidence of any decline, the habitats remain largely in good condition, and there has been a reassessment of the pressures and threats with the effect that these are considered to have less of an impact on the conservation status than previously considered.

Field label	Note
Species: 1024	**Kerry Slug**
3.1.01 a) Population size - Unit	Population was measured by number of occupied hectads in the absence of any more meaningful statistic. This coarse measure makes it problematical to measure the proportion of the population within Natura sites. However a tentative value of 25 hectads is given which is estimated from the proportion (46 %) of the total number of records (250) that intersect with SAC boundaries. The species was recorded within all 8 SACs for which it is a QI and it also occurs within another 9 SACs where it is not a QI. SACs with positive records and for which Kerry Slug is a QI 000090 Glengarriff Harbour and Woodland SAC 000093 Caha Mountains SAC 000102 Sheep's Head SAC 000365 Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC 000370 Lough Yganavan and Lough Nambrackdarrig SAC 001342 Cloonee and Inchiquin Loughs, Uragh Wood SAC 002173 Blackwater River (Kerry) SAC SACs with positive records and for which Kerry Slug is not a QI 0000375 Mount Brandon SAC 0002158 Kenmare River SAC 0001040 Barley Cove to Ballyrisode Point SAC 0002158 Kenmare River SAC 0001873 Derryclogher (Knockboy) Bog SAC 0000101 Roaringwater Bay and Islands SAC 0002185 Slieve Mish Mountains SAC 0002070 Tralee Bay and Magharees Peninsula, West to Cloghane SAC 0000106 St. Gobnet's Wood SAC
3.2 Conservation measures	A threat response plan was written for the species and operated from 2008 (NPWS 2008). Forestry guidelines (Forest Service 2009) were produced as part of the threat response plan and have been in operation since 2009. Guidance has been drafted for planning authorities on how to ensure any activities and projects will be in compliance with Articles 12 and 16 of the Habitats Directive with regard to the Kerry Slug and other Annex IV species. Rhododendron clearance programme has been undertaken in Killarney National Park and Glengarriff Nature Reserve.

Kerry Slug
Geomalacus maculosus (1024)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
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Scale - Scála
0 10 20 30 40 50 km

Map - Léarscáil
V 1.0
Date - Dáta
10-05-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1029**
0.2.2 Species name	**Margaritifera margaritifera**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	Freshwater pearl mussel

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Complete survey/Complete survey or a statistically robust estimate (3)
1.1.3 Year or period	1985-2012
1.1.4 Additional map	Yes
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published sources

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2.3 Range

2.3.1 Surface area - Range (km²)	15200	
2.3.2 Method - Range surface area	Complete survey/Complete survey or a statistically robust estimate (3)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period	1989-2012	
2.3.7 Long-term trend direction	stable (0)	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	15200
	operator	N/A
	unknown	No
	method	The range derived from the current known distribution is considered to be the Favourable Reference Range (FRR), as there is no evidence of a decline since the Directive came into force. This is larger than the FRR set in 2007 (14,200 km2) owing to the discovery of additional populations, the

mapping of additional beds of mussels in known populations and the capture of historical records omitted in 2007. The increase in the FRR is not the result of an expansion in the species' distribution or colonisation of new sites. It is more likely that the actual range of the species is contracting in Ireland. Monitoring of the distribution of mussels within individual catchments/sub-catchments will capture any such changes and these will be reported in future Article 17 cycles.

2.3.10 Reason for change	Improved knowledge/more accurate data

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	number of individuals (i)		
	min	10990320	max	10990320
2.4.2 Population size (other than individuals)	Unit	N/A		
	min		max	
2.4.3 Additional information	Definition of locality			
	Conversion method			
	Problems	Estimating the number of mature individuals of freshwater pearl mussel is challenging for a number of reasons, including: 1. Margaritifera populations in Ireland, other than those in the poorest conservation condition, are numbered in their thousands, tens of thousands, hundreds of thousands or even millions of mature individuals. Accurate absolute counts and routine re-counts are, therefore, impractical. 2. Margaritifera density is naturally variable within and among rivers. Such variation is the result of natural habitat characteristics, impacts on the species and its habitat and other, often stochastic factors. The lateral and longitudinal heterogeneity of river habitats is well known. Basing population estimates on sub-samples and measurements of river length or area is likely, therefore, to introduce significant uncertainty. 3. Margaritifera survey is challenging owing to fast river flows, water depths and visibility. Visibility can be impaired by light-levels/cloud-cover, water colour, turbidity and dense growths of macrophytes or macroalgae. Surveying conditions and inter-operator variability both introduce additional uncertainty to estimates. 4. The number of mature individuals visible at the surface can be significantly different from the total number of mature individuals in that area, particularly where mussels are abundant (e.g. in the Caragh River 2004, an average of 11% of the mussels were "hidden" in the quadrats examined.		
2.4.4 Year or period	2007-2012			
2.4.5 Method – population size	Estimate based on partial data with some extrapolation and/or modelling (2)			

2.4.6 Short-term trend period	2001-2012
2.4.7 Short term trend direction	decrease (-)
2.4.8 Short-term trend magnitude	min max confidence interval
2.4.9 Short-term trend method	Estimate based on partial data with some extrapolation and/or modelling (2)
2.4.10 Long-term trend period	1989-2012
2.4.11 Long term trend direction	decrease (-)
2.4.12 Long-term trend magnitude	min max confidence interval
2.4.13 Long-term trend method	Estimate based on partial data with some extrapolation and/or modelling (2)
2.4.14 Favourable reference population	number 12000000 operator N/A unknown No method The favourable reference population (FRP) is based on the national population estimate from 2007 (Moorkens, et al., 2007), as this is the best available estimate of the size of the population when the Directive came into force. In 2007, the FRP was set as 11 viable populations. The number of viable populations is still considered to be a more appropriate target.
2.4.15 Reason for change	Genuine

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	2.69
2.5.2 Year or period	2000-2012
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Bad
2.5.4 b) Quality of habitat - method	The quality of the freshwater pearl mussel habitat was based primarily on dedicated surveillance of the species' habitat in approximately 30 catchments/sub-catchments. In addition, EPA river water quality data were examined. The status of the habitat is assessed using five criteria/attributes, each with specific targets, established in law through S.I. 296 of 2009. The attributes are macroinvertebrates, phytobenthos/diatoms, macroalgae cover, macrophyte cover and siltation. The target used for both macroinvertebrates and phytobenthos is Water Framework Directive (WFD) ‘high ecological status’. The results for the individual attributes across the 26 SAC populations were as follows: 1. macroinvertebrates - 24 or 92% of the 26 failed; 2. phytobenthos/diatoms - 8 or 31 % failed; 3. macroalgae cover – 18 or 69% failed; 4. macrophyte cover – 24 or 92% failed; 5. siltation - 24 or 92% failed. Combining the data from dedicated surveillance with the EPA river water quality data, demonstrated that sedimentation or sedimentation with nutrient enrichment are the main causes of the species' decline in Ireland. The quality of the habitat for Margaritifera margaritifera was assessed and unfavourable bad.
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	decrease (-)
2.5.7 Long-term trend period	1989-2012
2.5.8 Long term trend direction	decrease (-)
2.5.9 Area of suitable habitat (km²)	2.69
2.5.10 Reason for change	Genuine Improved knowledge/more accurate data

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
Modification of hydrographic functioning, general (J02.05)	high importance (H)	N/A
Other human induced changes in hydraulic conditions (J02.15)	high importance (H)	N/A
Restructuring agricultural land holding (A10)	high importance (H)	N/A
Water abstractions from groundwater (J02.07)	high importance (H)	N/A
diffuse pollution to surface waters due to agricultural and forestry activities (H01.05)	high importance (H)	N/A
pollution to surface waters by industrial plants (H01.01)	medium importance (M)	N/A
diffuse pollution to surface waters due to other sources not listed (H01.09)	medium importance (M)	N/A
pollution to surface waters by storm overflows (H01.02)	medium importance (M)	N/A
other point source pollution to surface water (H01.03)	medium importance (M)	N/A
diffuse pollution to surface waters due to household sewage and waste waters (H01.08)	medium importance (M)	N/A
surface water abstractions for public water supply (J02.06.02)	medium importance (M)	N/A
collapse of terrain, landslide (L05)	low importance (L)	N/A
dredging/ removal of limnic sediments (J02.02.01)	low importance (L)	N/A
other outdoor sports and leisure activities (G01.08)	low importance (L)	N/A

2.6.1 Method used – pressures	based exclusively or to a larger extent on real data from sites/occurrences or other data sources (3)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
Modification of hydrographic functioning, general (J02.05)	high importance (H)	N/A
Other human induced changes in hydraulic conditions (J02.15)	high importance (H)	N/A
Restructuring agricultural land holding (A10)	high importance (H)	N/A
Water abstractions from groundwater (J02.07)	high importance (H)	N/A
diffuse pollution to surface waters due to agricultural and forestry activities (H01.05)	high importance (H)	N/A
pollution to surface waters by industrial plants (H01.01)	medium importance (M)	N/A
diffuse pollution to surface waters due to other sources not listed (H01.09)	medium importance (M)	N/A
pollution to surface waters by storm overflows (H01.02)	medium importance (M)	N/A
other point source pollution to surface water (H01.03)	medium importance (M)	N/A
diffuse pollution to surface waters due to household sewage and waste waters (H01.08)	medium importance (M)	N/A
surface water abstractions for public water supply (J02.06.02)	medium importance (M)	N/A
collapse of terrain, landslide (L05)	low importance (L)	N/A
dredging/ removal of limnic sediments (J02.02.01)	low importance (L)	N/A
other outdoor sports and leisure activities (G01.08)	low importance (L)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	Although the population estimate is less than 25% below the favourable reference population, the concluding assessment for Population is Unfavourable Bad based on a combination of population viability and population decline. In 2007, the number of viable populations (11) was used as the measure of the conservation status of the freshwater pearl mussel population. Specific attributes and targets were used to assess the viability of individual Irish freshwater pearl mussel populations including the numbers of live adult mussels, the number of dead mussels, the percentage of the population of approx. five years of age and under, and the percentage of the population of approx. 10-15 years of age and under. Using these and associated criteria in 2007, it was concluded that no Irish populations were viable. During the reporting period (2007-2012), a large percentage of Irish populations, including all SAC populations, were monitored. The monitoring results indicate that no Irish freshwater pearl mussel population is viable and therefore Population is assessed as Unfavourable Bad.
2.8.2 Other relevant Information	The standard EU codes for pressures and threats were considered particularly problematical for freshwater habitats and species, such as Margaritifera margaritifera, as many pressures act indirectly (e.g. hydrological change, nutrient pollution, sediment pollution, acidification). The pressures are frequently diffuse, and arise as a result of a number of developments and activities from a variety of sectors. Impacts are almost always the result of cumulative pressures, and interactions among pressures are frequently complex and can be difficult to predict. The standard list of codes is long, allowing multiple codes to be used to cover one pressure. The option of using a pollution qualifier further adds to the confusion and has been avoided here. There is a lack of clear codes for drainage activities; this is likely to give rise to significant inconsistencies in reporting among Member States and even within Member States. The Article 17 database does not allow dates before 1985, so the date provided in the reporting format of 1985-2012 for field 1.1.3 is incorrect. The oldest record used in the distribution mapping dated from 1894 and the most recent from 2012. The vast majority of records date from 1990 or after. Further survey work is necessary, however, to confirm the continued presence of mussels in rivers and lakes not surveyed in recent years. An estimated 9.7 million adult mussels occur in the 19 SACs designated for the protection of the species. This represents 89% of the national population.
2.8.3 Trans-boundary assessment	As there are cross border populations with Northern Ireland, a transboundary assessment in the next reporting period would allow a fuller appreciation of the range and status of this species.

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.9.2. Population	assessment	Bad (U2)
	qualifiers	declining (-)
2.9.3. Habitat	assessment	Bad (U2)
	qualifiers	declining (-)

2.9.4. Future prospects	assessment Bad (U2) qualifiers improving (+)
2.9.5 Overall assessment of Conservation Status	Bad (U2)
2.9.6 Overall trend in Conservation Status	declining (-)

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit number of individuals (i) min 10277656 max 10277656
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)
3.1.3 Trend of population size within	decrease (-)

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Legal protection of habitats and species (6.3)	Legal Administrative	high importance (H)	Both	Enhance
Specific single species or species group management measures (7.4)	Administrative	medium importance (M)	Both	Enhance
Restoring/improving water quality (4.1)	Legal	high importance (H)	Both	Enhance
Urban and industrial waste management (8.1)	Administrative	high importance (H)	Both	Enhance

Article 17 - SPECIES NOTES

Field label | Note

Species: 1029 Freshwater pearl mussel

0.2.01 Species code

The freshwater pearl mussel (Margaritifera margaritifera (L.)) is a large bivalve species found in oligotrophic, soft to neutral waters of rivers and, occasionally, in lakes. The species has a discontinuous holarctic distribution, being found in North America, north-western Europe and parts of central Europe. In Ireland, the species is concentrated along the western sea-board, but also occurs in the south and east where geology allows.

The biology and ecology of the species are particularly notable in that individuals can grow to very large sizes relative to other freshwater molluscs, building up thick calcareous valves, in rivers with relatively soft water and low levels of calcium. Their shell building is consequently very slow, and individuals in natural conditions live to over a hundred years of age.

Members of the pearl mussel family, Margaritiferidae, have a complex life cycle. They mature between seven and 15 years of age, and can have a prolonged fertile period lasting into old age. Margaritifera margaritifera produces glochidial larvae that use a temporary salmonid host, typically Atlantic salmon and sea trout in Ireland, but also brown trout.

The freshwater pearl mussel is highly threatened and was recently categorised as critically endangered across Europe (Cuttelod et al., 2011). It is also recognised as critically endangered in Ireland (Byrne et al., 2009). 90% of all freshwater pearl mussel are known to have died out across Europe during the twentieth century.

Owing to its threatened status and dramatic decline, the freshwater pearl mussel is listed on Annex II and Annex V of the Habitats Directive. As the name suggests, this mussel produces freshwater pearls and, because of historic over-exploitation, the species is protected under the Irish Wildlife Acts, 1976 and 2000. Consequently, it is an offence to hunt, injure, wilfully interfere with or destroy its breeding place or resting place.

Freshwater pearl mussels are widespread in Ireland, occurring in more than 160 rivers and a handful of lakes. The estimated national population of adult mussels is large, at in excess of 10 million, however, this figure masks the reality that this is a species in severe decline and, in many cases, unable to reproduce because of poor water quality.

The main cause of the poor status and the ongoing decline of the species across Ireland and Europe is no longer hunting for freshwater pearls, rather enrichment (eutrophication) and sedimentation of its habitat.

As the mussel lives in fast-flowing rivers, the tiny juvenile mussels have to burrow into the river substratum to prevent being washed to sea. With the increase in nutrients and sediment entering rivers, the gravels into which they burrow become clogged with silt, algae and rooted-plants, so the young mussels can no longer survive. In many Irish rivers, pollution has become so severe that the adults are also dying, starved of oxygen and food.

1.1.01 Distribution map

This distribution map has been transformed from the Irish Grid map referred to in 1.1.2 and 1.1.4.

1.1.02 Method used - map

The distribution was based on Margaritifera margaritifera records held in the NPWS Margaritifera_Geodatabase. Positive records of living mussels are held in the Margaritifera_Records feature class. The distribution of freshwater pearl mussel habitat in Special Areas of Conservation is mapped as a polyline feature. Both of these feature classes were intersected with the Irish National 10 km Grid, producing a distribution of 152 10 km squares.

The species is found in 162 rivers, in 104 catchments/sub-catchments across 14 counties (Carlow, Cavan, Clare, Cork, Donegal, Galway, Kerry, Limerick, Mayo, Sligo, Tipperary, Waterford, Wexford and Wicklow).

Field label	Note
Species: 1029	**Freshwater pearl mussel**
1.1.03 Year or period	The IT tool does not allow dates before 1985, so the date provided in the reporting format of 1985-2012 is incorrect. The oldest record used in the distribution mapping dated from 1894 and the most recent from 2012. The vast majority of records date from 1990 or after. Further survey work is necessary, however, to confirm the continued presence of mussels in rivers and lakes not surveyed in recent years
1.1.04 Additional distribution map	The lake distribution map referred to in 1.1.2 was intersected with the ING 10 square grid to determine the national grid distribution.
1.1.05 Range map	Range maps were derived from the ING 10 square grid (1.1.4) and the ETRS LAEA 52 10 projection (1.1.1) distribution maps. The recommended Range Tool was not used, as the mapped distribution is considered accurate and the species is very unlikely to occur outside the mapped 10 km squares. For a lotic species or habitat, occupying linear features in the landscape, the Range Tool is likely to include 10 km squares without rivers or with unsuitable river types (e.g. Margaritifera margaritifera does not occur in high gradient, first- and second-order streams).

Field label	Note
Species: 1029	**Freshwater pearl mussel**
2.2 Published sources	The publications listed contain information on the distribution of Margaritifera margaritifera, as well as information on the condition of populations and their habitat. Many of the listed sources also provided insight into pressures and threats on the species. All 26 SAC populations of Margaritifera margaritifera and the single M. durrovensis population (see Article 17 report for species 1990) listed on the First Schedule to S.I. 296 of 2009 were monitored in 2008/2009 as part of the work to develop Sub-basin Management Plans (SBMPs) for the freshwater pearl mussel. Monitoring included detailed assessment of the condition of both the population and its habitat. The SBMPs also provide detailed assessment of the pressures impacting on the populations, as well as a programme of measures to address these pressures. The 26 Margaritifera margaritifera populations are: Allow (Munster Blackwater), Aughavaud (Barrow), Ballymurphy (Barrow), Bandon, Bundorragha, Caragh, Clady, Clodiagh (Suir), Cloon (Shannon Estuary), Currane, Dawros, Derreen (Slaney), Eske, Gearhameen (Laune), Glaskeelan (Leannan), Kerry Blackwater, Leannan, Licky, Mountain (Barrow), Munster Blackwater, Newport, Owencarrow, Owenea, Owenmore, Owenriff (Corrib), Ownagappul In addition, data and observations were utilised from freshwater pearl mussel surveys conducted as part of environmental assessments (AA/EIA). Surveying the species requires a licence under the Wildlife Acts (1976, 2000) and the submission of returns is a condition on each licence issued. Other quoted sources were as follows: Byrne, A., Moorkens, E.A., Anderson, R., Killeen, I.J. & Regan, E.C. (2009) Ireland Red List No. 2 – Non-Marine Molluscs. National Parks and Wildlife Service, Department of the Arts, Heritage and the Gaeltacht, Dublin, Ireland. Cuttelod, A., Seddon, M. and Neubert, E. (2011) European Red List of Non-marine Molluscs. Luxembourg: Publications Office of the European Union. Lehane, M. and O'Leary, B. (2012) Ireland's Environment 2012 – An Assessment. EPA, Wexford. Lucey, J. (2009) Water Quality in Ireland 2007-2008, Key Indicators of the Aquatic Environment. EPA, Wexford. McGarrigle, M., Lucey, J. and Ó Cinnéide M. (2010) Water Quality in Ireland 2007-2009. EPA, Wexford. Monaghan, F. and O'Brien, T (2011a) A survey of the upland and peatland grazing impacts in commonage and private land in the Lower Bundorragha catchment. A freshwater pearl mussel SAC catchment. Unpublished report to the National Parks and Wildlife Service, Dublin. Monaghan, F. and O'Brien, T (2011b) A survey of the upland and peatland grazing impacts in commonage and private land in the Lower Dawros catchment. A freshwater pearl mussel SAC catchment. Unpublished report to the National Parks and Wildlife Service, Dublin. Monaghan, F. and O'Brien, T (2011c) A survey of the upland and peatland grazing impacts in commonage and private land in the Lower Owenriff catchment. A freshwater pearl mussel SAC catchment. Unpublished report to the National Parks and Wildlife Service, Dublin. Moorkens, E.A. (2010) Addressing the conservation and rehabilitation of Margaritifera margaritifera (L.) populations in the republic of Ireland within the framework of the habitats and species directive. Journal of Conchology 40 (3): 339-350. The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. (S.I. 296 of 2009).
2.3.03 Short-term trend - Period	The default trend period was used.

Field label	Note
Species: 1029	**Freshwater pearl mussel**
2.3.04 Short term trend - Trend direction	No extinctions of freshwater pearl mussel populations have been documented since the early twentieth century (Moorkens et al., 2007). As result, the short-term trend for range is considered to be stable.
2.3.06 Long-term trend - Period	The recommended long-term trend period of 24 years or 1989-2012 was used.
2.3.07 Long-term trend - Trend direction	No extinctions of freshwater pearl mussel populations have been documented during the trend period (Moorkens et al., 2007).
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Significant monitoring and survey have taken place during the reporting period (2007-2012) under Article 11 of the Habitats Directive and as part of environmental assessment (AA and EIA) (see 2.2). The improved knowledge and more accurate data on the distribution of Margaritifera margaritifera have resulted in 17 hectads being added to the distribution in 2013. In addition, improved mapping accuracy has led to the removal of seven incorrect 10 km squares from the 2007 distribution. Mapping errors arose in 2007 owing to factors such as incorrect two-figure/10 km square grid references and the inclusion of unconfirmed records for dead shells.
2.4.01 a) Population size estimation (using individuals or agreed exceptions where possible) - Unit	The size of adult populations of Margaritifera margaritifera can be estimated based on sub-samples and length or area of available habitat. Population estimates are provided as part of all baseline or complete surveys, generally at river/catchment scale. All available population estimates, plus expert opinion, were used in 2007 to provide a national population estimate for Ireland of 12 million adult mussels (Moorkens et al., 2007). Since 2007, routine surveillance has evaluated changes in adult mussel numbers using three main measures: numbers of dead shells, changes in adult numbers in permanent count areas and, in particular, population age profiles. Since 2007, all monitored mussel populations have been found to be in decline. On average, the best populations (i.e. the largest, most widespread populations, with some, but insufficient recruitment and the largest age ranges) were estimated to be declining at a rate of 1% per year. This means a total loss over the reporting period (2007-2012) of 6%. Eight populations were considered to fall into this category, namely: Bundorragha, Carragh, Kerry Blackwater, Owenriff, Dawros, Glaskeelan, Ownagappul and Currane. These eight had estimated population sizes that summed to 9,586,000 in 2007. With a decline of 6%, this reduced to 9,010,840. The remaining populations were estimated to total 2,414,000 in 2007. On average, these populations were considered to be declining at a rate of 3% per year since 2007. This means a total loss over the reporting period (2007-2012) of 18%, reducing the population estimate in 2013 to 1,979,480. The estimated number of mature individuals for 2013 is, therefore 10,990,320 and the overall decline over the reporting period was 8%. Both of these figures are estimates and no confidence intervals can be provided at this time.
2.4.04 Year or period	The first estimates of population were made in 2007.
2.4.06 Short-term trend - Period	Detailed surveillance of freshwater pearl mussel populations began in 2004. Since then, further surveillance has led to estimates of the population declines. See 2.4.1 for further information. As the long term trend is also considered to be declining an ongoing decline since the start of the recommended short term trend period is given.
2.4.07 Short-term trend - Trend direction	Populations with some, but insufficient, recruitment were shown to be declining at an average rate of approximately 1% per year. Populations with no recruitment were shown to be declining at an average rate of approximately 6% per year. See 2.4.1a for further information.

Field label	Note
Species: 1029	**Freshwater pearl mussel**
2.4.09 Short-term trend - Method used	The population assessment is based on detailed surveillance of approximately 30 populations. Repeat counts of adult mussel numbers in fixed sampling stations, recording numbers of dead mussels and, in particular, measurement of the population profile (based on shell-length) were used to produce extinction curves and estimates of the rate of decline (see SBMPs, Moorkens, 2010).
2.4.10 Long-term trend - Period	The default trend period was used.
2.4.11 Long-term trend - Trend direction	As population profiles clearly show that recruitment has been failing in the majority of Irish freshwater pearl mussel populations for 30 years or more, the trend in the numbers of mature individuals during the long-term trend period was a decline.
2.4.14 d) Favourable reference population - Indicate method used to set reference value if other than operators	Additional note: Further consideration should be given to the biological and ecological justifications for setting a FRP target as at least the size of the population when the Directive came into force, where the species in question has been in decline since before that date. The minimum necessary to ensure the long-term viability of the species may, in fact, be less than this number. The viability of the individual populations and the resilience of the national population (considering factors such as number of sites occupied, geographical distribution, pressures, etc.) should be considered in setting targets for ensuring the long-term survival of a species within a member state.
2.4.15a Population reason for change genuine	The lack of recruitment and elevated adult mortalities have resulted in a continued decline in the number of mature individuals. See 2.4.1 a and 2.4.9 for further information.
2.5.01 Area estimation	The habitat of the freshwater pearl mussel has been mapped in the 26 SAC for Margaritifera margaritifera and included as the polyline feature within the NPWS Margaritifera Geodatabase. In order to estimate the length of occupied channel in non-SAC populations, the individual river segments that intersect Margaritifera records were selected. As the habitat for the freshwater pearl mussel can be considered to include the spawning area of the mussel's temporary salmonid host, the mapped habitat and selected river segments were compared to mapped Atlantic salmon spawning areas provided by the Inland Fisheries Ireland (IFI). The selected river segments were found to extend beyond the mussel habitat and to include identified spawning areas. As a result, the length of the freshwater pearl mussel habitat was based on the selected river segments and summed to 1,008,300 m or 1,008.3 km across all occupied rivers The width of these river segments was then estimated using the IFI wetted area data. The average wetted area for the selected segments was calculated as 2.67 m. The habitat surface area was calculated by multiplying the estimated channel length (1,008,300 m) by the average wetted-width (2.67) giving 2,692,161 m2 or 2.69 km2.
2.5.02 Year or period	The habitat area was based the "RiverSegment" feature data class from the EPA's Water Framework Geodatabase (WFDGeodatabase.mdb Ver Oct 2011) and the Inland Fisheries Ireland (IFI) Wetted Area data. The data are at 1:50,000 scale, with the RiverSegment features based on the 2000 OSi Orthophotography and the wetted width figures based on predictive modelling completed in 2012. IFI predicted wetted width was based on the deEyto et al. method, using shreve link magnitude and catchment area.
2.5.03 Method used Habitat for the species	The method used to estimate the area of the freshwater pearl mussel habitat is detailed in 2.5.1. The length of occupied channel was based on mapped freshwater pearl mussel habitat and point records. The available salmonid spawning habitat was also considered. River segments from the WFD Geodatabase were used to estimate the length of channel. The average river width was estimated using IFI wetted width data. Channel length was multiplied by estimated river width to give an estimated area of habitat.

Field label	Note
Species: 1029	**Freshwater pearl mussel**
2.5.05 Short-term trend - Period	The default trend period was used.
2.5.06 Short-term trend - Trend direction	There is no evidence of a decrease in the area of the habitat for the species since the Directive came into force, so the surface area of the species' habitat is assessed as stable. The quality of the species' habitat was assessed as unfavourable bad in 2007. There has been repeat monitoring of the condition of the species' habitat at a number of sites since 2004. The trend at these individual sites has been for on-going bad condition or further deterioration in the habitat condition. Overall, therefore, the short-term trend in habitat quality is assessed as declining. . As the long term trend is also considered to be declining an ongoing decline since the start of the short term trend period is given.
2.5.07 Long-term trend - Period	The default trend period was used.
2.5.08 Long-term trend - Trend direction	came into force, the surface area of the species' habitat is assessed as stable. National trends in river water quality were used to assess long-term changes in habitat quality. The EPA has highlighted the decline in high quality rivers sites (i.e. Q5 and Q4-5 sites) between 1987 and 2008 as a key concern (Lucey, 2009). An EPA-sponsored research study further analysed these trends in high status water bodies over time (Ní Chatháin et al., 2013). Ní Chatháin et al. (2013) documented a steady decline in monitored high status river sites from 41% in 1998-2000, to 37% in 2001-2003, 31% in 2004-2006, and 27% in 2007-2009. Even allowing for a reduction in the number of river sites monitored, this represented a loss of 280 high status sites between 1998 and 2009 (this is an adjusted figure - the actual reduction in the number of sites achieving Q5/Q4-5 was 369) (Ní Chatháin et al., 2013). Of particular concern for the freshwater pearl mussel were the significant losses of high status river sites in counties where the species is widespread and/or abundant, notably Donegal (79 high status river sites lost), Mayo (33), Kerry (22), Wicklow (19), Galway (14), Carlow (11) and Cork (10). Status was based on macroinvertebrate monitoring and included both Q5 and Q4-5 sites (Ní Chatháin et al., 2013). Only 41 of the 407 river sites classified as at high status for the 2007-2009 monitoring period were at Q5 (366 at Q4-5), again indicative of the deterioration in the highest quality river sites (Ní Chatháin et al., 2013). The long-term trend in habitat quality is, therefore, assessed as declining.
2.5.09 Area of suitable habitat for the species (km2)	Approximately six Margaritifera margaritifera populations are considered to have gone extinct before 1970 (Moorkens et al., 2007). As the causes of the extinctions were habitat destruction (e.g. the damming of rivers to create reservoirs, arterial drainage and acid mine drainage), it is assumed that these areas no longer contain suitable habitat for the species. As a result, the area of suitable habitat is considered equivalent to estimated habitat surface area of 2.69 km2.
2.5.10 a) Reason for change - genuine change?	There is no evidence of a genuine change in habitat area for Margaritifera margaritifera since 2007 or over the short- or long-term trend periods. It should be noted that the habitat of the freshwater pearl mussel is more likely to be damaged (i.e. deteriorate in terms of quality) rather than destroyed. Significant loss of freshwater pearl mussel habitat requires large-scale hydromorphological damage, such as arterial drainage, or other in-stream activities. As a result, habitat quality is a more sensitive measure of the conservation status of the species' habitat than surface area of the habitat. The quality of the habitat has continued to decline since 2007.
2.5.10 b) Reason for change - improved knowledge/more accurate data?	No figure for habitat surface area was provided in 2007. The compilation of a detailed Margaritifera Geodatabase and the inclusion of new data from dedicated survey and monitoring efforts has allowed the area of the habitat to be estimated for this report. See 1.1.2 and 2.5.1 for further information.

Field label	Note
Species: 1029	**Freshwater pearl mussel**
2.6 Main pressures - Pressure	The pressures impacting on Margaritifera margaritifera are often indirect, arising within the catchments of the occupied rivers, and can be broadly categorised into pollution and hydrological change. Direct impacts on the species have been documented in Ireland, resulting from in-stream works such as arterial drainage, bridge-construction and repairs and recreational fishery structures. Data on pressures on the freshwater pearl mussel came from a number of sources: 1. The main source of information on pressures on the freshwater pearl mussel was the 26 Sub-basin Management Plans for the SAC populations. 2. In addition, pressures are routinely documented during survey and monitoring of the species by the NPWS. 3. Appropriate Assessment under Article 6(3) of the Directive and Environmental Impact Assessment also provides information on pressures and threats, particularly where monitoring is required following approval of a plan or project. 4. WFD River Basin Management Plans, and associated Water Management Unit Action Plans (http://www.wfdireland.ie/docs/1_River%20Basin%20Management%20Plans%202009%20-%202015/) and the 2005 Article 5 Report (http://www.wfdireland.net/wfd-charreport.html)). 5. National Water Quality Reports (McGarrigle, et al., 2010), State of the Environment Reports and Environmental Indicators (Lehane and O'Leary, 2012, Lucey, 2009, http://testweb.epa.ie/irelandsenvironment/). All of these sources were reviewed. The standard "reference list of pressures, threats and activities" was used to categorise the identified pressures on Margaritifera margaritifera. The pressures identified, listed in approximate order of importance, were: 1. J02.05, Modification of hydrographic functioning, general, high importance (used to cover activities, other than land drainage, that lead to changes in the hydrological regime and morphology of rivers. These include large hydro-electric dams, weirs, hard in-stream measures to protect river banks, bridges, small-scale hydropower plants and other structures/works on river beds and banks. Such modifications cause direct damage to the freshwater pearl mussel and its habitat and change flows and deposition/erosion processes) 2. J02.15, Other human induced changes in hydraulic conditions, high importance (this code was used to cover the specific pressure of river bank erosion and slumping associated with removal of deep-rooting vegetation, including riparian trees. Such vegetation change results from a large number of activities in freshwater pearl mussel catchments, including grazing by livestock, other farming activities, conifer forestry, land-clearance for houses and other developments, construction of tracks and roads for fisheries and other recreational activities, for access to farmland, forests and areas of peat-cutting and for public routes.) 3. A10, Restructuring agricultural land holding, high importance, (used to cover agricultural land reclamation practices that involve large-scale earth movements, including re-contouring of the land, removal of stones and boulders, ploughing and re-seeing for grassland, removal of hedges etc.) 4. J02.07, Water abstractions from groundwater, high importance (This code was used to cover land drainage, particularly in peatland and other erodible soils. Both new drainage works and maintenance works on existing drains are pressures. Areas of wetland and other terrestrial habitats are frequently drained in Ireland for purposes such as development, agriculture, forestry and peat-cutting. Drainage leads to changes in the hydrological regime, resulting in modification of the bed and banks of rivers through erosion and deposition processes. Erosion in the drains themselves increases the sediment load to water. Drains also provide a shorter and more direct pathway to rivers for pollutants originating on 'dry land'. Drains are also installed to facilitate land uses that typically increase the sources of sediment and nutrients) 5. H01.05, diffuse pollution to surface waters due to agricultural and forestry activities,

	high importance (there are multiple and complex agricultural and forestry activities that act as sources of sediment, nutrients and other pollutants, and that can impact on the freshwater pearl mussel. These are described in many texts on the species, particularly the Sub-basin Management Plans) 6. H01.01, pollution to surface waters by industrial plants, Medium importance (particularly urban wastewater treatment plants, but also industrial plants in the south-east and east and small discharges (e.g. hotels, pubs) in western catchments) 7. H01.09, diffuse pollution to surface waters due to other sources not listed, Medium importance (particularly pollutants arising from drainage and degradation of peatland. Mineralization of peat increases losses of particulate and dissolved organic fractions (including dissolved organic carbon) and ammonia to water. These losses in turn cause sedimentation, increased colour and turbidity, and enrichment of freshwater pearl mussel rivers. Enrichment in these instances promotes increased biomass of the bacteria and fungi that can utilise organic fractions, as well as of primary producers. The loss of organic acids from drained and degraded peatland has also been demonstrated to result in acid episodes is Irish streams. The activities that result in such peatland degradation include peat-cutting and over-grazing by sheep) 8. H01.02, pollution to surface waters by storm overflows, medium importance (particularly urban wastewater treatment plants) 9. H01.03, other point source pollution to surface water, medium importance (particularly quarries and construction activities alongside or adjacent to rivers. Excavation and disposal/storage of peat and other erodible soil is a significant pressure that results from activities such as wind farm construction, road construction/improvement and other infrastructure projects) 10. H01.08, diffuse pollution to surface waters due to household sewage and waste waters, medium importance 11. J02.06.02, surface water abstractions for public water supply, low importance 12. L05, collapse of terrain, landslide (both natural and influenced by removal of vegetation cover), low importance 13. J02.02.01, dredging/ removal of limnic sediments, low importance (removal of gravel from rivers) 14. G01.08, other outdoor sports and leisure activities, low (kayaking, potential trampling pressure on mussel and its habitat) For all of the listed pollution pressures, sediment/particulate matter is considered to be the most significant pollutant, followed by dissolved and particulate nutrients and other organic matter. Fitting the documented pressures to the standard list of codes was challenging. A decision was taken to base the pressure list on the detectable impacts in freshwater pearl mussel rivers, rather than the specific responsible drivers. The main reason for this decision was the large number of activities within pearl mussel catchments that contribute to impacts such as increased sediment and nutrient loads.
2.7 Threats - Threat	All pressures documented at 2.6 were also listed as threats. In addition, climate change was identified as a threat, owing to its potential to exacerbate many of the current hydrological and pollutant pressures. For more information on the threats associated with climate change see the Irish Article 17 reports and associated backing documents for blanket bogs (habitat code 7130), lake habitats (habitat codes 3110, 3130, 3140, 3150 and 3160) and Najas flexilis (species code 1833).

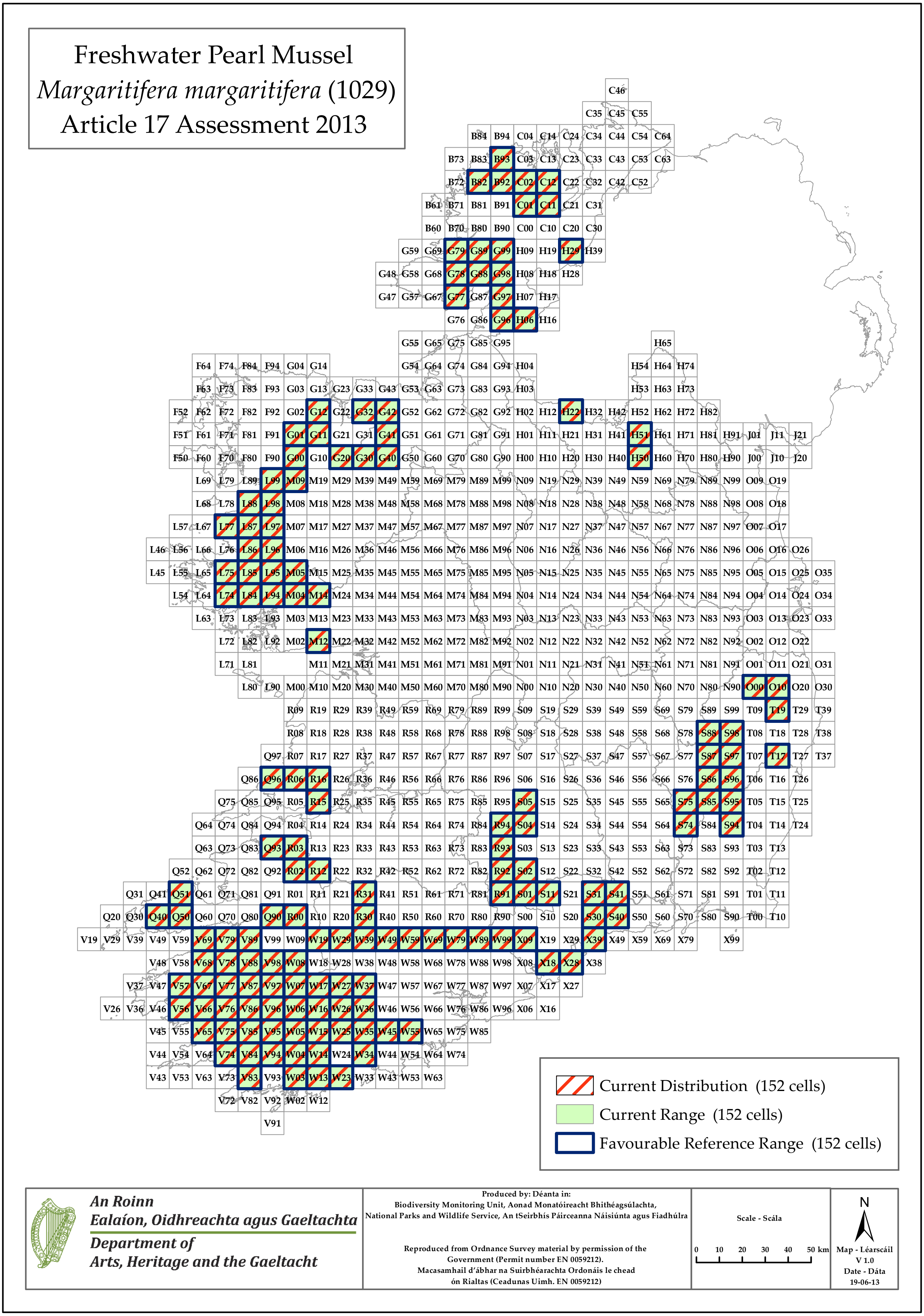
Field label	Note
Species: 1029	**Freshwater pearl mussel**
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Margaritifera margaritifera occurs in approximately 162 rivers in 104 catchments/sub-catchments across 14 counties. The largest populations are found along the western sea-board. Knowledge of the species' range has improved slightly since 2007 owing to additional survey work and collation of historical records. There has been no real expansion in the species' range. As in 2007, the species distribution was used as the range, as the species is unlikely to occur outside of the mapped 10 km squares. As the current range is equal to the favourable reference range (FRR) and there is no evidence of a change in the species' range since the Directive came into force, the range for Margaritifera margaritifera is assessed as favourable.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The number of mature individuals of Margaritifera margaritifera was estimated to have declined by 8% on average, from 12 million in 2006 to 10,990,320 by the end of 2012. Extensive monitoring of freshwater pearl mussel populations between 2007 and 2012 demonstrated that no populations are in favourable condition. Population condition was assessed using four main attributes: the number of live adult mussels, the number of dead mussels, the percentage of the population of approx. five years of age and younger, and the percentage of the population of approx. 10-15 years of age and younger. The assessments showed that recruitment continues to be insufficient to replace the existing adult mussels in all populations, and adult mortality is still elevated in many rivers. As a result, the status of the Margaritifera margaritifera population is assessed as unfavourable bad.
2.9.02 b) Population - If CS is U1 or U2, use of qualifiers is recommended	Recruitment levels continue to be insufficient in all populations and, indeed, recruitment rates have decreased in some of the largest populations.
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	There is no evidence of a decrease in the area of the habitat for the species since the Directive came into force. The quality of the species' habitat, however continues to be bad and, at many sites, has deteriorated further since 2007. The assessment of the quality of the freshwater pearl mussel habitat was based on dedicated surveillance, which included measurement of macroinvertebrates, phytobenthos/diatoms (both are based on WFD methods and having targets of WFD 'high ecological status'), macroalgae cover, macrophyte cover and siltation. The condition of the habitat at all 26 freshwater pearl mussel SAC populations was assessed as unfavourable. Sedimentation of the mussel habitat, or sedimentation in combination with enrichment, were the main cause of the decline in the quality of the species' habitat. As a result of the poor and declining quality of the habitat for Margaritifera margaritifera the habitat is assessed as unfavourable bad.
2.9.03 b) Habitat for the species - If CS is U1 or U2, use of qualifiers is recommended	Repeat monitoring of the condition of the species' habitat at a number of sites since 2004 demonstrated on-going bad condition or further deterioration in the habitat condition. Overall, therefore, the habitat quality is considered to be declining.

Species:	1029	Freshwater pearl mussel
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)		A number of significant Margaritifera margaritifera conservation measures have been implemented during the reporting period, including: 1. Making of the Freshwater Pearl Mussel Regulations (S.I. 296 of 2009) which set environmental objectives for the SAC populations of the species, required the production of Sub-basin Management Plans (SBMPs) for the species and set duties on public authorities in respect of the SBMPs and their programmes of measures. 2. The 'North South 2' project, conducted all necessary survey and monitoring work and drafted the SBMPs. This project ran from late 2008 to late 2010. 3. Significant progress has been made in the implementation of many important SBMP measures, notably for authorised discharges and domestic wastewater treatment systems (septic tanks). The EPA has examined IPPC and Waste licences in accordance with European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009, S.I. No. 296 of 2009 and determined which licences required full reviews. The majority of these reviews have been completed and more stringent and/or additional conditions have been imposed on many licences. The EPA is examining Waste Water Discharge Licences issued prior to the introduction of S.I. 296 of 2009, to determine whether the licences require to be reviewed or technically amended. The EPA specifies the appropriate treatment on a case-by-case basis during the licensing process. The EPA has also produced a priority list of urban areas that are key pressures on the environment including the freshwater pearl mussel and that require measures to comply with the species' requirements. The EPA and NPWS continue to work with and advise Local Authorities on the integration of the freshwater pearl mussel ecological quality objectives withn the authorisation of smaller discharges under the Water Pollution Acts. The EPA has published the National Inspection Plan for inspection of domestic wastewater treatment systems (DWWTS). The EPA, GSI and external expert consultants have developed and published a scientific risk based methodology to identify the potential risk to human health, groundwater and surface water from DWWTS. The risk assessment method considers the sensitivity of the receptor and the freshwater pearl mussel is included as a key sensitive receptor. The EPA and NPWS worked together to develop a protocol for prioritising areas for inspection of DWWTS in pearl mussel catchments. Inspections are being targeted in the very high and high risk areas, which also coincide with sensitive receptors such as pearl mussel catchments. 4. The NPWS has developed a national conservation strategy for the species, based on the findings of the SBMPs and related work (Moorkens, 2010). This strategy prioritises the implementation of measures for the largest populations and those closes to favourable condition. 5. For non-SAC population of the freshwater pearl mussel, the WFD, which provides the legal and administrative mechanism for maintaining and enhancing water quality in Ireland, may help improve their habitat condition. The measures implemented under the current and future River Basin Management Plans (RBMPs) will improve surface waters that are in moderate poor or bad status and help prevent deterioration in those in high or good status. National investment in municipal wastewater treatment and regulation of such discharges by the EPA are particularly important RBMP measures for the freshwater pearl mussel. Inspection of DWWTS in the wider countryside will reduce pollution from once-off houses. Economic pressures should also reduce the number of new houses proposed, while new guidelines and risk assessment tools should ensure any new houses built will not result in additional pollutant loads. The current RBMP measures are likely to be insufficient to restore the habitat of the freshwater pearl mussel outside of SAC, however, as an objective of good status applies to all river water bodies not currently at high status. 6. New legislation has been enacted and associated guidance developed on EIA and AA of agricultural activities (under the European Communities (Environmental Impact Assessment) (Agriculture) Regulations, S.I. 456 of 2011; the Planning and Development (Amendment) (No. 2) Regulations, S.I 454 of 2011 and the European Communities

(Amendment to Planning and Development Regulations) Regulations, S.I. 464 of 2011). Specific reference to the freshwater pearl mussel is made in the DAFM Guide for farmers and in the draft DECLG guidance on drainage and reclamation of wetlands. These measures should reduce the pressure from land reclamation and intensification in freshwater pearl mussel catchments.
7 Conservation actions to rehabilitate and restore blanket bogs (Reasoned opinion 2010/2161) and ongoing measures to combat overgrazing of upland and peatland resources may help reduce the pressures from peatlands in some freshwater pearl mussel catchments. However, economic pressures are apparently increasing the reliance on relatively cheap fuels such as turf.
Practical measures for addressing agricultural and forestry pressures are still under development. These are key to the full implementation of the freshwater pearl mussel SBMPs. Significant progress is being made in this area, including:
1. Donegal County Council, in partnership with the Northern Ireland Environment Agency, was awarded funding under the European Union's European Regional Development Fund (INTERREG IVA Programme, Priority 2, Theme 2: Environment) for a project aimed at securing the conservation of the freshwater pearl mussel. This project has three main work areas: preparation of management strategies for three Northern Ireland pearl mussel catchments, trialling of a suite of the SBMPs agricultural and forestry measures to establish their effectiveness and cost efficiency and drafting of codes-of-practice to assist authorities and key stakeholders in planning, environmental assessment, mitigation and decision making on proposed developments, works and activities within freshwater pearl mussel catchments. The draft codes-of-practice will cover the development, construction, operation and maintenance of specific activities and sectors including the following: Road, water and sewerage infrastructure, Housing and industrial development, Wind farm development, Water abstractions, physical modifications and impoundments, Agricultural and forestry planning and practices, Peat extraction & quarrying practices and General guidelines for HD Article 6 assessment for the freshwater pearl mussel. The project is scheduled for completion in March 2014
2. The NPWS has completed surveys of erosion and associated risks to the freshwater pearl mussel in the upland and peatland areas of three of the eight priority freshwater pearl mussel catchments, namely the Bundorragha, Dawros and Owenriff. These surveys provide the site-specific and detailed upland and peatland measures that can be implemented through individual farm plans. Each unpublished Catchment Assessment Report contains detailed information on the habitats present, their condition, and the associated erosion-risks; describes the land-uses and recommends habitat-specific measures at a sub-catchment scale. In addition, a standard methods manual for survey, assessment and development of remedial actions in upland and peatland areas of freshwater pearl mussel catchments was completed under the contract. This manual will be the basis of future efforts to produce farm plans for the freshwater pearl mussel.
3. The NPWS, with Woodlands of Ireland, has prepared a freshwater pearl mussel LIFE+ application that will be submitted at the end of June 2013. The project is entitled 'Sustainable land use management for the conservation of freshwater pearl mussel' and will be based in the Caragh and (Kerry) Blackwater catchments, which contain more than 5 million adult mussels. The aims of the project are to demonstrate effective conservation measures for the restoration of the freshwater pearl mussel to favourable condition, to demonstrate sustainable management techniques for farming and forestry, to enhance awareness and understanding of species amongst local stakeholders, and to provide guidance for farming and forestry practices. The project beneficiaries are the NPWS (DAHG), DAFM (Nitrates, Biodiversity and Engineering Division), Forest Service (DAFM), South Kerry Development Partnership, Coillte Teoranta and Teagasc.
4. NPWS has developed, disseminated to relevant public authorities, and continues to

	manage a Margaritifera GeoDatabase containing all freshwater pearl mussel records, maps of the species' habitat and catchments of SAC populations, as well as the catchments of all extant mussel populations. The latter is referred to as the 'Margaritifera Sensitive Areas' map and is available from the NPWS website. This is an invaluable planning tool for public authorities, in particular for environmental assessment purposes (SEA, EIA and AA). The EPA has incorporated the NPWS Margaritifera geodatabase into their WebGIS tool for the implementation of the National Inspection Plan for Domestic Waste Water Treatment Systems. All of these efforts represent significant positive progress, but the restoration of the habitat for the species remains challenging and will take a significant length of time to achieve. The delay to any likely recoveries will result from: 1. The time needed to develop and test the effectiveness of measures for key diffuse pressures, particularly those arising from farming and forestry. 2. The time needed to implement measures. The implementation of agri-environmental or forestry schemes is one example. For DWWTS, a very large number need to be inspected nationally and that this will take a significant amount of time, as will any necessary upgrades. Similarly upgrading urban wastewater collection and treatment systems will take time. 3. Once the source of a pollutant or other pressure has been reduced or eliminated, there will be a delay before the habitat of the freshwater pearl mussel shows signs of recovery (e.g. the time to wash fines out of the river bed or use and re-cycle the available nutrients). 4. After the species' habitat has recovered, there is again likely to be a lag time before recruitment levels improve sufficiently. Owing to the 'gaps' of age classes in the population profiles, it may be decades before adult numbers recover fully. It is unlikely, therefore, that significant recovery will occur, at a national scale, within the next 12 years. As well as the development, implementation and recovery time-scale, there are concerns in relation to the availability of the necessary resources (e.g. to manage and fund the necessary agri-environmental measures), as well as other policy and economic drivers. Agriculture is still the greatest exporter of phosphorus to surface waters in Ireland, and current agricultural policy supports food production and land intensification. The recent state of the Environment reports states: "The development strategy for the agriculture sector, Food Harvest 2020 (DAFF, 2010) proposes a 50% increase in milk production by 2020. While environmental sustainability is a key underlying principle of Food Harvest 2020, the milk production targets will present a significant challenge to meeting WFD objectives." (Lehane and O'Leary, 2012). All of these considerations combined with the current bad status of the species' population and habitat quality and the on-going pressures from sectors such as agriculture and forestry, mean that the future prospects are considered bad. The significant conservation measures being undertaken should, with time, lead to improvements.
2.9.04 b) Future prospects - If CS is U1 or U2, use of qualifiers is recommended	Owing to the significant conservation measures being developed and implemented, the future prospects are considered to be improving.

Field label	Note
Species: 1029	**Freshwater pearl mussel**
2.9.05 Overall assessment of Conservation Status	The distribution of Margaritifera margaritifera is well known and mapped in Ireland. There have been no documented population extinctions since before the 1970s, therefore the species' range is stable. The population has been in decline for a very long time, and was likely initiated by early drainage schemes in Ireland. Most population profiles demonstrate, however, that the decline accelerated in the 1970s. Since 2007, the Irish population is considered to have declined by approximately 8% to 10,990,320 adult mussels. The area of the species habitat has not decreased significantly in recent time, however the habitat quality continues to be in bad condition and, in some rivers, has deteriorated further. Significant conservation effort have been made and specific measures are being developed and implemented, however experts remain uncertain as to likelihood of restoration. A significant time delay is also expected before any individual populations will show signs of recovery. Owing to the bad and declining status of both the species' population and habitat, the on-going pressures and the uncertainties and time-delays associated with its future prospects, the overall conclusion is that Margaritifera margaritifera is in unfavourable bad conservation status.
2.9.06 Overall trend in Conservation Status	The overall trend is considered to be declining, owing to the documented declines in both population and habitat. It is expected that the significant conservation measures undertaken will lead to an overall improvement in the future, however this is unlikely to be evident in the next 12 years.
3.1.02 Method used	Margaritifera margaritifera occurs within 38 SAC, of which 19 are designated for its protection. 56 populations are within the 38 SAC. Using the estimates of Moorkens et al. (2007) accounting for the declines, as documented in 2..4.1 a, it is estimated that there are 10,277,656 adult mussels in the 38 SAC. Estimates are available for all 26 SA populations of the species and they sum to 9,760,975 adult mussels.
3.1.03 Trend of population size within the network (short-term trend)	All freshwater pearl mussel populations are in decline (See 2.4.1 a), therefore the tren within the network is a decline. All of the largest populations with some, but insufficient, recruitment and a slower rate of decline (c1% per year) are within the Natura 2000 network and specifically within the 19 SAC designated for the species' protection. As a result, the decline within the network is slower than in the wider countryside. See 2.4.1a for further information.
3.2 Conservation measures	The species is protected through the Natura 2000 network where it is listed as a qualifying interest for the SAC (Measure 6.3). Conservation objectives for the species i these SAC afford protection against proposed developments and activities, both withi the designated site and the wider catchment, through Article 6 (3). The freshwater pearl mussel is a protected faunal species under the Wildlife Acts (1976, 2000), as it wa added to the Fifth Schedule by Wildlife Act, 1976 (Protection of Wild Animals) Regulations, S.I. 112 of 1990. The species is also afforded legal protection (6.3) under the Water Framework Directive, which prevents deterioration in status, and by the Environmental Liability Directive, which prevents and remedies environmental damag to natural habitats and protected species. Significant conservation measures are being undertaken to restore freshwater pearl mussel populations, notably the 26 SAC populations and, in particular, the eight largest SAC populations which account for 80% of the national population. These conservation measures are detailed in 2.9.4 a. Additionally, The Forestry and Freshwater Pearl Mussel Requirements were published by the Forest Service in 2008. The Requirements describe a range of measures intende to reduce any potential negative impacts on the species arising from forest operations.


Freshwater Pearl Mussel
Margaritifera margaritifera (1029)
Article 17 Assessment 2013
Current Distribution (152 cells)
Current Range (152 cells)
Favourable Reference Range (152 cells)
An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht
Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra
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Macasamhail d'ábhar na Suirbhéarachta Ordonáis le chead ón Rialtas (Ceadunas Uimh. EN 0059212)
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19-06-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1065**
0.2.2 Species name	**Euphydryas aurinia**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	Marsh Fritillary

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	1995-2012
1.1.4 Additional map	Yes
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region: **Atlantic (ATL)**

2.2 Published sources:

Bulman, C.R., Wilson, R.J., Holt, A., Galvez Bravo, L., Early, R., Warren, M. & Thomas, C.D. (2007) Minimum viable metapopulation size, extinction debt, and the conservation of a declining species. Ecological Applications 17: 1460–1473
Fealy, R.M., & Green, S., (editors). (2006) Teagasc EPA Soil and Subsoils Mapping Project-Final Report. Teagasc, Dublin.
Fox, R., Asher, J., Brereton, T., Roy, D. & Warren, M. (2006) The state of butterflies in Britain and Ireland. Pisces Publications, Newbury.
Heath, J., Pollard, E. & Thomas, J. (1984) Atlas of butterflies in Great Britain and Ireland. Viking, Harmondsworth.
Lavery, T. (1993) A review of the distribution, ecology and status of the Marsh Fritillary Euphydryas aurinia Rottemburg, 1775 (Lepidoptera: Nymphalidae) in Ireland. Irish Naturalists' Journal 24: 192-199
Nash, D., Boyd, T. & Hardiman, D. (2012) Irelands' Butterflies. The Dublin Naturalists' Field Club, Dublin
Ní Lamhna, E. (1980) Distribution atlas of butterflies in Ireland. Irish Biological Records Centre, Dublin.
Ravenscroft, N., Bourn, N. & O'Hanrahan, B. 2013. Baseline web surveys and habitat assessments for the Marsh Fritillary Euphydryas aurinia in Moneen Mountain SAC and East Burren Complex SAC. Report to National Parks and Wildlife Service, Dublin.
Regan, E.C., Nelson, B., Aldwell, B., Bertrand, C., Bond, K., Harding, J., Nash, D., Nixon, D., & Wilson, C.J. (2010) Ireland Red List No. 4 – Butterflies. National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Ireland.
Regan, E. and Staats, W. 2013. Irish Butterfly Monitoring Scheme annual report 2012. National Biodiversity Data Centre, Waterford.
Van Swaay, C., Cuttelod, A., Collins, S., Maes, D., Lopez Munguira, M., Šašić, M., Settele, J., Verovnik, R., Verstrael, T., Warren, M., Wiemers, M. & Wynhof, I. (2010) European Red List of Butterflies. Luxembourg: Publications Office of the European Union.
Warren, M.S. (1994) The UK Status and suspected metapopulation structure of a threatened European butterfly, the Marsh Fritillary, Eurodryas aurinia. Biological

Conservation 67:239-249.
Wilson, F., Bond, K., Crushell, P., Foss, P.J. & Osthoff, C. (2013) Survey of Marsh Fritillary Colonies – South and East Ireland 2012. Report to National Parks and Wildlife Service, Dublin.
Woodrow, W. & Allen, D. (2012) Survey of Marsh Fritillary Colonies North and West Ireland 2011 Report. Report to National Parks and Wildlife Service, Dublin.
Woodrow, W. (2013) Survey of Marsh Fritillary Colonies North and West Ireland 2012 Report. Report to National Parks and Wildlife Service, Dublin.

2.3 Range

2.3.1 Surface area - Range (km²)	39300	
2.3.2 Method - Range surface area	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	39300
	operator	N/A
	unknown	No
	method	The distribution and range value are derived from the latest hectad distribution maps combined with data from field surveys. There is no evidence of any historical decline or change in range since the Directive came into force. The Favourable reference range is therefore set as the same current range.
2.3.10 Reason for change	Improved knowledge/more accurate dataUse of different method	

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	N/A		
	min		max	
2.4.2 Population size (other than individuals)	Unit	number of map 10x10 km grid cells (grids10x10)		
	min	239	max	239
2.4.3 Additional information	Definition of locality			
	Conversion method			
	Problems			
2.4.4 Year or period	1995-2012			
2.4.5 Method – population size	Estimate based on partial data with some extrapolation and/or modelling (2)			
2.4.6 Short-term trend period	2001-2012			
2.4.7 Short term trend direction	unknown (x)			
2.4.8 Short-term trend magnitude	min	max	confidence interval	
2.4.9 Short-term trend method	Estimate based on expert opinion with no or minimal sampling (1)			
2.4.10 Long-term trend period				

2.4.11 Long term trend direction	N/A
2.4.12 Long-term trend magnitude	min max confidence interval
2.4.13 Long-term trend method	N/A
2.4.14 Favourable reference population	number operator N/A unknown Yes method The most informative statistic on population size for the Marsh Fritillary in Ireland would be the number of locations or the number of occupied 1km squares. Although there have been localised monitoring surveys in parts of Ireland. there has never been a dedicated national survey for this species and comprehensive data at this resolution is not available. Therefore the Favourable Reference Population is unknown.
2.4.15 Reason for change	Genuine Use of different method

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	1918
2.5.2 Year or period	1995-2012
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Moderate
2.5.4 b) Quality of habitat - method	Habitat quality for Marsh Fritillary is well understood and described from other parts of its range. Good quality habitat is defined generally as having a moderate to high coverage of Succisa pratensis (more than 3 plants per m2) growing in a low-growing unintensive sward with a height range of 10-25cm and low cover of invasive scrub. Shorter and taller sward may also be occupied but these are considered to be less suitable and perhaps indicators of over and under grazing. The definition of good quality habitat in Ireland is still being evaluated and until this is done the assumption is made that it is similar to elsewhere. Results from surveys in 2011 and 2012 indicate that as well as the three factors already mentioned, structure in the vegetation is perhaps important. Webs on the Irish sites appear to be associated with a degree of structural variation in the form of tussocks or hummocks. This is considered to provide support for the webs and allows the species to deal with variation in water levels and exposure (Woodrow & Allen 2012). It was also found that on many sites webs were located in small areas of good habitat within blocks of habitat that were classified using the accepted criteria as marginally suitable habitat. Good quality habitat may therefore encompass taller vegetation than is used in Britain. Where management was evident it was generally of low intensity and mostly by cattle. This is the case on the calcareous grassland in the Burren which are winter grazed and on several large coastal sites in the north west. Many sites especially on peatland sites however appeared unmanaged. Specific site management for Marsh Fritillary is very rare on Irish sites. Many Marsh Fritillary records from peatland sites are from habitat that has been modified by human activity e.g. on recolonised cutaway and on tracks and peat ramparts on abandoned cutover bogs. Wet heath sites may also encompass habitat that has developed on modified bog. The maintenance of these sites in suitable condition for Marsh Fritillary may require intervention and this management for Marsh Fritillary will be incompatible with restoring the original habitat. Marsh Fritillary colonies can be found on many types of site and the habitat it occupies can be difficult to define. The presence of Succisa pratensis is an essential factor. This species is very widespread occurring in virtually every hectad in Ireland. Theoretically the Marsh Fritillary could also occupy this range.

	What prevents occupancy of apparently suitable habitat is not known, but a key aspect may be connectivity of sites. As the Marsh Fritillary occupies the landscape in a metapopulation structure there is a need for a network of sites within a small area to allow the species to survive in the long-term. In England the figure of 50ha of suitable habitat within an area of 16km2 is indicated by Bulman et al. (2008). The modelling suggests that the species may persist in areas with less than the minimum amount of habitat for decades but will eventually go extinct if there is no additional habitat provided. More information is needed on this aspect in Ireland. The best expert judgement is that habitat quality in Ireland is declining (Regan et al 2010). There are many areas of good habitat but a significant proportion of the habitat is isolated and fragmented and not sustainable without management. The assessment of habitat quality is Moderate .
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	unknown (x)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	
2.5.10 Reason for change	Improved knowledge/more accurate data Use of different method

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
agricultural intensification (A02.01)	high importance (H)	N/A
abandonment of pastoral systems, lack of grazing (A04.03)	low importance (L)	N/A
species composition change (succession) (K02.01)	medium importance (M)	N/A
forest planting on open ground (B01)	low importance (L)	N/A
missing or wrongly directed conservation measures (G05.07)	medium importance (M)	N/A
anthropogenic reduction of habitat connectivity (J03.02)	high importance (H)	N/A
Peat extraction (C01.03)	medium importance (M)	N/A

2.6.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
agricultural intensification (A02.01)	high importance (H)	N/A
abandonment of pastoral systems, lack of grazing (A04.03)	low importance (L)	N/A
forest planting on open ground (B01)	low importance (L)	N/A
species composition change (succession) (K02.01)	medium importance (M)	N/A
missing or wrongly directed conservation measures (G05.07)	low importance (L)	N/A
anthropogenic reduction of habitat connectivity (J03.02)	high importance (H)	N/A
Peat extraction (C01.03)	medium importance (M)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	The declines reported for this species are based on small sample sizes and although the decline was considered real the rate of the trend is very uncertain and its extrapolation to national level is uncertain. A large part of this uncertainty is that it is impossible to determining how much of the observed declines are just

	natural fluctuation as there is insufficient long-term data. Habitat is currently considered sufficient for the species and so an Unfavourable-inadequate assessment was reached rather than Unfavourable-bad.
2.8.2 Other relevant Information	Marsh Fritillary is listed as a qualifying feature on the 14 SACs. There are extant populations on 3 of these and it is known from an additional 5 but not in this assessment period. Number of SACs with species as QI with extant populations 3 Number of SACs with species as QI without extant populations 11 Number of SACs without species as a QI with extant populations 25 The last figure is uncertain as some of these may be false positives due to the quality of the data, much of which is just at hectad level.
2.8.3 Trans-boundary assessment	Given the distribution of the species in Northern Ireland and the Republic of Ireland and that the Marsh Fritillary exists in metapopulations, it is highly likely that some of the these straddle the border. A transboundary assessment in the next reporting period would allow a fuller appreciation of the range and status of this species.

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment Favourable (FV) qualifiers N/A
2.9.2. Population	assessment Inadequate (U1) qualifiers declining (-)
2.9.3. Habitat	assessment Favourable (FV) qualifiers N/A
2.9.4. Future prospects	assessment Inadequate (U1) qualifiers declining (-)
2.9.5 Overall assessment of Conservation Status	Inadequate (U1)
2.9.6 Overall trend in Conservation Status	declining (-)

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit number of map 10x10 km grid cells (grids10x10) min 109 max 109
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)
3.1.3 Trend of population size within	unknown (x)

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Inside	Not evaluated
Measures needed, but not implemented (1.2)		()		

Field label		Note
Species:	**1065**	**Marsh Fritillary**

0.2.01 Species code

The Marsh Fritillary is an attractive butterfly with chequered wings of brown, orange, black and white. The adults have a short flight period of 4-6 weeks in May and June. Males emerge first a few days before the females. Females emerge with completely developed eggs and mating occurs soon after emergence. Within a few hours the female will have laid a first batch of eggs of several hundred eggs on the underside of a leaf of the foodplant, which in Ireland is exclusively Devil's-bit Scabious Succisa pratensis. Females may lay a second or possibly third batch of eggs on subsequent days. Females are incapable of flight until they have laid the first egg batch but they become more mobile and capable of short-distance dispersal as they age. This is the only period of the life cycle when long distance dispersal can occur. However, the evidence all indicates that the Marsh Fritillary is relatively sedentary, rarely dispersing beyond 750m, although colonisation may rarely take place over longer distances of 5–20 km (Warren 1994).

The larval stage is the longest part of the annual lifecycle lasting nine months. From August until October the brown-black spiny caterpillars feed together on Succisa leaves, protected inside a silken white web. During the winter they hibernate together in a small web hidden within the vegetation. The caterpillars emerge on sunny days in February or early March to feed, basking on exposed dead grass or leaf litter. As their feeding requirements increase they separate into smaller and smaller groups eventually becoming solitary feeders. The larvae pupate in late April with adults emerging two to three weeks later.

Caterpillars suffer from both parasitism and predation. Some studies have considered parasitism to be a driver of the population but the impact of parastism in Ireland is not known.

Marsh Fritillary lives in habitats where the foodplant is found in a low open sward that is typically dominated by grasses and sedges. Colonies in Ireland occur in a wide variety of situations often in a complex mosaic of habitats that are difficult to define and categorise and may appear to be far from the pristine condition of the habitat. Colonies have been recorded on sand dunes, fens, cutover raised bogs, blanket bogs and wet heaths, unimproved wet, neutral and calcareous grasslands, calcareous and coastal heaths. Most sites are in lowland situations below 200m but it has been recorded up to 350m in recent years. The species is associated with the following Annex I habitats (Regan et al. 2010)

2130 Fixed dunes (grey dunes), 2190 Humid dune slacks, 21A0 Machair, 4010 Wet heath, 6210 Orchid rich/calcareous grassland, 6410 Molinia meadows, 7120 Degraded raised bogs, 7140 Transition mires and 7230 Alkaline fens.

In surveys covering 66 Marsh Fritillary breeding and potential sites across Ireland in 2011 and 2012, the following Fossitt (2000) habitats were reported (Woodrow & Allen 2012; Woodrow 2013; Wilson 2013). Some sites may have had more than one habitat.

Fossitt Habitat classification (Number of sites classified n=66)

GS4 Wet grassland (31)
PB4 Cutover bog (25)
HH3 Wet heath (20)
PF1 Rich fen and flush (13)
GS1 Dry calcareous and neutral grassland (6)
HH2 Dry calcareous heath (6)
PF2 Poor fen and flush (6)
GS2 Dry meadows and grassy verges (6)
PF3 Transition mire & quaking bog (5)
GS3 Dry-humid acid grassland (4)
CD3 Fixed dunes (2)
CD6 Machair (2)
PB2 Upland Blanket Bog (2)
CD5 Dune slacks (1)
ER2 Exposed Calcareous Rock (1)
HH4 Montane Heath (1)

Colonies exist in a metapopulation which means they occupy patches in a cycle of extinction and recolonisation. Individual sites may not be permanently occupied, but the site nevertheless contributes an area of habitat to a population network that is needed to ensure the long-term survival of a metapopulation. The species survives best in an open landscape where movement is largely unimpeded and habitat patches are easily reached by the relatively sedentary adults. Modelling suggests that population networks require a minimum of 50ha of suitable habitat within a 16km2 area to persist in the long term (Bulman et al. 2007). Most population networks in western Europe are considered to be below this threshold and although many persist they are considered highly likely to go extinct even without further loss of habitat.

In the latest red list assessment of Irish butterflies (Regan et al. 2010) the Marsh Fritillary was assessed as Vulnerable. It was assessed as Least Concern on the European red list (Van Swaay et al 2010).

Field label	Note
Species: 1065	**Marsh Fritillary**
1.1.02 Method used - map	Knowledge of the distribution of the Marsh Fritillary in Ireland is incomplete. There are issues with poor coverage, no reliable baseline survey (a systematic national survey has not been attempted), lack of long-term data, amalgamation of historic data and access to much site-based data. This hinders interpretation of published distribution maps and makes it especially difficult to assess the changes in range. There have been several butterfly atlases produced which show the distribution in Ireland in different time periods since the 1970s. The early maps produced for the species are undoubtedly based on poor coverage and many of the individual records lack good quality supporting data. Levels of recording of the species have been improving over time, however some datasets are only publicly available at the hectad-level. The earliest maps produced include Ní Lamnha (1980) and Heath et al. (1984). The maps in the latter showed the distribution in three time periods, the most recent being 1970-1982. There were approximately 30 occupied hectads shown in Heath (1984) but these were widespread across Ireland from the south coast to northern Donegal. Lavery (1993) produced a review paper on the species and this included a map showing the distribution in hectads from 1980-1990. This showed many more occupied hectads (109) than previously and it was considered that the species range was at least stable. More organised mapping of the butterflies in Ireland has been taking place under the Butterflies for the New Millennium project. This has produced three series of maps (1995-1999 Asher et al. 2000; 2000-2004 Fox et al. 2006. and 2005-2009 Nash et al. 2012) covering successive five year periods from 1995 which have allowed some assessment of change in range and distribution. Asher et al. (2000) used the 1970-1982 period as a baseline to assess change. However the baseline data for Ireland appears to be an amalgamation of the data in Heath et al (1982) and Lavery (1993) i.e. extends over a different time period. Detailed surveys of the Marsh Fritillary have been undertaken in some parts of Ireland including the north-west in 2011 (Woodrow & Allen 2012) with a repeat on many of the same sites in 2012 (Woodrow 2013), the south and east (Wilson et al 2013) and the Burren (Ravenscroft et al 2013). The Red List showed the distribution in two time periods, pre 1995 and 1995-2009 based on the published maps. The number of post 1995 records (155) is just over twice the number of pre-1995 records (74). This increase in hectads is considered to be due to improved coverage rather than a genuine increase. The Irish data is indicated at hectad resolution in the absence of comprehensive higher resolution data. The distribution shown in Nash et al. (2012) is supplemented by data from NPWS commissioned surveys, data supplied to the National Biodiversity Data Centre as part of its butterfly monitoring scheme and casual recording, and records and maps displayed on web sites such as ButterflyIreland (http://www.butterflyireland.com accessed January 2013)
1.1.04 Additional distribution map	All field verified records were intersected with the ING 10 square grid.
1.1.05 Range map	The range map was calculated with the range tool.
2.3.01 Surface area - Range	This figure has been derived from the range map referred to in 1.1.5.
2.3.04 Short term trend - Trend direction	The number of occupied hectads in this period is an increase from the previous assessment. The overall pattern of the distribution is broadly similar to that shown in the previous assessment but increased recording has produced many new records, especially in Donegal and Wicklow. There have been no records for some south-eastern counties especially Waterford since the 1970s and many losses were reported by Lavery (1993) in Kerry but these were before the Habitats Directive came into force. The species seems always to have been absent from the north east. What is lacking is comprehensive data from shorter time periods to allow trends to be calculated. Comparison across time periods shown on historic maps must be interpreted carefully as coverage varies. The latest red list assessment (Regan et al. 2010) considered the species was Vulnerable due to a greater than 30% decline in area of occupancy and decline in habitat quality since 1995. This would equate to a decline of more than 2% per annum over this period. Fox et al. (2006) classified the trend in Ireland between the two recording periods 1970-1982 and 1995-2004 as a ‘severe decrease’ which means a decline of more than 50% in the number of occupied hectads. There is however difficulty in accepting this last figure in light of better knowledge. Expert opinion is that the decline is at the local level and is not apparent in the coarse hectad data that is available for this assessment. In the absence of any reliable data the range trend is assessed as stable.
2.3.10 a) Reason for change - genuine change?	There is no evidence for change at the hectad level in the assessment period. The species is still present in all of its historical range since the Habitats Directive came into force.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	There has been significantly better recording coverage at the hectad level for the species since 1995.

Species:	1065	Marsh Fritillary
2.3.10 c) Reason for change - use of different method?	The range tool was different from that used in the previous assessment.	
2.4.02 a) Population size estimation (using population unit other than individuals) - Unit	In the absence of comprehensive fine resolution data e.g. the site or 1km2 level, the number of occupied hectads is used as a surrogate for population size.	
2.4.03 c) Additional information on population estimates / conversion - Problems encountered	The most informative statistic on population size for the Marsh Fritillary in Ireland would be the number of locations or the number of occupied 1km squares. There has never been a dedicated survey for the Marsh Fritillary in Ireland and comprehensive data at this resolution is not available.	
2.4.07 Short-term trend - Trend direction	The number of occupied hectads is taken as the surrogate for population because of the limitations of the data. Equating population with the range data would suggest that there has been no decline in population and certainly not of the order of 50% since 1970s as given in Fox et al. (2006). Expert opinion is that the area of occupancy at the site level has declined over the 1995-2009 period at 30% or more. This would equate to a decline of more than 2% per annum over this period. There is some data on the population trends in this species from the Irish Butterfly monitoring scheme (Regan & Staats 2013) and from surveys of colonies in the north west and south east of Ireland (Woodrow & Allen 2012; Woodrow 2013; Wilson et al 2013). The numbers of adults has been monitored on 21 transects covered by the Irish Butterfly monitoring scheme since 2008. The trend of the adult numbers is a statistically significant, moderate decline. The index value in 2012 was 0.5 compared to the baseline of 1 in 2008 meaning a 50% reduction has been observed on the monitored sites since 2008 (Regan & Staats 2013). Web counts using the same methodology were carried out on 22 sites in the northwest in 2011 and 2012 (Woodrow & Allen 2012; Woodrow 2013). Webs were seen on all 22 sites in 2011. The total number of webs on all sites fell from 454 in 2011 to 137 in 2012, a decrease of 70%. Decreases were noted on 19 of the 22 sites and no webs were found on 6 sites. Just three sites recorded an increase. Some data on trends in the habitat quality is also available from these surveys. Habitat quality increased on 9 sites, was stable on 9 sites and declined on 4 sites. All the sites with declining habitat quality showed a drop in web numbers from 79 to 14, a decrease of 83% and a greater rate of decline than on sites overall. On two of the sites no webs were seen. This data supports an assessment of a declining population at the site level which is not apparent at the coarse hectad level. The data is not robust enough to determine a rate of decrease. A longer time series of monitoring data is needed to determine if the declines reported and observed are just natural population fluctuations or long-term trends.	
2.4.14 c) Favourable reference population - If favourable reference population is unknown	The most informative statistic on population size for the Marsh Fritillary in Ireland would be the number of locations or the number of occupied 1km squares. There has never been a dedicated national survey for the Marsh Fritillary in Ireland and comprehensive data at this resolution is not available.	
2.4.15 a) Reason for change - genuine change?	Expert opinion is that the Marsh Fritillary declined at the site level in the 1995-2010 period by at least 30%. A decline in population is supported by the limited data from web surveys and the Irish Butterfly monitoring scheme as described in 2.4.7.	
2.4.15 c) Reason for change - use of different method	Population in the last assessment was determined as 48 core populations. There is insufficient data to determine the number of core populations in Ireland and nor is it clear what constitutes a core population.	

Field label	Note
Species: 1065	**Marsh Fritillary**
2.5.01 Area estimation	The metapopulation nature of the Marsh Fritillary requires the area of suitable habitat to be larger than the area of occupied habitat as a network of patches is required to allow for expansion and contraction according to the cyclical nature of the species. The only data on the relationship between area of potential habitat and area of occupancy comes from the Burren (Ravenscroft et al. 2013). In the two Burren SACs (Moneen Mountain and East Burren SAC) it is estimated that there is 5700 ha of suitable habitat which is 22% of their total area. This data does show that in the Burren at least there is potentially a large area of suitable habitat but how much is needed for the species to maintain itself is still unclear. There is no estimate of what this figure is in Ireland. The Habitat area was calculated by intersecting the current range with the Teagasc habitat and landcove data from Fealy & Green (2006). The land cover classes that were chosen were those which corresponded best with the habitats with which the species has been associated with in the recent surveys (Woodrow & Allen, 2012, Woodrow 2013, Wilson et al 2013, Ravenscroft 2013) as described in 0.2.1. These were Bog and Heath, Wet Grassland, Fen, Cutover Fen, Reclaimed Fen, Raised Bog/Fen, Cutover Raised Bog, Reclaimed Raised Bog, Cutover/Eroding, Reclaimed Lowland Blanket Bog, Heath anc Wetland. This produced a habitat surface area estimate of 8718 km2. Applying the percentage of suitabl habitat from the Burren SACs (Ravenscroft 2013) of 22% to this national estimate produces a figure of 1918 km2. The applicability of the estimate from the Burren to other regions and nationally is very uncertain so the calculated figure must be viewed as a maximum estimate.
2.5.04 a) Quality of the habitat - Good / moderate / bad / unknown	Habitat quality for Marsh Fritillary is well understood and described from other parts of its range. Good quality habitat is defined generally as having a moderate to high coverage of Succisa pratensis (more than 3 plants per m2) growing in a low-growing unintensive sward with a height range of 10-25cm and low cover of invasive scrub. Shorter and taller sward may also be occupied but these are considered to b less suitable and indicators of over and under grazing. The definition of good quality habitat in Ireland is still being evaluated and until this is done the assumption is made that it is similar to elsewhere. Results from surveys in 2011 and 2012 indicate that as well as the three factors already mentioned, structure in the vegetation is perhaps important. Webs on the Irish sites appear to be associated with a degree of structural variation in the form of tussocks or hummocks. This is considered to provide support for the webs and allows the species to deal with variation in water levels and exposure (Woodrow 2013). It was also found that on many sites webs were located in small areas of good habitat within blocks of marginally suitable. Occupied habitat in Ireland may therefore encompass taller vegetation than is used in Britain. Where management was evident it was generally of low intensity and mostly by cattle. This is the case on the calcareous grassland in the Burren which are winter grazed and on several large coastal sites in the north west. Specific site management for Marsh Fritillary is very rare on Irish sites. Many sites especially on peatland sites however appeared unmanaged and many of these sites are on peat habitat that has been modified by human activity e.g. on vegetated cutaway and on tracks and ramparts on abandoned cutover bogs. Succisa colonises these areas but is otherwise absent from intact bog surfaces. Occupied wet heath and fen sites may also encompass habitat that has developed on modified bog. The maintenance of these sites in suitable condition for Marsh Fritillary may require intervention and this management is likely to be incompatible with restoring the original habitat. Marsh Fritillary colonies can be found on many types of site and the habitat it occupies can be difficult to define. The presence of Succisa pratensis is an essential factor. This species is very widespread occurring in virtually every hectad in Ireland. Theoretically the Marsh Fritillary could also occupy this range. What prevents occupancy of apparently suitable habitat is not known, but a key aspect may be connectivity of sites. As the Marsh Fritillary occupies the landscape in a metapopulation structure there is a need for a network of sites within a region to allow the species to survive in the long-term. In England the figure of 50ha of suitable habitat within an area of 16km2 is indicated by Bulman et al. (2007). The modelling suggests that the species may persist in areas with less than the minimum amount of habitat for decade but will eventually go extinct if there is no additional habitat provided. More information is needed on this aspect in Ireland. The best expert judgement is that habitat quality in Ireland is declining (Regan et al 2010). The data from the repeat surveys in 2011 and 2012 on 22 sites in the north west (Woodrow & Allen 2012; Woodrow 2013) found that habitat quality was stable or increased on 18 sites and declined on 4 sites. How applicable this result is across the range is unknown due to the lack of information from more sites. The assessment of habitat quality is Moderate. Whilst there are many areas of good habitat there is a significant proportion of habitat that is not in good or suitable condition for the species. Habitats are als isolated and fragmented and not sustainable without direct management or other intervention.
2.5.06 Short-term trend - Trend direction	The expert judgement used in the red list assessment is that habitat quality in Ireland is declining (Regar et al 2010). The data from the repeat surveys of 22 sites in the north west in 2011 and 2012 (Woodrow & Allen 2012; Woodrow 2013) found that habitat quality was stable or improved on 18 sites but had declined on 4 sites. How applicable this result is across the range is unknown due to the lack of information from more sites. There would appear to be a large area of potentially suitable habitat throughout Ireland but there is no comprehensive data on area of occupancy of this potential area. In th absence of comprehensive data, the trend in habitat quality is assessed as unknown.

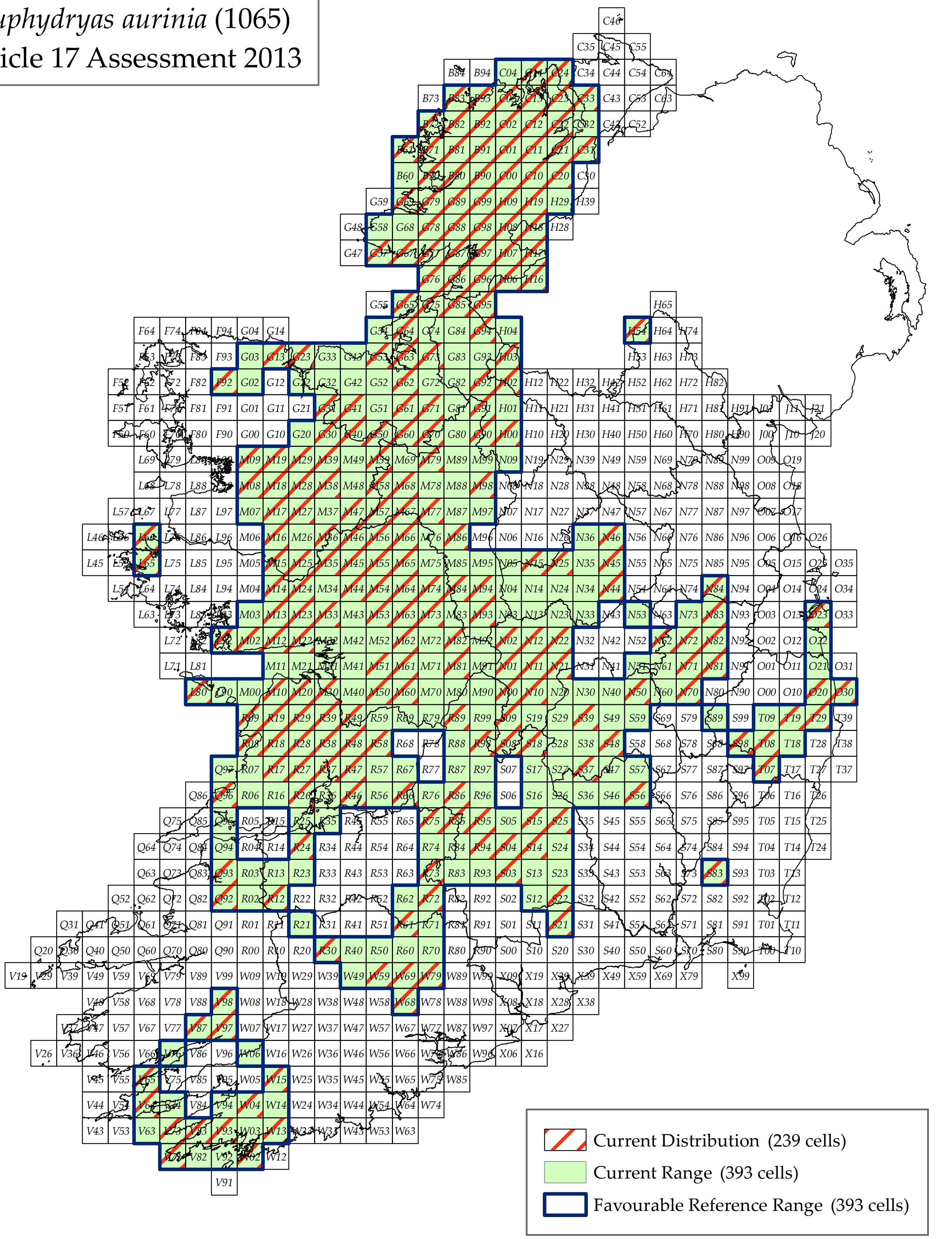
Field label	Note
Species: 1065	**Marsh Fritillary**
2.5.09 Area of suitable habitat for the species (km2)	The metapopulation nature of the Marsh Fritillary requires there to be a larger area of suitable habitat to occupied habitat. A network of patches is required to allow the species to expand and contract according to the cyclical nature of the species. The only data on the relationship between area of potential habitat and area of occupancy comes from the Burren (Ravenscroft et al. 2013). In the two Burren SACs (Moneen Mountain and East Burren SAC) it is estimated that there is a combined area of 5700 ha of suitable habitat but in 2012 webs were only found in sample squares which covered 19% of the potential habitat resource and that the actual area of occupancy would be much smaller. This data does show that in the Burren at least there is potentially a large area of suitable habitat but how much is needed for the species to maintain itself is still unclear. There is no estimate of what this figure is in Ireland.
2.5.10 c) Reason for change - use of different method (e.g. 'Range tool')?	The area of habitat was unknown in the last assessment. One was calculated in this assessment using the land cover classes produced by Teagasc (Fealy & Green 2006).

Field label	Note
Species: 1065	**Marsh Fritillary**
2.6 Main pressures - Pressure	The list of pressures are derived from expert opinion and evidence from site surveys. Expert opinion is that the pressures most affecting the Marsh Fritillary in Ireland are affecting site occupancy and quality of habitat. There is no evidence of any significant or widespread direct impact on the adult or larval stages. Parasitism of the larvae has been suggested as a cause of population cycling in the Marsh Fritillar and as a reason for shifts in site occupancy (Woodrow & Allen 2012). Parasitism has been observed on Irish sites but at low frequency and no instances of parasitism were reported in the site surveys in 2011 and 2012 (Woodrow & Allen 2012; Woodrow 2013; Wilson et al. 2013; Ravenscroft et al 2013). Other experts have also reported a low incidence of parasitism in Ireland. There is no evidence of collection of adults in Ireland. Marsh Fritillary colonies occur on a wide variety of sites as described in 0.2.1. Data from the sample of 5(sites covered in 2011 and 2012 would suggest that most sites are unmanaged (Woodrow & Allen 2012; Woodrow 2013; Wilson et al. 2013). Wilson et al (2013) found that that the majority of webs (224 out of 248, 93%) were found in habitat with no signs of grazing. This lack of management is probably significant in creating the conditions that allow the species to colonise some sites and the species undoubtedly also benefits from pressures on other habitats. This is most obvious on bogs where the species is found on areas of damaged bog such as tracks and uncut ramparts and areas of abandoned peat cutting. Succisa will colonise these modified areas although it is largely or completely absent from the original habitat (e.g. on Ballincurry bog Co Sligo Woodrow 2013). The longevity of these populations is unknown but the are easily lost by human activity and natural succession. Habitat on coastal sites and on the Burren is les prone to change. These sites tend also to be larger and are grazed in an unintensive way that benefits th Marsh Fritillary (Ravenscroft et al 2013). As the sites are large they encompass enough natural variation to allow the species to persist. Many heathland and wet grassland sites are unmanaged but may have been managed in the past. For this reason G05.07 - missing or wrongly directed conservation measures is included as a pressure. Occupancy by the Marsh Fritillary may only be possible after abandonment but the continued lack of management will mean these sites become less suitable over time. The rate of this change will depend on the nature of the sites especially wetness and the frequency of events such as burning. These heath and wet grassland sites are often considered marginal or degraded examples of richer habitat and at risk from intensification and change of land use. The Marsh Fritillary is a difficult species to deal with satisfactorily through designation. Currently it is a listed feature on 14 SACs. Most of the population undoubtedly lives outside the SAC network. Fifty three of the 66 known and potential breeding sites surveyed in 2011/2012 were outside the SAC network. All o the SACs with Marsh Fritillary as a QI were thought, based on the information available, to have breeding populations when selected. Searches for the species have been undertaken on 11 of the 14 SACS, the three exceptions being 000365 Killarney National Park, 001387 Ballynafagh Lake and 002034 Connemara Bog Complex. See list below. Breeding populations were confirmed from 3 SACs (000054, 001926 & 000197) since 2007. There are currently no known colonies on any of the raised bog SACs. These sites are problematic for the Marsh Fritillary as ensuring favourable conservation status for the habitat may not be compatible with the needs of the butterfly. The SAC list for this species will be reviewed in due course. SAC-Habitat-Status of species-Surveyed since 2007(Yes/No) 000432 Barrigone-Calcareous grassland. -Suitable habitat but no recent records-Yes 000692 Scragh Bog -Fen. Very limited habitat-Last recorded 2006-Yes 001656 Bricklieve Mountains & Keishcorran -Wet grassland heath in suitable condition-No recent record Yes 000600 Cloonchambers Bog -Raised bog. -Habitat very limited. No records since 2006. Nearby occupied site in 2011-Yes 000365 Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment-Heath, grassland -No recent records-No 000054 Moneen Mountain-Calcareous grassland, limestone pavement-Suitable habitat is abundant. Current population small-Yes 001926 East Burren Complex -Calcareous grassland, limestone pavement, wet heath, fen sites. -Habitat i abundant and highly suitable. Found in several areas in the southern part of the SAC-Yes 001387 Ballynafagh Lake-The Marsh Fritillary was undoubtedly present at this site but has not been seen since 1999-Habitat exists and is of sufficient size and quality to support a population if managed appropriately-No 000197 West of Ardara/Maas Road-Wet heath, fen and dune slack. Habitat in suitable condition-Present at Sheskinmore; population considered good-Yes 000572 Clara Bog-Raised bog; habitat limited and on tracks and peripheral areas -No records since 2010-Yes 000592 Bellanagare Bog-Raised bog; limited habitat on disturbed areas, tracks and banks-No current records. Status uncertain-Yes 000595 Callow Bog-Raised bog; limited habitat on disturbed areas, tracks and banks-No recent records. Status uncertain-Yes 000597 Carrowbehy/Caher Bog -Raised bog; limited habitat on disturbed areas, tracks and banks-No recent records. Status uncertain-Yes

Field label	Note
Species: 1065	**Marsh Fritillary**
	002034 Connemara Bog Complex-Blanket bog, grassland-No recent records. Status uncertain-No The pressures listed for this species are A02.01 - agricultural intensification. This is assessed as a high pressure as it is considered a direct threat to sites but also reduces connectivity of the species through habitat fragmentation. As the habitat is often considered marginal its importance is not recognised in impact assessments. A04.03 - abandonment of pastoral systems, lack of grazing. The species can be lost through lack of grazing but equally over grazed sites may become suitable if land is abandoned. The balance between these is uncertain in Ireland so the impact is assessed as low overall. K02.01 - species composition change (succession). This particularly affects wetland and peatland sites where natural succession to woodland and scrub reduces habitat quality. A moderate impact. B01 - forest planting on open ground. This is a real pressure on marginal land. Instances of planting applications on Marsh Fritillary sites are known. Assessed as low as this activity should be controllable. C01.03 – peat extraction. This is included as a pressure as Marsh Fritillary colonies tend to occupy damaged areas of raised bogs, access tracks and uncut ramparts. An increase in peat extraction tends to affect these areas through e.g. vehicle activity, storage of material. Also policies of increasing cutting on degraded bogs as substitute for intact bogs may increase pressure on the species as it is more likely to have colonies on degraded sites. G05.07 - missing or wrongly directed conservation measures. Refers to lack of appropriate management regimes, both within and outside the SAC network. J03.02 - anthropogenic reduction of habitat connectivity. Assessed as high pressure as related to other pressures.
2.6.01 Method used - Pressures	The list of pressures are derived from expert opinion and evidence from site surveys
2.7 Threats - Threat	The pressures are listed as threats as there is no evidence that they will cease in the immediate future. The lack of connectivity of sites is recognised as being particularly important for the Marsh Fritillary based on the evidence of decline elsewhere (Bulman et al. 2007). There is no data on the mobility of the species through the Irish landscape but the broad range of the species and its appearance in some unexpected sites (eg North Bull Island in Dublin), suggest that this is not a serious issue at present in Ireland but the experience from other regions is that the apparent persistence of metapopulations is no guarantee that there is sufficient habitat or connectivity to ensure long-term survival.
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Marsh Fritillary is a widespread species in Ireland. The current distribution is concentrated in a broad band in the west midlands from Limerick to Donegal. Large gaps exist in the country especially in the north east (Meath and Louth), the south east (Wexford, Kilkenny and Waterford) and the extreme west of Galway and Mayo. The species did occur in the south east but the populations were lost many decades ago. It has never been reported in the north east but suitable habitat does exist, so the species may still be undetected. There are a few occupied sites in the extreme west and habitat does exist and the species may be under-recorded. There appear to be no natural climatic reasons why the species could not occur throughout the whole island. The current range is probably as extensive as it ever has been but this assessment is hampered by lack of comprehensive historic data. Some of the increases in range could be genuine e.g. the northward expansion into Donegal, or through recolonisation of former range e.g. its reappearance in Dublin and Wicklow. The interpretation is that the range of Marsh Fritillary is still extensive and there are no climatic or ecological limits on the species. There is no evidence that range has declined since the Directive came into force and therefore the assessment is Favourable.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	There is no comprehensive data on population across the entire range in Ireland. Lack of data especially at the site level hampers assessment. The best data on population trends comes from repeat surveys of breeding populations and the Irish Butterfly Monitoring scheme. The repeat surveys recorded a reduction in the number of webs of 73% between 2011 and 2012. Monitoring data shows a statistically significant decline since 2008 of 50% on monitored sites. This decline may be part of natural fluctuations but this will require data from more sites and over a longer period to determine the trend. The conclusion on population is therefore Unfavourable-inadequate rather than Unfavourable-bad.
2.9.02 b) Population - If CS is U1 or U2, use of qualifiers is recommended	The assessment is Declining due to the declines described above.
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The overall assessment of habitat quality is that it is Moderate. Whilst there are many areas of good habitat there is a significant proportion of habitat that is not in good or suitable condition for the species. Nevertheless there remains a considerable area of habitat available for the species that is currently considered sufficient for it to maintain its range. The assessment of habitat is therefore favourable.

Field label	Note
Species: 1065	**Marsh Fritillary**
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	The significant pressures affecting Marsh Fritillary in Ireland are related to habitat quality and its extent and there is no reason to consider that they will reduce in the foreseeable future. As the impact on the species is not direct and immediate it may be some time before there is an observable reduction in range. The impact of the pressures may increase as habitat patches become more fragmented and isolated and metapopulations cease to function. The pressures could be mitigated by implementation of appropriate policies at the landscape level to address the needs of the species. At the site level, conservation measures are well-understood especially to improve and maintain the quality of habitat.
2.9.05 Overall assessment of Conservation Status	Although the range of the species is good the opinion is that the population and habitat quality are declining and that these declines will continue unless appropriate measures are taken to reduce the pressures. The overall assessment is Inadequate.
3.1.01 a) Population size - Unit	The total number of records of the species is 943 of which 109 (11.6%) are within the SACs. Some of these points may be false positives because of the resolution of the data points (many are simply at hectad level).
3.1.03 Trend of population size within the network (short-term trend)	Most of the Marsh Fritillary resource is probably outside SACs. There is no data available to determine the population trend within SACs. The trend is assumed to be the same as the whole population.
3.2 Conservation measures	Marsh Fritillary is listed as a qualifying feature on 14 SACs which are protected by the Habitat Regulation (S.I. No. 477/2011). This regulates any plans or projects that may negatively impact on the species. There is also an NPWS list of Activities Requiring Consent (ARCs) that are only granted if they do not negatively impact on the Qualifying features within an SAC. Impacts to Marsh Fritillary populations regulated under the Environment Liability Regulations 2008, which prevents and remedies environmental damage to natural habitats and protected species.

Marsh Fritillary
Euphydryas aurinia (1065)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 10 20 30 40 50 km

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Map - Léarscáil
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Date - Dáta
25-05-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1092**
0.2.2 Species name	**Austropotamobius pallipes**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	White-clawed Crayfish

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	2007-2012
1.1.4 Additional map	Yes
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published sources

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2.3 Range

2.3.1 Surface area - Range (km²)	35700	
2.3.2 Method - Range surface area	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	increase (+)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	35700
	operator	N/A
	unknown	No
	method	The distribution and range value are derived from the NPWS crayfish database. There is evidence of change in the range from when the Directive came into force. There appear to be some unexplained fluctuations in the populations at some sites, especially lakes, which are not well understood. The Favourable reference range in the last assessment was 334 hectads.
2.3.10 Reason for change	Genuine Improved knowledge/more accurate dataUse of different method	

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	N/A		
	min		max	
2.4.2 Population size (other than individuals)	Unit	number of map 10x10 km grid cells (grids10x10)		
	min	223	max	223
2.4.3 Additional information	Definition of locality			
	Conversion method			
	Problems	The crayfish is currently widespread occurring in rivers, streams and lakes. The species is naturally efficient at concealing itself making detection difficult. Counting individuals is therefore largely impractical in the majority of Irish habitats. It is also clear that the species is prone to unexplained fluctuations particularly in lakes but also on some rivers. As most of the recording of the species is through simple presence and absence surveys, there is difficulty in relating this to actual population.		

2.4.4 Year or period	2007-2012		
2.4.5 Method – population size	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.6 Short-term trend period	2001-2012		
2.4.7 Short term trend direction	unknown (x)		
2.4.8 Short-term trend magnitude	min	max	confidence interval
2.4.9 Short-term trend method	Estimate based on expert opinion with no or minimal sampling (1)		
2.4.10 Long-term trend period			

2.4.11 Long term trend direction	N/A		
2.4.12 Long-term trend magnitude	min	max	confidence interval
2.4.13 Long-term trend method	N/A		
2.4.14 Favourable reference population	number	223	
	operator	N/A	
	unknown	No	
	method	As there is no evidence of any significant decline in population size since the Directive came into force the current population estimate is set as the Favourable Reference Population of 223 occupied hectads. The population figure is derived from the sampling data and other records from 2007 to 2012 and this is considered to represent the population baseline.	
2.4.15 Reason for change	Use of different method		

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	73.47
2.5.2 Year or period	2007-2012
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Good
2.5.4 b) Quality of habitat - method	This is based on expert judgment.
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	stable (0)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	
2.5.10 Reason for change	Use of different method

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
invasive non-native species (I01)	high importance (H)	N/A
Leisure fishing (F02.03)	low importance (L)	N/A
dredging/ removal of limnic sediments (J02.02.01)	low importance (L)	N/A
management of aquatic and bank vegetation for drainage purposes (J02.10)	low importance (L)	N/A
introduction of disease (microbial pathogens) (K03.03)	high importance (H)	N/A
Pollution to surface waters (limnic & terrestrial, marine & brackish) (H01)	low importance (L)	N/A

2.6.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
invasive non-native species (I01)	high importance (H)	N/A
introduction of disease (microbial pathogens) (K03.03)	high importance (H)	N/A
Pollution to surface waters (limnic & terrestrial, marine & brackish) (H01)	low importance (L)	N/A
dredging/ removal of limnic sediments (J02.02.01)	low importance (L)	N/A

management of aquatic and bank vegetation for drainage purposes (J02.10)	low importance (L)	N/A
Leisure fishing (F02.03)	low importance (L)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant Information	White-clawed Crayfish is listed as a qualifying feature on 15 SACs. The occurrences within the SAC network is summarised below. Number of SACs with species listed as Qualifying Interest (QI) with extant populations 13 Number of SACs with species as QI without extant populations 2 Number of SACs without species as a QI with extant populations 17
2.8.3 Trans-boundary assessment	There is a clear linkage with the range in Northern Ireland as the species is found in several in cross-border catchments and in one SAC that straddles the Fermanagh/Monaghan border. A transboundary assessment in the next reporting period would allow a fuller appreciation of the range and status of this species.

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.9.2. Population	assessment	Favourable (FV)
	qualifiers	N/A
2.9.3. Habitat	assessment	Favourable (FV)
	qualifiers	N/A
2.9.4. Future prospects	assessment	Inadequate (U1)
	qualifiers	stable (=)
2.9.5 Overall assessment of Conservation Status	Inadequate (U1)	
2.9.6 Overall trend in Conservation Status	stable (=)	

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	number of map 10x10 km grid cells (grids10x10)		
	min	89	max	89
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3 Trend of population size within	stable (0)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Both	Maintain
Restoring/improving water quality (4.1)	Legal Recurrent	low importance (L)	Both	Maintain

Field label	Note
Species: 1092	**White-clawed Crayfish**
0.2.01 Species code	The White-clawed Crayfish, Austropotamobius pallipes (Lereboullet), is the largest non-marine invertebrate found in Ireland. Adults can grow to approximately 11cm in length. It is also relatively long-lived with a maximum life of 10 years. Globally it is confined to south and west Europe occurring from Spain, Italy and Croatia, north to Switzerland, Austria, western Germany, France, the U.K. and Ireland (Souty-Grosset et al. 2006). There is good evidence that the Irish population was introduced from France around 1680 (Gouin et al., 2003) and the UK, French and Irish populations are genetically rather uniform. The species is highly vulnerable to fungal disease carried by several American species of crayfish. The Irish population has considerable conservation significance as the island is uniquely free of both the disease and the non-native Crayfish species. In most of its range White-clawed Crayfish is found most commonly in first-order streams, but in Ireland it has a much wider habitat range occurring in small and medium-sized lakes (O'Connor et al, 2009), large rivers, streams and drains wherever there is sufficient lime (Lucey and McGarrigle 1987, Reynolds 1978, 1982, 1997, 1998, Reynolds and Demers 2006, Gallagher et al. 2006). In other parts of Europe, it may naturally be restricted to upper river courses by interactions with indigenous species of crayfish. Since the introduction of American crayfish and the appearance of disease transmitted by these non-native species, it has disappeared from many rivers. The impact on A. pallipes is well documented for the U.K. and France (e.g. Holdich et al. 1999). The White-clawed Crayfish is generally associated with good quality waters (e.g. Grandjean et al. 2003) but this is not necessarily the case in Ireland where it can occur in water of lower quality, down to a Q value of around 3 or an ASPT of 4 (Demers and Reynolds 2002, 2003, Gallagher et al. 2006). It is now generally considered as a keystone or heritage species rather than as a bioindicator (Reynolds and Souty-Grosset 2003), because of its traditional importance and its large size, longevity and dominant position in the ecosystem (Matthews and Reynolds 1992). The species prefers relatively cool temperatures and adequate dissolved oxygen and lime, although tolerating significant fluctuations in these parameters (Lyons and Kelly-Quinn 2003, Demers et al. 2006, Reynolds et al. 2002, Souty-Grosset et al. 2006). However, crayfish are susceptible to some pesticides and to certain organic compounds in water (Trouilhé et al. 2006) and periodic discharges from sewage treatment plants have been suggested as leading to its elimination from much of the lower Liffey (Demers and Reynolds 2002). Habitat heterogeneity is important (Smith et al. 1996); juveniles live among submerged tree roots, gravel or macrophytes, while larger crayfish must have stones to hide under, or an earthen bank in which to burrow (Holdich and Rogers 2000, Demers et al. 2003, Gallagher et al. 2006). Brooding females in particular require undisturbed shelter over a prolonged winter-spring period. The species is omnivorous, with juveniles more reliant than adults on animal foods (Reynolds and O'Keeffe 2005). Indicating its keystone status, A. pallipes had a marked impact on stands of charophytes and on most macroinvertebrates in caged experiments in an Irish lake (Matthews, et al 1993).

Field label	Note
Species: 1092	**White-clawed Crayfish**
1.1.02 Method used - map	There have been many surveys reporting crayfish in Ireland and its distribution is well established. Most of the records come from the following sources River water quality monitoring surveys of the Environmental Protection Agency (EPA), carried out over a three year cycle. Records from fish surveys by Inland Fisheries Ireland and its predecessor bodies. Licence returns from NPWS-issued survey licences NBDC records Publications and papers. There is an extensive literature on Irish crayfish many that contain records or summaries of information. One of the more significant publications in the assessment period 2007-2012 is O'Connor et al. (2009) which reports on surveys for the species in a range of Irish lakes. The records were compiled into a spreadsheet for error-checking and cross-referencing There are over 3100 records. 75% of records have been gathered since 1994 and all these are fully geo-referenced.
1.1.04 Additional distribution map	All records were intersected with the ING 10 square grid.
1.1.05 Range map	The range map was derived from the range tool
2.3.01 Surface area - Range	This figure has been derived from the range map referred to in 1.1.5.
2.3.02 Method used - Surface area of Range	As described in 1.1.2.
2.3.03 Short-term trend - Period	The default trend period was used.
2.3.04 Short term trend - Trend direction	The number of occupied hectads (223) is greater than in the previous assessment (207). The differences in the two periods are considered to relate largely to variation in survey coverage. Gaps in the range have been filled particularly in south Leitrim and east Mayo. The species was also recorded in the Monaghan Blackwater catchment which was a gap in the previous assessment. The species would appear to have recolonised this area. Effort was also put in to recording the species in lakes particularly by O'Connor et al. (2009) and other lake records have been obtained through casual recording. A range extension has been reported in on the River Blackwater, Co Cork by Lucey (2010) which is considered to have been a natural colonisation. On the basis of this accumulated evidence the short term trend for range is considered to be increasing
2.3.09 a) Favourable reference range - In km2	The Favourable reference range is considered the same as the current range and it fully encompasses the ecological range of the species.
2.3.10 a) Reason for change - genuine change?	The species was recorded in the Monaghan Blackwater system during this assessment period. This population was considered lost in the last assessment so this represents a recolonisation of this river catchment. There has been a range expansion in the Blackwater catchment in Co Cork (Lucey 2010).
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Some of the differences in the range are considered to be due to improved knowledge. Specific surveys were undertaken of lakes by O'Connor et al (2009).
2.3.10 c) Reason for change - use of different method?	The range tool was different from that used in the previous assessment. Most of the records of the species come from river quality monitoring and fish surveys, and there is likely to be a variation in effort and detection of the species.

Field label	Note
Species: 1092	**White-clawed Crayfish**
2.4.02 a) Population size estimation (using population unit other than individuals) - Unit	There is no reliable data on population in Ireland. As in the previous assessment most of the records are gathered in presence/absence surveys or incidentally in other surveys. Localities was used in the last assessment and this was defined as the number of occupied catchments or sub-catchments separated by physical barriers. This is a very coarse measure and whilst useful for management purposes does not reflect area of occupancy within the catchment. Therefore for this assessment the number of occupied hectads is used as the surrogate for population.
2.4.06 Short-term trend - Period	The default trend period was used.
2.4.07 Short-term trend - Trend direction	There are records from 223 hectads in the 2007-2012 period which is more than the previous assessment period (207). The species has been refound in the Monaghan Blackwater catchment and on the River Eslin catchment in the Shannon system. It is still absent from the Nenagh and some lakes in the north Midlands but these losses predate the Directive. In the previous assessment the population was measured by the number of occupied localities. Localities were defined as catchments or sub-catchments separated by physical barriers. The number of occupied localities was 23 out of a total of 24 known since the Directive came into force. It was present in 22 of these localities in both assessment periods. The catchment where it was considered lost in the last assessment period was the Monaghan Blackwater but it was found here between 2007 and 2012. There are no records from one of the occupied localities, the River Dee, Co Meath during this assessment period. Only one site is known on the Dee, which is a river monitoring station and it is possible that the species could have escaped detection when this was sampled. This population is best considered of uncertain status until a more thorough survey can be done. The species has colonised two new localities, one in Co Cork (Lucey 2010) which is considered a range expansion and one in Co Donegal which could be an overlooked population. Lake populations are poorly known in Ireland. O'Connor et al (2009) surveyed a range of Irish lakes confirming presence in 13 of the 26 lakes sampled. This was a baseline survey for most of the lakes as the historic information is patchy and often contradictory. For example, reports that the species had become extinct in Lough Owel have proved inaccurate as it was certainly present in 2010 (Reynolds 2011). Although losses have been reported in the pre Directive period there has been no confirmed loss of crayfish from any Irish lake since 1994. Some additional lake records have also been forthcoming (eg Lough O'Flynn) and there is continued uncertainty on the status in lakes like Lough Carra, Corrib and Ennel. Overall the species has regained some populations that were deemed lost and the range has expanded in at least one catchment. There are still some catchments where the species has not recovered losses in the north Midlands in Tipperary and there may be residual impacts from disease events and habitat changes. There is no conclusive evidence of permanent reductions in any populations, although the numbers in some lakes appear to be prone to fluctuations of unknown cause and magnitude. Although the species has reappeared in some areas, there is a lack of knowledge and great uncertainty over the trends at the site level, so the short-term trend of population is deemed unknown.
2.4.15 c) Reason for change - use of different method	In the previous assessment population was estimated by the number of localities which were defined as catchments or sub-catchments separated by physical barriers. This definition has not been used in this assessment and replaced by the number of occupied hectads.

Field label	Note
Species: 1092	**White-clawed Crayfish**
2.5.01 Area estimation	White-clawed Crayfish is found in rivers and streams and still water. The area of habitat was calculated by taking the length of each occupied river segment from the EPA WFD Geodatabase WFD-river segment feature. The average width was assigned from the wetted area table. Point records were buffered to 100m to ensure they were assigned to the correct river segments. The area of occupied lakes was taken from the same WFD database. The whole area of the lake was assumed to be occupied as there is no data on area of occupancy. The list of occupied lakes was taken from the Irish crayfish database, from an examination of the overlay of the point data to the WFD geodatabase, and from published sources principally O'Connor et al (2009). The list of occupied lakes that this produced was the following: Lough Labe (G71), Kilroosky Lough (H42), White Lough (N57), Lough Owel (N43), Lough Talt (G31), Cavetown Lough (M89), Lough Gowna (N29), Lough Kill (N49), Lough Major (H72), Lough Nageage (H17), Lough Veenagreane (H17), Lough Doon (G73), Lough Glenade (G84), Lough Ennell, Lough McHugh (N09), Drimmon Lough (M98), Bran Lough (G90), Keshcarrigan Lough (G00), Keeldra Lough (N19), Lough O'Flynn (M58), Polaphuca reservoir (N90) and St John's Lough (H01). There are records from Lough Carra and Lough Corrib but the status of the species in both lakes during the assessment period is uncertain and they were not included in the area calculation. The area calculations were 13.19km2 for the rivers and 60.28 km2 for the lakes, a combined total of 73.47km2.
2.5.02 Year or period	The area calculation was based on 2007-2012 data.
2.5.04 a) Quality of the habitat - Good / moderate / bad / unknown	Good quality habitat for this species is defined as moderate to good water quality. The species prefers relatively cool temperatures and adequate dissolved oxygen and lime, although tolerating significant fluctuations in these parameters. Habitat heterogeneity is important; juveniles live among submerged tree roots, gravel or macrophytes, while larger crayfish must have stones to hide under, or an earthen bank in which to burrow. Brooding females in particular require undisturbed shelter over a prolonged winter-spring period. There is no systematic recording of the habitat heterogeneity attributes. Water quality as measured by the EPA has shown an improvement nationally over the assessment period and most waters within its range are assessed as at least of moderate quality (McGarrigle et al 2010). The species is undoubtedly impacted by water course management work and there may be residual effects of this in some areas (O'Connor et al 2009). However the implementation of mitigation practices by the Office of Public Works should improve the situation. More detailed analysis of these aspects is needed but on balance the species is not being restricted by habitat and so the assessment of habitat quality is Good.
2.5.05 Short-term trend - Period	The default trend period was used.
2.5.06 Short-term trend - Trend direction	There is no evidence of a decline in the area of habitat for this species. The species has recovered in one locality it was considered to have been lost from and there has been a range expansion in one catchment. There is no evidence of any historic decline and although there are undoubted fluctuations in the numbers of crayfish at some sites the assessment is that the trend in habitat is stable.

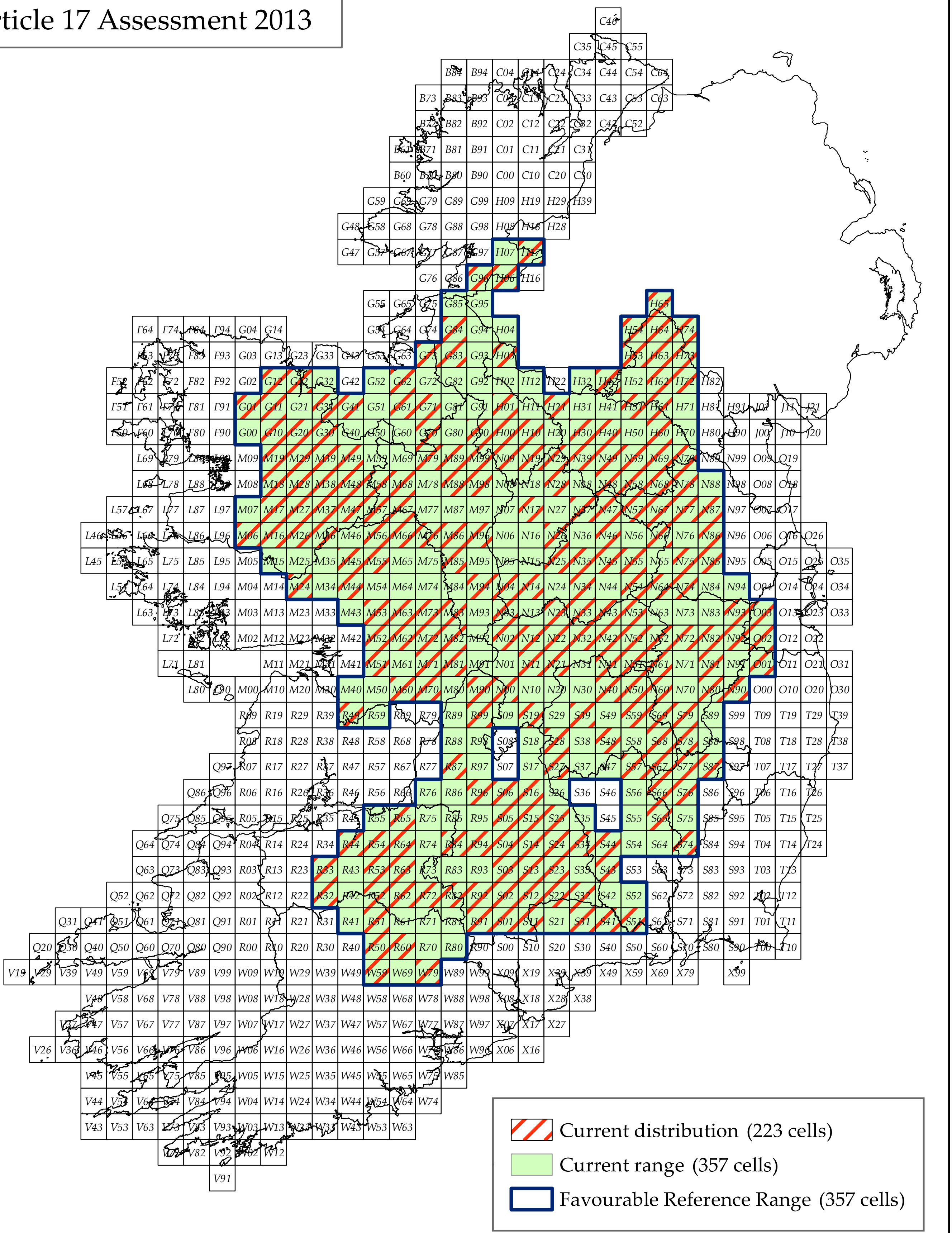
Field label	Note
Species: 1092	**White-clawed Crayfish**
2.5.08 Long-term trend - Trend direction	Good quality habitat for this species is defined as moderate to good water quality. The species prefers relatively cool temperatures and adequate dissolved oxygen and lime, although tolerating significant fluctuations in these parameters. Habitat heterogeneity is important; juveniles live among submerged tree roots, gravel or macrophytes, while larger crayfish must have stones to hide under, or an earthen bank in which to burrow. Brooding females in particular require undisturbed shelter over a prolonged winter-spring period. There is no systematic recording of the habitat heterogeneity attributes. Water quality as measured by the EPA has shown an improvement nationally over the assessment period and most waters within its range are assessed as at least of moderate quality (McGarrigle et al 2010). The species is undoubtedly impacted by water course management work and there may be residual effects of this in some areas (O'Connor et al 2009). However the implementation of mitigation practices by the Office of Public Works should improve the situation. More detailed analysis of these aspects is needed but on balance the species is not being restricted by habitat and so the assessment of habitat quality is Good.
2.5.09 Area of suitable habitat for the species (km2)	The Area of suitable habitat is considered to be equal to the Habitat for the species.
2.5.10 c) Reason for change - use of different method (e.g. 'Range tool')?	In the previous assessment, the habitat for the species was estimated as being the occupied range. In this assessment the area of occupancy has been calculated using river length measurements and lake areas as described in 2.5.1.

Field label	Note
Species: 1092	**White-clawed Crayfish**
2.6 Main pressures - Pressure	There is no systematic recording of the pressures on the species in Ireland but the experience in other parts of its range demonstrate that the greatest threat is from disease and introduced non-native species. The species loses out in competitive interactions with the larger non-native crayfish and becomes increasingly confined to small headwaters. In Ireland as most of the available habitat is lowland, with few major barriers to prevent spread across catchments, the potential impact of this competitive exclusion could be more severe than in other parts of its range. The greatest impact of non-native species is however through transmission of disease by introduced crayfish species and should they reach Ireland, the effects could be catastrophic based on the experience elsewhere. Incidences of plague have been reported in Ireland but for some reason the disease died out (Reynolds 2011). In order to safeguard Ireland's position as free of both the disease and non-native crayfish, legislation has been implemented to ban the import of non-native crayfish. However this has still not been fully implemented. The pathways for introduction of non-native crayfish are via the pet trade and importation for food. This pressure is deemed as High. There are other pressures on the crayfish but these all have more local impacts. Ongoing river maintenance directly removes animals and removes their habitat. Bridge repairs can also remove habitat in the form of refuges. The species does recover but there may be a cumulative impact of regular maintenance. Pollution of water courses is an ongoing problem as with all aquatic species. These pressures are listed but impact is low. Fluctuations in the population of the species do occur but the causes are obscure and poorly understood. There is evidence from direct observation and anecdotal reports of some fishing for crayfish in Ireland. However there is no evidence that this is impacting populations negatively. I01 - invasive non-native species, High, this is the most significant pressure as impact would be severe and very unlikely to be controllable. K03.03 - introduction of disease (microbial pathogens) High, this is related to I01 and is most likely to happen if non-native species is introduced. H01 - Pollution to surface waters (limnic & terrestrial, marine & brackish Low J02.02.01 - dredging/ removal of limnic sediments Low J02.10 - management of aquatic and bank vegetation for drainage purposes Low F02.03 - Leisure fishing Low. There are reports of crayfish being harvested for food and some are used as bait in other fishing.
2.7 Threats - Threat	The pressures are all listed as threats as there is no evidence that they will be reduced.
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The range of the Crayfish is extensive in the limestone central plain of Ireland. The range extends through the cross-border Erne catchment in Fermanagh and southern Donegal. There are some populations in the NW which are found off limestone but where there is a calcareous influence. A loss of range was reported in the last assessment in the Monaghan Blackwater but the species has now reappeared here. There is evidence of range expansion in Co Cork. Taken together this evidence supports a Favourable assessment.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	In the previous assessment the population was estimated by the number of occupied localities. One of the localities was not occupied so the population was deemed unfavourable. The species has recovered in this locality (Monaghan Blackwater) and two other localities are now occupied (one in Donegal and one in Cork). There has been no records from one occupied locality in this assessment period, but more survey work is required to determine whether this was not just an artefact of recording. Lake populations have shown fluctuations but there is no evidence of a permanent decline. Taking all the evidence the population is deemed Favourable.

Species: 1092	White-clawed Crayfish
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The crayfish occupies a wide range of habitat in Ireland from small headwater streams to some substantial lakes. It is considered there is sufficient habitat to support the long-term survival of the species. Declines in water quality or a significant reduction in the heterogeneity of habitat could impact the habitat resource for the species but there is perhaps a greater tolerance for apparently sub-optimal conditions than previously considered. However there are now policies in place to maintain and improve water quality in rivers and lakes and to mitigate the potential impact of drainage maintenance work which should benefit this species. The conclusion is that habitat is in Favourable conservation status.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	The White Clawed Crayfish is a widespread species in Ireland with an extensive range and a wide ecological tolerance. Habitat quality in particular the loss of heterogeneity along river systems and a reduction in water quality in some lakes caused the loss of some populations before the Directive came into force. However there has been recovery in range, habitat quality and population. If there is no change in the trend of improving water quality and no alteration in the area of habitat, the prospects for the species should be good. However, the major cause of the decline in the species elsewhere in its range has due to the dual impact of disease and introduced species. There are no non-native crayfish present in Ireland and although there has been one occurrence of disease in the 1980s it has died out. Ireland therefore remains free both of crayfish plague and non-native species and maintenance of this status is essential to ensuring the long-term favourable conservation status. Legislation is in place to control import of non-native species. The relevant legislation is Regulation 50 of the European Communities (Birds and Natural Habitats) Regulations 2011. This regulation is not effective until the Minister gives public notice and as this legislative gap still exists and the potential impact of either disease or non native species is likely to be severe, the assessment for Future prospects is Unfavourable-Inadequate.
2.9.04 b) Future prospects - If CS is U1 or U2, use of qualifiers is recommended	The qualifier is stable as the threat from introduction of disease and not native species is not likely to diminish.
2.9.05 Overall assessment of Conservation Status	There are three green assessments but as Future Prospects are amber, the overall assessment in Unfavourable-Inadequate
2.9.06 Overall trend in Conservation Status	There has been an improvement or no deterioration in the in the range and habitat quality and population in Ireland and measures are in place that should maintain this status. As the greatest threat to the species is from disease and introduction of alien species and this is as likely in the future as now, the overall trend is considered stable
3.1.01 b) Population size - Minimum	The area within the Natura 2000 network was calculated by overlapping the occupied river and lake segments described in 2.5.1.with the SAC shapefiles. The breakdown of the figures are Area of occupied lakes within SACs 24.21km2 Area of occupied river segments within SACs 5.59km2 Total area of occupied habitat within SACs 29.80km2 This is 40% of the total area. Applying this percentage to the population produces the estimate of 89 hectads

Field label		Note
Species:	**1092**	**White-clawed Crayfish**
3.2 Conservation measures		Where Crayfish is listed as a qualifying interest in SACs it is protected by the Habitat Regulations (S.I. No. 477/2011), this regulates any plans or projects that may negatively impact on the species. There is also an NPWS list of Activities Requiring Consent (ARCs) that are only granted if they do not negatively impact on the Qualifying interests within an SAC. This species is also afforded protection by the Environmental Liability Directive, which prevents and remedies environmental damage to natural habitats and protected species. There are measures in place of benefit to this species. In terms of habitat the Water Framework Directive targets is of principal benefit. The import of non-native species is prohibited by Regulation 50 of the European Communities (Birds and Natural Habitats) Regulations 2011. However this requires a Ministerial notice to become effective. Survey for Crayfish is licensed under the Wildlife Act. The Office of Public Works have implemented Arterial Drainage Maintenance Environmental Management Protocols & Standard Operating Procedures for crayfish since 2009.

White-clawed Crayfish (1092)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
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Map - Léarscáil
V 1.0
Date - Dáta
31-05-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1095**
0.2.2 Species name	**Petromyzon marinus**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	Sea lamprey (Loimpre mhara)

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	2001-2012
1.1.4 Additional map	Yes
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

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2.3 Range

2.3.1 Surface area - Range (km²)	7100	
2.3.2 Method - Range surface area	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	13000
	operator	N/A
	unknown	No
	method	In several sea lamprey rivers, (e.g. the Mulkear, the Feale, the Fergus, the Barrow) severe barriers to passage occur at the upstream end of the tidal freshwater. This does not represent a favourable situation. The FRR proposed here includes up to 75% of the main stem channel in each SAC. Consideration of FRR is confined to the SAC network, although some recent records of adult sea lamprey do occur from non-SAC channels. The 75% of main stem length is arbitrary, in one sense, but is consistent with findings from the Moy and Laune (Killarney National Park) SACs where no barriers to passage occur and where sea lamprey adults have been recorded a long distance upstream of the tidal limit. Such a length of main stem is likely to provide: • Adequate spawning habitat in the main stem channel • Adequate access into major tributaries (as observed in the Moy SAC) for spawning • Sufficient access to juvenile or nursery habitat in downstream areas to permit colonisation of fine sediment and consolidation of juvenile populations
2.3.10 Reason for change	Use of different method	

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	N/A		
	min		max	
2.4.2 Population size (other than individuals)	Unit	length of inhabited feature in km (length)		
	min	467	max	467
2.4.3 Additional information	Definition of locality			
	Conversion method			
	Problems			

2.4.4 Year or period	2007-2012		
2.4.5 Method – population size	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.6 Short-term trend period	2001-2012		
2.4.7 Short term trend direction	stable (0)		
2.4.8 Short-term trend magnitude	min	max	confidence interval
2.4.9 Short-term trend method	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.10 Long-term trend period			

2.4.11 Long term trend direction	N/A	
2.4.12 Long-term trend magnitude	min	max	confidence interval
2.4.13 Long-term trend method	N/A	
2.4.14 Favourable reference population	number	
	operator	N/A
	unknown	Yes
	method	Surveys for adult lampreys are complicated by seasonal migration and river conditions. Float-over surveys to estimate degree and location of spawning were undertaken in the Munster Blackwater and Slaney (2010) and in the Moy and Laune (2011). The 2010 data were comparable in number and location to those of 2003 on the same rivers. The counts on both the Laune and Moy were in single figures. If the latter are a reflection of sea lamprey spawning effort then the Conservation Status of the species is in danger in these channels. The Slaney survey identified a relatively high occurrence of sea lamprey redds up to the first barrier to passage – at Clohamon Weir. The redd count of circa 100 spawning structures might equate to approximately 300 adult sea lamprey, based on observations of Kelly and King (2001). The Slaney survey did identify substantial areas of suitable spawning habitat, with a degree of use being made of most areas. However, a total of 300 adult fish would not be considered adequate to fully colonise a large river system. The level of occurrence of redds and issues of barriers have been noted in the R. Nore (Gargan et al 2011) as well as previously in the Slaney and Munster Blackwater (King and Linnane 2004). Extrapolation of such spawning numbers to the suite of sea lamprey SACs might generate a population estimate of circa 3,000 adult sea lamprey spread over 10 SACs designated for this species. This could not be considered to be a population size adequate to sustain colonisation in Irish waters, particularly when the extremely low density of sea lamprey ammocoetes is taken into consideration. Extrapolation of the total population to a larger FRR would yield a population in excess of 10,000 fish and this might represent a more acceptable Favourable Reference Population for Ireland in the context of the long term viability of this species. However, further survey work is required to support this approach and in the interim the FRP is considered unknown.
2.4.15 Reason for change	Use of different method	

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	7100
2.5.2 Year or period	2007-2012
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Good
2.5.4 b) Quality of habitat - method	Recent float-over surveys gave an indication of habitat quality and degree of use by migratory adult sea lamprey. While suitable spawning habitat was very scarce in the main Moy channel, extensive areas of suitable habitat were available in the Laune. Furthermore, catchment-wide surveys for ammocoetes confirmed the presence of extensive suitable juvenile habitat. Overall, habitat quality is considered good.
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	stable (0)

2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	13000
2.5.10 Reason for change	Use of different method

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
canalisation (J02.03.02)	high importance (H)	N/A
reduction in migration/ migration barriers (J03.02.01)	high importance (H)	N/A
Pollution to surface waters (limnic & terrestrial, marine & brackish) (H01)	medium importance (M)	N/A

2.6.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
bait digging / collection (F02.03.01)	medium importance (M)	N/A
Pollution to surface waters (limnic & terrestrial, marine & brackish) (H01)	medium importance (M)	N/A
reduction in migration/ migration barriers (J03.02.01)	high importance (H)	N/A
canalisation (J02.03.02)	high importance (H)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant Information	Inland Fisheries Ireland has confirmed the occurrence of what are considered non-migratory sea lamprey in a series of large lakes in the territory. The identification as sea lamprey is based on dentition patterns of adult migratory sea lamprey. The occurrence of the non-migratory form was flagged by the Inland Fisheries Trust in the 1960s but little was heard further until capture of a sample in L. Derg was reported by Dr. William O' Connor in the ESB annual fisheries report for 1997-98. A number of subsequent records were taken from L. Derg, on the Shannon. Enquiries by IFI elicited information and specimens/photographs from L. Conn, L. Gill, L. Corrib and Muckross Lake. The adult lamprey were taken attached to host fish and were in the size range 150 - 400 mm, suggesting more than one age class. Spawning locations of the land-locked or non-migratory form have not been identified to date.
2.8.3 Trans-boundary assessment	

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment Bad (U2) qualifiers stable (=)
2.9.2. Population	assessment Bad (U2) qualifiers stable (=)
2.9.3. Habitat	assessment Favourable (FV) qualifiers N/A

2.9.4. Future prospects	assessment	Bad (U2)
	qualifiers	stable (=)
2.9.5 Overall assessment of Conservation Status	Bad (U2)	
2.9.6 Overall trend in Conservation Status	stable (=)	

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	length of inhabited feature in km (length)		
	min	467	max	467
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3 Trend of population size within	stable (0)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Inside	Long term
Other wetland-related measures (4.0)	Recurrent	high importance (H)	Both	Maintain

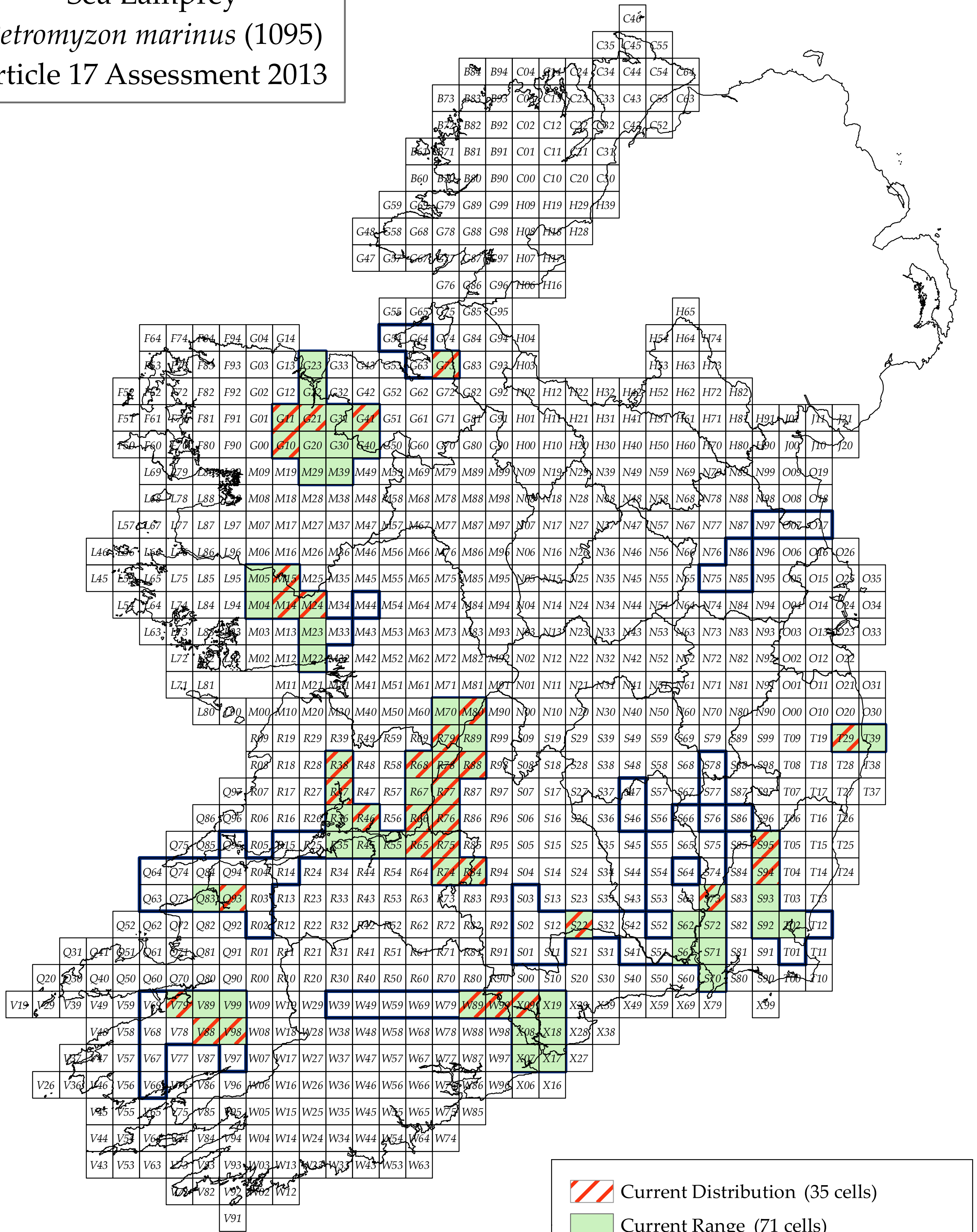
Field label	Note
Species: 1095	**Sea lamprey**
0.2.01 Species code	The life cycle of the sea lamprey (Petromyzon marinus L.) contains both a marine phase and a freshwater phase. Adult sea lamprey range from circa 60 to 100 cm in length and live at sea as external parasites on host fish (Kelly and King 2001). Adult fish migrate in spring into freshwater and ascend rivers. There is no known natal fidelity, with upstream attraction being induced by pheromones released by juvenile lamprey or ammocoetes into the water column. The adult fish can migrate long distances up into freshwater, with artificial barriers to passage frequently causing a focussing of spawning effort downstream of these structures (Gargan et al 2011). Adult sea lamprey excavate redds or spawning nests in gravelled areas, generally in the open channel areas of large rivers, and the spawning site habitat attributes mirror those used by Atlantic salmon. The sea lamprey spawning tends to occur in the June-July period whereas the salmon spawning is a winter activity. Male fish generally commence redd excavation and are joined by females when excavation is well-advanced. The males release a pheromone that attracts the female fish to the redd site. Fertilisation is external, the males and females releasing sperm and eggs into the more sheltered confines of the redd and fertilised eggs may be washed into the gravel interstices of the redd structure. Hatching out of very small ammocoetes takes place within days and the young immature lamprey can swim or is washed / drifted downstream until it encounters an area of fine sediment into which it can burrow. The ammocoete is a filter feeder and retains its burrowing habit in fine-grained sediment over a period of years. Transformation to the young adult stage occurs in late summer and young adult sea lamprey can be found migrating downriver to estuarine waters and the open sea in late autumn – winter. The young adult sea lamprey have been recorded feeding in estuarine waters. The Inland Fisheries Trust, in some of its annual reports in the late 1950s and early 60s, noted the occurrence of non-migratory or 'land-locked' sea lamprey In L. Derg, on the Shannon, and L. Conn in Mayo. More recently, samples of the land-locked sea lamprey have been recorded annually in L. Derg during the annual mayfly fishing season. Specimens have also been presented from L. Conn, again, as well as new reports from L. Corrib and L. Gill (Sligo). Barriers to upstream migration are seen as a major negative impactor to good conservation status for sea lamprey. In the course of catchment-wide juvenile lamprey surveys, conducted by IFI since 2009, it has proved extremely difficult to locate sea lamprey ammocoetes in any numbers or in any number of locations – even when sampling in catchments where sea lamprey spawning has been observed. The sea lamprey is listed in the most recent Irish Red Data Book as Near Threatened (A2c, B1ab(iii)) (King et al 2011). This assessment was primarily based on (a) the limited access to freshwater due to impassable anthropogenic barriers in the lower reaches of numerous large rivers and (b) the very limited degree to which juvenile sea lamprey were occurring in catchment-wide surveys in systems where spawning was known to occur.
1.1.01 Distribution map	This map was derived from the transformation of the map referred to in 1.1.4 to the LAEA projection.
1.1.02 Method used - map	Locations of direct observation were georeferenced. These included areas of active spawning, sites of redds where spawning was completed (based on expert judgement) and locations where sea lamprey ammocoetes were captured in catchment-wide surveying.
1.1.04 Additional distribution map	All Irish records were intersected with the Irish 10km grid map to derive this additional map.

Field label	Note
Species: 1095	**Sea lamprey**
2.3.02 Method used - Surface area of Range	The supplied range tool was run to evaluate the range of the sea lamprey. The sea lamprey can only have a form of linear range, being confined to water, and its range may extend from the seaward end of an estuary upstream through the estuary and into freshwater. The upstream extent of penetration will be either a known spawning location or a location of ammocoete occurrence. Thus the range will extend from the most upstream known location to the junction of the estuary with the open sea. The range tool provided did not allow for the linear habit of sea lamprey and so the range was calculated manually using the 10km2 grid, counting all 10 km squares that intersected with the river from the known upstream location to the open sea. The range included in this section includes both the migratory sea lamprey and also the non-migratory sea lamprey. The non-migratory form has been recorded in several large lakes and the full surface area of these lakes is also included in the range.
2.3.04 Short term trend - Trend direction	Comparative surveys of spawning on the Rivers Blackwater and Slaney recorded similar numbers of redds, at similar locations, in both rivers in 2003 and 2010, thus indicating a stable trend in this sea lamprey range within these SACs. On-going observation of spawning effort on R. Mulkear (Lower Shannon SAC) and at Clonmel (Suir SAC), combined with the redd counts, also indicate stability.
2.3.10 c) Reason for change - use of different method?	The range reported in this period is lower than that reported in 2007. This is largely based on different use of the range tool. Only river corridors or lakes en route to known locations of sea lamprey or non-migratory sea lamprey were included in the present assessment. In the 2007 report extensive terrestrial habitat between sea lamprey rivers was also included.
2.4.07 Short-term trend - Trend direction	Comparative studies are available for sea lamprey redd counts on the Rivers Slaney and Blackwater in both 2003 and 2010. Similar numbers were recorded on both sampling occasions. Using this limited comparative study the population of sea lamprey was deemed to be stable.
2.5.01 Area estimation	Surveys for spawning activity indicate a substantial degree of adult spawning habitat in the majority of main stem channels examined. Catchment-wide juvenile lamprey surveys indicate, in most cases, extensive availability of juvenile habitat in main stem channels also (King and Linnane 2004; O' Connor 2004 - 07). Given that adult fish must migrate from coastal waters to spawning beds, the entire channel from estuary to upper freshwater extent of the range forms an integral part of the species habitat. Consequently, the area of habitat is taken as the area of Range.
2.5.09 Area of suitable habitat for the species (km2)	The Favourable Reference Range used in Section 2.3.9 is proposed as a proxy for area of suitable habitat.
2.5.10 c) Reason for change - use of different method (e.g. 'Range tool')?	The area of habitat reported in 2007 was based on the Range of the species at that time. Although the same approach is used this time the value provided here (7,000km2) is significantly smaller than the 2007 value (20,100km2) because a more refined estimation of range has been conducted (see 2.3.10c).

Field label	Note
Species: 1095	**Sea lamprey**
2.6 Main pressures - Pressure	Three ongoing pressures are identified - one impacting on all life stages, one on adult sea lamprey and the third on the juvenile or ammocoete stage. Pollution to surface water is a constant threat to all aquatic organisms. Both adult and ammocoete life stages for lamprey have been shown to be vulnerable to the effects of pollution in Irish systems (D. Byrne & B. Beckett, IFI Blackrock, pers. comm.). The single largest pressure acting on adult sea lamprey is that of artificial physical barriers to passage for upstream migrating adult fish. The concentration of spawning effort downstream of the first major weir on many of Ireland's major sea lamprey rivers indicates a problem with passage (Gargan et al 2011). Barrier removal or modification to permit upstream migration would permit a greater penetration of river channels by adult fish and a greater dispersal of spawning effort, with consequent increased downstream extent of habitat for ammocoetes to colonise. Canalisation is used here as a catch-all term for river drainage works - both as first-phase dredging and as second-phase maintenance of the completed works. Canalisation is undertaken to improve channel capacity for flood flows and to permit land drainage and improvement to agricultural land. This process tends to remove factors in the channel that may tend to slow down water flow e.g. vegetation growth and siltation. This latter process is essential for lamprey ecology as the juvenile or ammocoete stage of the life cycle lives for up to several years burrowed into fine sediment in the river. Adverse impacts of sediment removal in Irish drained rivers are identified in King et al (2008).
2.7 Threats - Threat	The identified pressures are also listed as threats as they are considered likely to continue into the future. Bait digging / collection is identified as a potential additional threat to sea lamprey. Fishing tackle shops now regularly display lamprey fillets or segments as bait, particularly for pike. Similarly, angling magazines often identify fillets etc. of smelt, shad and lamprey as among the prime baits. There is a clear potential conflict between the status of conservation species and their identified use as angling bait. In the case of lamprey, it is often stated that the baits are imported as frozen fillets or nuggets etc. There is clearly potential for major export from North America of frozen sea lamprey, given the intensive removal operations being undertaken there for many years. It is not considered that Irish populations of sea lamprey can sustain any exploitation.
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The current range is not sufficient to suport the long term viability of the species, due to the extent to which aggregation of spawning effort is located downstream of the first major barrier to passage in so many Irish rivers, e.g. the Slaney, Barrow, Nore, Suir and Lower Shannon (on the Feale, Fergus, Mulkear). As the current range represents only 71% of the Favourable reference range it is considered Inadequate - Bad.
2.9.01 b) Range - If CS is U1 or U2, use of qualifiers is recommended	The range is considered stable; the only change since the last reporting period has resulted from the change in methods used to map the data.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Population is considered bad on four counts: (1) aggregation of spawning effort, (2) overall low total populations in certain rivers, despite some degree of spawning activity,(3) major paucity of recorded spawning effort on Moy and Laune, despite suitable habitat and (4) serious concern in regard to very low or zero presence of sea lamprey ammocoetes in river habitats, even in areas downstream of sea lamprey spawning sites. This conclusion is more severe than that of 2007 and is based on additional catchment-wide survey information compiled since 2007 and on additional float-over survey information in SAC channels.

Field label	Note
Species: 1095	**Sea lamprey**
2.9.02 b) Population - If CS is U1 or U2, use of qualifiers is recommended	The population of adult fish is considered stable, based on comparative studies on the Slaney and Munster Balckwater. This assessment will only improve when adult numbers increase and have greater capacity to penetrate into freshwater and when ammocoete populations occur in substantially greater densities.
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Habitat is considered favourable, with reference to the current range and Favourable Reference Range. Extensive areas of spawning habitat are available to sea lamprey adults in the channels where they occur. However, access to these areas can be restricted due to barriers to passage. Juvenile river/brook lamprey are commonly found in sedimenting habitat downstream of sea lamprey spawning sites. Such sediments are also available to sea lamprey ammocoetes but they are rarely found there. It is a common European experience that the whereabouts of sea lamprey ammocoetes is a mystery. Despite on-going successful sea lamprey spawning at Annacotty, on the R. Mulkear, only a single sea lamprey ammocoete was found in a catchment-wide survey in 2012. The Range of the species is considered to be currently well below the Favourable Reference Range and visual evidence of spawning habitat and recording of ammocoetes of other species clearly indicate a substantial extent of suitable habitat beyond the current recorded range. Habitat is not restricting the range expansion for this species and is considered favourable.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	Future prospects are considered bad in view of the restricted penetration into catchments by spawning adults as a consequence of barriers to passage and in view of (a) low adult population numbers recorded in float-over spawning surveys and (b) low juvenile densities in suitable sediment. The threat of exploitation for bait is a further concern for this species.
2.9.04 b) Future prospects - If CS is U1 or U2, use of qualifiers is recommended	This is considered stable as the same scenarios occur now as was the case in the 2007 assessment.
2.9.05 Overall assessment of Conservation Status	The conservation status of the sea lamprey is considered bad in view of barriers and passage issues and in view of low population levels recorded.
2.9.06 Overall trend in Conservation Status	This is considered stable, based on comparison of limited data sets in the previous 6-year cycle and in this cycle.
3.1.02 Method used	The vast majority of sea lamprey observations come from within SAC channels. In the absence of more detailed information, the length of lamprey penetration into these rivers (see 2.4.2) is taken as a crude approximation of population size within the network.
3.2 Conservation measures	6.3 - Legal protection of habitats and species: The enactment of the Habitats Regulations (SI 477 of 2011) provides a legal framework for protection of lampreys in Natura 2000 sites in Ireland. The Water Framework Directive will also benefit lampreys. 4.0 - Other wetland-related measures: The OPW Drainage Division has worked with Inland Fisheries Ireland for a number of years to develop strategies to minimise adverse impacts of OPW's drainage maintenance programme. Measures developed and rolled out in training (in 2003 and again in 2010) include strategies to improve channel hydromorphology, under Water Framework Directive, and Standard Operating Procedures (SOPS) have been implemented to deal with situations where lamprey are encountered in channel maintenance (King et al 2008; King et al 2011). Such measures represent an awareness of Annex I and Annex II qualifying interests and an approach to dealing with situations arising. More work remains to be done in this area to ensure conservation of lamprey populations and habitat, particularly juvenile habitat.

Sea Lamprey
Petromyzon marinus (1095)
Article 17 Assessment 2013



Current Distribution (35 cells)
Current Range (71 cells)
Favourable Reference Range (130 cells)

An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 10 20 30 40 50 km

N
Map - Léarscáil
V 2.0
Date - Dáta
23-08-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1096**
0.2.2 Species name	**Lampetra planeri**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	Brook Lamprey

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	2003-2012
1.1.4 Additional map	Yes
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published sources

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Gardiner, R. 2003 Identifying lamprey: A field key for sea, river and brook lamprey. Conserving Natura 2000 Rivers Conservation Techniques Series No. 4, English Nature, Peterborough. 27pp.

Harvey, J. & Cowx, I. 2003 Monitoring the river, sea and brook Lamprey, Lampetra fluviatilis, L. planeri and Petromyzon marinus. Conserving Natura 2000 Rivers Monitoring Series No. 5, English Nature, Peterborough.

Joint Nature Conservation Council (JNCC) 2005 Common Standards Monitoring Guidance for Freshwater fauna Version August 2005 ISSN 1743-8160 (online)

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King, J.J., Lehane, B.M., Wightman, G.D., Dooley, R. and Gilligan, N. (2011) Development and implementation of environmental protocols in river maintenance in Ireland. Water and Environment Journal, 25, 422 - 428.

King, J.J., Hanna, G. and Wightman, G.D. (2008) Ecological Impact Assessment of the effects of statutory arterial draiage maintenance activities on three lamprey species (Lampetra planeri Bloch, Lampetra fluviatilis L. and Petromyzon marinus L.). Series of Ecological Assessments on Arterial Drainage Maintenance No. 9. Environment Section, Office of Public Works, Headford, Co. Galway.

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O'Connor, W. 2006 (a) A baseline survey of juvenile lamprey populations in the River Feale catchment. Irish Wildlife Manuals No. 22. National Parks and Wildlife Service, Dept. of Environment, Heritage and Local Government, Dublin Ireland.

O'Connor, W. 2006 (b) A baseline survey of juvenile lamprey populations in the River Boyne catchment. Irish Wildlife Manuals No. 24. National Parks and Wildlife Service, Dept. of Environment, Heritage and Local Government, Dublin Ireland.

O'Connor, W. 2007 A baseline survey of juvenile lamprey populations in the Corrib and Suir catchments. Irish Wildlife Manual No 26. National Parks and Wildlife Service, Dept. of Environment, Heritage and local Government, Dublin Ireland.

Rooney, S.M., O'Gorman, N.M., Greene, F. and King J.J. (In Press) Aspects of brook lamprey (Lampetra planeri bloch) spawning in Irish waters. Biology and Environment 0000.

Salewski, V. 2003 Satellite species in lampreys: a worldwide trend for ecological speciation in sympatry? Journal of Fish Biology 63, 267-279.

2.3 Range

2.3.1 Surface area - Range (km²)	75300	
2.3.2 Method - Range surface area	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2000-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	75300
	operator	N/A
	unknown	No
	method	Favourable reference range has been taken as the species current range. Suitable habitat has been found in all catchments examined, even though not all suitable habitats contained ammocoetes when surveyed.
2.3.10 Reason for change	Improved knowledge/more accurate data	

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit N/A min max
2.4.2 Population size (other than individuals)	Unit number of map 10x10 km grid cells (grids10x10) min 753 max 753
2.4.3 Additional information	Definition of locality Conversion method Problems: Accurate population estimates of lampreys are difficult. Surveys of adults are complicated by seasonal movements and river conditions, whereas variable densities of juveniles make population extrapolations prone to error. Given the widespread distribution of this species, in channels as small as Stream Order 1, the 10 x 10km grid is used as a surrogate for population size.
2.4.4 Year or period	2003-2012
2.4.5 Method – population size	Estimate based on partial data with some extrapolation and/or modelling (2)
2.4.6 Short-term trend period	2001-2012
2.4.7 Short term trend direction	stable (0)
2.4.8 Short-term trend magnitude	min max confidence interval
2.4.9 Short-term trend method	Estimate based on partial data with some extrapolation and/or modelling (2)
2.4.10 Long-term trend period	
2.4.11 Long term trend direction	N/A
2.4.12 Long-term trend magnitude	min max confidence interval
2.4.13 Long-term trend method	N/A
2.4.14 Favourable reference population	number 753 operator N/A unknown No method The current population (753 x 10km cells) is taken as the Favourable Reference Population.
2.4.15 Reason for change	Improved knowledge/more accurate data

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km^2)	75300
2.5.2 Year or period	2003-2012
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Good
2.5.4 b) Quality of habitat - method	Visual observation - based on juvenile habitat at catchment-wide sampling stations and on adult spawning habitat and activity (Rooney et al In Press).
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	stable (0)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km^2)	
2.5.10 Reason for change	Improved knowledge/more accurate data

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
diffuse pollution to surface waters due to agricultural and forestry activities (H01.05)	medium importance (M)	N/A
dredging/ removal of limnic sediments (J02.02.01)	high importance (H)	N/A
other point source pollution to surface water (H01.03)	medium importance (M)	N/A
Siltation rate changes, dumping, depositing of dredged deposits (J02.11)	medium importance (M)	N/A

2.6.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
bait digging / collection (F02.03.01)	medium importance (M)	N/A
other point source pollution to surface water (H01.03)	medium importance (M)	N/A
dredging/ removal of limnic sediments (J02.02.01)	high importance (H)	N/A
diffuse pollution to surface waters due to agricultural and forestry activities (H01.05)	medium importance (M)	N/A
Siltation rate changes, dumping, depositing of dredged deposits (J02.11)	medium importance (M)	N/A
invasive non-native species (I01)	low importance (L)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant Information	
2.8.3 Trans-boundary assessment	

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.9.2. Population	assessment	Favourable (FV)
	qualifiers	N/A
2.9.3. Habitat	assessment	Favourable (FV)
	qualifiers	N/A
2.9.4. Future prospects	assessment	Favourable (FV)
	qualifiers	N/A
2.9.5 Overall assessment of Conservation Status	Favourable (FV)	
2.9.6 Overall trend in Conservation Status	N/A	

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	number of map 10x10 km grid cells (grids10x10)		
	min	71	max	71

3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)
3.1.3 Trend of population size within	stable (0)

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Both	Long term
Other wetland-related measures (4.0)	Recurrent	high importance (H)	Both	Enhance

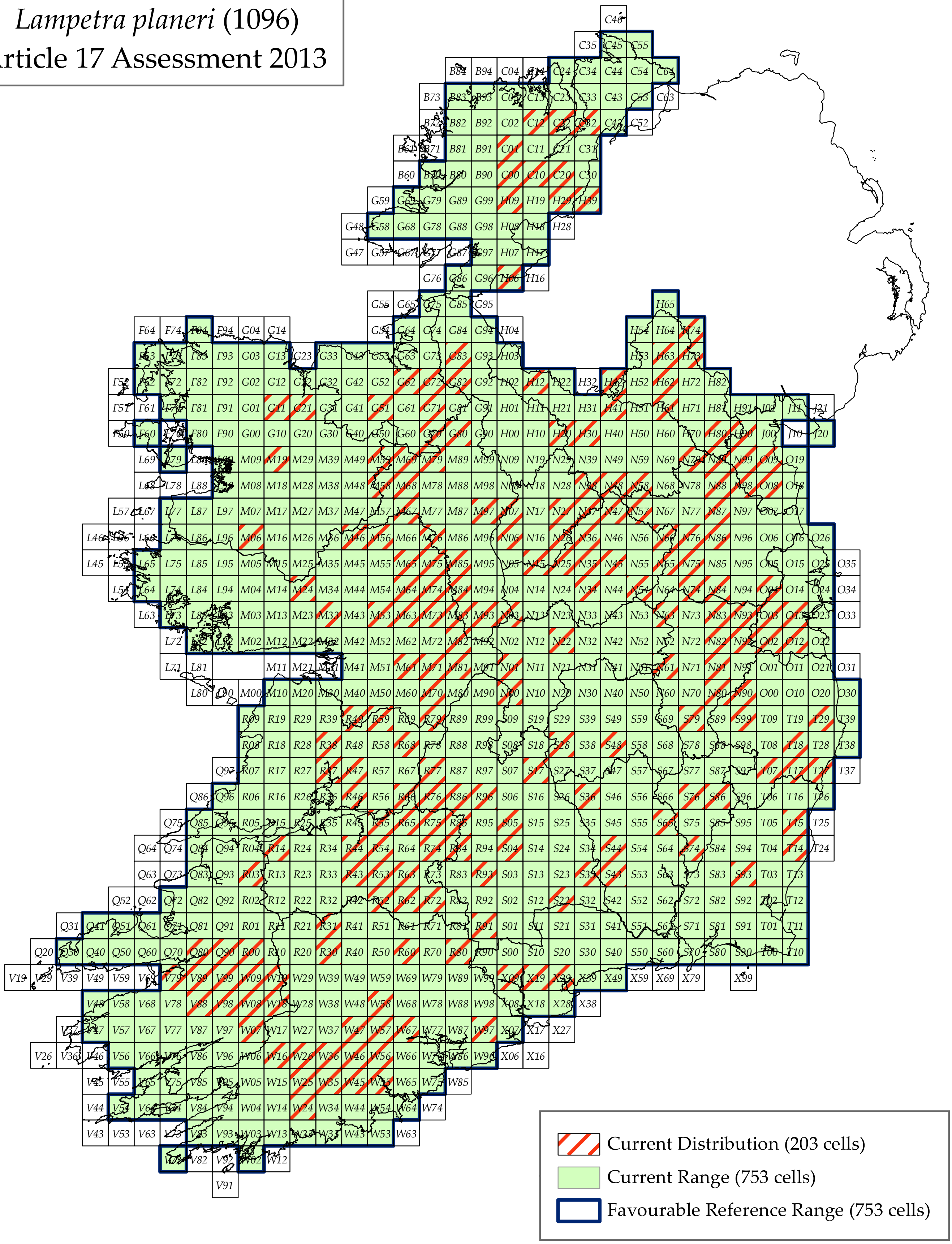
Article 17 - SPECIES NOTES

Field label	Note
Species: 1096	**Brook Lamprey**
0.2.01 Species code	The brook lamprey (Lampetra planeri Bloch) is the smallest of the three lamprey taxonomic entities recorded in Ireland (Kurz and Costello 1997; Kelly and King 2001). The species is non-parasitic and non-migratory as an adult, living its entire life in freshwater. Adults spawn in spring, excavating shallow nests in relatively small sized gravels in areas of reduced flow (Rooney et al In Press). After hatching, the young ammocoetes drift or swim downstream before encountering areas of river bed with a fine silt composition. They burrow into this bed material and live as filter feeders over a period of years before transforming into young adult fish. The young adults overwinter before migrating short distances upstream to gravelled areas where they spawn. The adult fish die after spawning. The river and brook lamprey are indistinguishable as larvae, living as filter feeders in sediment. The mature adult forms are clearly distinguishable on the basis of body size. The pair are considered by many in the same context as the brown trout – sea trout pairing, with similar absence of genetic discriminators (Salewski 2003; Espanhol et al. 2007). The approach to lamprey status assessment in Ireland has focussed on juvenile lamprey or ammocoetes. This is because it is feasible to carry out cost-effective catchment-wide surveys on ammocoetes over an extended annual time window. Such opportunities do not present themselves for the adult spawning phase of brook or of river lamprey. Consequently, the vast majority of available data relates to "Lampetra sp." and cannot be assigned to one species or the other. For the above reasons, a joint assessment is presented here that covers both taxonomic entities – the brook lamprey and the river lamprey.
1.1.01 Distribution map	This map was derived from the transformation of the map referred to in 1.1.4 to the LAEA projection.
1.1.04 Additional distribution map	Distribution data was intersected with the Irish 10 km2 grid.
1.1.05 Range map	Range was derived from catchment-wide electro-fishing surveys for ammocoetes (2003 2012) plus some extrapolation to catchments not yet examined.
2.3.01 Surface area - Range	A series of catchment-wide surveys (2003 - 2007) confirmed widespread distribution of Lampetra sp. A series of subsequent catchment -wide surveys, with no distributional overlap with previous surveys, for juvenile lamprey and for spawning L. planeri (2009 - 2012) again indicated a widespread distribution. The species was recorded in all size of channels, from 1st order streams to large 6th order rivers. Based on this large spread of information, it is proposed that the surface area range for this species should match the surface area of the state, minus a small number of coastal squares without freshwater.
2.3.02 Method used - Surface area of Range	Based on catchment-wide electrofishing survey outcomes for ammocoetes (2003 - 2012) and extrapolation to catchments not yet examined
2.3.04 Short term trend - Trend direction	The trend is considered stable, based on data sets obtained over the period 2009 - 2012, and augmented by the data of 2003 - 2007.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Additional survey work in the current reporting period (in 2007 and from 2009-2012) has confirmed that Lampetra are even more widespread across the country than previously thought.
2.4.02 b) Population size estimation (using population unit other than individuals) - Minimum	The 10 x 10 km grid is used as a surrogate for population size.

Field label	Note
Species: 1096	**Brook Lamprey**
2.4.07 Short-term trend - Trend direction	Survey data indicates a widespread population of Lampetra. There is no indication of population increase; the reported increase in range (and hence population) comes as a result of increased survey effort. Lampetra are considered to be stable in Ireland.
2.4.15 b) Reason for change - improved knowledge/more accurate data?	As with 2007, the extent of the range is used in the current reporting period as a proxy for population. However, additional survey work has shown the Lampetra spp. to be more widespread than previously thought and this accounts for the difference in Population estimate between the two reports.
2.5.01 Area estimation	Surveys have been carried out on both spawning and juvenile habitat and both have to found to have a widespread distribution throughout the range. The area of the range is taken to represent the extent of habitat.
2.5.04 b) Quality of the habitat - Explain how the quality was assessed	Spawning surveys for brook lamprey examined gravelled areas for redds. Extensive spawning habitat is available and exceeds degree of usage. Catchment-wide surveys in areas of fine sediment deposition commonly encountered a range of year or size classes of juvenile Lampetra indicating successful spawning and healthy recruitment. Overall, habitat quality is assessed as Good.
2.5.10 b) Reason for change - improved knowledge/more accurate data?	In 2007, the extent of the distribution was taken to represent the area of lamprey habitat. However, additional survey work has shown the Lampetra spp. to be more widespread than previously thought and the species range is now considered to extend to the entire country. This accounts for the difference in habitat estimate between the two reports.
2.6 Main pressures - Pressure	Pollution to surface water, from diffuse and point sources (H01.05 / H.01/03), is a constant threat to all aquatic organisms. Both adult and ammocoete life stages for lamprey have been shown to be vulnerable to the effects of pollution in Irish systems (D.Byrne & B. Beckett, IFI Blackrock, pers. comm.). J.02.11 – Lampreys spend much of their life cycle in river sediments. Changes in siltation patterns can significantly impact on lamprey habitat. Dredging and removal of sediments (J 02.02.01) and allied river engineering works can lead to loss or removal of sediment that may already contain juvenile lamprey (King et al 2008). Such works can also lead to limited, or large-scale, re-alignment of channel features and are likely to be designed to provide a more laminar or streamlined flow. If lamprey ammocoete habitats are to form or be maintained, a channel must have a capacity to deposit fine sediment along its margins or into 'alcove' niches, frequently in the lee of some obstructing feature that is disturbing the flow. Brook lamprey are non-migratory, but river lamprey migrations can be significantly impacted by artificial barriers such as weirs, particularly in low flow conditions (J.03.02.01).
2.7 Threats - Threat	The issues identified as Pressures are also considered to constitute Threats into the future. Two additional Threats are also identified. F02.03.01 - bait digging / collection: Lamprey are now identified as a very desirable bait for pike anglers. Fillets of larger sea- and river lamprey are sold as vacuum-packed items in many fishing tackle shops. There is also anecdotal, unproven, information of ammocoetes being dug out of nursery habitat for use as bait. It is considered that Irish lamprey populations cannot sustain any form of extensive or intensive exploitation. The threat of invasive aquatic species is also included (I01). The potential impact on spawning beds of invasive molluscs such as Corbicula and Dreissena is a concern.
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Range is equal to FRR and is considered favourable based on the results of the catchment-wide juvenile survey programme in the period 2009 - 2012.

Field label	Note
Species: 1096	**Brook Lamprey**
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The principal criteria in examining lamprey ammocoete populations on a catchment basis were (1) distribution or degree of occurrence, (2) population density at sampling site and (3) population structure or number of size/age classes (Harvey and Cowx 2003). Lampetra were found to be widespread although occupancy of suitable habitat was lower in Irish catchments (c50%, King et al unpublished data) than the 66% suggested for the UK (JNCC, 2005). Nonetheless, the populations recorded were commonly found to be present in reasonable densities and represented a range of age classes. Overall population is assessed as Favourable.
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	In specific hydromorphological or geological areas lamprey habitat was found to be limited, e.g. higher altitudes with inadequate sorting options for fine sediments, or areas with intermittent or disjointed surface water flows. However, suitable spawning and juvenile habitat was found to be widespread in a majority of catchments and overall habitat is assessed as Favourable.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	Despite some concerns about the potential localised impacts of pollution and dredging, Lampetra are widespread, with extensive areas of suitable habitat, and future prospects for this taxon must be seen, overall, as favourable.
2.9.05 Overall assessment of Conservation Status	The range and population for Lampetra are in good status. There are extensive areas of suitable habitat and future prospects are good. The overall assessment of conservation status is considered favourable.
3.1.01 a) Population size - Unit	10km grid cells are used as a proxy for population, as per 2.4.
3.1.02 Method used	Lampetra have a widespread distribution and occur in all river types, from 1st order streams to main channels. The survey data from 2003-2006 and 2009-2012 shows lampreys to be equally common inside and outside SACs. Consequently, the area of the network is taken as a crude approximation for population size within the SACs. The area of Ireland (not including coastal/marine) covered by SACs is approximately 71 x 10km2.
3.1.03 Trend of population size within the network (short-term trend)	While the 2003-2006 surveys largely concentrated on SACs, the 2009-2012 surveys examined non-SAC catchments and hence, no direct comparative information is available to permit assessment of trends within the network. Nonetheless, given the generally favourable status of most catchments surveyed, a stable trend is considered likely.
3.2 Conservation measures	6.3 - Legal protection of habitats and species: The enactment of the Habitats Regulations (SI 477 of 2011) provides a legal framework for protection of lampreys in Natura 2000 sites in Ireland. The Water Framework Directive will also benefit lampreys. 4.0 - Other wetland-related measures: The OPW Drainage Division has worked with Inland Fisheries Ireland for a number of years to develop strategies to minimise adverse impacts of OPW's drainage maintenance programme. Measures developed and rolled out in training (in 2003 and again in 2010) include strategies to improve channel hydromorphology, under Water Framework Directive, and Standard Operating Procedures (SOPS) have been implemented to deal with situations where lamprey are encountered in channel maintenance (King et al 2008; King et al 2011). Such measures represent an awareness of Annex I and Annex II qualifying interests and an approach to dealing with situations arising. More work remains to be done in this area to ensure conservation of lamprey populations and habitat, particularly juvenile habitat.

Brook Lamprey
Lampetra planeri (1096)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 10 20 30 40 50 km

N
Map - Léarscáil
V 1.0
Date - Dáta
12-06-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1099**
0.2.2 Species name	**Lampetra fluviatilis**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	River lamprey

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	2003-2012
1.1.4 Additional map	Yes
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published sources

Gardiner, R. 2003 Identifying lamprey: A field key for sea, river and brook lamprey. Conserving Natura 2000 Rivers Conservation Techniques Series No. 4, English Nature, Peterborough. 27pp.

Harvey, J. & Cowx, I. 2003 Monitoring the river, sea and brook Lamprey, Lampetra fluviatilis, L. planeri and Petromyzon marinus. Conserving Natura 2000 Rivers Monitoring Series No. 5, English Nature, Peterborough.

Hubbs, C. L. & Potter, I. C. 1971 Distribution, phylogeny and taxonomy In M. W. Hardisty and I. C. Potter (eds.) The Biology of Lampreys, Volume 1, Academic Press, London.

Igoe, F., Quigley, D.T.G., Marnell, F., Meskell, E., O'Connor, W. & Byrne, C. 2004 The sea lamprey Petromyzon marinus (L.), river lamprey Lampetra fluviatilis (L.) and brook lamprey Lampetra planeri (Bloch) in Ireland: general biology, ecology, distribution and status with recommendations for conservation. Biology and Environment: Proceedings of the Royal Irish Academy. 104 B (3), 43-56.

Kelly, F. L. & King, J. J. 2001 A review of the ecology and distribution of three lamprey species, Lampetra fluviatilis (L.), Lampetra planeri (Bloch) and Petromyzon marinus (L.): a context for conservation and biodiversity considerations in Ireland. Biology and Environment: Proceedings of the Royal Irish Academy 101B, 165-185.

King, J.J. 2006 The status and distribution of lamprey in the R. Barrow SAC. Irish Wildlife Manuals No. 21. National Parks and Wildlife Service, Dept. of Environment, Heritage and Local Government, Dublin Ireland.

King, J.J. & Linnane, S.M. 2004 The status and distribution of lamprey and shad in the Slaney and Munster Blackwater SACs. Irish Wildlife Manuals No 14. National Parks and Wildlife Service, Dept. of Environment, Heritage and Local Government, Dublin Ireland.

Kurz, I. & Costello, M. J. 1999 An outline of the biology, distribution and conservation of lampreys in Ireland. Irish Wildlife Manuals No. 5. Dublin, Duchas – the Heritage Service.

Maitland, P. S. 2003 Ecology of the river, brook and sea lamprey. Conserving Natura 2000 Rivers Ecology Series No. 5. English Nature, Peterborough.

O'Connor, W. 2004 A survey of juvenile lamprey populations in the Moy catchment. Irish Wildlife Manuals, No. 15. National Parks and Wildlife Service, Dept. of Environment, Heritage and Local Government, Dublin Ireland.

O'Connor, W. 2006 (a) A baseline survey of juvenile lamprey populations in the River Feale catchment. Irish Wildlife Manuals No. 22. National Parks and Wildlife Service, Dept. of Environment, Heritage and Local Government, Dublin Ireland.

O'Connor, W. 2006 (b) A baseline survey of juvenile lamprey populations in the River Boyne catchment. Irish Wildlife Manuals No. 24. National Parks and Wildlife Service, Dept. of Environment, Heritage and Local Government, Dublin Ireland.

O'Connor, W. 2007 A baseline survey of juvenile lamprey populations in the Corrib and Suir catchments. Irish Wildlife Manual No 26. National Parks and Wildlife Service, Dept. of Environment, Heritage and local Government, Dublin Ireland.

2.3 Range

2.3.1 Surface area - Range (km²)	75300	
2.3.2 Method - Range surface area	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	75300
	operator	N/A
	unknown	No
	method	Favourable reference range has been taken as the species current range. Suitable habitat has been found in all catchments examined, even though not all suitable habitats contained ammocoetes when surveyed.
2.3.10 Reason for change	Use of different method	

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	N/A		
	min		max	
2.4.2 Population size (other than individuals)	Unit	number of map 10x10 km grid cells (grids10x10)		
	min	753	max	753
2.4.3 Additional information	Definition of locality			

	Conversion method	
	Problems	Accurate population estimates of lampreys are difficult. Surveys of adults are complicated by seasonal movements and river conditions, whereas variable densities of juveniles make population extrapolations prone to error. The 10 km square dimension is used as a surrogate for population size. This is based on the widespread distribution of this species in channels as small as Stream Order 1. Such a wide distribution is best captured on such a large-scale grid.

2.4.4 Year or period	2007-2012
2.4.5 Method – population size	Estimate based on partial data with some extrapolation and/or modelling (2)
2.4.6 Short-term trend period	2001-2012
2.4.7 Short term trend direction	stable (0)
2.4.8 Short-term trend magnitude	min / max / confidence interval
2.4.9 Short-term trend method	Estimate based on partial data with some extrapolation and/or modelling (2)
2.4.10 Long-term trend period	
2.4.11 Long term trend direction	N/A
2.4.12 Long-term trend magnitude	min / max / confidence interval
2.4.13 Long-term trend method	N/A
2.4.14 Favourable reference population	number: 753 operator: N/A unknown: No method: The current population estimate (753 x 10km cells) is taken as the favourable reference population.
2.4.15 Reason for change	Improved knowledge/more accurate data

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	75300
2.5.2 Year or period	2007-2012
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Good
2.5.4 b) Quality of habitat - method	Visual observation - based on juvenile habitat at catchment-wide sampling stations and on adult spawning habitat and activity (Rooney et al In Press).
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	stable (0)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	
2.5.10 Reason for change	Use of different method

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
dredging/ removal of limnic sediments (J02.02.01)	high importance (H)	N/A
Siltation rate changes, dumping, depositing of dredged deposits (J02.11)	high importance (H)	N/A
reduction in migration/ migration barriers (J03.02.01)	high importance (H)	N/A
other point source pollution to surface water (H01.03)	medium importance (M)	N/A

invasive non-native species (I01)	medium importance (M)	N/A
diffuse pollution to surface waters due to agricultural and forestry activities (H01.05)	medium importance (M)	N/A

2.6.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
bait digging / collection (F02.03.01)	low importance (L)	N/A
other point source pollution to surface water (H01.03)	high importance (H)	N/A
diffuse pollution to surface waters due to agricultural and forestry activities (H01.05)	high importance (H)	N/A
invasive non-native species (I01)	high importance (H)	N/A
dredging/ removal of limnic sediments (J02.02.01)	high importance (H)	N/A
reduction in migration/ migration barriers (J03.02.01)	high importance (H)	N/A
Siltation rate changes, dumping, depositing of dredged deposits (J02.11)	medium importance (M)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant Information	
2.8.3 Trans-boundary assessment	

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.9.2. Population	assessment	Favourable (FV)
	qualifiers	N/A
2.9.3. Habitat	assessment	Favourable (FV)
	qualifiers	N/A
2.9.4. Future prospects	assessment	Favourable (FV)
	qualifiers	N/A
2.9.5 Overall assessment of Conservation Status	Favourable (FV)	
2.9.6 Overall trend in Conservation Status	N/A	

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

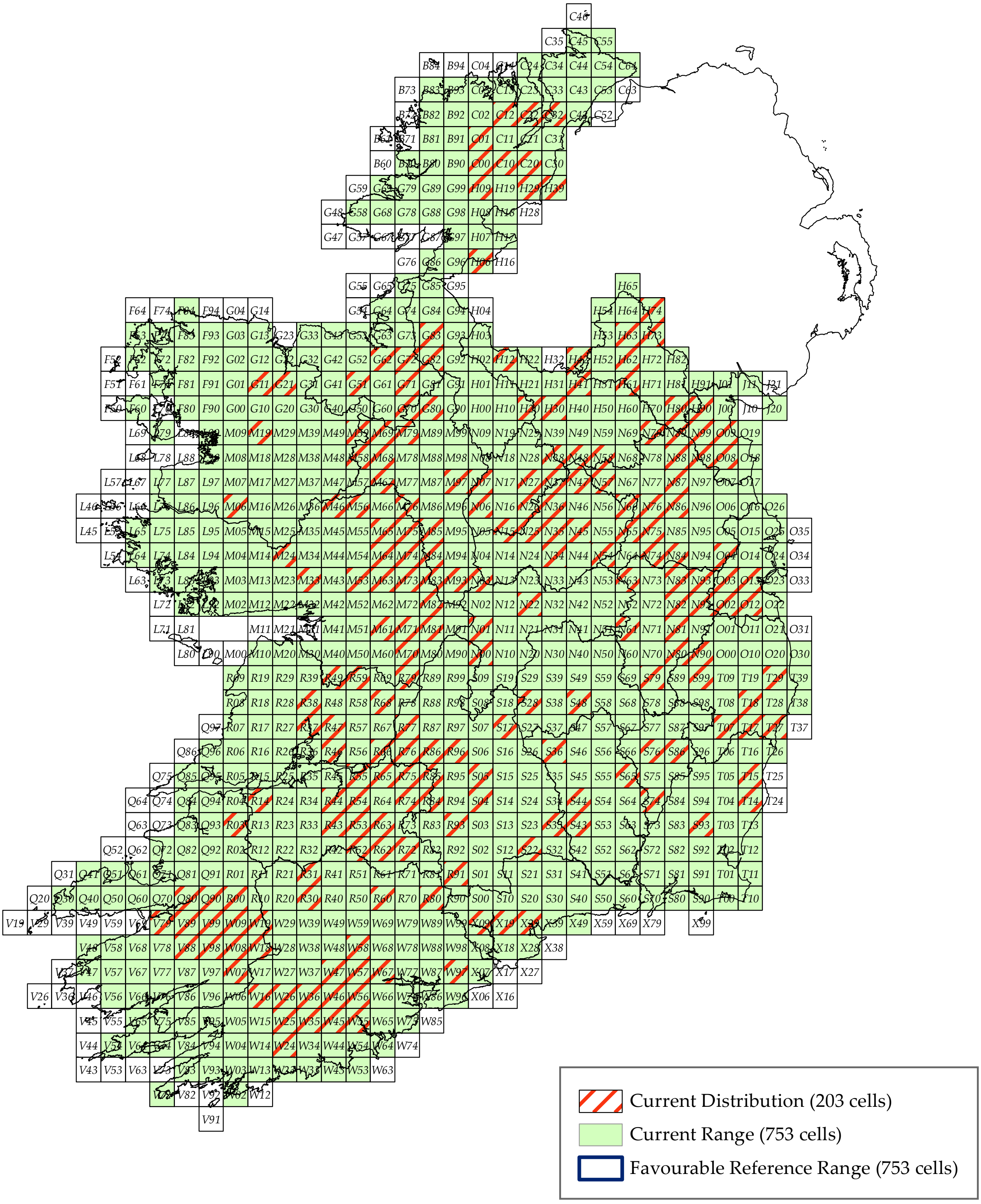
3.1.1 Population Size	Unit	number of map 10x10 km grid cells (grids10x10)		
	min	71	max	71
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3 Trend of population size within	stable (0)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Both	Long term
Other wetland-related measures (4.0)	Recurrent	high importance (H)	Both	Enhance

Field label	Note
Species: 1099	**River lamprey**
0.2.01 Species code	The river and brook lamprey are indistinguishable as larvae, living as filter feeders in sediment. The mature adult forms are clearly distinguishable on the basis of body size. The pair are considered by many in the same context as the brown trout – sea trout pairing, with similar absence of genetic discriminators (Salewski 2003; Espanhol et al. 2007). The approach to lamprey status assessment in Ireland has focussed on juvenile lamprey or ammocoetes. This is because it is feasible to carry out cost-effective catchment-wide surveys on ammocoetes over an extended annual time window. Such opportunities do not present themselves for the adult spawning phase of brook or of river lamprey. Consequently, the vast majority of available data relates to "Lampetra sp." and cannot be assigned to one species or the other. For the above reasons, a joint assessment is presented here that covers both taxonomic entities – the brook lamprey and the river lamprey. See notes 1.1 - 3.2 for L. planeri (1096), whch also apply to this species.

River Lamprey
Lampetra fluviatilis (1099)
Article 17 Assessment 2013



An Roinn
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Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála

0 10 20 30 40 50 km

N

Map - Léarscáil
V 1.0
Date - Dáta
12-06-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1102**
0.2.2 Species name	**Alosa alosa**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	Allis Shad (Sead aloseach)

1. National Level

1.1 Maps

1.1.1 Distribution Map	No
1.1.1a Sensitive species	No
1.1.2 Method used - map	N/A
1.1.3 Year or period	
1.1.4 Additional map	No
1.1.5 Range map	No

2. Biogeographical Or Marine Level

2.1 Biogeographical Region	**Atlantic (ATL)**
2.2 Published sources	

2.3 Range

2.3.1 Surface area - Range (km²)		
2.3.2 Method - Range surface area	N/A	
2.3.3 Short-term trend period		
2.3.4 Short-term trend direction	N/A	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	
	operator	N/A
	unknown	No
	method	
2.3.10 Reason for change		

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	N/A
	min	max
2.4.2 Population size (other than individuals)	Unit	N/A
	min	max
2.4.3 Additional information	Definition of locality	
	Conversion method	
	Problems	
2.4.4 Year or period		
2.4.5 Method – population size	N/A	
2.4.6 Short-term trend period		
2.4.7 Short term trend direction	N/A	

2.4.8 Short-term trend magnitude	min	max	confidence interval
2.4.9 Short-term trend method	N/A		
2.4.10 Long-term trend period			
2.4.11 Long term trend direction	N/A		
2.4.12 Long-term trend magnitude	min	max	confidence interval
2.4.13 Long-term trend method	N/A		
2.4.14 Favourable reference population	number		
	operator N/A		
	unknown No		
	method		
2.4.15 Reason for change			

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	
2.5.2 Year or period	
2.5.3 Method used - habitat	N/A
2.5.4 a) Quality of habitat	
2.5.4 b) Quality of habitat - method	
2.5.5 Short term trend period	
2.5.6 Short term trend direction	N/A
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	
2.5.10 Reason for change	

2.6 Main Pressures

2.6.1 Method used – pressures	N/A

2.7 Main Threats

2.7.1 Method used – threats	N/A

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant Information	The Allis shad (Alosa alosa L.) is a large member of the herring family. It spends much of its life in coastal waters and some are caught off the south-east coast of Ireland. Allis shad enter freshwater to breed, and travel long distances up some large rivers in continental Europe. There is some evidence of small numbers of Allis shad entering Irish rivers but the only evidence of breeding is the presence of Allis-Twaite shad hybrids (King and Roche 2008; Coscia et al 2010). No juvenile Allis shad have been found during surveys in the Twaite shad SACs. It is considered therefore that the Allis shad is an opportunistic spawner in Irish waters; and until evidence of an established breeding population is found, the species is considered a vagrant.
2.8.3 Trans-boundary assessment	

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment	N/A
	qualifiers	N/A
2.9.2. Population	assessment	N/A
	qualifiers	N/A

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

2.9.3. Habitat	assessment N/A qualifiers N/A
2.9.4. Future prospects	assessment N/A qualifiers N/A
2.9.5 Overall assessment of Conservation Status	N/A
2.9.6 Overall trend in Conservation Status	N/A

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	N/A	
	min		max
3.1.2 Method used	N/A		
3.1.3 Trend of population size within	N/A		

3.2 Conservation Measures

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1103**
0.2.2 Species name	**Alosa fallax**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	Twaite Shad (Sead fhallacsach)

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	2006-2012
1.1.4 Additional map	Yes
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published sources

Bracken, J. & M. Kennedy, 1967. Notes on some Irish estuarine and inshore fishes. Irish Fisheries Investigations, Series B (Marine), No.3.28pp.

Coscia I., Rountree V., King J.J., Roche W.K. and Mariani S. (2010) A highly permeable species boundary between two anadromous fishes. Journal of Fish Biology, 77, 1137-1149.

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2.3 Range

2.3.1 Surface area - Range (km²)	2200	
2.3.2 Method - Range surface area	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	3200
	operator	N/A
	unknown	No
	method	The favourable reference range was calculated based on barriers to upstream migrations. The first impassable barrier was taken to represent the upstream extent of favourable range. On the River Barrow, this was St. Mullins weir. On the River Nore, there is an impassable weir at Thomastown, on the River Suir a weir in Clonmel; on the River Slaney at Clohamon and the River Blackwater at Carysville. This figure was calculated using the 10x10km grid. The reference range (32 x 10 km sq) is larger than the range as it is considered that adult shad should be able to

	migrate upstream on the R. Nore and Suir past the upper tidal limit to Thomastown weir and Clonmel, respectively. Individual shad have been encountered in three consecutive years in the estuary of R. Boyne. This channel has, visually, habitat comparable to the designated SAC channels for shad spawning and it is included in the calculation of Favourable Reference Range.
2.3.10 Reason for change	Use of different method

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit N/A min max
2.4.2 Population size (other than individuals)	Unit number of colonies (colonies) min 4 max 5
2.4.3 Additional information	Definition of locality: The stretch of river from the sea to the first impassable barrier to upward migration. Conversion method Problems
2.4.4 Year or period	2006-2012
2.4.5 Method – population size	Estimate based on partial data with some extrapolation and/or modelling (2)
2.4.6 Short-term trend period	2001-2012
2.4.7 Short term trend direction	stable (0)
2.4.8 Short-term trend magnitude	min max confidence interval
2.4.9 Short-term trend method	Estimate based on partial data with some extrapolation and/or modelling (2)
2.4.10 Long-term trend period	
2.4.11 Long term trend direction	N/A
2.4.12 Long-term trend magnitude	min max confidence interval
2.4.13 Long-term trend method	N/A
2.4.14 Favourable reference population	number 6 operator N/A unknown No method: There are established populations of shad on the Barrow, Nore, Suir and Blackwater - confirmed by scientific surveys, angling surveys, angling information. Recruitment of Twaite shad, at least in some years, has been demonstrated on these waters. The Slaney has long been considered a shad river and this population is also retained within the favourable reference population (FRP). The Boyne records represent a new interest by shad in this channel, which is highly suitable for shad penetration and spawning. This population is also included in the FRP. Thus the FRP is set at 6 populations.
2.4.15 Reason for change	Improved knowledge/more accurate data

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	2200
2.5.2 Year or period	2007-2012
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Moderate
2.5.4 b) Quality of habitat - method	Spawning locations for the Nore populations has not been identified despite a

	number of surveys including acoustic tagging. Good habitat is present on the River Barrow, Blackwater and Suir as good numbers of individuals present
2.5.5 Short term trend period	2000-2012
2.5.6 Short term trend direction	stable (0)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	3400
2.5.10 Reason for change	Improved knowledge/more accurate data Use of different method

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
invasive non-native species (I01)	high importance (H)	N/A
Fishing and harvesting aquatic resources (F02)	high importance (H)	N/A
reduced fecundity/ genetic depression in animals (inbreeding) (K05.01)	high importance (H)	N/A

2.6.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
invasive non-native species (I01)	high importance (H)	N/A
Fishing and harvesting aquatic resources (F02)	high importance (H)	N/A
reduced fecundity/ genetic depression in animals (inbreeding) (K05.01)	high importance (H)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant Information	Since 2011 the Irish Specimen Fish Committee has introduced a Shad hybrid category. These Hybrid Shad physically look like Twaite shad but differ genetically. As hybrid records only exist for 2011 and 2012, investigations into the the extent of hybridisation is only in its infancy. In order to conserve the Alosa Sp, specimen fish collectors now need only send a few fish scales rather than the fish body required in previous years.
2.8.3 Trans-boundary assessment	

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment Bad (U2) qualifiers improving (+)
2.9.2. Population	assessment Inadequate (U1) qualifiers stable (=)
2.9.3. Habitat	assessment Inadequate (U1) qualifiers stable (=)
2.9.4. Future prospects	assessment Inadequate (U1) qualifiers stable (=)
2.9.5 Overall assessment of Conservation Status	Bad (U2)

2.9.6 Overall trend in Conservation Status	stable (=)

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	number of colonies (colonies)		
	min	4	max	5
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3 Trend of population size within	stable (0)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Inside	Long term

Field label	Note
Species: 1103	**Twaite Shad**
0.2.01 Species code	The shads are large members of the herring family and both the Allis shad (Alosa alosa L.) and the Twaite shad (Alosa fallax Lacepede) occur In Irish waters and are generally distinguished on the basis of gill raker numbers. The Twaite shad lives in the lower reaches of estuaries or at sea as adults, feeding on juvenile fish and on crustacean species. Adult fish travel upriver in Irish estuaries and spawn at the upper tidal reaches in a series of rivers in the south east. While Twaite shad have been recorded travelling up extended distances into freshwater in the UK, particularly in the Severn system, this habit is not apparent in Ireland. There is no evident physical barrier to shad passage in some of the Irish rivers and further work is required in this area. Following spawning, the adult Twaite shad descend the estuaries and resume feeding. Eggs are externally fertilised and either drop to the channel bed or float in the water column. The eggs hatch after a short period and post-larval fish of circa 20 mm have been collected in late June and July. The young-of-year fish can reach up to 100 mm at the end of the first year and spend all this time in estuarine water, drifting down with flow and tides and being mainly captured in the lower estuarine reaches in October - November. Limited knowledge indicates that Irish Twaite shad will live in estuarine waters for at least two full years prior to going to sea. The large expanses of water available in the lower reaches of some Irish estuaries e.g. Waterford harbour, may facilitate such long-term use of the estuaries by the growing fish. Recent evidence reports the hybridisation of the species in certain rivers (King and Roche 2008; Coscia et al 2010)) and the extent of the hybridisation renders it problematic to distinguish an individual fish on morphological features (Coscia et al 2010). The Irish Specimen Fish committee annual report (ISFC 2012) now includes a category for Shad Hybrids (based on genetic discrimination). The approach adopted in this review has distinguished between Allis and Twaite shad on the basis of classical gill raker counting. Data sets, in terms of bodies available for examination and locations of capture, are much reduced in the 2007-2012 period. There are two main reasons for this: the introduction of controls on commercial fishing for salmon in Irish estuaries, leading to a reduction or elimination of shad samples coming as by-catch, and the introduction of genetic identification by the Irish Specimen Fish Committee, eliminating the need for anglers to produce fish bodies for verification.
1.1.01 Distribution map	This map was derived from the transformation of the map referred to in 1.1.4 to the LAEA projection.
1.1.02 Method used - map	The distribution map is based on surveys between 2006-2012 undertaken by IFI and also reports by snap fishermen (River Nore) and anglers. IFI undertakes a number of specific surveys for shad; these include post-larval netting surveys in each SAC and angling surveys for adults in spawning areas. Juvenile shad investigations using bongo netting were also completed by IFI. In recent years water levels allowed only one sampling on the main five rivers where Alosa spp are known to occur (Rivers Barrow, Nore, Suir, Blackwater and Slaney).
1.1.04 Additional distribution map	The distribution data from IFI was intersected with the Irish 10km grid.
1.1.05 Range map	The range map is based on the locations where Twaite shad were taken during the survey period (2006-12). From these points, IFI created its own range based on the length of river a fish would have had to take to get to the location where they were identified. In effect, from the most upstream record in each river, downstream to the estuary. When the route from sea to most upstream positive location was taken into consideration, 22 x 10 km2 were included in the range.

Field label	Note
Species: 1103	**Twaite Shad**
2.3.01 Surface area - Range	The range tool did not include the habitat connecting the river corridor between the sea and the locations where the fish were identified. Therefore, IFI manually developed a surface range on ArcView using the 10km grid provided. When the range tool was run the range of Twaite shad was deemed to cover 13 grids of 10km2 area, compared to the IFI-manually chosen 22 grids of 10km2 . This larger value was used by IFI in this report.
2.3.02 Method used - Surface area of Range	The range is considered to encompass five rivers in the south/south-east of the country from the estuary to the upriver extent of migration of Twaite shad. This coincides with the first artificial barrier to passage on the Barrow - which is also the tidal limit. In the case of the Munster Blackwater, Nore and Suir it appears to coincide with the upper tidal freshwater limit. A solitary Twaite shad was taken on the Slaney at Clohamon, circa 20 km into freshwater above the tidal limit. This points to a capacity for Irish Twaite shad to ascend into freshwater.
2.3.04 Short term trend - Trend direction	The reduction of available samples and locations of capture has hindered any trend assessment in the 2006 - 2012 period. Focused sampling via angling has pointed to presence of adult Twaite shad in traditional spawning areas at characteristic time of year in the Barrow, Suir and Munster Blackwater. Sampling of post-larval shads has indicated low level of recruitment in some rivers in some years and no post-larval fish were recorded in June - July 2012, following heavy freshwater flows / floods in May 2012. This method is still being refined and will be informative in the longer term. The trend period is indicated by the EU Commission as 12 years. IFI has carried out Twaite shad sampling in both six-year periods 2001 - 06 and 2007-12. In both periods the range of the species was essentially the same, despite a reduced sample availability of adult fish in the latter period, due to cessation of commercial salmon netting (generating a shad bycatch). Overall, the range is considered stable.
2.3.10 c) Reason for change - use of different method?	The previous assessment used the 50km grid to plot range; the 10km grid is used this time.
2.4.02 a) Population size estimation (using population unit other than individuals) - Unit	It is not possible, at this stage, to provide any estimate of population size in any of the rivers occupied by Twaite shad. Number of colonies is used as a surrogate for population size. A colony, for these purposes, is taken as a spawning population in a particular river. Relative size of the colonies can be assessed, in a coarse way, by comparing sampling results. The Barrow comes out with the largest sample sizes, followed by the Munster Blackwater, Suir, Nore and Slaney. The Barrow outcomes are commonly ten-fold larger than the other channels - based on angling effort, autumn trawling for 0+ fish and on tow-netting (bongo netting) for post-larval fish. Studies by IFI over the 2000 – 2012 period have demonstrated presence of Twaite, Allis and hybrid shad in five large rivers of the south east (King and Roche 2008). The studies have also demonstrated shad recruitment, at least In some years, in the Blackwater, Suir and Barrow – Nore. Twaite shad migration into purely freshwater habitat has been demonstrated in the Blackwater and Slaney. As a minimum, it is proposed that four colonies – Blackwater, Suir, Nore and Barrow – should be considered as populations. The Slaney is included to provide the current considered maximum of colonies, based on survey and expert judgement.

Field label	Note
Species: 1103	**Twaite Shad**
2.4.07 Short-term trend - Trend direction	The populations of shad on the Barrow, the Blackwater and the Suir are relatively stable, based on angling and post-larval surveys. However, there is a lack of data for a number of populations, namely the Rivers Nore, Slaney and Boyne. Single individuals, only, were recorded on the Rivers Slaney and Boyne for individual years in the 2006 - 2012 period and it is unknown whether there are established populations. Only one twaite shad was recorded on the River Slaney in the current 6-year reporting cycle - commercial salmon netting had previously been a major source of information on the shads. The individual Slaney fish was 41 km upstream of the sea so the notion that a population may exist on the River Slaney must not be ruled out. Bongo netting for juvenile fish over two separate years has yielded no positive results in the Slaney. Despite the uncertainty about the trend in some rivers, the trend overall is considered to be stable.
2.4.09 Short-term trend - Method used	See 2.4.7. Sampling of post-larval shad has been developed as a technique in the last 3 years by IFI but is still being refined. Results indicate a major fluctuation between years and major differences in catch per unit effort (CPUE) between different rivers in the same and in different years. High flood conditions in 2012 are considered responsible for zero post-larval outcomes from sampling in June - July 2012. This points to an erratic or inconsistent recruitment - with strong year classes in some years and poor recruitment in others - as put forward by Miran Aprahamian (UK Environment Agency, pers. comm.). This post-larval sampling is likely to prove a useful tool, capable of replication, and is likely to identify substantial variation in spawning 'success' between years - leading to the need for an extended-term approach to viewing status and trends.
2.4.15 b) Reason for change - improved knowledge/more accurate data?	Recent surveys show that the Boyne is also being used by Shad. Given the importance of including all geographical variation, this river is also included in the calculations of favourable reference population.
2.5.01 Area estimation	This figure incorporates the suite of habitats used by the extant Irish populations and matches the range value.
2.5.03 Method used Habitat for the species	The area of habitat is taken to equal the area of the Range. This figure incorporates the suite of habitats used by the extant Irish populations i.e. the spawning grounds in upper tidal waters and the full extent of estuarine water downstream of this point to open sea. This suite of habitats covers spawning grounds, nursery and feeding areas of 0+ fish up to early stages in 3rd year of life i.e. 2+ fish, as well as covering some of the habitat that may be used by feeding adult Twaite shads.
2.5.04 a) Quality of the habitat - Good / moderate / bad / unknown	In water quality terms, the habitat quality must be considered to be moderate. There are no known areas where oxygen or thermal issues might impact on Twaite shad life stages. A habitat survey at the spawning area on the R. Barrow in 2010 indicated a wide range of bed conditions including some areas with extensive filamentous algal cover, others with moss or other aquatic plants and further sites with a loosely-textured gravel-cobble bed. Eggs dropping into areas of algal matting may be liable to suffocation and reduced hatching. This issue has been anecdotally cited on the R. Suir as an issue in regard to decline of shad populations in that river. Suspended solids (SS) are a frequent issue in estuarine waters, particularly those with major commercial shipping and port facilities. The lower Suir estuary has recorded high SS values, frequently of natural origin arising from elevated river flow levels and high wind levels. Young shad are likely to have grown beyond the post-larval level before reaching the lower reaches of the present SACs, where SS levels are likely to be most elevated. Although many areas of shad habitat are in good condition, given the concerns outlined above, an overall assessment of moderate is given.

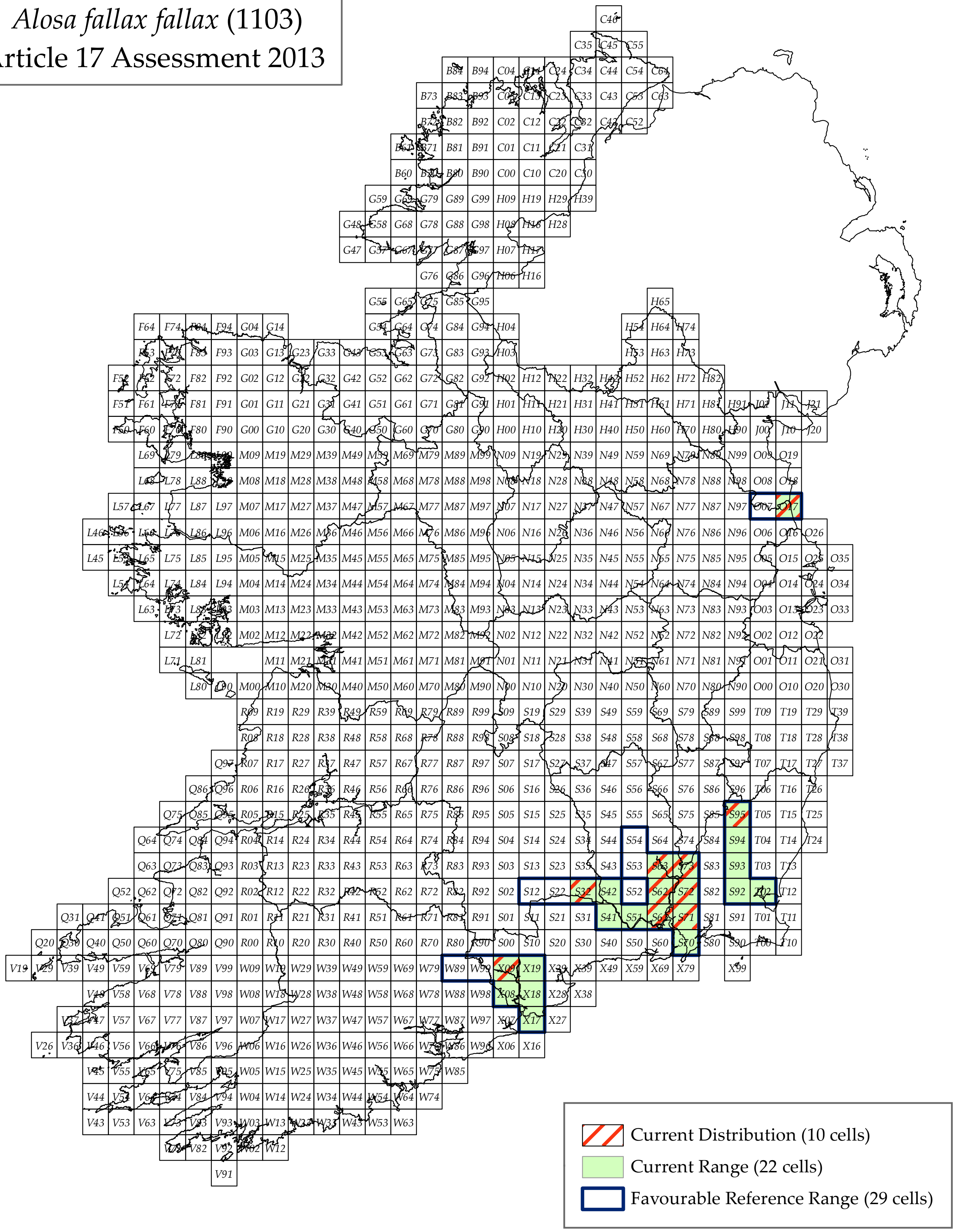
Field label	Note
Species: 1103	**Twaite Shad**
2.5.04 b) Quality of the habitat - Explain how the quality was assessed	Based on expert judgement, using outcomes from direct surveys on the target species and on limited habitat information from one spawning area. Telemetry studies in 2012 (IFI report for 2012) indicated active use of the discrete Barrow estuary, from confluence with the Suir to upper tidal limit, by adult fish during the spawning period.
2.5.09 Area of suitable habitat for the species (km2)	This is considered to be the area of habitat within the state that could provide the suite of habitat requirements for the Twaite shad life cycle. The area value provided is based on opinion or expert judgement. It includes, reasonably, the current FRR, as presented. It also includes a discrete set of long, linear estuaries that provide access to freshwater habitat containing gravelled areas for spawning. The length of estuary, or of continuous freshwater-tidal aquatic habitat, is considered sufficient for maturation of larval and post-larval shad up to the late autumn 0+ stage to occur without washout from the system. The additional estuaries included are the Avoca and Bandon. The area of suitable habitat is assessed at the Favourable Reference Range + the number of 10 km2 grids to the first impassable barrier on the Rivers Bandon and Avoca as these are deemed to be characteristic of what shad require for spawning.
2.5.10 b) Reason for change - improved knowledge/more accurate data?	A better understanding of shad ecology and distribution has allowed a more detailed assessment of the extent of shad habitat in this report
2.5.10 c) Reason for change - use of different method (e.g. 'Range tool')?	In the previous assessment, the extent of distribution records was used as a proxy for habitat. In this assessment, the full extent of the range is used to calculate area of habitat.
2.6 Main pressures - Pressure	I01 - invasive non-native species: Dace (Leuciscus leuciscus) is present in the Nore, Barrow and Munster Blackwater spawning areas of the Twaite shad. It is likely that the dace feeds on shad eggs. The Asian clam (Corbicula fluminea) is also present in the Barrow and Nore downstream of the spawning grounds. Initial observations indicate an upriver creep of the carpet of this mollusc. It filters water at a high rate and can remove eggs and larval stages of shad. F02 - Fishing and harvesting aquatic resources: Adult Twaite (and Allis) shad are a shoaling species, as with other members of the herring family. At sea, these shoals are susceptible to marine capture and will appear on sonar and other investigatory tools used by commercial fishermen. The shads are a by-catch and may be discarded. The extent of shad by-catch is not known but individual samples, from a wide range of sites around the coast, have been presented to IFI over several years by port-based colleagues of MI, BIM and SFPA. More substantial samples were presented from trawling due south of Dunmore East in 2001 and from ground-netting trials off the south-west coast in 2011. K05.01 - reduced fecundity/ genetic depression in animals (inbreeding): There is genetic evidence that hybridisation is occurring between Twaite and Allis shad. This is considered a pressure arising from inadequate spawning stock for the less-well represented species (A. alosa) and from a focussing of spawning fish into limited spawning areas.
2.6.01 Method used - Pressures	The pressures are based on known situations and application of expert judgement to these, in the context of the Twaite shad life cycle.
2.7 Threats - Threat	The current pressures are considered likely to persist into the future.

Field label	Note
Species: 1103	**Twaite Shad**
2.8.02 Other relevant information	King and Roche (2008) provide evidence of both shad species, and their hybrids, occurring in the designated SAC channels in Republic of Ireland. A number of other estuarine habitats occur around the Irish coast that have hydromorphology attributes suitable for shad adults to penetrate to upper tidal limits, and into freshwater, and also have suitable spawning habitats, as per Maitland and Hatton-Ellis (2003). Suitable estuaries, based on the current Irish distribution, would appear to be those with a long, linear form, with a relatively large volume discharge from freshwater i.e. large rivers discharge into these linear estuaries. Candidate estuaries that might be suitable for shad include: the Boyne (current review indicates occurrence of isolated individuals); the Liffey (previous records in 1960s); the Bandon (no records); the Ilen (records from 1950s - Bracken and Kennedy 1967); the Laune (no records but Killarney shad occur in this basin). Some of these have been included at 2.5.9 - Areas of Suitable Habitat.
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The range was considered favourable in the 2007 assessment, but was mapped at the 50km level. The range has not decreased since then, in fact with the addition of records in the Boyne, the range has slightly increased. However, better understanding of the species ecology indicates that further penetration into freshwater is required in the channels occupied before favourable status is reached. These additional stretches of channel are now included in the favourable reference range. As the current range represents only 75% of the FRR, Range is assessed as Unfavourable-Bad.
2.9.01 b) Range - If CS is U1 or U2, use of qualifiers is recommended	The range has increased slightly since the last assessment with the addition of records in the Boyne.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The long-term angling information on the Barrow indicates that there is a healthy population with annual spawning and recruitment. The 'confining effect' of the weir at St. Mullins may serve to improve mating opportunities in this river. Angling surveys in 2011 pointed to the presence of a 'modest' population of adult shad at the Munster Blackwater but a smaller population on the R. Suir. Sampling for larval and post-larval shad in 2011 - 2012 yielded negative results in the majority of the rivers sampled, apart from the Barrow. Even here, negative results were recorded in 2012. This was considered to be due to high river flows and their adverse impact on shad residency and spawning success. In surveys to date, larger numbers of adult shad have been captured compared to numbers of juvenile shad. Overall, population is assessed as Unfavourable- inadequate.
2.9.02 b) Population - If CS is U1 or U2, use of qualifiers is recommended	The population attribute was assessed as Bad in the 2007 assessment. The information compiled since 2000 points to a strong annual spawning presence of Twaite shad in the Barrow. The recent additional findings from the Blackwater also point to a modest spawning population of adult Twaite shad. The Slaney population is a concern and more work is required on the newly discovered population on the Boyne to establish its status. Overall population is assessed as stable.

Field label	Note
Species: 1103	**Twaite Shad**
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Although the extent of habitat is generally good, habitat quality is assessed as moderate. Precise spawning locations have not been delineated. However, the characteristics of spawning habitats, as per Maitland and Hatton-Ellis (2003) are certainly present in the freshwater tidal and adjoining freshwater areas of each of the major south east rivers. Only the Barrow spawning habitat has been surveyed and there was evidence of substantial filamentous algal growths and of aquatic macrophytes in the spawning area. These would not be conducive to successful settlement and hatching out of settling fertilised eggs. The post-larval fish are buoyant in the tidal system and are widely dispersed quite early after hatching out (IFI report 2011). The extent of post-larval habitat and 0+ habitat is considered satisfactory. Habitat for the species was classed as Unknown in 2007. Additional information since that date has enabled a more definite classification. Further definition and delineation of spawning areas on the large south east rivers will be necessary as will further assessment of any penetration of adult spawning fish into freshwater in the Suir, Nore and Boyne.
2.9.03 b) Habitat for the species - If CS is U1 or U2, use of qualifiers is recommended	Basic physical attributes in terms of volume discharge from freshwater, general water quality, including temperature and oxygen conditions, and physical access to upper tidal areas and further are all available to Twaite shad in the SAC channels where the species is currently recorded. The presence of non-native invasive species – dace and Asian clam – in the Nore and Barrow and of dace in the Blackwater is not conducive to good habitat quality. The impact of these invasives is not likely to abate in the immediate future. Habitat trend is considered stable.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	Overall, future prospects are considered Inadequate – Poor. The presence of small populations in most of the shad rivers makes this species vulnerable to population crashes and losses. The threat from invasive aquatic species will continue into the future, but the full impact on spawning and recruitment is unknown. The extent of shad by-catch in commercial harvesting at sea is unknown. Given the homing instinct and the relatively small size of the Irish shad populations, loss through by-catch could have a significant impact. Barriers to upstream migration have been identified on a number of shad rivers. The same issue has been identified for sea lamprey. A review of barriers by IFI is underway and it is hoped that means of mitigating at least some of these impediments can be achieved. On the plus side, climate change may lead to the shad species being pushed slowly to more northerly latitudes, resulting in increased use of the Irish estuaries. The reduction of commercial fishing pressures in the Irish estuaries is likely to have been beneficial to shads leading to an increase in numbers of fish available for spawning. It is also expected that the reduction in nutrient levels to receiving waters of the current SAC estuaries, as required under the Urban Wastewater Directive and WFD, will lead to habitat improvements such as a decrease in levels of aquatic macrophytes and filamentous algae in current shad spawning areas. This could lead to increased survival of fertilised shad eggs.
2.9.04 b) Future prospects - If CS is U1 or U2, use of qualifiers is recommended	It is likely that the future prospects of the Twaite shad will remain 'Inadequate' going forward. The Threats identified (2.7) are broadly the same as current pressures i.e. the problems of today will remain the problems of tomorrow. Climate change may lead to northerly shift of temperature etc. preferences for the species and this may be positive for the status of the species in Irish waters. Overall, this parameter is considered stable.

Field label	Note
Species: 1103	**Twaite Shad**
2.9.05 Overall assessment of Conservation Status	The current range of the Twaite shad, although increasing, is only 75% of the identified favourable reference range. Population, although strong in the Barrow and reasonable in the Blackwater, is poor in some rivers and assessed as Inadequate overall. The extent of habitat is considered to be adequate to carry a larger population than is currently recorded, but there are concerns about habitat quality at spawning sites in particular. A number of threats have been identified that will require management to ensure continued successful spawning in the Barrow and elsewhere. Overall, the status of this species is considered Inadequate – Bad.
3.1.01 a) Population size - Unit	All five populations of twaite shad identified in 2.4.2 fall within the N2000 network. The twaite shad is a qualifying interest in the following SACs: Slaney, Barrow-Nore, Suir and Munster Blackwater. It has been demonstrated to occur in all of these SACs. It is not a qualifying interest in other SACs. Individual specimens of Twaite shad have been taken in three successive years in the lower reaches of the Boyne SAC, where this species is not a qualifying interest. Twaite shad have not been taken from other estuarine waters around the Irish coast in recent years. It is proposed that a number of other long, linear estuaries with upstream access to freshwater are available for colonisation but such colonisation has not been recorded. It is suggested that in excess of 95% of the Irish population of Twaite shad occurs within the SAC network designated for this species and that the current network is adequate and appropriate for the species, in the context of maintaining adequate conservation status.
3.2 Conservation measures	Under SI 477 of 2011, the Minister responsible for fish is given powers for the protection and management of the fish species listed in Annex II and V of the Habitats Directive. Under the SI, this Minister is empowered to bring forward measures to conserve the status of twaite shad. The Water Framework Directive aims to improve water quality in rivers and estuarine waters, this will be of direct benefit to shad.

Twaite Shad
Alosa fallax fallax (1103)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 10 20 30 40 50 km

N
Map - Léarscáil
V 1.0
Date - Dáta
12-06-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1106**
0.2.2 Species name	**Salmo salar**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	Atlantic Salmon (Bradán)

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	1990-2003
1.1.4 Additional map	Yes
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published sources

Habitat Quantification
McGinnity, P., Gargan, P.,Roche, W.,Mills, P. & McGarrigle, M., 2003. Quantification of the Freshwater Salmon Asset in Ireland using data interpreted in a GIS platform. Irish Freshwater Fisheries Ecology and Management Series: Number 3, Central Fisheries Board, Dublin, Ireland.

New wetted area paper:
McGinnity P., DeEyto, E., Gilbey, J., Gargan, P., Roche, W., Stafford, T., McGarrigle, M., O'Maoileidigh, N., & Mills, P. 2012. A predictive model for estimating river habitat area using GIS-derived catchment and river variables. Fisheries Management and Ecology, 19 (1) 67-77.

Stock Levels:
Anon 2012. The Status of Irish Salmon Stocks in 2011 and Precautionary Catch Advice for 2012. [PDF] Available from: http://www.fisheriesireland.ie/Salmon-management/salmon-management.html [Accessed 10/02/13]

ICES 2012a. ICES WGNAS REPORT 2012: Report of the Working Group on North Atlantic Salmon (WGNAS).ICES CM 2012/ACOM:09. [PDF] Available from: http://0101.nccdn.net/1_5/168/300/330/wgnas_2012.pdf [Accessed 10/2/12]

ICES 2012b. ICES Advice 2012, Book 10. [PDF] Available from: http://www.ices.dk/committee/acom/comwork/report/2012/Special%20Requests/NASCO_North_East_Atlantic_Commission.pdf [Acessed 22/1/13]

NASCO (2005) CNL (05) 45. Development of the NASCO Database of Irish Salmon Rivers. Report on Progress, May 2005. NASCO, Edinburgh.

NASCO 2013, Report of the Meeting of the Sub-Group on the Future Direction of Research on
Marine Survival of Salmon. [PDF] available from:
http://www.nasco.int/sas/pdf/archive/papers/2013/SAG_13_2.pdf [accessed

30/5/13]

O Maoileidigh, N. et al., 2004. Application of pre-fishery abundace modelling and Bayesian hierarchical stock and recruitment analysis to the provision of precautionary catch advice for Irish salmon (Salmon salar L.) fisheries. ICES Journal of Marine Science, 61 pp.1370-1378.

PRESSURES:
Siltation:
Study by EPA:
Walsh, N., Neill, M. and Lucey, J.(2012) RIVER SEDIMENT STUDIES IN RELATION TO
JUVENILE PEARL MUSSELS AND SALMONIDS. [PDF] EPA. Available from: http://www.epa.ie/downloads/pubs/water/rivers/EPA_River_Sediment_Studies.pdf

Sealice:
Krkosek, M., Revie, C.W., Gargan P.G., Skilbrei, O.T., Finstad, B. and Todd, C.D. (2012)
Impact of parasites on salmon recruitment in the Northeast Atlantic Ocean
Proceedings of the Royal Society B. 280. Alailable from: http://rspb.royalsocietypublishing.org/content/early/2012/11/01/rspb.2012.2359.full [Accessed 1/2/2013]

Climate Change:
Friedland, K., Reddin, D. & McMenemy, J. (2003) Multidecadal trends in North American Atlantic salmon (Salmo salar) stocks and climate trends relevant to juvenile survival. Canadian Journal Of Fisheries And Aquatic Sciences. 60, 5, pp. 563-583, OmniFile Full Text Mega (H.W. Wilson), EBSCOhost, [accessed 23/1/2013].

Graham, C., and Harrod, C. (2009) Implications of Climate change for the fishes of the British Isles. Journal of Fish Biology 74, 1143–1205.

EPA (2012) Water Quality - Ireland's Environment 2012 - An Assessment. [PDF] Available from: http://www.epa.ie/downloads/pubs/indicators/name,33606,en.html [accessed 29/1/13].

General Salmon Ecology:
Hendry, K. and Cragg-Hine. D. (2003) Ecology of the Atlantic Salmon.Conserving Natura 2000 Rivers Ecology Series No. 7 English Nature. [PDF] Available from: http://ec.europa.eu/environment/life/project/Projects/index.cfm?fuseaction=home.showFile&rep=file&fil=SMURF_salmon.pdf [accessed 30/5/13]

2.3 Range

2.3.1 Surface area - Range (km²)	63200	
2.3.2 Method - Range surface area	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2000-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period	1988-2012	
2.3.7 Long-term trend direction	stable (0)	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	63200
	operator	N/A
	unknown	No
	method	The current range is set as the Favourable Reference Range (FRR) as there is no evidence of a decline since the Directive came into force and all ecological and geographical variation is considered to be encompassed within the FRR.
2.3.10 Reason for change	Use of different method	

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	number of individuals (i)		
	min	244107	max	244107
2.4.2 Population size (other than individuals)	Unit	N/A		
	min		max	
2.4.3 Additional information	Definition of locality			
	Conversion method	Various measurements of population (and Favourable Reference population) were considered. In this report the total estimated number of spawners is considered the unit of measurement most appropriate and illustrative of the current status of the Salmon in Ireland. In the previous report the unit of measurement chosen was the number of rivers meeting their conservation limit (CL). There are 143 identified salmon rivers in Ireland, 56 of which are meeting or exceeding their conservation limit. At the time of the previous report it was reported that there were 148 Salmon rivers, since that time 5 small rivers found in the estuaries or tidal reaches of larger rivers have been reclassified to be included as part of those larger rivers.		
	Problems			

2.4.4 Year or period	2010-2011		
2.4.5 Method – population size	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.6 Short-term trend period	2001-2012		
2.4.7 Short term trend direction	stable (0)		
2.4.8 Short-term trend magnitude	min	max	confidence interval
2.4.9 Short-term trend method	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.10 Long-term trend period	1988-2012		

2.4.11 Long term trend direction	decrease (-)
2.4.12 Long-term trend magnitude	min max confidence interval
2.4.13 Long-term trend method	Estimate based on partial data with some extrapolation and/or modelling (2)
2.4.14 Favourable reference population	number 251378 operator N/A unknown No method The Favourable Reference Population is set as the sum total of the 1 Sea Winter (1SW) and Multi Sea Winter (MSW) Conservation Limits (CL) identified for the 143 salmon rivers. This Population is considered adequate to contribute towards the long term survival of the species.
2.4.15 Reason for change	Use of different method

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	569
2.5.2 Year or period	2011-2012
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Moderate
2.5.4 b) Quality of habitat - method	Water quality changes documented in state of environment report (EPA 2012) show that while there has been virtual elimination of seriously polluted river sites, and that approximately 71% of river channel is classified as good or better, there has been a decline in the number of high status waters in recent decades. A range of programmes to improve the physical and chemical habitat for salmon have taken place; these have included rehabilitation of rivers, work by angling clubs and fisheries owners under conservation stamp fund and IFI led local initiatives. Overall, Habitat Quality is assessed as Moderate.
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	stable (0)
2.5.7 Long-term trend period	1988-2012
2.5.8 Long term trend direction	increase (+)
2.5.9 Area of suitable habitat (km²)	1205
2.5.10 Reason for change	Use of different method

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
agricultural intensification (A02.01)	high importance (H)	N/A
intensive sheep grazing (A04.01.02)	medium importance (M)	N/A
Fertilisation (A08)	medium importance (M)	N/A
artificial planting on open ground (non-native trees) (B01.02)	medium importance (M)	N/A
forest replanting (non native trees) (B02.01.02)	medium importance (M)	N/A
use of fertilizers (forestry) (B05)	medium importance (M)	N/A
Peat extraction (C01.03)	low importance (L)	N/A
disposal of household / recreational facility waste (E03.01)	high importance (H)	N/A
disposal of industrial waste (E03.02)	medium importance (M)	N/A
intensive fish farming, intensification (F01.01)	medium importance (M)	N/A
poaching (F05.04)	high importance (H)	N/A
pollution to surface waters by industrial plants (H01.01)	low importance (L)	N/A

diffuse pollution to surface waters due to agricultural and forestry activities (H01.05)	high importance (H)	N/A
diffuse pollution to surface waters due to household sewage and waste waters (H01.08)	high importance (H)	N/A
invasive non-native species (I01)	low importance (L)	N/A
Modification of hydrographic functioning, general (J02.05)	low importance (L)	N/A
Water abstractions from surface waters (J02.06)	medium importance (M)	N/A
management of aquatic and bank vegetation for drainage purposes (J02.10)	low importance (L)	N/A
predation (K03.04)	medium importance (M)	N/A
Threats and pressures from outside the Member State (XO)	medium importance (M)	N/A

2.6.1 Method used – pressures: mainly based on expert judgement and other data (2)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
agricultural intensification (A02.01)	high importance (H)	N/A
intensive sheep grazing (A04.01.02)	low importance (L)	N/A
Fertilisation (A08)	low importance (L)	N/A
artificial planting on open ground (non-native trees) (B01.02)	medium importance (M)	N/A
forest replanting (non native trees) (B02.01.02)	medium importance (M)	N/A
use of fertilizers (forestry) (B05)	medium importance (M)	N/A
Peat extraction (C01.03)	low importance (L)	N/A
disposal of household / recreational facility waste (E03.01)	high importance (H)	N/A
disposal of industrial waste (E03.02)	medium importance (M)	N/A
intensive fish farming, intensification (F01.01)	medium importance (M)	N/A
poaching (F05.04)	high importance (H)	N/A
pollution to surface waters by industrial plants (H01.01)	low importance (L)	N/A
diffuse pollution to surface waters due to agricultural and forestry activities (H01.05)	high importance (H)	N/A
diffuse pollution to surface waters due to household sewage and waste waters (H01.08)	high importance (H)	N/A
invasive non-native species (I01)	low importance (L)	N/A
Modification of hydrographic functioning, general (J02.05)	low importance (L)	N/A
Water abstractions from surface waters (J02.06)	medium importance (M)	N/A
management of aquatic and bank vegetation for drainage purposes (J02.10)	low importance (L)	N/A
predation (K03.04)	medium importance (M)	N/A
Threats and pressures from outside the Member State (XO)	medium importance (M)	N/A

2.7.1 Method used – threats: expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends

2.8.2 Other relevant Information	Rivers are managed on a single stock status and no fisheries are allowed to fish on stocks deemed to be below their Conservation Limit (CL). The closure of the Irish mixed stock fishery at sea was implemented in 2006. There are currently three inshore mixed stock fisheries in Ireland: Killiary Harbour, Tullaghan Bay and Castlemaine Harbour. The risk assessment for the common estuary quotas results in a higher requirement for spawners than simply combining the CL's for the rivers to ensure simultaneous attainment of CL in all rivers; the total available surplus for the rivers combined is reduced in a common estuary analysis to ensure that each river meets it's CL simultaneously. 143 rivers have been identified as salmon catchments. Currently 56 of the 143 rivers are meeting conservation limits. [Conservation limits (CLs) for North Atlantic salmon stock complexes have been defined by ICES as the level of stock (number of spawners) that will achieve long-term average maximum sustainable yield (MSY), these CLs are limit reference points; having populations fall below these limits should be avoided.(ICES 2012a)]
2.8.3 Trans-boundary assessment	

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment Favourable (FV) qualifiers N/A
2.9.2. Population	assessment Inadequate (U1) qualifiers stable (=)
2.9.3. Habitat	assessment Favourable (FV) qualifiers N/A
2.9.4. Future prospects	assessment Inadequate (U1) qualifiers stable (=)
2.9.5 Overall assessment of Conservation Status	Inadequate (U1)
2.9.6 Overall trend in Conservation Status	stable (=)

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit number of individuals (i) min 97643 max 146464
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)
3.1.3 Trend of population size within	unknown (x)

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Adapt forest management (3.2)	Administrative	medium importance (M)	Both	Not evaluated
Restoring/improving water quality (4.1)	Legal Administrative	high importance (H)	Both	Enhance
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Both	Enhance

Regulation/ Management of hunting and taking (7.1)	Legal	medium importance (M)	Both	Enhance
Specific single species or species group management measures (7.4)	Legal	high importance (H)	Both	Enhance
Regulating/Managing exploitation of natural resources on sea (9.2)	Legal	high importance (H)	Both	Enhance

Field label	Note
Species: 1106	**Atlantic Salmon**
0.1 Member State	Ireland
0.2.01 Species code	The atlantic salmon is an anadramous species indigenous to the North Atlantic. In freshwater it is found in an arc from Northern Portugal in the east, to Connecticut River, New England, United States in the west. Salmon use rivers to reproduce and as nursery areas during their juvenile phase. Adults spend one to three years at sea where growth rates are much greater. Eggs are deposited during the winter in a depression, called a redd, excavated in river gravels. The eggs are then covered over with gravel. The eggs develop protected within the substrate and during spring hatch into alevins, at this stage the juvenile fish feed exclusively from their yolk sac, when this is depleted they begin to feed and become known as fry, the fry feed for the summer then over the autumn and gradualy develop characteristic vertical bars and become parr. Fry and parr feed primarily upon invertebrates. The Irish population generally comprises fish that spend two winters (small numbers spend one or three winters) in freshwater before going to sea, in spring, as smolts. The smoltification process involves physiological, morphological and behavioural changes which begin when the parr reach around 10-25cm in length. The smolts migrate to sea mainly from April to June. At sea the salmon feed upon crustaceans such as amphipods and euphausiids, and fish such as capelin and sandeels as they migrate to feeding grounds in the North Atlantic; growth is rapid. The majority of Irish fish spend one winter at sea before returning to their natal rivers, mainly during the summer, as grilse. Smaller numbers spend two winters at sea, returning mainly in spring, hence "spring" salmon. Older salmon are uncommon. A small proportion of the adult population returns to the sea post-spawning (known at this spent stage as a kelt) and can return to spawn again.
0.2.04 Common name	English: Salmon Irish: Bradán
1.1.01 Distribution map	Based on point distribution ' Salmon_site_to_2012' intersected with the 10km grid (=488 x10km cells)
1.1.02 Method used - map	An annual catchment-wide electrofishing (CWEF) survey of Salmon fry has been carried out by Inland Fisheries Ireland staff in conjunction with University College Cork since 2007, each year a number of catchments have been surveyed to discover the extent and estimate (semi-quantatitively) the freswater populations of salmon; Standard quantitative and qualitative surveys carried out by CFB since 1990 on various projects; Water Framework Directive sampling of water bodies; Salmon rod catch data; Where catchments have no data from any of the above sources expert opinion has been used to assess presence of salmon.
2.3.01 Surface area - Range	63200km sq. derived by range tool applied to the summary of data 1990 to 2006 from previous report plus the Catchment-wide electrofishing surveys' sites 2007 to 2012 and Water Framework Directive Surveys 2008-2011 where salmon were present.
2.3.10 c) Reason for change - use of different method?	The Range tool used to determine range resulted in a change in the value reported in 2007.
2.4.01 a) Population size estimation (using individuals or agreed exceptions where possible) - Unit	Estimated Total Number of Spawners (1SW & MSW). From submission to Working Group on North Atlantic Salmon (WGNAS) 2012, (ICES 2012a) and from discussions with Gargan (IFI) and O'Maoileidigh and White (both Marine Institute).

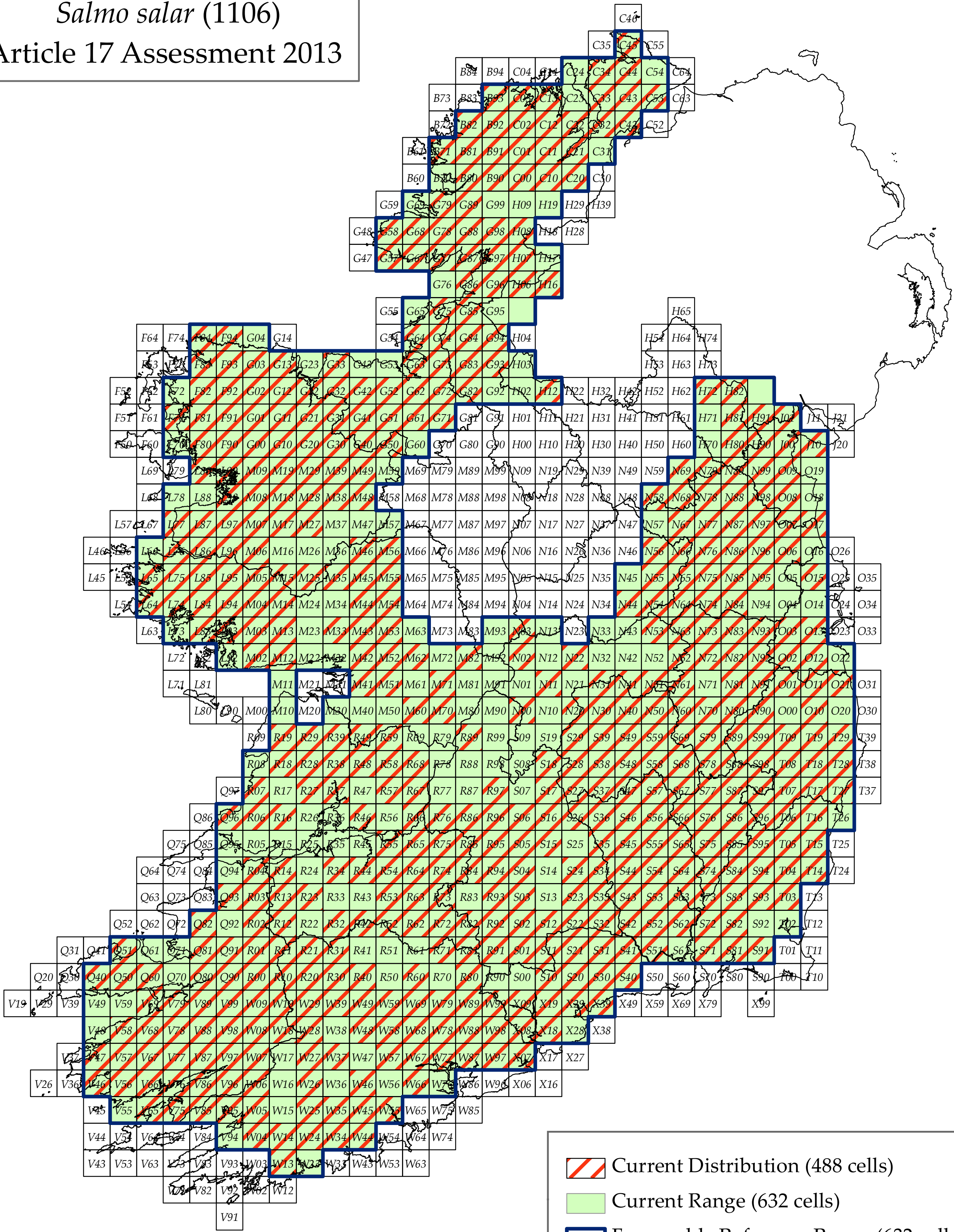
Field label	Note
Species: 1106	**Atlantic Salmon**
2.4.07 Short-term trend - Trend direction	For the period 2000 to 2006 there was a decline in the estimated number of spawners from 394975 to 151870, this was followed by a recovery to 265751 in 2007. For the last six years the figure has remained stable between 228929 and 275291 spawners annually. ICES advice is provided annually in the form of an estimated pre fishery abundance for 1SW and for MSW salmon. Figures for Ireland show a decrease from 2000 to 2006, but since 2006 the figure has remained stable (ICES 2012A) and overall this short term trend is considered stable.
2.4.11 Long-term trend - Trend direction	Over this period the population has been on average 6.73% below the conservation limit. Estimated number of spawners has varied between 151870 and 394975 (avg: 234449). Over the period 1988 to 2010 the pre fishery abundance has varied from 1323185 to 312242 (Avg 614807) (ICES 2012a).
2.4.14 a) Favourable reference population - Number of individuals/agreed exceptions/other units	Is the sum total of the 1 Sea Winter (1SW) and Multi Sea Winter (MSW) Conservation Limits (CL) for the 143 rivers.
2.5.01 Area estimation	A quantitative estimate of the national fluvial and lacustrine habitat resource accessible to salmon in Ireland. Accessible fluvial habitat refers to the extent of channel into which salmonids can migrate freely up to the first impassable barrier (12198ha). Accessible lacustrine habitat includes those lakes that can be used by salmon (44745ha). (McGinnity et al 2012). Figure from the previous report was 55900ha (11300ha accessible fluvial habitat and 44633ha accessible lacustrine habitat) (McGinnity et al 2003).
2.5.08 Long-term trend - Trend direction	Increase in Habitat over this period due to improvements in Water quality documented in state of environment report (EPA 2012). A range of programmes have taken place which have improved salmon habitat including rehabilitation of rivers, work by angling clubs and fisheries owners under conservation stamp fund and IFI led local initiatives.
2.5.09 Area of suitable habitat for the species (km2)	A quantitative estimate of the national fluvial and lacustrine habitat resource in Ireland. This includes areas of suitable habitat above impassible barriers. Total fluvial habitat refers to all wetted area of riverine channel for salmon rivers, up to the tidal limit and excluding first order streams (14759ha). Similarly, total lacustrine habitat includes the total surface area of lakes within the identified salmon rivers (105777ha)(McGinnity et al 2012). Figure from the previous report was 1217 km sq. (16050ha total fluvial habitat and 105661ha total lacustrine habitat) (McGinnity et al 2003).
2.5.10 c) Reason for change - use of different method (e.g. 'Range tool')?	The GIS model upon which riverine surface area is based has been improved since previous article 17 report. McGinnity et al 2012.
2.6 Main pressures - Pressure	Based on expert opinion and Ireland's Environment 2012 (EPA 2012): "The number of high status water has declined significantly in recent decades"; There has been "virtual elimination of seriously polluted waters" in the past eight years. Suspected causes of pollution at 953 polluted river sites surveyed 07-09: Agriculture-47%, Municipal-37.5%, Forestry-4%, Industrial-4%, Peat harvesting- 1%, Engineering works- 1%, Aquaculture-1%. Miscellaneous- 4.5%. And: "The Status of Irish salmon stocks in 2011 with precautionary advice for 2012" (Anon 2012): "there are real concerns relating to factors causing mortality at sea such as predation by seals, diseases and parasites, marine pollution and climate change." XO_ Threats fom outside Member State- Refers to Threats at sea. There are onging concerns at low marine survival, research is underway to try to identify the causes and methods to alleviate the problem (ICES 2012a,Nasco 2013, Anon 2012)

Field label	Note
Species: **1106**	**Atlantic Salmon**
2.7 Threats - Threat	All pressures are also listed as threats as there is no evidence of them ceasing in the future
2.8.02 Other relevant information	The risks to productive capacity are identified and monitored using a range of tools and measures as set out below: 1. Salmonid River Surveys Extensive, detailed morphological and ecological surveys of many of Ireland's salmonid rivers have been carried out, for different purposes, over the past decade. These surveys help identify risks to productive capacity. 2. Salmon Conservation Stamp Funding Programme The revenue generated from the salmon conservation stamp funding programme is being reinvested in habitat improvement and is ring-fenced and designated for the purpose of prioritised investment in salmon conservation initiatives. Funding is allocated to rehabilitate salmon rivers which are below their conservation limit and have the greatest prospect of recovery. 3. Catchment Wide Electro-fishing Catchment-wide electro-fishing surveys are undertaken in approximately fifty salmon catchments annually. Data are generated on the abundance and distribution of juvenile salmon in catchments. This programme has led to habitat plans being drawn up for locations where low densities of juvenile salmon have indicated habitat problems exist. 4. Aerial Photography Database A high quality aerial photographic series of the majority of salmon rivers in Ireland, collected in the course of low level flights, is being compiled by IFI. These are, and will continue to be used to identify the location and extent of habitat imbalances in Ireland's salmon rivers. 5. Monitoring for Habitats Directive Fish Species Funding has been allocated to meet the monitoring requirements of Annex II & V fish species (salmon, lamprey, shad, pollan) under Habitats Directive requirements. This monitoring programme will assist in the identification of impacted salmon habitat.
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	There has been no evidence of a decline in Range since the Directive came into force, therefore Range is assessed as Favourable.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	When measured in terms of rivers meeting conservation limits there has been an increase from 43 rivers in the previous report to 56 rivers at present. Over the same period of time (2007-2012) the estimated number of spawners has remained relatively stable at an average of 256138 (min: 228929, max: 2752910) which is slightly above the national conservation limit of 251378. Nevertheless it must be noted that this current period of stability has to be set against the context of a long trend of decline from an estimated 695526 spawners in 1975 (with minimum of 70417 in 1981), to a series of poor years from 1990 to 1995, followed by a period of recovery through the 1990's and early 2000's followed by another decline before a slight improvement to the current numbers. The most recent estimate put the numbers of spawners at 244107, this is below both the national conservation limit and the mean annual average (245669) for the period 1970 to 2012. However, despite recent stability, salmon numbers have not greatly increased. This may in large part be due to the fact that the last 10 years have seen particularly poor rates of marine survival.
2.9.02 b) Population - If CS is U1 or U2, use of qualifiers is recommended	The period of recent relative stability in salmon numbers has coincided with the removal of drift net fisheries from the Irish coast after 2006. Therefore the qualifier has been set as stable.

Field label	Note
Species: 1106	**Atlantic Salmon**
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Ongoing programmes to monitor and restore habitat are expected to continue to ensure the freshwater habitat is maintained. The extent and quality of Habitat for the species is considered adequate and therefore assessed as Favourable.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	Future prospects are assessed as Unfavourable inadequate due to the fact that population figures are below reference values and there are poor rates of marine survival. There are ongoing concerns about the poor marine survival of the species and efforts are ongoing at an international level, by agencies such as ICES and NASCO, and by the cooperative efforts of various national bodies to investigate these concerns. It is important in this context of poor marine survival to ensure that high numbers of salmon smolts are produced annually.
2.9.04 b) Future prospects - If CS is U1 or U2, use of qualifiers is recommended	Monitoring, modelling and protection and management of salmon populations and freshwater habitats is ongoing and overall there is no reason to expect a wide scale disimprovement of the freshwater situation for salmon, therefore the qualifier has been set as stable.
2.9.05 Overall assessment of Conservation Status	While the recent stabilisation of the numbers of salmon spawning in Ireland, along with the increasing number of salmon rivers meeting their conservation limits is encouraging, low rates of marine survival are of concern. There are also numerous threats to the freshwater habitat and vigilance is required to ensure the maintenance of good quality habitat which salmon require to thrive. The salmon population is still low in comparison to previous decades and so, in the absence of a recovery, the conservation status is considered unfavourable inadequate.
2.9.06 Overall trend in Conservation Status	The extent of habitat and range are considered to be favourable, with no evidence in decline. The population, as indicated by total estimated number of spawners, is also showing a trend towards stabilisation. There is no indication that the future prospects for salmon will deteriorate; national and international bodies are involved in a number of projects designed to improve the future prospects of the salmon. So the overall qualifier for the assessment is stable.
3.1.01 a) Population size - Unit	Salmon is listed under the terms of the E.U. Habitats Directive (Annex II). Accordingly 26 of the SACs in Ireland list salmon amongst their species of qualifying interest (QI). SSC's 2012 report notes: 30 rivers are listed specifically under EU Habitats Directive, 21 of theses are above CL, while a further two are meeting 2SW CL. GIS analysis of the SSC advice 2012 has identified that (based on an arbitrary assumption that salmon are evenly distributed throughout the available wetted area of the systems for which SSC advice is provided) between 40% and 60% of the salmon are within the SAC network.

Field label	Note
Species: 1106	**Atlantic Salmon**
3.2 Conservation measures	As well as the legal protection provided for under the Habitats Directive and Fisheries legislation, measures aimed at restoring lost or degraded salmon habitats have been identified and prioritized: 1. Rehabilitation of Salmon Rivers above Hydro-Electric Dams The Electricity Supply Board (ESB) manage the fisheries on Ireland's five hydro-electric rivers. As part of their responsibility to rehabilitate the salmon stock in these rivers, the ESB have embarked on a habitat rehabilitation programme 2. Programme for Rehabilitation of Drained Rivers Many of Irelands salmon rivers have been subjected to arterial drainage since the 1840s. The Office of Public Works (OPW), who has responsibility for drained rivers, has embarked on a programme to restore these catchments. As part of their responsibility in such channels, and for the implementation of the WFD requirements, the OPW have contracted IFI to carry out a programme of works that will address the negative impacts that drainage works have had on many Irish rivers. 3. Water Framework Directive (WFD) River Monitoring Monitoring of fish stocks, invertebrates, water chemistry, macrophytes and morphology takes place at 179 WFD surveillance monitoring river sites every three years. The WFD monitoring programme will assign ecological status to each water body. This will be based on water quality, the presence and abundance of fish species, river morphology etc. Any water body classified as less than good status has to have remedial measures drawn up through the Programme of Measures (POMS). POMs outlines the most cost effective management measures and their application within the basin to meet the multiple objectives set to obtain good ecological status. All of the environmental problems affecting rivers will be considered to formulate proactive Government policy to address the requirements of the Water Framework Directive in relation to riverine morphological imbalances. This policy, when implemented, will be of major benefit to Irish salmon stocks. 4. Fishery Owners / Angling Clubs Fishery owners and angling clubs, who own or lease fisheries, undertake rehabilitation work on salmon rivers nationally. The work normally involves raking of spawning gravels, input of new gravels, tree pruning, bank clearance, fencing etc. and is undertaken in consultation with IFI staff. 5. Mitigation for Infrastructural Programmes As the Irish economy has been developing over the past twenty years, infrastructure has improved with increases in the extent and quality of the road network and other utilities including water supplies, and gas pipelines. Infrastructural change has led to different scales of disruption to salmon rivers and through the consultative and planning process mitigatory or 'like for like replacement' measures have been agreed and implemented. In isolated cases, where serious pollution or fish kills have occurred through attributable discharges, some channel rehabilitation works have been carried out to enhance the existing habitat and attempt to accelerate natural recolonisation rather than restocking.

Altlantic Salmon
Salmo salar (1106)
Article 17 Assessment 2013



Current Distribution (488 cells)
Current Range (632 cells)
Favourable Reference Range (632 cells)

An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 10 20 30 40 50 km

N
Map - Léarscáil
V 1.0
Date - Dáta
31-05-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1202**
0.2.2 Species name	**Bufo calamita**
0.2.3 Alternative species scientific name	Epidalea calamita
0.2.4 Common name	Natterjack toad

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Complete survey/Complete survey or a statistically robust estimate (3)
1.1.3 Year or period	2007-2012
1.1.4 Additional map	Yes
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published sources

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http://www.npws.ie/publications/euconservationstatus/NPWS_2007_Cons_Ass_Backing_V1.pdf
Stevens V., Leboulengé, E., Wesselingh, R. and Baguette, M. (2006). Quantifying functional connectivity: experimental assessment of boundary permeability for the natterjack toad (Bufo calamita). Oecologia, 150: 161-171
Sweeney, P., Sweeney, N. and Hurley C. (2013) Natterjack toad monitoring project, 2011 - 2012. Irish Wildlife Manuals, No. 67. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

2.3 Range

2.3.1 Surface area - Range (km²)	72	
2.3.2 Method - Range surface area	Complete survey/Complete survey or a statistically robust estimate (3)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period	1988-2012	
2.3.7 Long-term trend direction	stable (0)	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	172
	operator	N/A
	unknown	No
	method	The Favourable Reference Range has been taken as the known historical range of the species in Kerry, based on Beebee (2002). Small adjustments at the periphery of the range, due to improved mapping and better data, have led to a slight reduction in the FRR since the last assessment.
2.3.10 Reason for change	Genuine	

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	number of individuals (i)		
	min	3385	max	12612
2.4.2 Population size (other than individuals)	Unit	N/A		
	min		max	
2.4.3 Additional information	Definition of locality			
	Conversion method			
	Problems	Toad populations will fluctuate from year to year in response to the pattern of recruitment that follows their boom or bust breeding ecology (Beebee & Griffiths, 2000). Population estimates are further complicated by variations in the proportion of the total adult population that breeds in any particular year. These estimates are based on spawn string counts assuming a 1:1 ratio of males:females i.e. 1 spawn string = 2 adults. While this is a widely used approach in toad monitoring, it has its limitations. In particular, numbers produced ignore non-breeding females leading to underestimates. Becart et al., (2007) estimated that 35% of females did not spawn in an average year and included a correction factor to account for that in their calculations. The same figure		

was used by Sweeney et al. (2013). However, in dry years, when many breeding sites fail to form, the proportion of non-breeding females may be considerably higher (T. Beebee, pers. comm.).
The most recent intensive surveys were undertaken in 2011 and 2012 and in both years, due to unseasonably dry conditions in March / April, many sites either did not fill at all or filled so late that only a limited number of females spawned. The resulting population estimates [3,385 (2011); 3,446 (2012)] are consequently very low, much lower than the last estimates, for 2005 and 2006, but comparable to the figure reported in 2004 (Becart et al., 2007). The 2011/12 figures are likely to be underestimates of the true population, although to what extent is not clear. Because of the considerations outlined above, a broad range for population is given based on all recent complete surveys, spanning the lowest estimate (2011) to the highest (2006).

2.4.4 Year or period	2004-2012		
2.4.5 Method – population size	Complete survey/Complete survey or a statistically robust estimate (3)		
2.4.6 Short-term trend period	2001-2012		
2.4.7 Short term trend direction	unknown (x)		
2.4.8 Short-term trend magnitude	min	max	confidence interval
2.4.9 Short-term trend method	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.10 Long-term trend period			
2.4.11 Long term trend direction	N/A		
2.4.12 Long-term trend magnitude	min	max	confidence interval
2.4.13 Long-term trend method	N/A		
2.4.14 Favourable reference population	number	13000	
	operator	N/A	
	unknown	No	
	method	The Favourable Reference Population of c. 13,000 adult toads that was calculated for the last reporting period is retained. This figure is based on an average population estimate of c. 9,000 adults from all breeding sites for the 2004-2006 breeding seasons (see Becart et al, 2007) plus an additional estimate of the density of toads required in the connecting habitat between main breeding sites necessary to ensure long term viability of the species (see NPWS, 2007).	
2.4.15 Reason for change	Use of different method		

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	41
2.5.2 Year or period	2001-2012
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Moderate
2.5.4 b) Quality of habitat - method	Toads require suitable waterbodies for breeding as well as suitable terrestrial habitat for foraging, dispersal and overwintering. Some ideal breeding areas occur within the current range with complexes of ponds connected by good feeding habitat e.g. Magharees, Roscullen. However, in other areas ponds are isolated, or surrounded by unsuitable vegetation, or prone to early dessication.

	On balance, with some habitat in good condition and some in unfavourable status, and based on best expert judgement, habitat quality is assessed as moderate.
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	increase (+)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	92
2.5.10 Reason for change	Improved knowledge/more accurate data

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
abandonment of pastoral systems, lack of grazing (A04.03)	high importance (H)	N/A
species composition change (succession) (K02.01)	medium importance (M)	N/A
invasive non-native species (I01)	low importance (L)	N/A
infilling of ditches, dykes, ponds, pools, marshes or pits (J02.01.03)	medium importance (M)	N/A
saltwater intrusion (J02.09.01)	low importance (L)	N/A
Water abstractions from groundwater (J02.07)	high importance (H)	N/A

2.6.1 Method used – pressures	based exclusively or to a larger extent on real data from sites/occurrences or other data sources (3)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
abandonment of pastoral systems, lack of grazing (A04.03)	high importance (H)	N/A
invasive non-native species (I01)	medium importance (M)	N/A
infilling of ditches, dykes, ponds, pools, marshes or pits (J02.01.03)	medium importance (M)	N/A
Water abstractions from groundwater (J02.07)	high importance (H)	N/A
saltwater intrusion (J02.09.01)	low importance (L)	N/A
species composition change (succession) (K02.01)	medium importance (M)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant Information	
2.8.3 Trans-boundary assessment	

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment Bad (U2) qualifiers stable (=)
2.9.2. Population	assessment Bad (U2) qualifiers unknown (x)
2.9.3. Habitat	assessment Inadequate (U1) qualifiers improving (+)

2.9.4. Future prospects	assessment Inadequate (U1) qualifiers stable (=)
2.9.5 Overall assessment of Conservation Status	Bad (U2)
2.9.6 Overall trend in Conservation Status	improving (+)

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	N/A	
	min		max
3.1.2 Method used	N/A		
3.1.3 Trend of population size within	N/A		

3.2 Conservation Measures

Field label	Note
Species: 1202	**Natterjack toad**
0.2.01 Species code	The natterjack toad is widespread across continental Europe but lives at the edge of its climatic range in Ireland. It is one of only three amphibians found here and is confined to a small number of coastal sites around the Dingle and Iveragh peninsulas in West Kerry, with one translocated population in Wexford. The toad is the last of our amphibians to emerge from hibernation normally appearing at the end of March/early April. Males take up residence in traditional breeding ponds where, in the evenings, they call to females. Eggs are laid in strings. In warm weather tadpoles can develop quickly and emerge onto land within 8-10 weeks. The toad is adapted to temporary water bodies; while dry years lead to mass mortalities of tadpoles, good years can see thousands of juveniles emerge successfully. Consequently, significant population fluctuations can also occur between years. Natterjacks do best in warm, open grassy habitat such as dunes and coastal grasslands. They are most active at night and will forage until late Autumn. Toads feed on terrestrial invertebrates such as spiders and beetles. As nights get colder Natterjacks retreat to frost free refuges (e.g. under piles of logs/stones, in sandy rabbit burrows) where they will hibernate over winter.
1.1.01 Distribution map	This map was derived from the transformation of the map referred to in 1.1.4 to the LAEA projection.
1.1.02 Method used - map	The distribution map shows the location of all records collected in the 2007-2012 period. This includes records of spawn, tadpoles and adult toads. Most of the data comes from the 2010/11 survey (Sweeney et al. 2013).
1.1.04 Additional distribution map	Two additional maps are provided. All Irish grid records were intersected with the Irish 10km grid map to derive the first additional map. Given the restricted distribution of the natterjack, a finer scale map is necessary to allow changes in distribution and range to be visualised. Consequently, a further map using the 2km grid is also provided.
1.1.05 Range map	The current range of the natterjack toad is well known following many years of intensive survey work. The Range Map is based on all records collated by NPWS in the 2007-2012 period, with no extrapolation and without resorting to the Range Tool. The translocated population in Wexford is not included as it is not considered to form part of the natural range of the species in Ireland.
2.3.01 Surface area - Range	Natterjacks are concentrated in a small number of location on the Dingle and Iveragh peninsulas. The translocated population in Wexford, being outside the natural range of the species, is not considered in this assessment. To allow a better appreciation of this restricted range and the changes to it over time, the assessment of range is being done at the 2km level. The range extends to 18 x 2km cells – 72km2.
2.3.02 Method used - Surface area of Range	Based on all known distribution records in the period 2007-2012, not including the Wexford translocation. Records largely derived from 2011/2012 survey (see Sweeney et al. 2013).
2.3.04 Short term trend - Trend direction	Despite some minor changes at the periphery of the range (e.g. the loss of a breeding site at Fermoyle; the gain of two breeding sites at Rosbeigh), overall the range has remained stable since 2001.
2.3.07 Long-term trend - Trend direction	Beebee (2002) synthesized the historical status of the natterjack in Ireland since they were first discovered in the early 1800s. Before the 1970s, a substantial range contraction seems to have occurred, in particular around Castlemaine Harbour. However, Beebee went on to conclude that no natterjack breeding sites were lost between 1974 and 2002. Although one site has been lost since then (at Fermoyle), new sites have been colonized at Rosbeigh, so that overall the range has remained stable.

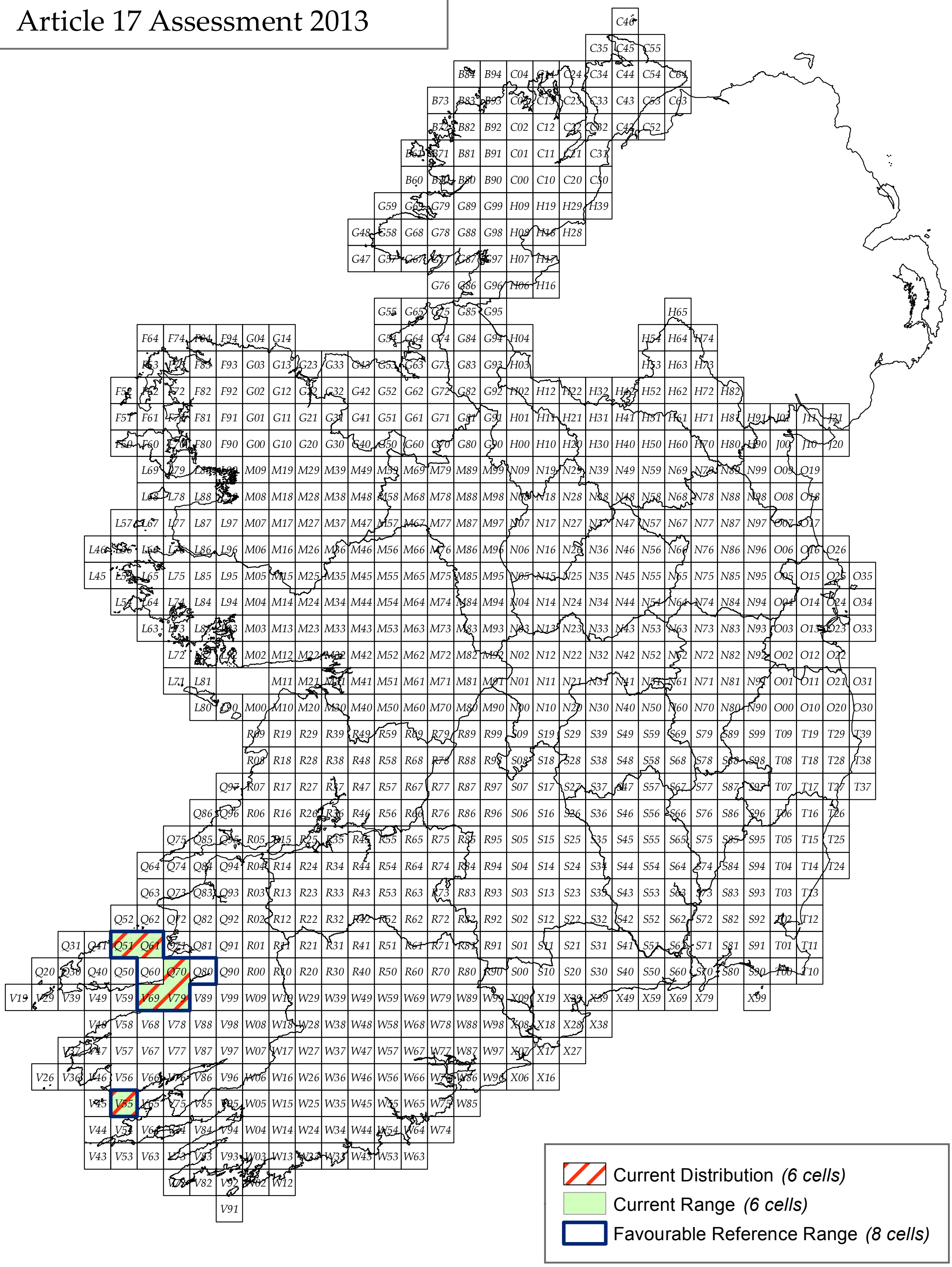
Field label	Note
Species: 1202	**Natterjack toad**
2.3.09 a) Favourable reference range - In km2	The naturally restricted distribution of natterjack toads in County Kerry is likely to result from climatic conditions specific to this region and also from the rocky nature of the coastline in this part of the country, which would have restricted dispersion of the toads (Beebee 1984). A favourable reference range (FRR) must be sufficiently large to allow the long term survival of the species (Evans & Arvella, 2011). To ensure the long-term survival of this species, it is important to allow for migration between breeding sites, in order to ensure genetic diversity and thus avoid local inbreeding and population extinctions. Currently, there are only two metapopulations in Kerry (North Dingle and North Iveragh peninsulas), and the four remaining populations are isolated (Fermoyle, Inch, Roscullen, Caherdaniel, and possibly Glenbeigh). Beebee (2002) states that the ideal way of achieving the long-term safe-guard of the species in Ireland would be to restore the continuity of the recent historical range around Castlemaine Harbour. Thus, the FRR is based on the maintenance of the current range (72km2) plus the reinstatement of toads around Castlemaine Harbour (approx 100km2), thereby providing linkages between the isolated Inch and Roscullen populations on the south side of the Dingle peninsula, with the existing populations on the north side of the Iveragh peninsula. It excludes two areas present in the historical range but not currently used by the toads (Rosbeigh and Ballycarbery) and not deemed essential for the maintenance of the long-term viability of the species. We therefore consider the FRR as 172 km2.
2.3.10 a) Reason for change - genuine change?	No spawning has taken place at a peripheral breeding site at Fermoyle, west of Castlegregory during the current reporting period and this remnant population is likely to have gone extinct. The range has been reduced accordingly by the removal of the 2x2km cell at Fermoyle as well as the adjacent 2x2km cell which linked the Fermolye population to the main Castlegregory metapopulation. At Rosbeigh, however, two newly constructed ponds have been colonized by toads thereby adding a new 2x2km cell to the range.
2.4.01 a) Population size estimation (using individuals or agreed exceptions where possible) - Unit	A broad range for population is given based on all recent complete surveys, spanning the lowest estimate (2011) to the highest (2006). See 2.4.3c for explanation.
2.4.07 Short-term trend - Trend direction	This species is subject to inter-annual fluctuations in population size due to its boom or bust reproductive strategy as well as the variable proportion of females breeding in any given year (see 2.4.3c). These factors make genuine trends very difficult to detect. Latest population estimates (2011 and 2012) are 70% lower than the previous estimate in 2006. However, for the reasons outlined in 2.4.3c, this does not indicate a 70% decline, just as the increase in estimated population from 4,089 in 2004 to 11,283 in 2005 did not indicate a 275% increase. Annual monitoring of all sites, or of carefully chosen indicator sites, over a protracted period of time will be required to allow robust assessments of population trend in the future.
2.4.15 c) Reason for change - use of different method	A conservative, broad population range is being used this time. An average figure from three consecutive years of monitoring was used in 2007. The latest monitoring figures are believed to underestimate the current population of adult toads, but may also emphasise the level of natural inter-annual fluctuations shown by this species.

Field label	Note
Species: **1202**	**Natterjack toad**
2.5.01 Area estimation	During the breeding season (April-July) natterjacks require unshaded, shallow ponds (or shallow lakes) with gradually shelving sides. Ideally, every few years, ponds should dry out late in the summer after metamorphosis is complete (as this reduces the number of predators). Water quality is important – there should be little organic pollution, a pH above 5 and a salinity less than 15% of seawater (Beebee 2002). Outside the breeding season, natterjacks generally require an open unshaded habitat with short vegetation, over which they can hunt their invertebrate prey. They also need a soft sandy substrate to construct burrows and piles of rocks, logs or dry-stone walls, in which they can hibernate from November to early March. Within the natterjacks current range, the CORINE (2006) habitats suitable for natterjack toads to breed, forage and hibernate (and thus meeting the requirements mentioned above) include: Pastures; Land principally occupied by agriculture with significant areas of natural vegetation; Natural grassland; Moors and heathlands; Beaches, dunes, sand; Sparsely vegetated areas; Water bodies; Inland marshes; Peat bogs; Salt marshes By clipping these Landcover categories to the toad's range, it is possible to estimate that within the current range of the species, suitable terrestrial and aquatic habitats cover 41 km2.
2.5.06 Short-term trend - Trend direction	A substantial amount of toad breeding habitat was lost due to drainage in the first half of the 20th century. The findings of Bécart et al. (2007) concurred with Beebee and Denton's (1996) suggestion that natterjack population size is usually limited by the number of suitable breeding ponds available, rather than by the extent of the terrestrial habitat. The current reporting period has seen a major programme of pond creation for the toad within its range in Kerry. Since 2008, a government funded scheme has encouraged farmers to dig and manage ponds for toads. 100 ponds have been dug to date, significantly increasing the availability of breeding sites for the species both within its current range and the wider area of its favourable reference
2.5.09 Area of suitable habitat for the species (km2)	The same approach outlined in 2.5.1 was used on the total area of the favourable reference range producing an estimate of suitable habitat of 92km2. What has not been available in the additional areas of the FRR, outside the current range until recently is suitable waterbodies for spawning. A project to construct suitable breeding ponds in these areas began in 2008 and is continuing. To date 100 ponds have been constructed under the Natterjack Toad Pond Scheme. Landowners are paid to manage the ponds and the surrounding land for the benefit of toads. To date 20% of the new ponds have been colonized. It is hoped that this % will gradually rise in the coming years.
2.5.10 b) Reason for change - improved knowledge/more accurate data?	The CORINE 2006 dataset was used for the current report. This provides a more accurate picture of current landcover.

Field label	Note
Species: 1202	**Natterjack toad**
2.6 Main pressures - Pressure	Toads forage on land and do best when the sward is low. The lack of grazing has led to an increase in rank vegetation around some breeding ponds. The lowering of the water table in some areas can reduce the amount of water available for toads to breed. In the Magharees dune system for instance, historically up to 25 ponds have formed. Over the last decade, however, fewer ponds have formed (Beebee 2002; Bécart et al., 2007, Sweeney et al., 2013). Desiccation has also tended to occur earlier in the season, severely reducing the probability that tadpoles will survive to metamorphosis (Bécart et al., 2007; Sweeney et al., 2013). The reasons for this reduced hydroperiod are not clear. Annual precipitation has not declined in the last 30 years (Aubry and Emmerson, 2005). A lowering of the water table through changes in water resource utilisation seems likely. The expansion of caravan parks as experienced in the Magharees dune system can lead to significant increases in water consumption and thus a reduction in water table levels. The spread of sea buckthorn (Hippophae rhamnoides) on the Magharee dunes is also having a negative effect by accelerating the drying out of adjacent dune slacks through evapotranspiration. This invasive plant also makes for unsuitable terrestrial habitat for toads. Another invasive species, Crassula helmsii has been reported from one important breeding site and while eradication is very difficult, steps have been taken to control its spread. The ponds favoured by toads tend to be shallow and consequently prone to natural succession. Their coastal distribution can also make them liable to sea water incursions and while toads can cope with some saline influence, inundations during the breeding season are catastrophic.
2.7 Threats - Threat	The current threats are predicted to continue into the future, with the possibility that invasive plant species (e.g. Crassula, Hippophae) may become a bigger problem as these species continue to spread in Ireland.
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The toad's range has only declined very slightly since the Directive came into force. However, its current range is significantly less than the historical range of the species due to an extensive contraction in distribution in the first half of the 20th century. Reinstatement of the historical range is deemed necessary to ensure the long term survival of this species in Ireland.
2.9.01 b) Range - If CS is U1 or U2, use of qualifiers is recommended	The range has been reduced by the loss of a peripheral site at Fermoyle. However at Rosbeigh, two newly constructed ponds have been colonized by toads thereby adding a new 2x2km cell to the range. Overall, range is considered stable.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Natterjack populations display significant inter-annual variation making population assessment difficult. The most recent estimate of 3446 adult toads (2012) is significantly below the FRP of 13,000 (see 2.4.14) and although the 2012 figure is considered an underestimate (see 2.4.1), some improvement is clearly needed before FRP is reached. Population is assessed as Unfavourable - Bad.
2.9.02 b) Population - If CS is U1 or U2, use of qualifiers is recommended	Raw data would suggest a decline in population since the last reporting period. However, there is evidence of population expansion into the newly constructed ponds in some areas suggesting a healthy metapopulation structure with surplus dispersing toads in places. Given the difficultly of accurately defining true population in the midst of natural fluctuation, the trend is considered unknown.
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Habitat is considered inadequate. A substantial amount of toad breeding habitat was lost due to drainage in the first half of the 20th century and although there is significant areas of suitable terrestrial habitat, suitable water bodies for spawning remain limited over much of its range.

Field label	Note
Species: 1202	**Natterjack toad**
2.9.03 b) Habitat for the species - If CS is U1 or U2, use of qualifiers is recommended	The current reporting period has seen a major programme of pond creation for the toad with 100 ponds dug to date. Although there are still large areas of the favourable range without breeding waters, the pond scheme has significantly increased the availability of breeding sites for the species both within its current range and the wider area of its favourable reference range.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	The natterjack toad suffered a significant loss of habitat in the first half of the 20th century and its range declined dramatically as a result. Since the 1970s, there has been a period of relative stability – only one known breeding site has been lost (Fermoyle). Most recently encouraging signs of expansion have been seen with 20 newly constructed ponds colonized. Management of invasive plant species will pose a significant challenge in the coming years. In the Magharees in particular there is the potential for Hippophae control to benefit both the Annex I dune systems and the toads. Water resource utilization is also an issue at that site, with evidence of water table depletion as a result of increasing holiday usage. Elsewhere the lack of grazing around ponds is reducing the suitability of terrestrial habitats for toads. However, these issues can be addressed, and with continued investment in pond creation and management a period of range and population expansion for the toad is feasible.
2.9.04 b) Future prospects - If CS is U1 or U2, use of qualifiers is recommended	Evidence that the pond creation scheme is working is encouraging, but concerns remain about old traditional sites drying out. Active intervention will be required to ensure the long term survival of this species.
2.9.05 Overall assessment of Conservation Status	The natterjack toad suffered a significant loss of habitat in the first half of the 20th century and its range and population declined dramatically as a result. Both its range and its population are considered to be in Unfavourable – Bad condition. Recent investment in pond creation has seen an increase in available habitat, but continued intervention in terms of habitat creation and management will be required before the long term future of this species can be ensured.
2.9.06 Overall trend in Conservation Status	Although the natterjack's range, and consequently its population, remain in Bad condition there are encouraging signs that the pond creation scheme is working. The area of suitable habitat has increased and the toad's natural ability to find and colonise new breeding sites has been proven with evidence of spawning in 20 of the new sites. Continued intervention, including the creation of more ponds and, potentially, targeted spawn translocations, will be required. But with this investment, genuine range expansion should become apparent and favourable reference population could be achieved within 2 reporting cycles.

Natterjack Toad - *Bufo calamita* (1202)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
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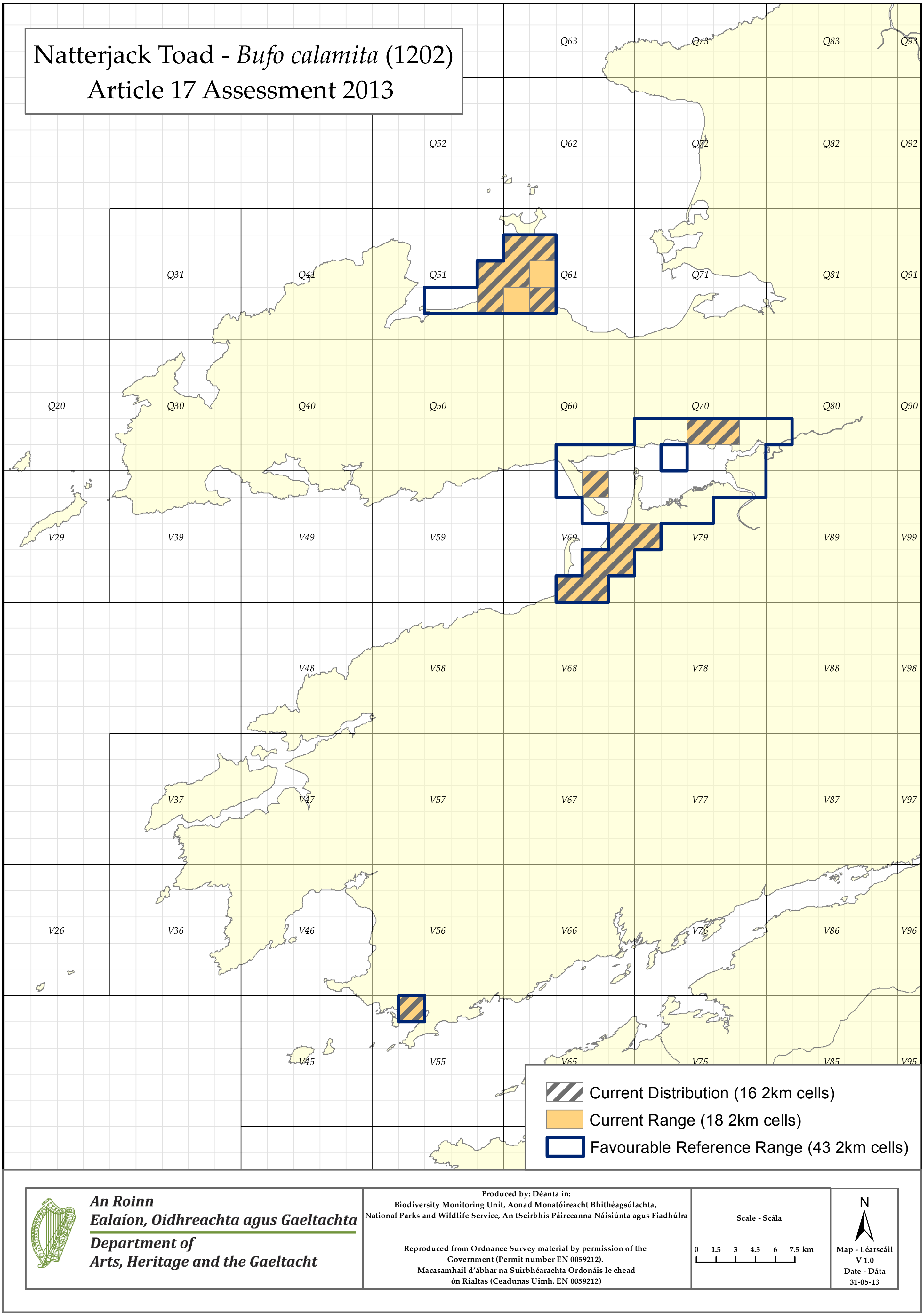
Scale - Scála
0 10 20 30 40 50 km

N
Map - Léarscáil
V 1.0
Date - Dáta
10-05-13



Natterjack Toad - *Bufo calamita* (1202)
Article 17 Assessment 2013
Q63
Q73
Q83
Q93
Q52
Q62
Q72
Q82
Q92
Q31
Q41
Q51
Q61
Q71
Q81
Q91
Q20
Q30
Q40
Q50
Q60
Q70
Q80
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V87
V97
V26
V36
V46
V56
V66
V76
V86
V96
V45
V55
V65
V75
V85
V95
Current Distribution (16 2km cells)
Current Range (18 2km cells)
Favourable Reference Range (43 2km cells)
An Roinn
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Department of
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Produced by: Déanta in:
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Scale - Scála
0 1.5 3 4.5 6 7.5 km
N
Map - Léarscáil
V 1.0
Date - Dáta
31-05-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1213**
0.2.2 Species name	**Rana temporaria**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	common frog (loscán)

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Complete survey/Complete survey or a statistically robust estimate (3)
1.1.3 Year or period	2007-2011
1.1.4 Additional map	Yes
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published sources

Dingerkus, S.K., Stone, R.E., Wilkinson, J.W., Marnell, F. & Reid, N. (2011) Developing a methodology for the National Frog Survey of Ireland: a pilot study in Co. Mayo. Irish Naturalists' Journal 31(2): 85-90.

Marnell, F. (1998) Discriminant analysis of the terrestrial and aquatic habitat determinants of the smooth newt (Triturus vulgaris) and the common frog (Rana temporaria) in Ireland. J. Zoology 244: 1-6.

Marnell, F. (1998) The distribution of the smooth newt, Triturus vulgaris L., in Ireland. Bulletin of the Irish Biogeographical Society 22: 84-96.

Marnell, F. (1999) The distribution of the Common Frog Rana temporaria L. in Ireland. Bulletin of the Irish Biogeographical Society 23: 60-70.

Reid, N., Dingerkus, S.K., Stone, R.E., Buckley, J., Beebee, T.J.C. & Wilkinson, J.W. (2013a) National Frog Survey of Ireland 2010/11. Irish Wildlife Manuals, No. 58. National Parks and Wildlife Service, Department of Arts, Hertiage and the Gaeltacht, Dublin, Ireland.

Reid, N., Karina Dingerkus, Richard E. Stone, John Buckley, Trevor J.C. Beebee, Ferdia Marnell and John W. Wilkinson (2013b) Assessing historical and current threats to common frog Rana temporaria populations in Ireland. J. of Herpetology.

Reid, N., Karina Dingerkus, Richard E. Stone, Ruth Kelly, John Buckley, Trevor J.C. Beebee, Ferdia Marnell & John W. Wilkinson (2013c) Population enumeration and assessing conservation status in a widespread amphibian: a case study of Rana temporaria in Ireland. Animal Conservation doi:10.1111/acv.12022.

2.3 Range

2.3.1 Surface area - Range (km²)	86900	
2.3.2 Method - Range surface area	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min 0	max 0
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	unknown (x)	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	86900
	operator	N/A
	unknown	No
	method	Current range is calculated as the entire country based on current distribution and modelling of available habitat information; favourable reference range is taken as same.
2.3.10 Reason for change	Use of different method	

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	number of individuals (i)		
	min	104000000	max	310000000
2.4.2 Population size (other than individuals)	Unit	N/A		
	min		max	
2.4.3 Additional information	Definition of locality			
	Conversion method			
	Problems			

2.4.4 Year or period	2011-2011		
2.4.5 Method – population size	Complete survey/Complete survey or a statistically robust estimate (3)		
2.4.6 Short-term trend period	2001-2012		
2.4.7 Short term trend direction	unknown (x)		
2.4.8 Short-term trend magnitude	min	max	confidence interval
2.4.9 Short-term trend method	Absent data (0)		
2.4.10 Long-term trend period			
2.4.11 Long term trend direction	unknown (x)		
2.4.12 Long-term trend magnitude	min	max	confidence interval
2.4.13 Long-term trend method	Absent data (0)		
2.4.14 Favourable reference population	number	104000000	
	operator	N/A	
	unknown	No	
	method	>/== 104M (or >/== 15 frogs/ha). Amphibian populations are characterisied by high interannual amplitude in abundance. Thus the favourable reference population has been taken as the lower 95% confidence interval for the baseline estimates during 2011. Conservation objectives should aim to maintain a mean density and abundance equal to or greater than the lowest estimate at baseline.	
2.4.15 Reason for change	Improved knowledge/more accurate data Use of different method		

2.5 Habitat for the Species

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

2.5.1 Surface area - Habitat (km^2)	86900
2.5.2 Year or period	2011-2011
2.5.3 Method used - habitat	Complete survey/Complete survey or a statistically robust estimate (3)
2.5.4 a) Quality of habitat	Good
2.5.4 b) Quality of habitat - method	2% of the landscape was suitable frog breeding habitat. However, frogs spent most of the year on land and GIS biogeographical modelling suggested that any area may be suitable for frogs outside of the breeding season as no habitats appear to be avoided. Thus, the figure presented is the area estimated to be suitable throughout the frog's life cycle. Other modelling suggested that only the perceived impacts and threats of intensive grazing and pollution negatively influence frog occurrence and these occurred singly at <25% of water bodies and together at just 8% of water bodies. Therefore, the availability of habitat and its suitability was generally perceived to be “Good”. See Reid et al. (2013a) for full details.
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	stable (0)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km^2)	86900
2.5.10 Reason for change	Improved knowledge/more accurate data Use of different method

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
Cultivation (A01)	low importance (L)	N/A
intensive grazing (A04.01)	low importance (L)	N/A
abandonment of pastoral systems, lack of grazing (A04.03)	low importance (L)	N/A
removal of hedges and copses or scrub (A10.01)	low importance (L)	N/A
Forest and Plantation management & use (B02)	low importance (L)	N/A
Peat extraction (C01.03)	low importance (L)	N/A
Outdoor sports and leisure activities, recreational activities (G01)	low importance (L)	N/A
Urbanised areas, human habitation (E01)	low importance (L)	N/A
Industrial or commercial areas (E02)	low importance (L)	N/A
Pollution to surface waters (limnic & terrestrial, marine & brackish) (H01)	low importance (L)	Phosphor/Phosphate input (P)
invasive non-native species (I01)	low importance (L)	N/A
Landfill, land reclamation and drying out, general (J02.01)	low importance (L)	N/A
infilling of ditches, dykes, ponds, pools, marshes or pits (J02.01.03)	low importance (L)	N/A
abiotic (slow) natural processes (K01)	low importance (L)	N/A
Biocenotic evolution, succession (K02)	low importance (L)	N/A
predation (K03.04)	low importance (L)	N/A

2.6.1 Method used – pressures	based exclusively or to a larger extent on real data from sites/occurrences or other data sources (3)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
Cultivation (A01)	low importance (L)	N/A
intensive grazing (A04.01)	low importance (L)	N/A
abandonment of pastoral systems, lack of grazing (A04.03)	low importance (L)	N/A
removal of hedges and copses or scrub (A10.01)	low importance (L)	N/A
Forest and Plantation management & use (B02)	low importance (L)	N/A
Peat extraction (C01.03)	low importance (L)	N/A
Urbanised areas, human habitation (E01)	low importance (L)	N/A
Outdoor sports and leisure activities, recreational activities (G01)	low importance (L)	N/A
Pollution to surface waters (limnic & terrestrial, marine & brackish) (H01)	low importance (L)	Phosphor/Phosphate input (P)
invasive non-native species (I01)	low importance (L)	N/A
infilling of ditches, dykes, ponds, pools, marshes or pits (J02.01.03)	low importance (L)	N/A
Drying out (K01.03)	low importance (L)	N/A
Biocenotic evolution, succession (K02)	low importance (L)	N/A
predation (K03.04)	low importance (L)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant Information	Reid et al. (2013a), National Frog Survey of Ireland. Irish Wildlife Manuals No. 58 is the final report from the first national baseline survey of frogs in Ireland. The results are based on extensive field work throughout Ireland with data extrapolation as required. This report provided the data that largely underpins this conservation assessment for the frog.
2.8.3 Trans-boundary assessment	

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment Favourable (FV) qualifiers N/A
2.9.2. Population	assessment Favourable (FV) qualifiers N/A
2.9.3. Habitat	assessment Favourable (FV) qualifiers N/A
2.9.4. Future prospects	assessment Favourable (FV) qualifiers N/A
2.9.5 Overall assessment of Conservation Status	Favourable (FV)
2.9.6 Overall trend in Conservation Status	N/A

3. Natura 2000 coverage and conservation measures - Annex II species

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

3.1 Population

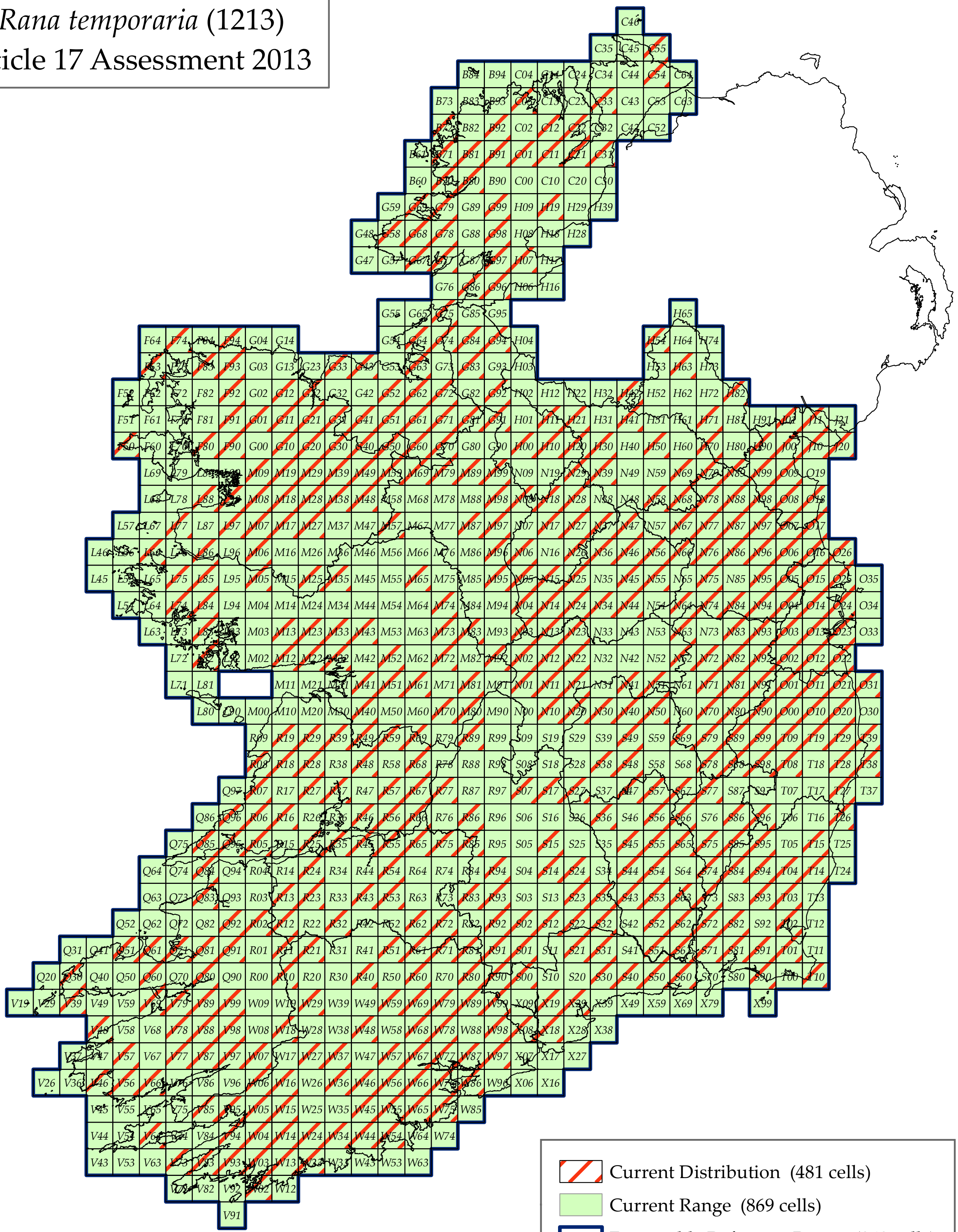
3.1.1 Population Size	Unit	N/A	
	min		max
3.1.2 Method used	N/A		
3.1.3 Trend of population size within	N/A		

3.2 Conservation Measures

Field label	Note
Species: 1213	**common frog**
0.2.01 Species code	Common frog is one of only three amphibians found in Ireland. It is a widespread and abundant species occuring in a broad range of habitats throughout the country. Adults congregate to spawn in ponds and ditches in the spring. Eggs develop into tadpoles as water temperature rises and following metamorphosis, young froglets emerge onto land in early summer. These young animals are particularly vulnerable to predation. They spend 2-3 years on land, feeding on terrestrial invertebrates, before returning to freshwater to breed. Life expectancy of 3-4 years would be typical.
1.1.01 Distribution map	This map is based on the records from the 2011 national frog survey, plus other records collated from www.biology.ie and the IPCC. For full details see Reid at al (2013a) .
1.1.02 Method used - map	For full details see Reid at al (2013a)
1.1.03 Year or period	2007-2012
1.1.05 Range map	The range map has been generated from the distribution data with some additional squares included on the basis of expert opinion and biogeographical modelling. See Reid at al (2013a) for full details.
2.2 Published sources	Reid et al. 2013a, National Frog Survey of Ireland. Irish Wildlife Manuals No. 58 is the final report from the first national baseline survey of frogs in Ireland. The results are based on extensive field work with data extrapolation as required. IWM 58 provided a preliminary draft of the conservation assessment for the frog which has been modified slightly here. Other relevant publications that provided data on frog distribution, habitat usage, pond loss and ecology in Ireland are also included.
2.3.01 Surface area - Range	Distribution data relates to 2007-2012. It is largely based on the National Survey conducted by NPWS in 2010/2011. This survey involved 2 elements - a scientific survey of allocated 1km squares, plus a public element where members of the public submitted records through an online reporting tool. Additional records were collated from the IPCC and biology.ie websites for this period. Gaps in the range were filled assuming suitable habitat was present within 3 cells distant between occupied cells (in a straight line) or within 2 cells at right angles in the oblique or, if beyond this, assumed suitability derived from GIS biogeographical modelling. See Reid et al. (2013a) for full details. Total land area of Ireland considered to be the range of the frog - 869 x 10km squares.
2.3.09 a) Favourable reference range - In km2	The current range is taken as the entire country [i.e. 869 x 10km squares] and consequently this is also taken as the favourable reference range.
2.4.01 a) Population size estimation (using individuals or agreed exceptions where possible) - Unit	The 2011 population density was calculated as 15-44 adult frogs/ha, giving a national population estimate of 112-326M. These figures were derived from a custom negative binomial model to generate the total population assuming the mean number of individuals per water body (derived from a nationwide survey) multiplied by the availability of water bodies (derived from a statistically robust survey). See Reid et al. 2013a for full details.
2.4.02 a) Population size estimation (using population unit other than individuals) - Unit	Reid et al (2013a) also calculated population estimates based on density/ha; with a mean of 23.5 adult frogs/ha, a minimum estimate of 15 frogs/ha and a max of 44 frogs/ha.
2.4.07 Short-term trend - Trend direction	No estimate of population trend is possible, as 2010/11 survey provided first baseline for the country.

Field label	Note
Species: 1213	**common frog**
2.4.14 a) Favourable reference population - Number of individuals/agreed exceptions/other units	Amphibian populations are characterisied by high interannual amplitude in abundance. Thus the favourable reference population has been taken as the lower 95% confidence interval for the baseline estimates during 2011. See Reid et al. (2013a) for full details.
2.4.15 b) Reason for change - improved knowledge/more accurate data?	The 2007 report used the number of 10km squares as a proxy for Population size. This report is based on the first national survey of habitat usage by frogs.
2.4.15 c) Reason for change - use of different method	The 2007 report used the number of 10km squares as a proxy for Population size. This report is based on the first national survey of habitat usage by frogs.
2.5.01 Area estimation	A total of 2% of the total land area was estimated to be suitable as frog breeding habitat (derived from a complete survey or a statistically robust estimate). However, it should be noted that any area may be suitable for frogs out of the breeding season as no habitats appear to be avoided. Thus, the figure presented is the area estimated to be suitable throughout their life cycle (i.e. the total land area of Ireland based on 869x10km squares). See Frog Survey report [IWM 58; Reid et al. 2013a] for full details.
2.5.08 Long-term trend - Trend direction	Farmland pond occurrence has remained largely stable between 1887-1913 to 2005-2011, decreasing marginally from 28.7% to 24.1% of 1km squares containing at least one pond. Despite the mean number of ponds per 1km square decreasing -53.9%, estimates of breeding densities suggest that only 4.7% of frogs used farmland ponds for breeding with the majority using drainage ditches which are common. Thus, the availability of suitable habitat has probably remained stable over the long-term.
2.5.09 Area of suitable habitat for the species (km2)	Taken as total land area of Ireland based on 869 x 10km squares.
2.5.10 b) Reason for change - improved knowledge/more accurate data?	The 2007 report used the number of 10km squares as a proxy for Population size. This report is based on the first national survey of habitat usage by frogs.
2.6 Main pressures - Pressure	See Reid et al (2013a)
2.7 Threats - Threat	see Reid et al (2013a)
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The frog is known to be widespread througout the country, from coastal areas to upland habitats. Current range is equal to favourable range so this attribute is considered to be favourable.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	A systematic survey of hundreds of breeding sites was carried out to estimate frog numbers in various habitat types across the country. From this a national population estimate was extrapolated. Current population is at least as high as the favourable population so this parameter is considered to be favourable. See Reid et al (2013a) for full details.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	Although a number of threats have been identified which may impact directly on frogs or indirectly on their terrestrial or aquatic habitats, none of these is considered to pose a significant risk to the favourable conservation status of the species. This parameter is considered favourable.
2.9.05 Overall assessment of Conservation Status	Previous Article 17 assessment concluded an overall status of Inadequate U2, thus, the conservation status appears to have improved, however this is considered to be due to improved knowledge and understanding of how frogs use the Irish landscape, rather than any actual improvement in the status of the species.

Common Frog
Rana temporaria (1213)
Article 17 Assessment 2013



Current Distribution (481 cells)

Current Range (869 cells)

Favourable Reference Range (869 cells)

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Scale - Scála

0 10 20 30 40 50 km

N

Map - Léarscáil
V 1.0
Date - Dáta
07-05-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1223**
0.2.2 Species name	**Dermochelys coriacea**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	Leatherback turtle

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	2007-2012
1.1.4 Additional map	No
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Marine Atlantic (MATL)

2.2 Published sources

Bartlettt, D (2004) http://www.marineadministration.org/countrydata/ir.htm
Doyle, T. (2007) Leatherback sea turtles (Dermochelys coraicea) in Irish waters. Irish Wildlife Manuals, No. 32. Mational Parks & Wildlife Service, Department of the Environment, Heritage & Local Government, Dublin, Ireland.
Doyle T, Houghton JDR, O'Súilleabháin PF, Hobson V, Marnell F, Davenport J & Hays GC (2008) Summer residence of leatherback turtles in the northeast Atlantic. Endangered Species Research, 4:23-31.
Dutton DL, Dutton PH, Chaloupka M & Boulon RH (2005) Increase of a Caribbean leatherback turtle Dermochelys coriacea nesting population linked to long-term nest protection. Biological Conservation 126:186-194
Eckert SA (2006) High-use oceanic areas for Atlantic leatherback sea turtles (Dermochelys coriacea) as identified using satellite telemetered location and dive information. Marine Biology 149:1257-1267
Eckert, K. L., Wallace, B. P., Frazier, J. G., Eckert, S. A. and Pritchard, P. C. H. (2012) Synopsis of the Biological Data on the Leatherback Sea Turtle (Dermochelys coriacea). U.S. Fish and Wildlife Service Biological Technical Publication BTPR4015-2012.
Hays GC, Hobson VJ, Metcalfe JD, Righton D & Sims DW (2006) Flexible foraging movements of leatherback turtles across the North Atlantic Ocean. Ecology 87:2647-2656
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James MC, Eckert SA & Myers RA (2005) Migratory and reproductive movements of male leatherback turtles (Dermochelys coriacea). Marine Biology 147:845-853
King GL & Berrow SD (2008) Marine turtles in Irish waters. Irish Naturalist's Journal Special Supplement
Lewison, R., Freeman, S.A and Crowder, L. B. 2004. Quantifying the effects of fisheries on threatened species : the impact of pelagic longlines on loggerhead and leatherback sea turtles. Ecology Letters. 7:221-231
McGowan, A. , A. C. Broderick, G. Frett, S. Gore,M. Hastings, A. Pickering, D. Wheatley, J. White,M. J. Witt & B. J. Godley (2011) Down but not out: marine

turtles of the British Virgin Islands. Animal Conservation 11: 92–103
McMahon CR & Hays GC (2006) Thermal niche, large-scale movements and implications of climate change for a critically endangered marine vertebrate. Global Change Biology 12:1330-1338
Pierpoint, C. (2000) Bycatch of marine turtles in UK waters. JNCC Report No. 310
Pierpoint C & Penrose R (1999) TURTLE: A Database of marine turtle records for the United Kingdom & Eire
Rivalan P, Dutton PH, Baudry E, Roden SE & Girondot M (2006) Demographic scenario inferred from genetic data in leatherback turtles nesting in French Guiana and Suriname. Biol. Conservation 130:1-9
KELLY STEWART,MICHELLE SIMS, ANNE MEYLAN, BLAIR WITHERINGTON,BETH BROST & LARRY B. CROWDER (2011) Leatherback nests increasing significantly in Florida, USA; trends assessed over 30 years using multilevel modeling. Ecological Applications, 21(1): 263–273
Turtle Expert Working Group (2007) An assessment of the leatherback turtle population in the Atlantic Ocean. NOAA Technical Memorandum
Witt MJ, Broderick AC, Johns DJ, Martin C, Penrose R, Hoogmoed MS & Godley BJ (in press) Prey landscapes help identify potential foraging habitats for leatherback turtles in the NE Atlantic. Marine Ecology Progress Series.
Witt, M. J., et al. (2009). Aerial surveying of the world's largest leatherback turtle rookery: A more effective methodology for large-scale monitoring. Biological Conservation 142:1719–1727.

2.3 Range

2.3.1 Surface area - Range (km²)	580000	
2.3.2 Method - Range surface area	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	unknown (x)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	
	operator	N/A
	unknown	Yes
	method	
2.3.10 Reason for change	Use of different method	

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	number of individuals (i)		
	min	2000	max	3000
2.4.2 Population size (other than individuals)	Unit	N/A		
	min		max	
2.4.3 Additional information	Definition of locality			
	Conversion method			
	Problems	Providing an actual estimate of the number of leatherbacks foraging within Irish waters is difficult as their numbers may be extremely low (Houghton et al. 2006a, Houghton et al. 2006b) and the inherent variability between years as a result of climate, long-		

term population cycles (Rivalan et al. 2006), and variation in gelatinous zooplankton biomass and distribution. Also, many animals may simply be passing through Irish waters whereas others may reside for longer periods (Doyle et al. 2008). Using leatherback sightings as an index of abundance can be informative, however, variability in the reporting mechanisms, their consistency and effort, can mask any real trends. Determining if two sightings were of the same animal or two different animals can also add confusion to this index. The aerial survey estimates provided by Doyle et al. (2008) - 0.25 leatherbacks per 1000 km (or 0.06 leatherbacks per 100 km2) - may represent the most realistic estimate of leatherback activity in Irish waters to date. However, their value may be an underestimate of actual leatherback abundance, as their surveys primarily focused on the Irish Sea where leatherbacks may not be as numerous as other areas (King & Berrow 2008, Witt et al. 2009) and submerged animals would not have been spotted (Houghton et al. 2006a). However, with the above caveats in mind, and using the density estimate provided by Doyle et al. (2008), the number of leatherbacks in Irish territorial waters (12 nautical miles from coastal baseline) during a summer day is probably around 25 (i.e. [39,000 x 0.06]/100) . However, it you extend this calculation to include Ireland's marine territory (652,000 km2, which includes Ireland's continental shelf waters) (Bartlett 2004), the number of leatherbacks during a summer day may be as many as 400. However, there will be much variation around this estimate considering population estimates for other species that occur in low densities (i.e. many beaked whales have CV (coefficient of variation) values of 0.80 and up, which basically means that any estimate will have huge errors associated with it). If we apply the same CV value of 0.80 to our estimate of 400 animals this will give a range between 80 and 720 leatherbacks during a summer day.

In terms of the actual number of leatherbacks that pass through or use Irish waters each year, there is great uncertainty. How long individual turtles remain resident in Irish waters and how much time they spend at the surface are important criteria for estimating population abundance, yet these data are scarce (Doyle et al. 2008). However, considering that individuals may spend periods of two months or more in coastal/shelf waters and other areas (James et al. 2005a, Eckert 2006, Doyle et al. 2008), and that turtles spend as much as 50 % of their time at the surface (James et al. 2005c), the number of leatherbacks passing through or residing in Irish waters each year is probably in the low thousands - 2-3,000 - which may be equivalent to 2-5 % of the Atlantic population . Future aerial surveys and more dedicated observations from ships of opportunity in-conjunction with concerted coastal observations may improve these estimates.

2.4.4 Year or period	2007-2012		
2.4.5 Method – population size	Estimate based on expert opinion with no or minimal sampling (1)		
2.4.6 Short-term trend period	2001-2012		
2.4.7 Short term trend direction	unknown (x)		
2.4.8 Short-term trend magnitude	min	max	confidence interval
2.4.9 Short-term trend method	Absent data (0)		
2.4.10 Long-term trend period			
2.4.11 Long term trend direction	N/A		
2.4.12 Long-term trend magnitude	min	max	confidence interval
2.4.13 Long-term trend method	N/A		
2.4.14 Favourable reference population	number		
	operator	N/A	
	unknown	Yes	
	method		
2.4.15 Reason for change	Use of different method		

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	580000
2.5.2 Year or period	2007-2012
2.5.3 Method used - habitat	Estimate based on expert opinion with no or minimal sampling (1)
2.5.4 a) Quality of habitat	Unknown
2.5.4 b) Quality of habitat - method	n/a
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	unknown (x)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	
2.5.10 Reason for change	Use of different method

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
potting (F02.01.01)	low importance (L)	N/A
pelagic longlining (F02.01.04)	medium importance (M)	N/A
Threats and pressures from outside the EU territory (XE)	medium importance (M)	N/A

2.6.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
potting (F02.01.01)	low importance (L)	N/A
pelagic longlining (F02.01.04)	medium importance (M)	N/A
Threats and pressures from outside the EU territory (XE)	medium importance (M)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant Information	
2.8.3 Trans-boundary assessment	

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment	Unknown (XX)
	qualifiers	N/A
2.9.2. Population	assessment	Unknown (XX)
	qualifiers	N/A
2.9.3. Habitat	assessment	Unknown (XX)
	qualifiers	N/A
2.9.4. Future prospects	assessment	Unknown (XX)
	qualifiers	N/A
2.9.5 Overall assessment of Conservation Status	Unknown (XX)	
2.9.6 Overall trend in Conservation Status	N/A	

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	N/A		
	min		max	
3.1.2 Method used	N/A			
3.1.3 Trend of population size within	N/A			

3.2 Conservation Measures

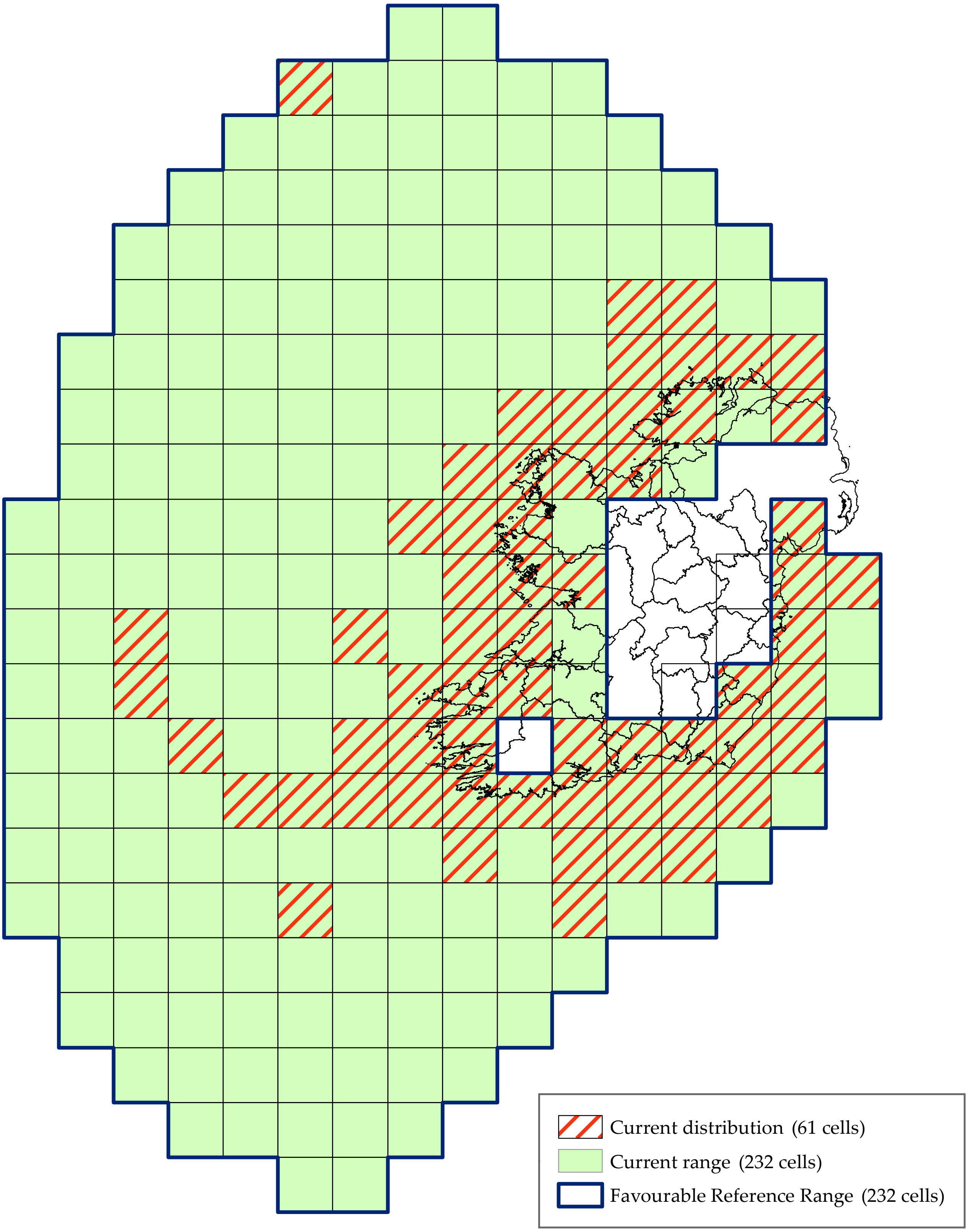
Field label	Note
Species: 1223	**Leatherback turtle**
0.2.01 Species code	The leatherback sea turtle (Dermochelys coriacea Vandelli 1761) is the most widely distributed living reptile species, being found in all oceans except the Southern Ocean (Davenport 1998). Within the North Atlantic their range extends from the tropics to the high latitudes of Newfoundland right across to Europe's northwesterly fringe (Ferraroli et al. 2004, Hays et al. 2004a, James et al. 2005a). They are a widely roaming epipelagic (< 200 m) species (Hays et al. 2004a), with individuals making extensive pan-oceanic movements. Though they are reproductively confined to warm tropical regions because of thermal constraints on egg incubation (Pritchard 1997, Dutton et al. 1999), they have many unique anatomical and physiological adaptations that permit them to forage seasonally into cooler temperate waters that are largely inaccessible to other sea turtles. As such, leatherback populations have a very dynamic range that expands and contracts depending on the season. During the summer months their range is at its greatest extent with individuals probably located throughout the entire north Atlantic, whereas during the winter months their range is restricted to areas where the sea surface temperature (SST) is > 15 °C (McMahon & Hays 2006). Recent studies have shown that after nesting in the tropics the majority of Atlantic female leatherbacks head north towards cooler temperate waters (Ferraroli et al. 2004, Hays et al. 2004a). Some of these individuals head north towards the Northeast Atlantic (NEA) and Irish waters (Doyle et al. 2008, King & Berrow 2008) where they forage on jellyfish for the summer months before turning south again as water temperatures decline.
2.3.01 Surface area - Range	The TURTLE database is used to collate all leatherback records from Ireland and the UK. It is clear that leatherbacks migrate through Irish waters each year and while most records are from sightings and stranding near to the coast, they can also be encountered off-shore. It is likely that some off shore areas are more important than others; that some areas are important foraging grounds at certain times with significant concentrations of jellyfish whereas other areas are not. However it is not possible to identify these areas at this time and based on current information it would appear that leatherbacks could range over the entire expanse of Irish waters. Consequently, the range is taken as the entire EEZ. See also Doyle (2007) Irish Wildlife Maunal No. 32.
2.3.02 Method used - Surface area of Range	Leatherbacks migrate through Irish waters each year. This migration appears to be in reponse to the availaibility of the main food item: jelly-fish, which are seasonally abundant in Irish waters. While the temperate waters of the North Atlantic appear to represent the northern limit of the leatherback's physiology, this turtle is specially adapted to cooler waters and has been recorded diving to considerable depths. They can be encountered off-shore or inshore (Doyle, 2007). The entire EEZ has been taken as representing the range of the leatherback in Ireland. Rises in sea temperatures may lead to changes in migratory patterns of this species.
2.3.09 a) Favourable reference range - In km2	There is no evidence to suggest that the range of this species is anyway limited in Irish waters or that it has declined in extent in recent years. Nonetheless, it is clear that we are only starting to understand the migration patterns and seasonal behaviour of leatherbacks in the Northeast Atlantic. More work is required before a definitive statement can be made on Favourable Reference Range.
2.3.10 c) Reason for change - use of different method?	The Range was considered to cover the entire EEZ.

Species: 1223	Leatherback turtle
2.4.01 a) Population size estimation (using individuals or agreed exceptions where possible) - Unit	In the Atlantic, the largest nesting populations of leatherbacks are located in French Guiana and Surinam along the northern coastline of South America, in the southern Caribbean islands of Trinidad and Tobago, and in Gabon on the coast of West Central Africa (Rivalan et al. 2005, Eckert 2006, Georges et al. 2006). The Atlantic population has been estimated as somewhere between 26,000 and 43,000 female leatherbacks (Spotila et al. 1996, Dutton et al. 1999), although more recent information suggests this may be an underestimate given that the population nesting in Gabon alone could be greater than 20,000 females (Turtle Expert Group 2007). Providing an actual estimate of the number of leatherbacks foraging within Irish waters is difficult as their numbers may be extremely low (Houghton et al. 2006a, Houghton et al. 2006b) and the inherent variability between years as a result of climate, long-term population cycles (Rivalan et al. 2006), and variation in gelatinous zooplankton biomass and distribution. Also, many animals may simply be passing through Irish waters whereas others may reside for longer periods (Doyle et al. 2008). Using leatherback sightings as an index of abundance can be informative, however, variability in the reporting mechanisms, their consistency and effort, can mask any real trends. Determining if two sightings were of the same animal or two different animals can also add confusion to this index. The aerial survey estimates provided by Doyle et al. (2008) - 0.25 leatherbacks per 1000 km (or 0.06 leatherbacks per 100 km2) - may represent the most realistic estimate of leatherback activity in Irish waters to date. However, their value may be an underestimate of actual leatherback abundance, as their surveys primarily focused on the Irish Sea where leatherbacks may not be as numerous as other areas (King & Berrow 2008, Witt et al. 2009) and submerged animals would not have been spotted (Houghton et al. 2006a). However, with the above caveats in mind, and using the density estimate provided by Doyle et al. (2008), the number of leatherbacks in Irish territorial waters (12 nautical miles from coastal baseline) during a summer day is probably around 25 (i.e. [39,000 x 0.06]/100) . However, if you extend this calculation to include Ireland's EEZ, the number of leatherbacks during a summer day may be as many as a few hundred. However, there will be much variation around this estimate considering population estimates for other species that occur in low densities (i.e. many beaked whales have CV (coefficient of variation) values of 0.80 and up, which basically means that any estimate will have huge errors associated with it). In terms of the actual number of leatherbacks that pass through or use Irish waters each year, there is great uncertainty. How long individual turtles remain resident in Irish waters and how much time they spend at the surface are important criteria for estimating population abundance, yet these data are scarce (Doyle et al. 2008). However, considering that individuals may spend periods of two months or more in coastal/shelf waters and other areas (James et al. 2005a, Eckert 2006, Doyle et al. 2008), and that turtles spend as much as 50 % of their time at the surface (James et al. 2005c), the number of leatherbacks passing through or residing in Irish waters each year is probably in the low thousands - 2-3,000 - which may be equivalent to 2-5 % of the Atlantic population . Future aerial surveys and more dedicated observations from ships of opportunity in-conjunction with concerted coastal observations may improve
2.4.07 Short-term trend - Trend direction	Leatherbacks are encountered in small numbers in Irish waters and it is not possible to judge whether numbers are increasing, decreasing or stable.
2.4.11 Long-term trend - Trend direction	Leatherbacks are encountered in small numbers in Irish waters and it is not possible to judge whether numbers are increasing, decreasing or stable.

Field label	Note
Species: 1223	**Leatherback turtle**
2.4.14 c) Favourable reference population - If favourable reference population is unknown	Best expert opinion puts the number of leatherbacks using Irish waters at ~2,500 per annum - approximately 2-5% of the North Atlantic leatherback population. However, it must be recognised that the confidence intervals for this estimate would be very large and that figures will vary annually for natural reasons. Given concerns about the global decline of this species, further work is required throughout the North Artlantic and at the turtle's nesting beaches in the Tropics to establish the full conservation status of this animal. Arising from that work a meaningful estimate of favourable reference population should be possible for the north Atlantic and for Irish waters. In the meantime, this parameter is considered to be Unknown.
2.4.15 c) Reason for change - use of different method	A population figure was extrapolated for the EEZ. See field 2.4.1 for more details.
2.5.01 Area estimation	In the absence of more complete information on migration patterns and habitat utilisation, the current range is also taken to represent the extent of habitat.
2.5.10 c) Reason for change - use of different method (e.g. 'Range tool')?	The Habitat for the Species was considered to cover theentire EEZ.
2.6 Main pressures - Pressure	Main concerns relate to mortalities at nesting beaches in Caribbean and northern coast of South America (e.g. French Guiana). Long-line fishing in the Pacific is a significant cause of mortality, and this is also considered a risk in the North Atlantic (Lewison et al. 2004; Pierpoint, 2000), although the impact has not been fully quantified. In Irish coastal waters animals have died and been injured as a result of becoming entangled in ropes associated with lobster and crab fisheries. Collisions with pleasure boats has been reported as a cause for concern for turtles in some waters, but this is not thought to be a significant issue in Irish waters.
2.7 Threats - Threat	Current pressures - relating to mortalities at nesting beaches; long-line fishing; and entanglement in ropes associated with lobster and crab fisheries - are considered likely to continue into the forseeable future. Further research is required on the extent of impact of these on the North Atlantic population.
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	There is no evidence to suggest that the range of this species is anyway limited in Irish waters or that it has declined in extent in recent years. Nonetheless, it is clear that we are only starting to understand the migration patterns and seasonal behaviour of leatherbacks in the Northeast Atlantic. More work is required before a definitive statement can be made on Favourable Reference Range. Consequently, this parameter is considered at present to be Unknown.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Best expert opinion puts the number of leatherbacks using Irish waters at ~2,500 per annum - approximately 2-5% of the North Atlantic leatherback population. However, it must be recognised that the confidence intervals for this estimate would be very large and that figures will vary annually for natural reasons. Given concerns about the global decline of this species, further work is required throughout the North Artlantic and at the turtle's nesting beaches in the Tropics to establish the full conservation status of this animal. Arising from that work a meaningful estimate of favourable reference population should be possible for the north Atlantic and for Irish waters. In the meantime, this parameter is considered to be Unknown.

Field label	Note
Species: 1223	**Leatherback turtle**
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Little is known about the habitat requirements of the leatherback turtle in North Atlantic waters. It is clear that leatherbacks migrate through Irish waters each year and while most records are from sightings and strandings near to the coast, they can also be encountered off-shore. The purpose of this migration appears to be solely related to food availability. It is likely that some off shore areas are more important than others; that some areas are important foraging grounds at certain times with significant concentrations of jellyfish whereas other areas are not. However it is not possible to identify these areas at this time.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	It has been suggested that global warming and the related rise in sea level temperatures may encourage more leatherbacks to enter Irish coastal waters and will also allow for leatherback turtles to spend more time in Irish waters. However, the most significant threats to this species occur outside Irish territorial waters at their nesting beaches and from fishing activities in international waters of the north Atlantic. Consequently, future prospects will be largely determined by international conservation efforts. Surveys of the nesting beaches in South America and Florida suggest that conservation efforts there are producing signs of population increases (Stewart et al. 2011). While further efforts are still required to minimise the risk from long-line fisheries, the current evidence suggest that this is not as significant a risk as it has proved in the Pacific and overall the leatherback population in the North Atlantic would appear to have a more favourable future. Nonetheless, our understanding of the population ecology and habitat utilisation of this species is very limited, therefore future prospects have been assessed as Unknown.
2.9.05 Overall assessment of Conservation Status	There are significant difficulties associated with studying this species. Despite recent progress, the population ecology, range and habiat utilisation of this species in the NE Atlantic are not fully understood. Consequently a full assessment of the future prospects is not possible and overall, the status of this species must be considered unknown.

Leatherback turtle - *Dermochelys coriacea* (1223)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

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Scale - Scála
0 25 50 75 100 km

N
Map - Léarscáil
V 1.0
Date - Dáta
10-05-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1303**
0.2.2 Species name	**Rhinolophus hipposideros**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	Lesser horseshoe bat (Ialtóg crúshrónach)

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Complete survey/Complete survey or a statistically robust estimate (3)
1.1.3 Year or period	2000-2012
1.1.4 Additional map	Yes
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published sources

Bontadina, F., Schofield, H. & Naef-Daenzer,B. (2002) Radio-tracking reveals that lesser horseshoe bats (Rhinolophus hipposideros) forage in woodland. Journal of Zoology, London. 258: 281-290.
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Motte, G. & Libois, R. (2002) Conservation of the lesser horseshoe bat (Rhinolophus hipposideros Bechstein, 1800) (Mammalia: Chiroptera) in Belgium. A case study of feeding habitat requirements. Belgian .Journal of Zoology 132 (10): 49-54.
NPWS (2008) The status of EU protected habitats and species in Ireland. National Parks & Wildlife Service, Department of the Environment, Heritage & Local Government. Dublin, Ireland.
Roche, N. (2001) The status of lesser horseshoe bats Rhinolophus hipposideros Bechstein in Co. Limerick. Irish Naturalists' Journal. Vol. 26: 437-484.
Roche, N. Langton, S. & Aughney, T. (2012) Lesser horseshoe bat: population, trends and threats 1986-2012. Unpublished report to NPWS, Dublin. http://www.npws.ie/publications/archive/
Schofield, H.W. (2008) The lesser horseshoe bat conservation handbook. The Vincent Wildlife Trust. Herefordshire, U.K.

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

2.3 Range

2.3.1 Surface area - Range (km²)	11400	
2.3.2 Method - Range surface area	Complete survey/Complete survey or a statistically robust estimate (3)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period	1988-2012	
2.3.7 Long-term trend direction	stable (0)	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	11400
	operator	N/A
	unknown	No
	method	The current range is taken as the favourable reference range. This is lower than the figure used in 2007, but is believed to better represent the core area of the lesser horseshoe bat in Ireland. It encompasses all the significant ecological variation of the species and is sufficiently large to ensure its long term survival.
2.3.10 Reason for change	Genuine Improved knowledge/more accurate dataUse of different method	

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	number of individuals (i)		
	min	14010	max	14010
2.4.2 Population size (other than individuals)	Unit	N/A		
	min		max	
2.4.3 Additional information	Definition of locality			
	Conversion method			
	Problems			
2.4.4 Year or period	2010-2011			
2.4.5 Method – population size	Complete survey/Complete survey or a statistically robust estimate (3)			
2.4.6 Short-term trend period	2001-2012			
2.4.7 Short term trend direction	increase (+)			
2.4.8 Short-term trend magnitude	min	max	confidence interval	
2.4.9 Short-term trend method	Complete survey/Complete survey or a statistically robust estimate (3)			
2.4.10 Long-term trend period	1988-2012			
2.4.11 Long term trend direction	increase (+)			
2.4.12 Long-term trend magnitude	min	max	confidence interval	
2.4.13 Long-term trend method	Estimate based on partial data with some extrapolation and/or modelling (2)			
2.4.14 Favourable reference population	number	13740		
	operator	N/A		
	unknown	No		
	method	The calculation of population for the last reporting period has been re-examined using more robust statistical techniques (see Roche et al., 2012 for details). This has indicated that the last figure was a slight underestimate and a revised estimate of 13,740 (based on 2005-2006 data) has been calculated. This updated figure is considered sufficient for the long term viability of the species in Ireland and is used here as the new favourable reference population.		

2.4.15 Reason for change	Genuine Improved knowledge/more accurate data

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	6624
2.5.2 Year or period	2001-2012
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Good
2.5.4 b) Quality of habitat - method	Habitat quality, based on expert judgement and taking into account the favourable population status and stable range, both indicative of good quality habitat, is assessed as good.
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	stable (0)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	6624
2.5.10 Reason for change	Genuine Improved knowledge/more accurate data Use of different method

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
removal of hedges and copses or scrub (A10.01)	medium importance (M)	N/A
removal of stone walls and embankments (A10.02)	low importance (L)	N/A
Forest and Plantation management & use (B02)	high importance (H)	N/A
demolishment of buildings & human structures (E06.01)	medium importance (M)	N/A
reconstruction, renovation of buildings (E06.02)	high importance (H)	N/A
speleology (G01.04.02)	low importance (L)	N/A
recreational cave visits (G01.04.03)	low importance (L)	N/A
Other human intrusions and disturbances (G05)	low importance (L)	N/A
Light pollution (H06.02)	medium importance (M)	N/A
inundation (natural processes) (L08)	medium importance (M)	N/A

2.6.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
removal of hedges and copses or scrub (A10.01)	medium importance (M)	N/A
removal of stone walls and embankments (A10.02)	low importance (L)	N/A
Forest and Plantation management & use (B02)	high importance (H)	N/A
demolishment of buildings & human structures (E06.01)	medium importance (M)	N/A
reconstruction, renovation of buildings (E06.02)	high importance (H)	N/A
speleology (G01.04.02)	low importance (L)	N/A
recreational cave visits (G01.04.03)	low importance (L)	N/A
Other human intrusions and disturbances (G05)	low importance (L)	N/A
Light pollution (H06.02)	medium importance (M)	N/A
inundation (natural processes) (L08)	medium importance (M)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant Information	
2.8.3 Trans-boundary assessment	

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.9.2. Population	assessment	Favourable (FV)
	qualifiers	N/A
2.9.3. Habitat	assessment	Favourable (FV)
	qualifiers	N/A
2.9.4. Future prospects	assessment	Favourable (FV)
	qualifiers	N/A
2.9.5 Overall assessment of Conservation Status	Favourable (FV)	
2.9.6 Overall trend in Conservation Status	N/A	

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	number of individuals (i)		
	min	5000	max	7000
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3 Trend of population size within	stable (0)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Both	Long term
Adapt forest management (3.2)	Administrative	high importance (H)	Both	Long term
Specific management of traffic and energy transport systems (8.2)	One-off	high importance (H)	Both	Enhance

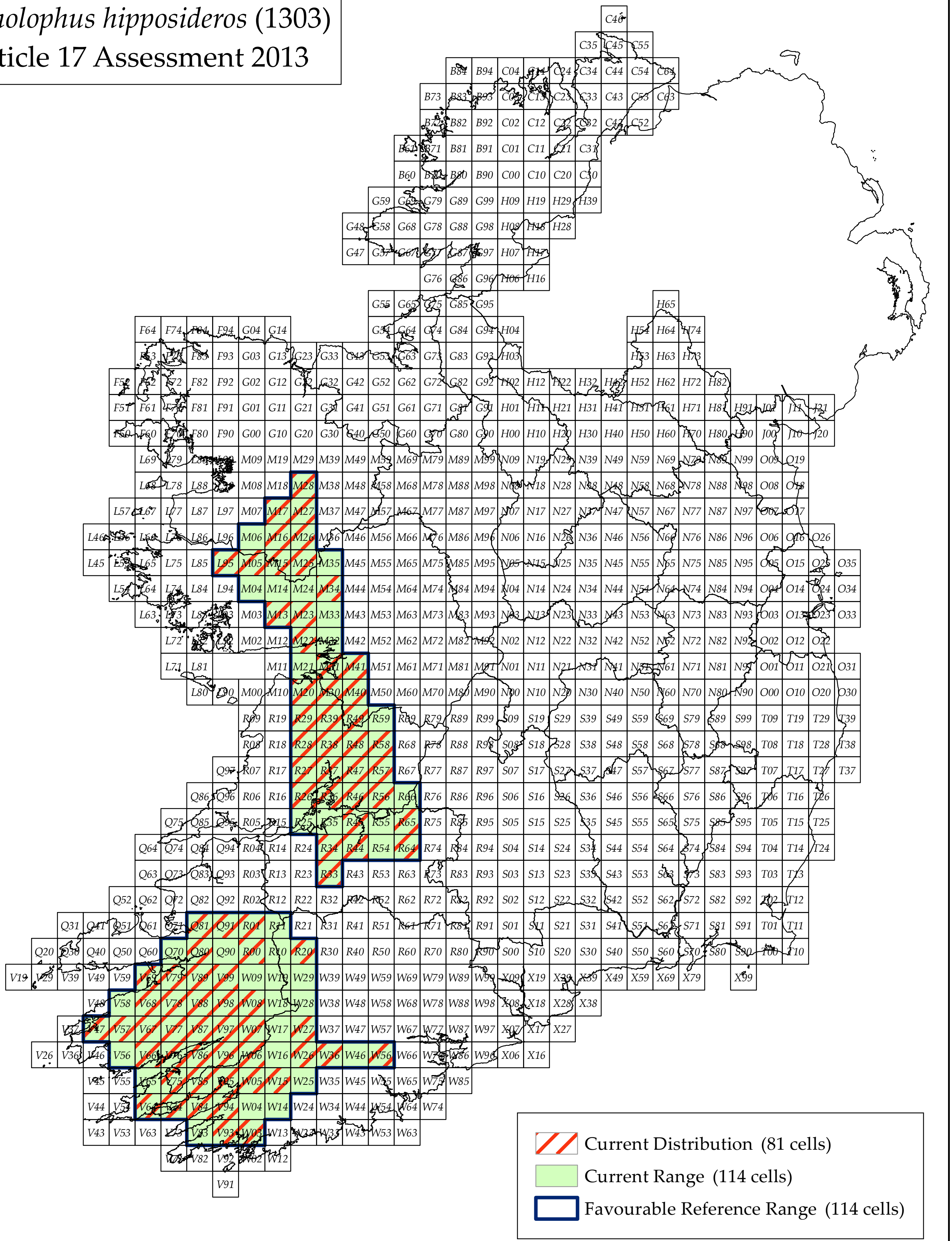
Field label	Note
Species: 1303	**Lesser horseshoe bat**
0.2.01 Species code	The lesser horseshoe bat is widely distributed through western, central and southern Europe and as far east as Kashmir and through northern Africa to Arabia, Ethiopia and Sudan (Mitchell-Jones et al., 1999). Ireland represents the most northerly and westerly limits of the species' distribution (Roche, 2001) and here it is confined to 6 west coast counties: Mayo, Galway, Clare, Limerick, Cork and Kerry (McAney, 1994). A single animal has also been recorded in Co. Roscommon in 2004 (B. Keeley, pers. comm.). Although this bat has declined in many European countries, Ireland is considered a stronghold for the species (Marnell et al, 2009). The lesser horseshoe bat is the only member of the Rhinolophidae occurring in Ireland. Summer roosting sites are often in the attics of old or derelict buildings. The bats are faithful to a roost site and will return to the same site each year. Hibernation sites are typically caves, souterrains, cellars and icehouses (O' Sullivan, 1994; Kelleher, 2004). Lesser horseshoes rely on linear landscape features (e.g. treelines, stonewalls and hedgerows) to navigate and commute from roosts to feeding sites and are reluctant to fly out in the open (Schofield, 2008). The bats forage on flying insects predominantly in deciduous woodland and riparian vegetation normally within a few km of their roosts (Bontadina et al., 2002, Motte & Libois, 2002). Lesser horseshoe bats are sensitive to disturbance and normally do not occupy the same buildings as humans. Loss of roosting sites due to deterioration or renovation of old buildings, loss of commuting routes linking roosts to foraging sites and unsympathetic management of foraging sites are the major threats to this species (McAney, 1994; McGuire, 1998; Roche, 2001).
1.1.01 Distribution map	This map was derived from the transformation of the map referred to in 1.1.4 to the LAEA projection.
1.1.02 Method used - map	Distribution records are derived from the NPWS lesser horseshoe bat database. The vast majority of records are collected by NPWS during the course of summer and winter roost monitoring.
1.1.04 Additional distribution map	All records were intersected with the Irish 10km grid map to derive the additional map.
2.3.04 Short term trend - Trend direction	Some bat roosts have declined or been lost during the current reporting period, mainly due to the deterioration of old buildings used by the bats. However, a slight range expansion has also been observed with 1st records in 3 x 10km squares. Overall the range is assessed as stable.
2.3.07 Long-term trend - Trend direction	Monitoring data for the lesser horseshoe goes back to the 1980s. While some fluctuations have been seen at the margins of the species distribution, with small gains and losses, the core area remains solid. Overall, the long term trend is assessed as stable.
2.3.10 a) Reason for change - genuine change?	Some slight range expansion has been observed with 1st records for R65, W27 and W15 in the current reporting period.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	The previous assessment included records collected over a 33 year period and dating back as far as 1973. In some of those roosts only individual droppings had been recorded i.e. no bats had ever been seen. Subsequent survey work at some of these sites has failed to confirm any degree of regular use. These peripheral roosts are not considered to form an integral part of the lesser horseshoe's range and have now been excluded.

Field label	Note
Species: 1303	**Lesser horseshoe bat**
2.3.10 c) Reason for change - use of different method?	The new range tool is also responsible for some of the changes around the margins of the range.
2.4.01 a) Population size estimation (using individuals or agreed exceptions where possible) - Unit	The population estimate is based on a detailed examination of the NPWS lesser horseshoe bat database by Roche et al. (2012). The approach used for the 2007 report was revised so that an estimate was derived for the two year range of 2010-2011, thus: •The maximum count for all monitored sites in a particular year, or range of years, is used. •A mean count (all data from May, June and July) was calculated for each of the 142 monitoring roosts visited in summer, from 2000-2011. •A mean count for May, June and July for all non-monitored sites was calculated for 2000-2011 as 8.67. •183 maternity roosts were identified in the NPWS database (Kelleher, 2004). This figure has been retained for the present estimation in the absence of complete maternity roost status information for current sites. •For any given monitored site for which count data is unavailable in a particular year, or range of years, a count is imputed from the mean for that site. •Maximum counts and imputed counts (for monitoring sites where no count is available) are summed. This gives a total figure for 142 monitoring sites. •To bring the total to 183 summer sites, 8.67 x 41 is added, in the assumption that the average count for unmonitored roosts is lower than that of monitored sites. •It is understood that males represent about 25% of a maternity roost's population (Schofield, pers. comm. 2006; Knight, pers. comm., 2006, cited in NPWS (2007)). Thus the total count (max + imputed + unmonitored) is multiplied first by 0.75 and then by 2 to give an estimate for the total population, male and female, assuming a male: female population ratio of 1:1.
2.4.05 Method used - Population size	see 2.4.1 and Roche et al. (2012).
2.4.07 Short-term trend - Trend direction	Roche et al. (2012) examined roost count data from both summer and winter sites and found indication of significant population increases from 2003-2005 followed by a levelling off or slight decline since 2008. Overall there has been a slight increase since 2001.
2.4.11 Long-term trend - Trend direction	Roche et al. (2012), using roost count data back to mid 1980s, demonstrated an increasing trend in population, although data was only available for a low number of sites initially so this trend must be treated with caution.
2.4.15 a) Reason for change - genuine change?	Roche et al's 2012 analysis indicates a genuine, but very slight increase in population since the last assessment, from 13,740 to 14,010 adult bats.
2.4.15 b) Reason for change - improved knowledge/more accurate data?	Improved data and more robust statistical analysis accounts for some of the difference between the previous and current reporting periods.

Field label	Note
Species: 1303	**Lesser horseshoe bat**
2.5.01 Area estimation	Habitat area has been calculated from the intersection of the following CORINE (2006) land-classes: Unimproved pasture Broadleaved woodland Conifers Mixed forest Natural grassland Scrub stream courses water bodies Plus the following FIPS categories: Broadleaved forest Conifer forest Mixed forest other forest with the current range of the lesser horseshoe bat in Ireland.
2.5.09 Area of suitable habitat for the species (km2)	The area of habitat within the range is also taken as the area of suitable habitat.
2.5.10 a) Reason for change - genuine change?	There has been a genuine increase in the area of habitat available to the lesser horseshoe. Although a detailed breakdown of changes in the various Landcover types has not been conducted, it is known that forest cover, which is important for foraging, has increased year on year in Ireland (Casey & Ryan, 2012).
2.5.10 b) Reason for change - improved knowledge/more accurate data?	Revised land class data from CORINE and more up to date information on forest cover from FIPS was used to inform area of habitat. This accounts for some of the difference in area from the last report.
2.5.10 c) Reason for change - use of different method (e.g. 'Range tool')?	The more conservative approach to range calculation (see 2.3.10b) has led to a decrease in the area of habitat reported. However, the area of habitat within the range remains stable at c30% overall.
2.6 Main pressures - Pressure	Pressures impacting on lesser horseshoe can be divided into those affecting roosts and those reducing the quality of commuting routes and/or foraging habitat. The former include the renovation/demolition of buildings used as summer roosts, human disturbance in cave roosts and inundation – a particular issue in the Karst caves of Clare/south Galway. Removal of hedgerows and stonewalls can cause horseshoes to alter commuting behaviour leading to increased energy costs. Woodlands, including the edges and more open areas of coniferous plantations, provide important foraging habitat for these bats; unsympathetic management practises can have significant negative impacts. Lesser horseshoes will avoid areas with flood-lights or street lighting. Consequently light pollution can lead to roost abandonment or avoidance of preferred commuting routes or foraging areas.
2.7 Threats - Threat	The current pressure are considered likely to continue into the future.
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The current range of the lesser horseshoe bat is stable and is not smaller than the favourable reference range. It is considered to be in favourable condition.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The population of lesser horseshoe bat in Ireland is above the favourable reference population. Both the short term and long tern trends show increases. This parameter is considered to be favourable.

Field label	Note
Species: 1303	**Lesser horseshoe bat**
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	This bat uses a range of habitat including woodlands, hedgerows and pastures. These habitats are widespread in the west of Ireland. There are some concerns about deterioration of summer roosting habitats but this has been balanced by the successes at roosts managed specifically for bats (e.g. by The Vincent Wildlife Trust) and at purpose built roosts. Overall habitat is considered Favourable.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	This species faces a number of threats in the coming years. In particular, the continuing decline of some summer roosts is a concern. However, minimal intervention (e.g. roof repairs, boarding up windows to reduce light) can be sufficient to maintain roosting numbers in many cases. Continued liaison with Coillte and the Forest Service will also be important given the reliance on forest habitats for foraging. Overall, however, given the evidence of population increase and range stability, Future Prospects are considered Favourable.
2.9.05 Overall assessment of Conservation Status	The lesser horseshoe bat is restricted to Ireland's 6 western counties from Cork to Mayo, but its range and the area of suitable habitat available to it have remained stable. Both short term and long population term trends have shown slight increases and the identified threats are considered manageable. A significant proportion of this bat's summer and winter roosts are protected within SACs and overall, the conservation status of this species is considered favourable.
3.1.01 b) Population size - Minimum	92 lesser horseshoe roosts, with count data since 2001, fall within the SAC network. Data is not available for all 92 roosts for the same year, but a combination of roost records over the period 2001-2012 indicates that approximately 6,000 bats roost within the SAC network. To account for possible under-recording a maximum figure of 7,000 is suggested; to account for possible double recording, as both winter and summer roosts are included in the network, a minimum figure of 5,000 is used. Only 5 of the 92 roosts, with a combined total of approximately 100 bats, fall within SACs where the lesser horseshoe bat is not a qualifying interest.

Lesser horseshoe bat
Rhinolophus hipposideros (1303)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
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Scale - Scála
0 10 20 30 40 50 km

N
Map - Léarscáil
V 1.0
Date - Dáta
14-06-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1309**
0.2.2 Species name	**Pipistrellus pipistrellus**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	Common pipistrelle (Ialtóg fheascrach)

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	2007-2012
1.1.4 Additional map	Yes
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published sources

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2.3 Range

2.3.1 Surface area - Range (km²)	69500	
2.3.2 Method - Range surface area	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	69500
	operator	N/A
	unknown	No
	method	The Favourable Reference Range has been set as the current range. The distribution of the common pipistrelle is widespread across the country, indicating sufficient availability of roosts and adaptability to foraging in a range of habitats. This area is considered to be large enough to allow the long term survival of the species.
2.3.10 Reason for change	Improved knowledge/more accurate data	

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	number of individuals (i)		
	min	1070000	max	2417000

2.4.2 Population size (other than individuals)	Unit	N/A	
	min		max
2.4.3 Additional information	Definition of locality		
	Conversion method		
	Problems	Since all common pipistrelle bat roosts are not known it is not possible to count the population based on a complete census. Therefore, the population of mature (volant) individuals has been estimated using data from the Car-based Bat Monitoring Scheme. This population estimate is calculated based on the detection distance for echolocating common pipistrelles (20-30m) and the approximate area that is detectable. The area of Ireland is divided by the approximate detectable area and multiplied by the probability of detecting a common pipistrelle bat along any given roadside (2007-2012) on any given evening, from Car-based Bat Monitoring data. The minimum end of the range is based on the wider detection range (30m) while the maximum end is based on the closer detection range (20m). This population estimate uses a number of assumptions which may be only approximately correct and it could be improved with more detailed information on size and shape of detectable areas, better knowledge of common pipistrelle habitat use around roadsides and other factors. However, it may be considered a starting point from which to refine future estimates. See Roche et al. (2013) for further details.	

2.4.4 Year or period	2007-2012
2.4.5 Method – population size	Estimate based on partial data with some extrapolation and/or modelling (2)
2.4.6 Short-term trend period	2001-2012
2.4.7 Short term trend direction	stable (0)
2.4.8 Short-term trend magnitude	min 97 max 130.9 confidence interval 95
2.4.9 Short-term trend method	Estimate based on partial data with some extrapolation and/or modelling (2)
2.4.10 Long-term trend period	
2.4.11 Long term trend direction	N/A
2.4.12 Long-term trend magnitude	min max confidence interval
2.4.13 Long-term trend method	N/A

2.4.14 Favourable reference population	number	1070000
	operator	N/A
	unknown	No
	method	There is no evidence that the population has declined since the Directive came into force and good evidence that it has been stable since at least 2004. The current population is considered adequate to allow the species to thrive. Therefore, the Favourable Reference Population for the species is set to 1,070,000, the lower end of the range estimated for this assessment
2.4.15 Reason for change	Improved knowledge/more accurate data Use of different method	

2.5 Habitat for the Species

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2.5.1 Surface area - Habitat (km²)	51086
2.5.2 Year or period	2000-2009
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Good
2.5.4 b) Quality of habitat - method	Habitat and roosting associations of all Irish bat species including the common pipistrelle, were modelled using a Maximum Entropy model by Lundy et al. (2011) to determine likelihood of occurrence in specific habitats in the Irish landscape and maternity roost preferences. This modelling was carried out using roost and bat detector location data from 2000-2009 which is stored on the Bat Conservation Ireland bat database and includes records from monitoring schemes, BATLAS 2010 and records contributed by ecologists, academics and volunteers, among others. CORINE landcover, altitude, climate data, soil pH and human bias layers were included in the model. Common pipistrelle bat records were found to be associated broadly with broadleaved woodland, mixed woodland and riparian habitats and small amounts of urbanisation (Lundy et al. 2011). Since these habitat types are currently stable or increasing the habitat quality for the species is considered good.
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	stable (0)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	
2.5.10 Reason for change	Improved knowledge/more accurate data Use of different method

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
removal of hedges and copses or scrub (A10.01)	medium importance (M)	N/A
wind energy production (C03.03)	medium importance (M)	N/A
continuous urbanisation (E01.01)	medium importance (M)	N/A
use of biocides, hormones and chemicals (A07)	medium importance (M)	toxic inorganic chemicals (T)
		Mixed pollutants (X)
forestry clearance (B02.02)	low importance (L)	N/A
removal of dead and dying trees (B02.04)	low importance (L)	N/A
use of biocides, hormones and chemicals (forestry) (B04)	low importance (L)	toxic inorganic chemicals (T)
		Mixed pollutants (X)
roads, motorways (D01.02)	medium importance (M)	N/A
demolishment of buildings & human structures (E06.01)	low importance (L)	N/A
reconstruction, renovation of buildings (E06.02)	medium importance (M)	N/A
tree surgery, felling for public safety, removal of roadside trees (G05.06)	low importance (L)	N/A
anthropogenic reduction of habitat connectivity (J03.02)	medium importance (M)	N/A
death or injury by collision (G05.11)	low importance (L)	N/A
Other human intrusions and disturbances (G05)	medium importance (M)	N/A

2.6.1 Method used – pressures	mainly based on expert judgement and other data (2)

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2.7 Main Threats

Threat	ranking	pollution qualifier(s)
removal of hedges and copses or scrub (A10.01)	medium importance (M)	N/A
wind energy production (C03.03)	high importance (H)	N/A
continuous urbanisation (E01.01)	medium importance (M)	N/A
use of biocides, hormones and chemicals (A07)	medium importance (M)	toxic inorganic chemicals (T)
		Mixed pollutants (X)
forestry clearance (B02.02)	medium importance (M)	N/A
removal of dead and dying trees (B02.04)	low importance (L)	N/A
use of biocides, hormones and chemicals (forestry) (B04)	low importance (L)	toxic inorganic chemicals (T)
		Mixed pollutants (X)
roads, motorways (D01.02)	medium importance (M)	N/A
demolishment of buildings & human structures (E06.01)	medium importance (M)	N/A
reconstruction, renovation of buildings (E06.02)	medium importance (M)	N/A
tree surgery, felling for public safety, removal of roadside trees (G05.06)	low importance (L)	N/A
anthropogenic reduction of habitat connectivity (J03.02)	medium importance (M)	N/A
death or injury by collision (G05.11)	low importance (L)	N/A
Other human intrusions and disturbances (G05)	medium importance (M)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant Information	
2.8.3 Trans-boundary assessment	Given the mobility of this species, and in particular the tendency for seasonal movements between roosts, it is likely that bats regularly cross the border from the Republic of Ireland into Northern Ireland and vice versa. A transboundary assessment in the next reporting period would allow a fuller appreciation of the range and status of this species.

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment Favourable (FV) qualifiers N/A
2.9.2. Population	assessment Favourable (FV) qualifiers N/A
2.9.3. Habitat	assessment Favourable (FV) qualifiers N/A
2.9.4. Future prospects	assessment Favourable (FV) qualifiers N/A
2.9.5 Overall assessment of Conservation Status	Favourable (FV)
2.9.6 Overall trend in Conservation Status	N/A

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	N/A	
	min		max
3.1.2 Method used	N/A		
3.1.3 Trend of population size within	N/A		

3.2 Conservation Measures

Field label	Note
Species: 1309	**Common pipistrelle**
0.2.01 Species code	The common pipistrelle is widespread throughout the country and is one of the most commonly encountered and smallest mammal species in Ireland. It forages widely in both rural and urban settings. Maternity roosts are often in buildings where the species favours stone-construction, typically in the attics of dwelling houses although it is occasionally found roosting under bridges and in trees. Maternity colonies show a preference for roosts that are situated in areas of pasture but tend to avoid arable, conifer and natural grassland habitats surrounding roosts (Lundy et al., 2011). Bats normally disperse in autumn and hibernate over winter. The species has rarely been confirmed hibernating in Ireland. The available records for live bats in winter are from modern dwelling houses. Russ (1999) reports that the common pipistrelle is very general in its habitat preference, foraging in woodland, riparian habitats and parkland, along linear features in farmland, and in towns and cities. Lundy et al. (2011) reported that the bat is likely to be associated with broadleaved woodland and riparian habitats at a local (0.5km) scale, while mixed forestry may be more important at a wider scale in the landscape (20.5km). The species showsan association with urban areas, occurrence is more likely in less dense urban areas, but the species is less likely to occur in very dense urban areas. It also demonstrates avoidance of bog/marsh/heath habitats.
1.1.01 Distribution map	This map was derived from the transformation of the map referred to in 1.1.4 to the LAEA projection.
1.1.02 Method used - map	Distribution map shows location of all records collected in the 2007-2012 period. Records derive from BATLAS 2010 field surveys (Carden et al. 2010) which were carried out in 10km squares across the island, car-based bat monitoring data (e.g. Roche et al., 2011) & ad-hoc records collected by Bat Conservation Ireland staff and volunteers, NPWS staff, ecological consultants and academic institutions. The majority of records have been collected using bat detectors from bats in flight. This map does not include any extrapolation or modelling of the data, nor have all possible locations been surveyed for the species.
1.1.03 Year or period	Distribution map shows location of all records collected in the 2007-2012 period. This map does not include any extrapolation or modelling of the data, nor have all possible locations been surveyed for the species.
1.1.04 Additional distribution map	All Irish grid records were intersected with the Irish grid 10km grid map to derive this additional map.
1.1.05 Range map	Range Map has been generated using the Range Tool and is based on all records collated by BCIreland in the 2007-2012 period.

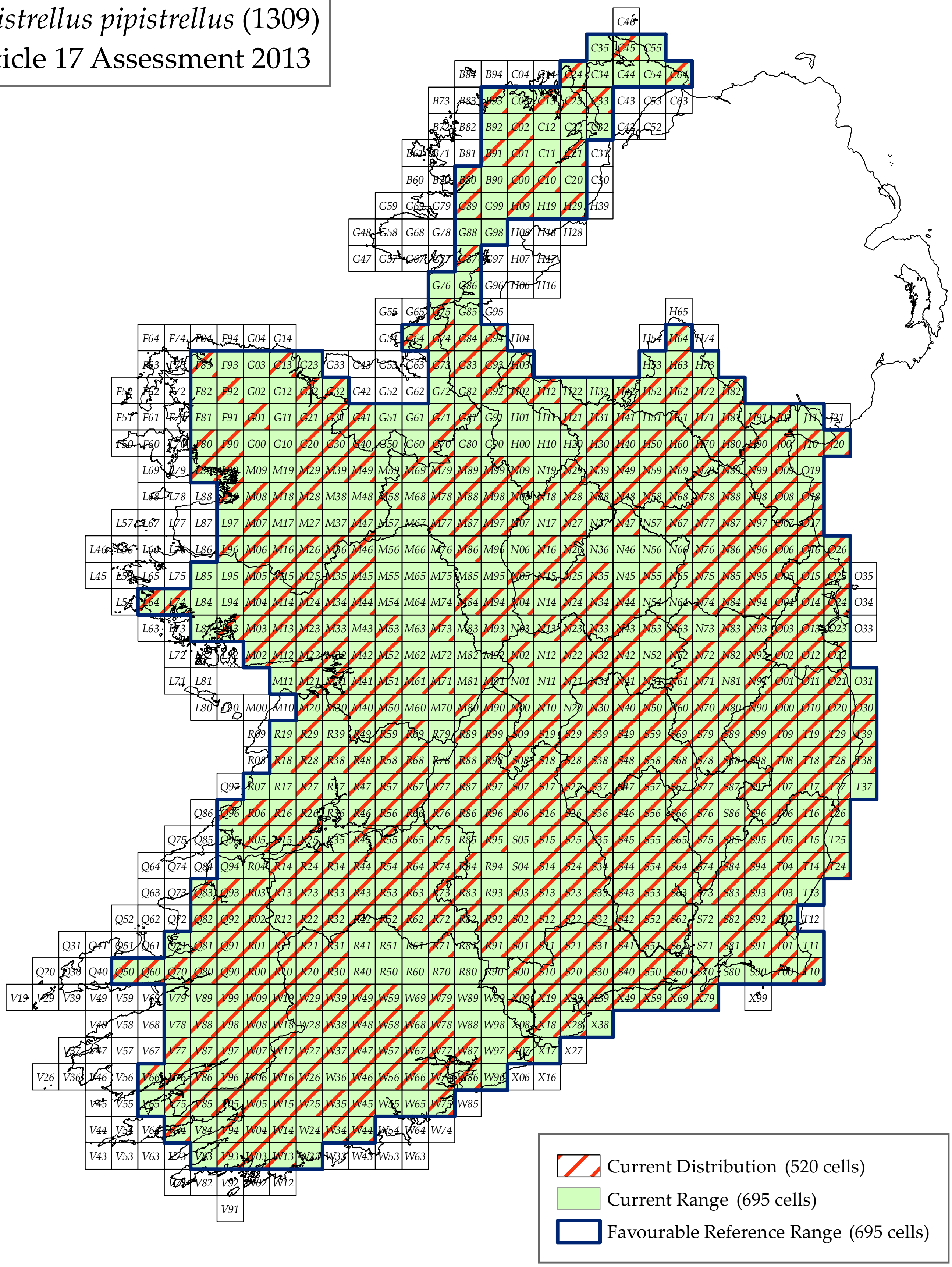
Species: 1309	Common pipistrelle
2.2 Published sources	Population estimates for the island and yearly trend information for the common pipistrelle have been derived from car-based bat monitoring (Roche et al., 2009; 2011; 2012). This scheme collects information on relative activity levels for the species along roadsides across the island from surveys carried out in July and August every year. Information on distribution was collected during the BATLAS 2010 project which involved bat detector surveys at 3-4 locations within 10km squares across the island (Carden et al., 2010). Habitat and roosting associations were modelled using a Maximum Entropy model and CORINE landscape data by Lundy et al. (2011) to determine likelihood of occurrence in specific habitats in the Irish landscape and maternity roost preferences. This modelling was carried out using roost and bat detector location data from 2000-2009 which is stored on the Bat Conservation Ireland bat database and includes records from monitoring schemes, BATLAS 2010 and records contributed by ecologists, academics and volunteers, among others. There have been no field or lab-based ecological or behavioural studies carried out on the species in Ireland, detailed information on feeding and other behaviours is therefore inferred from studies from the UK and continental Europe.
2.3.01 Surface area - Range	The range of 69,500km2 is based on distribution records for 520 x 10km cells collected between 2007 and 2012 (see 1.1.1). The Range Tool was run on this data with gap closure set at 20km. Thereafter 8 x 10km cells, which formed a hole in the range (in E. Galway) [M56, M66, M76, M55, M65, M75, M64 and M74] were added into the range. These were added on the basis that this is a reasonably wide ranging bat species and that the filled squares contained suitable habitat for the species and do not represent a barrier to movement.
2.3.04 Short term trend - Trend direction	Even though more squares are covered in the current reporting period than for the 2001-2006 reporting period, the Car-based Bat Monitoring Scheme indicates that the species has been stable or just slightly increasing since 2004. It is likely therefore that the reported range increase is simply due to improved information. Therefore 0 or Stable has been selected.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	The apparent increase in range since 2007 is thought to be largely explained by the availability of better data, rather than true range increase. A considerable number of new records for the species have been collected since the last reporting round (e.g. Roche et al., 2012; Carden et al. 2010) providing a better reflection of true range.
2.4.01 a) Population size estimation (using individuals or agreed exceptions where possible) - Unit	Since all common pipistrelle bat roosts are not known it is not possible to count the population based on a complete census. Therefore, the population of mature (volant) individuals has been estimated using data from the Car-based Bat Monitoring Scheme. This population estimate is calculated based on the detection range for echolocating common pipistrelle bats (20-30m) and the approximate area that is detectable. The area of Ireland is divided by the approximate detectable area and multiplied by the probability of detecting a common pipistrelle bat along any given roadside (2007-2012) on any given evening, from Car-based Bat Monitoring data. The minimum end of the range is based on the wider detection range (30m) while the maximum end is based on the closer detection range (20m). This population estimate uses a number of assumptions which may be only approximately correct and it could be improved with more detailed information on size and shape of detectable areas, greater knowledge of common pipistrelle habitat use around roadsides and other factors. However, it may be considered a starting point from which to refine future estimates. See Roche et al. (2013) for further details.

Field label	Note
Species: 1309	**Common pipistrelle**
2.4.04 Year or period	Population estimate is derived from the average probability of detecting a common pipistrelle bat from Car-based Bat Monitoring using 2007-2012 data inclusive, to correspond with the current reporting period. Also, since yearly estimates from monitoring schemes can vary considerably it was considered best practice to derive a mean from the six years of the reporting period, rather than using data from the last year of the series (Roche et al., 2013).
2.4.06 Short-term trend - Period	Although a 12 year window is prescribed, data is only available from 2003. 2004-2012 data was actually used because a smaller dataset was available in 2003 and it is better to use a second year as the base year in a trend index. It is assumed that population was stable from 2001-2003.
2.4.08 a) Short-term trend - Magnitude - Minimum	Trend in population of common pipistrelle bat is based on data from 2004 to 2012. It is not expressed in change of absolute numbers since annual surveillance measures levels of activity along roadsides, rather than numbers of bats. Therefore, annual trend estimates can be considered an index of activity that is likely to mirror population levels. In order to facilitate easy interpretation of this trend the base year, 2004, is set as 100 so that deviations from the base year can be easily understood and visualised. For reporting purposes, the confidence intervals are expressed as the final year upper and lower (95%) estimates. If both upper and lower intervals are less than 100 this indicates a declining trend. Increasing trends will have an upper and lower interval both greater than 100. For the common pipistrelle General Linear Model (GLM) modelling with Generalised Additive Model (GAM) smoothing indicates that there has been a fairly stable trend since the base year, 2004. The lower 95%confidence limit of the trend encompasses the baseline, meaning that the lower interval reads as 97 (i.e. <100). The upper interval in 2012 was at 130.9. Therefore, although the mean smoothed trend indicates a slight increase, the lower confidence interval still encompasses the baseline so this cannot be stated definitively (see Roche et al., 2013).
2.4.08 b) Short-term trend - Magnitude - Maximum	See 2.4.8a for explanation of trend.
2.4.15 b) Reason for change - improved knowledge/more accurate data?	Substantial additional information has been collected since 2007 (e.g.Carden et al 2010, Roche et al., 2012) allowing an actual population estimate to be calculated (see 2.4.1a).
2.4.15 c) Reason for change - use of different method	For the 2001-2006 reporting period the number of occupied grid squares was used as a proxy for the Favourable Reference Population for this species. However, substantial additional information has been collected since then allowing an actual population estimate to be calculated (see 2.4.1a).
2.5.01 Area estimation	Habitat and roosting associations of all Irish bat species including the common pipistrelle bat, were modelled using a Maximum Entropy model by Lundy et al. (2011) to determine likelihood of occurrence in specific habitats in the Irish landscape and maternity roost preferences. This modelling was carried out using roost and bat detector location data from 2000-2009 which is stored on the Bat Conservation Ireland bat database and includes records from monitoring schemes, BATLAS 2010 and records contributed by ecologists, academics and volunteers, among others. CORINE landcover, altitude, climate data, soil pH and human bias layers were included in the model. Modelling was carried out to a 5km scale. Common pipistrelle bat records were found to be associated broadly with broadleaved woodland, mixed woodland and riparian habitats and small amounts of urbanisation (Lundy et al. 2011). The area 51086km2 is derived from the model and is the estimated total core area of favourable landscape for the species for the Republic of Ireland.
2.5.02 Year or period	The Lundy et al (2011) analysis was carried out on available bat records for the years 2000-2009 which had been collated on the BCIreland National Bat Database.

Field label	Note
Species: 1309	**Common pipistrelle**
2.5.03 Method used Habitat for the species	This is calculated from Maximum Entropy modelling of bat records (2000-2009) combined with CORINE landcover, altitude, soil pH, climate and human bias layers (see Lundy et al. 2011).
2.5.06 Short-term trend - Trend direction	This estimation of habitat for the species is based on modelling of known records from 2000-2009 along with various land cover and other layers (Lundy et al. 2011). Limited data on area of occupancy from the National Bat Survey in the 1980s (O'Sullivan 1994) suggests that there has been no losses in the area occupied by this population in the long term past (i.e. from 1985 onwards), even though the common and soprano pipistrelle were not distinguished at the time. These comparisons stretch beyond the trend period, however there is also no evidence to suggest losses since 2000. Also, there is no evidence of loss of important habitats for the species. Therefore the short term trend for area is considered to be stable. This assessment is based mainly on expert opinion.
2.5.10 b) Reason for change - improved knowledge/more accurate data?	The habitat for the species has been modelled using a Maximum Entropy method described above (Lundy et al., 2011) and the resulting core area (51086) is assumed to more accurately represent available and potential habitat for the common pipistrelle than the higher figure (59200) that was included for the previous reporting period.
2.5.10 c) Reason for change - use of different method (e.g. 'Range tool')?	The habitat for the species has been modelled using a Maximum Entropy method described above (Lundy et al., 2011) and the resulting core area (51086) is assumed to more accurately represent available and potential habitat for the common pipistrelle than the higher figure (59200) that was included for the previous reporting period.
2.6 Main pressures - Pressure	G05 refers to pressure from deliberate disturbance to or exclusion from roosts (with or without licence). Other pressures have been listed based on available literature and published research such as Eurobats guidelines for windfarms (Rodrigues et al. 2008), information on the use of trees by roosting common pipistrelle bats (e.g. BCIreland database), extrapolation from findings by Lundy et al. (2011) about areas avoided by the species such as dense urbanisation, and information on important habitats from studies overseas (e.g. Davidson-Watts et al., 2006), the importance of linear landscape features (e.g. Boughey et al., 2011) and observed detrimental impact of major roads (Berthinussen and Altringham, 2012). Ranking of importance is based on expert opinion on likely impact of each pressure on the species.
2.7 Threats - Threat	As there is no evidence that the current pressures will cease they are also listed as threats. Ranking of importance is based on expert opinion on likely impact of each threat on the species.
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The common pipistrelle is widespread across all parts of the country. Range is not lower than the favourable reference value and is stable. It is assessed as Favourable.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The population is estimated to be in the range of 1,070,000 to 2,417,000 individuals, i.e. equal to or greater than the favourable reference value and is stable or increasing. It is assessed as Favourable.
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Lundy et al (2011) demonstrated that there is sufficient good quality habitat to support the long term survival of the species. There is no evidence to suggest that the extent or quality of the habitat for the species has changed in the recent past. Habitat for the species is therefore assessed as Favourable.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	While a number of pressures act on the common pipistrelle such as roost loss and exclusion, or vulnerability in the vicinity of large motorways, on the whole, the species is widely dispersed, occurs commonly, is adaptable and has widespread available suitable habitat. There is no reason to believe that the population will be threatened with debilitating losses in the future, therefore, future prospects are considered good.

Field label	Note
Species: 1309	**Common pipistrelle**
2.9.05 Overall assessment of Conservation Status	Considerable survey and research has been carried out since the last assessment. BATLAS 2010 (Carden et al., 2010) provided new data for distribution and range. Continued Car-based Bat Monitoring has provided new figures for population size and trends (Roche et al., 2012; Roche et al., 2013). All available records from 2000-2009 were modelled with land cover and other data to assess favourable habitat types for the species across the island (Lundy et al., 2011). Population is stable or even increasing and there is no evidence of decline in range or habitat. There is no evidence of any major pressures currently impacting populations. Future prospects are considered good. Therefore, all attributes have been assessed as Favourable.

Common Pipistrelle
Pipistrellus pipistrellus (1309)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 10 20 30 40 50 km

N
Map - Léarscáil
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Date - Dáta
27-05-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1314**
0.2.2 Species name	**Myotis daubentonii**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	Daubenton's bat (Ialtóg uisce)

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	2007-2012
1.1.4 Additional map	Yes
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published sources

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2.3 Range

2.3.1 Surface area - Range (km²)	69800	
2.3.2 Method - Range surface area	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	69800
	operator	N/A
	unknown	No
	method	The Favourable reference range has been set as the current range. The distribution of Daubenton's bat is widespread across the country, indicating sufficient availability of roosts and adaptability to foraging in a range of riparian habitats.
2.3.10 Reason for change	Improved knowledge/more accurate dataUse of different method	

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit: number of individuals (i) min: 57000 max: 79000
2.4.2 Population size (other than individuals)	Unit: N/A min: max:
2.4.3 Additional information	Definition of locality: Conversion method: Problems: Since all Daubenton's bat roosts are not known it is not possible to count the population based on a complete census. Therefore, the population of mature (volant) individuals has been estimated using data from the Republic of Ireland from the All-Ireland Daubenton's Bat Waterway Monitoring Scheme dataset. This population estimate is calculated based on the estimated detection range for echolocating Daubenton's bats (20+20m in each direction along a waterway) and the approximate length of waterway and lake perimeter across the country. The length of waterways and lake perimeters in the Republic of Ireland is divided by the approximate detectable length (40m in total) and multiplied by the probability of detecting a Daubenton's bat in any given moment in time (2007-2012) on any given evening, from the All-Ireland Daubenton's Bat Waterway Monitoring Scheme data. The minimum end of the range is based on a smaller estimate for river length based on Water Framework Directive Data, while the maximum end is based on data for river length classified according to average widths from the Environmental Protection Agency (EPA). Both estimates include lake perimeter data from the EPA. This population estimate uses a number of assumptions which may be only approximately correct and it could be improved with more detailed information on size and shape of detectable areas, greater knowledge of the extent of Daubenton's bat use of lakes. However, it may be considered a starting point from which to refine future estimates. See Roche et al. (2013) for further details.
2.4.4 Year or period	2007-2012
2.4.5 Method – population size	Estimate based on partial data with some extrapolation and/or modelling (2)
2.4.6 Short-term trend period	2001-2012
2.4.7 Short term trend direction	stable (0)
2.4.8 Short-term trend magnitude	min 92.65 max 104.01 confidence interval 95
2.4.9 Short-term trend method	Estimate based on partial data with some extrapolation and/or modelling (2)
2.4.10 Long-term trend period	

2.4.11 Long term trend direction	N/A
2.4.12 Long-term trend magnitude	min max confidence interval
2.4.13 Long-term trend method	N/A
2.4.14 Favourable reference population	number 57000 operator N/A unknown No method There is no evidence that the population has declined since the Directive came into force. Therefore, the Favourable Reference Population for the species is set to >57,000 for the current reporting period, which is the lower end of the estimated population range calculated for this assessment. This estimate is derived from the probability of detecting Daubenton's bat on any stretch of waterway or lake perimeter using data from the All-Ireland Daubenton's Bat Waterways Survey, Water Framework Directive river basin characterisation summary (Anon 2005) and EPA lake perimeter lengths (2012). Higher population estimates (79,000) are derived from using EPA stream order data (2012), however, this may include some streams that are insufficiently wide to support the species. Therefore, the lower of the two estimates is selected as a minimum Favourable Reference Population.
2.4.15 Reason for change	Improved knowledge/more accurate data

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	37569
2.5.2 Year or period	2000-2009
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Good
2.5.4 b) Quality of habitat - method	Habitat and roosting associations of all Irish bat species including the Daubenton’s bat, were modelled using a Maximum Entropy model by Lundy et al. (2011) to determine likelihood of occurrence in specific habitats in the Irish landscape and maternity roost preferences. This modelling was carried out using roost and bat detector location data from 2000-2009 which is stored on the Bat Conservation Ireland bat database and includes records from monitoring schemes, BATLAS 2010 and records contributed by ecologists, academics and volunteers, among others. CORINE landcover, altitude, climate data, soil pH and human bias layers were included in the model. Modelling was carried out to a 5km scale. Daubenton’s bat records were found to be associated broadly with riparian habitats, broadleaved woodland, and small amounts of urbanisation (Lundy et al., 2011). Since these habitat types are currently stable or increasing the habitat quality for the species is considered good.
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	stable (0)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	
2.5.10 Reason for change	Improved knowledge/more accurate data Use of different method

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
agricultural intensification (A02.01)	medium importance (M)	N/A
removal of hedges and copses or scrub (A10.01)	medium importance (M)	N/A
forestry clearance (B02.02)	medium importance (M)	N/A
removal of dead and dying trees (B02.04)	medium importance (M)	N/A
continuous urbanisation (E01.01)	medium importance (M)	N/A
demolishment of buildings & human structures (E06.01)	low importance (L)	N/A
reconstruction, renovation of buildings (E06.02)	medium importance (M)	N/A
Other human intrusions and disturbances (G05)	low importance (L)	N/A
tree surgery, felling for public safety, removal of roadside trees (G05.06)	medium importance (M)	N/A
closures of caves or galleries (G05.08)	low importance (L)	N/A
anthropogenic reduction of habitat connectivity (J03.02)	medium importance (M)	N/A
Pollution to surface waters (limnic & terrestrial, marine & brackish) (H01)	high importance (H)	Nitrogen input (N)
		Phosphor/Phosphate input (P)
		Mixed pollutants (X)
Light pollution (H06.02)	high importance (H)	N/A
speleology (G01.04.02)	low importance (L)	N/A
recreational cave visits (G01.04.03)	low importance (L)	N/A

2.6.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
agricultural intensification (A02.01)	medium importance (M)	N/A
removal of hedges and copses or scrub (A10.01)	medium importance (M)	N/A
forestry clearance (B02.02)	medium importance (M)	N/A
removal of dead and dying trees (B02.04)	medium importance (M)	N/A
continuous urbanisation (E01.01)	medium importance (M)	N/A
demolishment of buildings & human structures (E06.01)	low importance (L)	N/A
reconstruction, renovation of buildings (E06.02)	medium importance (M)	N/A
Other human intrusions and disturbances (G05)	low importance (L)	N/A
closures of caves or galleries (G05.08)	low importance (L)	N/A
Light pollution (H06.02)	high importance (H)	N/A
anthropogenic reduction of habitat connectivity (J03.02)	medium importance (M)	N/A
tree surgery, felling for public safety, removal of roadside trees (G05.06)	medium importance (M)	N/A
Pollution to surface waters (limnic & terrestrial, marine & brackish) (H01)	high importance (H)	Nitrogen input (N)
		Phosphor/Phosphate input (P)

		Mixed pollutants (X)
speleology (G01.04.02)	low importance (L)	N/A
recreational cave visits (G01.04.03)	low importance (L)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant Information	
2.8.3 Trans-boundary assessment	Given the mobility of this species, and in particular the tendency for seasonal movements between roosts, it is likely that bats regularly cross the border from the Republic of Ireland into Northern Ireland and vice versa. A transboundary assessment in the next reporting period would allow a fuller appreciation of the range and status of this species.

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.9.2. Population	assessment	Favourable (FV)
	qualifiers	N/A
2.9.3. Habitat	assessment	Favourable (FV)
	qualifiers	N/A
2.9.4. Future prospects	assessment	Favourable (FV)
	qualifiers	N/A
2.9.5 Overall assessment of Conservation Status	Favourable (FV)	
2.9.6 Overall trend in Conservation Status	N/A	

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	N/A		
	min		max	
3.1.2 Method used	N/A			
3.1.3 Trend of population size within	N/A			

3.2 Conservation Measures

Field label	Note
Species: 1314	**Daubenton's bat**
0.2.01 Species code	The Daubenton's bat is widespread throughout the country and is particularly associated with water-bodies. Dietz et al. (2009) note that the majority of Daubenton's bats forage over water, or in its vicinity, while individuals may also be found in other, non-aquatic, habitats. It is likely to avoid areas of turbulent water (Warren et al. 2000) but is positively associated with good water quality and macroinvertebrate diversity (Abbott et al., 2009; Langton et al., 2010). Data from the All-Ireland Daubenton's Bat Waterways Monitoring Scheme confirms that it prefers smooth to turbulent water and also indicates that the species is more likely to be found along waterways with trees present, and less likely to be present where there are street lights (Aughney et al., 2012). Lundy et al. (2011) found that it showed a preference for roosting in un-insulated structures; with bridges accounting for over 50% of its roost records on the Bat Conservation Ireland database (2000-2009 recording period). The remainder of roosts are found in buildings, with occasional records for caves and trees. Confirmed hibernacula for the species are extremely rare in Ireland. Just two records on the database are for winter months. Since 2009, several cave locations have been confirmed as swarming sites for the species, but it is unknown whether these sites also function as hibernacula for the species. However, monitoring or surveying for such species in the winter at potential hibernating sites is rarely undertaken which is, more than likely, the principal reason for the lack of such data. Modelling of Daubenton's bat records indicates that it selects areas with broadleaf woodland, riparian habitat and low density urbanization (<25%) at a local, 0.5km spatial scale. It tends to avoid areas of peatland and is negatively associated with increasing altitudes (Lundy et al., 2011).
1.1.01 Distribution map	This map was derived from the transformation of the map referred to in 1.1.4 to the LAEA projection.
1.1.02 Method used - map	The distribution map shows the location of all records collected in the 2007-2012 period. Records are from BATLAS 2010 field surveys (Carden et al. 2010) which were carried out in 10km squares across the island, All-Ireland Daubenton's Bat Waterways Monitoring Scheme (e.g. Aughney et al., 2012) & ad-hoc records collected by Bat Conservation Ireland staff and volunteers, NPWS staff, ecological consultants and academic institutions. The majority of records have been collected from bats in flight using bat detectors. This map does not include any extrapolation or modelling of the data, nor have all possible locations been surveyed for the species.
1.1.03 Year or period	This shows records for 2007-2012, collected as described for 1.1.2 above.
1.1.04 Additional distribution map	All Irish grid records were intersected with the Irish grid 10km grid map to derive this additional map.
1.1.05 Range map	Range Map has been generated using the Range Tool and is based on all records collated by BCIreland in the 2007-2012 period.

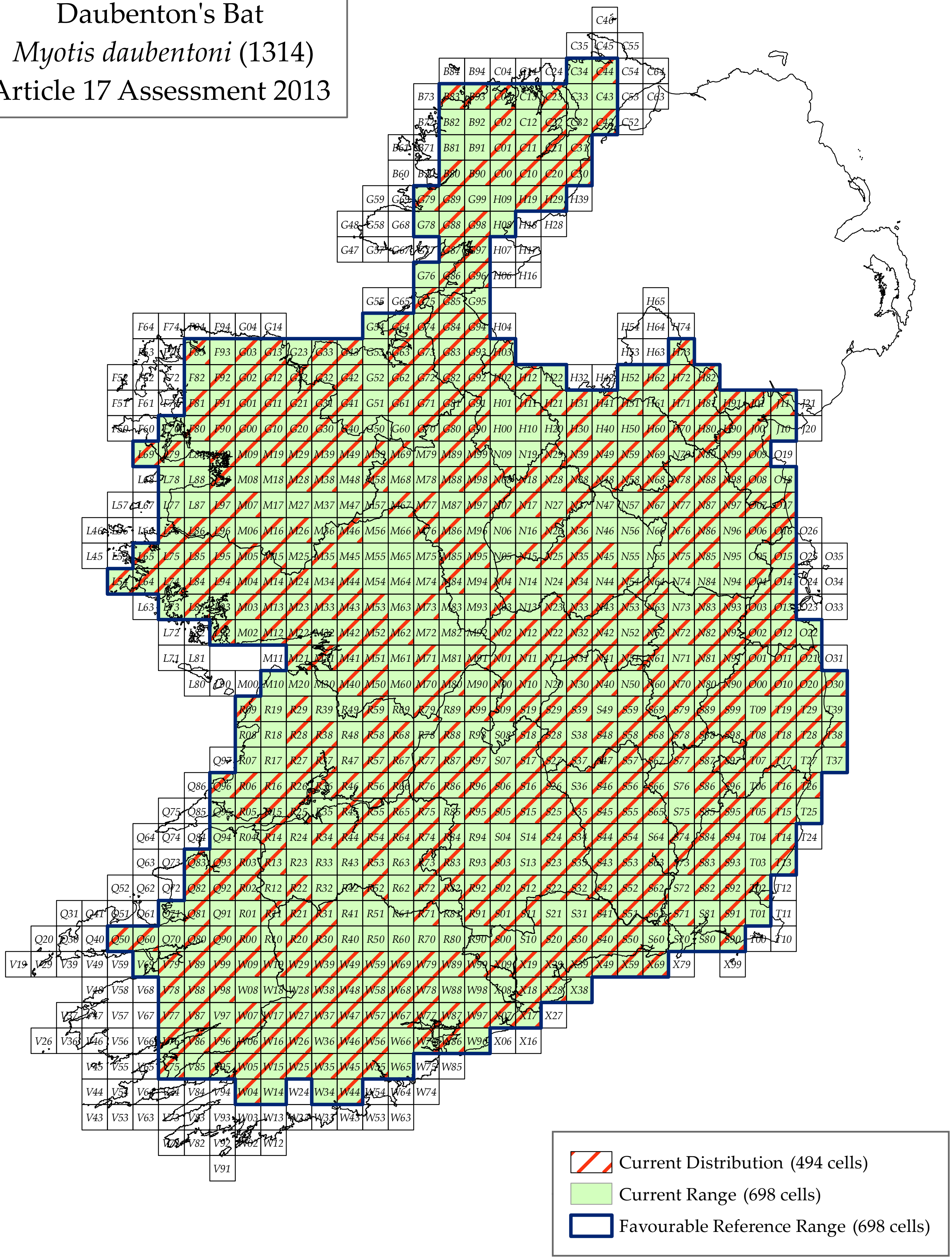
Field label	Note
Species: 1314	**Daubenton's bat**
2.2 Published sources	Published Sources. Population estimates for the island and yearly trend information for Daubenton's bat have been derived from the All-Ireland Daubenton's Bat Waterways Monitoring Scheme (Aughney et al., 2009; 2012; Aughney and Roche, 2012). This scheme collects information on relative activity levels for the species along waterways across the island from surveys carried out in August every year. Additional information on distribution was collected during the BATLAS 2010 project which involved bat detector surveys at 3-4 locations within 10km squares across the island (Carden et al., 2010). Habitat and roosting associations were modelled using a Maximum Entropy model and CORINE landscape data by Lundy et al. (2011) to determine likelihood of occurrence in specific habitats in the Irish landscape and maternity roost preferences. This modelling was carried out using roost and bat detector location data from 2000-2009 which is stored on the Bat Conservation Ireland bat database and includes records from monitoring schemes, BATLAS 2010 and records contributed by ecologists, academics and volunteers, among others. There have been relatively few field or lab-based ecological or behavioural studies published on the species in Ireland, excepting two analyses of diet by Sullivan et al,. (1993) and Flavin et al., (2001), and a comparative study of activity upstream and downstream of a sewage treatment plant (Abbott et al., 2009). Detailed information on aspects of ecology and behaviour is, therefore, inferred from studies from the UK and continental Europe.
2.3.01 Surface area - Range	The range recorded for the species for the 2007-2012 period, 69,800, is higher than that, 61200, noted for 2000-2006. This is, at least in part, due to records collected during the All-Ireland Daubenton's Bat Waterways Monitoring Scheme surveys (Aughney et al., 2009, 2012), as well as the BATLAS 2010 scheme (Carden et al., 2010) and an increase in the number of trained volunteers capable of identifying the species. In addition, a number of 10km squares were included in the range, despite not having been filled in by the Range Tool (4 x10 km squares: M55, M65, M54 and M64). This was because the species is reasonably wide ranging and suitable waterways are present in the listed squares, therefore, the filled squares do not represent a barrier to movement and include areas that are likely to be suitable for foraging Daubenton's bat.
2.3.04 Short term trend - Trend direction	Range Trend is described as stable, although more squares are covered in the current reporting period than for the 2001-2006 reporting period. This is assumed to be due to increased survey effort rather than reflecting a true range increase for the species, the All-Ireland Daubenton's Bat Monitoring Scheme indicates that the species has been stable since 2006. This trend can be inferred back to 2001.
2.3.09 a) Favourable reference range - In km2	There is no evidence of any historical decline or change since the Directive came into force. Hence, the FRR is set as the current range.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	A considerable number of records for the species has been collected since the last reporting round. Therefore, the increase in reported range is likely to be due to improved information, rather than true range increase.

Field label	Note
Species: 1314	**Daubenton's bat**
2.4.01 a) Population size estimation (using individuals or agreed exceptions where possible) - Unit	Since all Daubenton's bat roosts are not known it is not possible to count the population based on a complete census. Therefore, the population of mature (volant) individuals has been estimated using data from the Republic of Ireland from All-Ireland Daubenton's Bat Waterway Monitoring Scheme dataset. This population estimate is calculated based on the estimated detection range for echolocating Daubenton's bats (20+20m in each direction along a waterway) and the approximate length of waterway and lake perimeter across the country. The length of waterways and lake perimeters in the Republic of Ireland is divided by the approximate detectable length (40m in total) and multiplied by the probability of detecting a Daubenton's bat in any given moment in time (2007-2012) on any given evening, from the All-Ireland Daubenton's Bat Waterway Monitoring Scheme data. The minimum end of the range is based on a smaller estimate for river length based on Water Framework Directive Data, while the maximum end is based on data for river length classified according to average widths from the Environmental Protection Agency (EPA). Both estimates include lake perimeter data from the EPA. This population estimate uses a number of assumptions which may be only approximately correct and it could be improved with more detailed information on size and shape of detectable areas, greater knowledge of the extent of Daubenton's bat use of lakes. However, it may be considered a starting point from which to refine future estimates. See Roche et al. (2013) for further details.
2.4.04 Year or period	Population estimate is derived from the average probability of detecting a Daubenton's bat from the All-Ireland Daubenton's Bat Waterway Monitoring Scheme (Republic of Ireland data only) using 2007-2012 data inclusive, to correspond with the current reporting period. Also, since yearly estimates from monitoring schemes can vary considerably it was considered best practice to derive a mean from the six years of the reporting period, rather than using data from the last year of the series (Roche et al., 2013).
2.4.06 Short-term trend - Period	A 12 year window is set for short term trend, however, data is only available for this species since 2006. As there are no indications to the contrary, an assumption has been made that conditions and trends from 2001 – 2006 were also stable.
2.4.08 a) Short-term trend - Magnitude - Minimum	Trend in population of Daubenton's bat is based on data from 2007-2012. It is not expressed in change of absolute numbers since annual surveillance measures levels of activity along waterways, rather than numbers of bats. Therefore, annual trend estimates can be considered an index of activity that is likely to mirror population levels. In order to facilitate easy interpretation of this trend the base year, 2007, is set as 100 so that deviations from the base year can be easily understood and visualised. For reporting purposes, the confidence intervals are expressed as the final year upper and lower (95%) estimates. If both upper and lower intervals are less than 100 this indicates a declining trend. Increasing trends will have an upper and lower interval both greater than 100. For the Daubenton's bat Binomial General Linear Model (GLM) modelling with Generalised Additive Model (GAM) smoothing indicates that there has been a fairly stable trend since the base year, 2004. The lower 95% confidence limit of the trend encompasses the baseline, meaning that the lower interval reads as 92.65 (i.e. <100). The upper interval in 2012 was at 104.01. Therefore, the data indicates a stable trend since 2007 (see Roche et al., 2013).
2.4.08 b) Short-term trend - Magnitude - Maximum	See field 2.4.8a for explanation of trend.
2.4.09 Short-term trend - Method used	A surveillance scheme for this species has been in place since 2006. 2007-2012 data is used because a smaller dataset was available in 2006 and it is better to use a second year as the base year in a trend index. See 2.4.8a/b and Roche et al. (2013) for further details of data and extrapolations used.

Field label	Note
Species: 1314	**Daubenton's bat**
2.4.15 b) Reason for change - improved knowledge/more accurate data?	The Population for the species was set as a number of grid squares (153) for the 2001-2006 reporting period. However, substantial information has been collected since then allowing an estimate of actual population size to be made.
2.5.01 Area estimation	Habitat and roosting associations of all Irish bat species including the Daubenton's bat, were modelled using a Maximum Entropy model by Lundy et al., (2011) to determine likelihood of occurrence in specific habitats in the Irish landscape and maternity roost preferences. This modelling was carried out using roost and bat detector location data from 2000-2009 which is stored on the Bat Conservation Ireland bat database and includes records from monitoring schemes, BATLAS 2010 and records contributed by ecologists, academics and volunteers, among others. CORINE landcover, altitude, climate data, soil pH and human bias layers were included in the model. Modelling was carried out to a 5km scale. Daubenton's bat records were found to be associated broadly with riparian habitats, broadleaved woodland, and small amounts of urbanisation (Lundy et al., 2011). The area 37569km2 is derived from the model and is the estimated total core area of favourable landscape for the species for the Republic of Ireland.
2.5.02 Year or period	The Lundy et al., (2011) analysis was carried out on available bat records for the years 2000-2009 which had been collated on the BCIreland National Bat Database.
2.5.03 Method used Habitat for the species	This is calculated from Maximum Entropy modelling of bat records (2000-2009) combined with CORINE landcover, altitude, soil pH, climate and human bias layers (see Lundy et al., 2011).
2.5.04 a) Quality of the habitat - Good / moderate / bad / unknown	Habitat and roosting associations of all Irish bat species including the Daubenton's bat, were modelled using a Maximum Entropy model by Lundy et al. (2011) to determine likelihood of occurrence in specific habitats in the Irish landscape and maternity roost preferences. Daubenton's bat records were found to be associated broadly with riparian habitats, broadleaved woodland, and small amounts of urbanisation (Lundy et al. 2011). Since these habitat types are currently stable or increasing the habitat quality for the species is considered good.
2.5.06 Short-term trend - Trend direction	This estimation of habitat for the species is based on modelling of known records from 2000-2009 along with various land cover and other layers (Lundy et al., 2011). Limited data on area of occupancy from the National Bat Survey in the 1980s (O'Sullivan, 1994) suggests that there has been no losses in the area occupied by this population in the long term past (i.e. from 1985 onwards). These comparisons stretch beyond the trend period, however there is also no evidence to suggest losses since 2001. Also, there is no evidence of loss of important habitats for the species. Therefore the short term trend for area is considered to be stable. This assessment is based mainly on expert opinion.
2.5.10 b) Reason for change - improved knowledge/more accurate data?	The habitat for the species has been modelled using a Maximum Entropy method described above (Lundy et al., 2011) and the resulting core area (37569km2) is assumed to more accurately represent available and potential habitat for Daubenton's bat than the figure (61200km2) that was included for the previous reporting period.
2.5.10 c) Reason for change - use of different method (e.g. 'Range tool')?	The habitat for the species has been modelled using a Maximum Entropy method described above (Lundy et al., 2011) and the resulting core area (37569km2) is assumed to more accurately represent available and potential habitat for Daubenton's bat than the figure (61200km2) that was included for the previous reporting period.

Field label	Note
Species: 1314	**Daubenton's bat**
2.6 Main pressures - Pressure	G05 refers to pressure from deliberate disturbance to or exclusion from roosts (with or without licence). This is ranked as Low for this species as it rarely occurs in occupied buildings. Other pressures have been listed based on available literature and published research such as Daubenton’s bat preference in Ireland and the UK for unpolluted waterways (Abbott et al., 2009; Langton et al., 2010), information on the use of trees by Daubenton’s bats (e.g. BCIreland database), extrapolation from findings by Lundy et al. (2011) about areas avoided by the species such as dense urbanisation and the importance of linear landscape features (e.g. Helmer, 1983). Ranking of importance is based on expert opinion on likely impact of each pressure on the species.
2.7 Threats - Threat	As there is no evidence that the current pressures will cease they are also listed as threats.
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The range for the Daubenton’s bat is widespread across all parts of the country. Range is assessed as Favourable as there is no evidence of a decline in since the Directive came into force.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The population is estimated to be between 57,000 to 79,000 individuals. As there is no evidence of a decline in population size since the Directive came into force, population is assessed as Favourable.
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Lundy et al (2011) demonstrated that there is sufficient good quality habitat to support the long term survival of the species. There is no evidence to suggest that the extent or quality of the habitat for the species has changed in the recent past. Habitat for the species is therefore assessed as Favourable.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	While a number of pressures act on the Daubenton’s bat such as roost loss and exclusion, or vulnerability to water quality degradation, on the whole, the species is widely dispersed, occurs commonly and has widespread available suitable habitat. There is no reason to believe that the population will be threatened with debilitating losses in the future, therefore, future prospects are considered good.
2.9.05 Overall assessment of Conservation Status	Considerable survey and research has been carried out since the last assessment. BATLAS 2010 (Carden et al., 2010) provided new data for distribution and range and the All-Ireland Daubenton’s Bat Waterways Monitoring Scheme surveys (Aughney et al., 2009, 2012) have provided new figures for population size and trends. All available records from 2000-2009 were modelled with land cover and other data to assess favourable habitat types for the species across the island (Lundy et al., 2011). There is evidence for a stable population trend in the species and there is no evidence of decline in range or habitat. There is no evidence of any major pressures currently impacting populations. Future prospects are considered good. Therefore, all attributes have been assessed as Favourable.

Daubenton's Bat
Myotis daubentoni (1314)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
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Map - Léarscáil
V 1.0
Date - Dáta
27-05-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1317**
0.2.2 Species name	**Pipistrellus nathusii**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	Nathusius' pipistrelle (Ialtóg Nathusius)

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	2007-2012
1.1.4 Additional map	Yes
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published sources

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Russ, J.M. & Montgomery, W.I. (2002) Habitat association of bats in Northern Ireland: Implications for conservation. Biological Conservation 108: 49-58.

2.3 Range

2.3.1 Surface area - Range (km²)	5500	
2.3.2 Method - Range surface area	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	unknown (x)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	
	operator	N/A
	unknown	Yes
	method	Favourable Reference Range is defined as the "Range within which all significant ecological variations of the species are included …. And which is sufficiently large to allow the long term survival of the species ". The Nathusius' pipistrelle has undergone a range expansion across western Europe in recent decades (e.g. see EUROBATS national reports 2000-2010 http://www.eurobats.org/official_documents/national_reports). It is a relatively recent addition to the Irish fauna. However, the initial period of rapid expansion across Ireland has not been followed by range consolidation and the confirmation of established breeding populations. Furthermore, despite extensive field surveys (e.g. BATLAS (Carden et al 2010) and the Car Transect Surveys (Roche et al., 2012)) the species is rarely recorded and its current known distribution is restricted and disjunct. It is unclear whether further range expansion is required to provide for the long term survival of the species and consequently the Favourable Reference Range is considered to be unknown. Survey work will continue and a clearer picture of the status of this species in Ireland is expected to emerge in the coming years.
2.3.10 Reason for change	Improved knowledge/more accurate dataUse of different method	

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	number of individuals (i)			
	min	3000	max	5000	
2.4.2 Population size (other than individuals)	Unit	N/A			
	min		max		
2.4.3 Additional information	Definition of locality				
	Conversion method				
	Problems	Since all Nathusius' pipistrelle bat roosts are not known it is not possible to count the population based on a complete census. Therefore, the population of mature (volant) individuals has been estimated using data from the Car-based Bat Monitoring Scheme. This population estimate is calculated based on the detection range for echolocating Nathusius' pipistrelle bats (30-40m) and the approximate area that is detectable. The area of Ireland is divided by the approximate detectable area and multiplied by the probability of detecting a Nathusius' pipistrelle bat along any given roadside (2007-2012) on any given evening, from Car-based Bat Monitoring data. The minimum end of the range is based on the wider detection range (40m) while the maximum end is based on the closer detection range (30m). This population estimate uses a number of assumptions which may be only approximately correct and it could be improved with more detailed information on size and shape of detectable areas, greater knowledge of Nathusius' pipistrelle habitat use around roadsides and other factors. However, it may be considered a starting point from which to refine future estimates. See Roche et al. (2013) for further details.			
2.4.4 Year or period	2007-2012				
2.4.5 Method – population size	Estimate based on partial data with some extrapolation and/or modelling (2)				
2.4.6 Short-term trend period	2001-2012				
2.4.7 Short term trend direction	unknown (x)				
2.4.8 Short-term trend magnitude	min		max		confidence interval
2.4.9 Short-term trend method	Absent data (0)				
2.4.10 Long-term trend period					
2.4.11 Long term trend direction	N/A				
2.4.12 Long-term trend magnitude	min		max		confidence interval
2.4.13 Long-term trend method	N/A				
2.4.14 Favourable reference population	number				
	operator	N/A			
	unknown	Yes			
	method	Favourable Reference Population is defined as the "Population in a given region considered the minimum necessary to ensure the long-term viability of the species" (Evans & Arvela, 2011). The definition goes on to highlight the need to consider a number of factors including potential range, biological and ecological conditions, gene flow and healthy population structure. The current population			

	estimate for Nathusius' pipistrelle in Ireland is 3,000-5,000 animals. Records for the species are not restricted to the autumn, which might indicate a migratory population only (Russ et al., 2001) and yet no breeding roosts have been found in the Republic of Ireland despite extensive survey work in the last 10 years. It remains unclear whether the species is successfully reproducing in Ireland and also what level of population would be required to ensure long-term viability. Consequently, the Favourable Reference Population is considered unknown at this time.
2.4.15 Reason for change	Improved knowledge/more accurate data Use of different method

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	654
2.5.2 Year or period	2000-2009
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Good
2.5.4 b) Quality of habitat - method	Habitat and roosting associations of all Irish bat species including the Nathusius' pipistrelle bat, were modelled using a Maximum Entropy model by Lundy et al. (2011) to determine likelihood of occurrence in specific habitats in the Irish landscape. Nathusius' pipistrelle bat records were found to have a positive association with broadleaved woodland, a quadratic association with pasture (i.e. positive association to 30% cover of pasture) and a quadratic association with freshwater (i.e. positive association up to 45% cover of freshwater). Since these habitats are stable or increasing (as is the case for broadleaved woodland), habitat quality is considered good.
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	stable (0)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	8836
2.5.10 Reason for change	Improved knowledge/more accurate data Use of different method

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
removal of hedges and copses or scrub (A10.01)	medium importance (M)	N/A
forestry clearance (B02.02)	medium importance (M)	N/A
wind energy production (C03.03)	medium importance (M)	N/A
Urbanised areas, human habitation (E01)	low importance (L)	N/A
tree surgery, felling for public safety, removal of roadside trees (G05.06)	low importance (L)	N/A
Pollution to surface waters (limnic & terrestrial, marine & brackish) (H01)	medium importance (M)	Nitrogen input (N)
		Phosphor/Phosphate input (P)
		Mixed pollutants (X)
demolishment of buildings & human structures (E06.01)	medium importance (M)	N/A
reconstruction, renovation of buildings (E06.02)	medium importance (M)	N/A
Other human intrusions and disturbances (G05)	medium importance (M)	N/A

2.6.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
removal of hedges and copses or scrub (A10.01)	medium importance (M)	N/A
forestry clearance (B02.02)	medium importance (M)	N/A
wind energy production (C03.03)	medium importance (M)	N/A
Urbanised areas, human habitation (E01)	low importance (L)	N/A
demolishment of buildings & human structures (E06.01)	medium importance (M)	N/A
reconstruction, renovation of buildings (E06.02)	medium importance (M)	N/A
Other human intrusions and disturbances (G05)	medium importance (M)	N/A
tree surgery, felling for public safety, removal of roadside trees (G05.06)	low importance (L)	N/A
Pollution to surface waters (limnic & terrestrial, marine & brackish) (H01)	medium importance (M)	Nitrogen input (N)
		Phosphor/Phosphate input (P)
		Mixed pollutants (X)

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant Information	
2.8.3 Trans-boundary assessment	Given the mobility of this species, and in particular the tendency for seasonal movements between roosts, it is likely that bats regularly cross the border from the Republic of Ireland into Northern Ireland and vice versa. A transboundary assessment in the next reporting period would allow a fuller appreciation of the range and status of this species.

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment Unknown (XX) qualifiers N/A
2.9.2. Population	assessment Unknown (XX) qualifiers N/A
2.9.3. Habitat	assessment Favourable (FV) qualifiers N/A
2.9.4. Future prospects	assessment Unknown (XX) qualifiers N/A
2.9.5 Overall assessment of Conservation Status	Unknown (XX)
2.9.6 Overall trend in Conservation Status	N/A

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

3.1.1 Population Size	Unit	N/A		
	min		max	
3.1.2 Method used	N/A			
3.1.3 Trend of population size within	N/A			

3.2 Conservation Measures

Field label	Note
Species: 1317	**Nathusius' pipistrelle**
0.2.01 Species code	The soprano pipistrelle can easily be confused with the common pipistrelle. The most reliable way to separate these two species is in flight. The two species emit echolocation calls at slightly different peak frequencies. The soprano pipistrelle is widespread and common, and it is one of Ireland's smallest mammals. Roost records for the soprano pipistrelle are mainly from buildings. According to Lundy et al. (2011) the soprano pipistrelle favours buildings constructed from brick. It is occasionally recorded roosting in trees, bat boxes and under bridges. The mean size of soprano pipistrelle roosts recorded in Ireland is 100 and the largest known bat roosts on the island are for this species. Roosts with more than 1,500 individuals have been recordec The species has rarely been found in hibernation in winter. To date, there is only one record of an individual tucked into a crevice in stonework. The soprano pipistrelle is adaptable in its use of foraging habitats although some studies suggest that it favours riparian habitats for foraging more than the common pipistrelle. It can also be found in urban settings, albeit in relatively low numbers.
1.1.01 Distribution map	This map was derived from the transformation of the map referred to in 1.1.4 to the LAEA projection.
1.1.02 Method used - map	Distribution map shows location of all records collected in the 2007-2012 period. Records have been derived from BATLAS 2010 field surveys (Carden et al. 2010) which were carried out in 10km squares across the island, car-based bat monitoring data (e.g Roche et al., 2011) & ad-hoc records collected by Bat Conservation Ireland staff and volunteers, NPWS staff, ecological consultants and academic institutions. The majority of records have been collected using bat detectors from bats in flight. This map does not include any extrapolation or modelling of the data, nor have all possible locations been surveyed for the species.
1.1.03 Year or period	This shows records for 2007-2012, collected as described for 1.1.2 above.
1.1.04 Additional distribution map	All Irish grid records were intersected with the Irish grid 10km grid map to derive this additional map.
1.1.05 Range map	Range Map has been generated using the Range Tool and is based on all records collated by BCIreland in the 2007-2012 period.
2.2 Published sources	Population estimates for the island and yearly trend information for the soprano pipistrelle have been derived from car-based bat monitoring (Roche et al., 2009; 2011; 2012). This scheme collects information on relative activity levels for the species along roadsides across the island from surveys carried out in July and August every year. Information on distribution was collected during the BATLAS 2010 project which involved bat detector surveys at 3-4 locations within 10km squares across the island (Carden et al., 2010). Habitat and roosting associations were modelled using a Maximum Entropy model and CORINE landscape data by Lundy et al. (2011) to determine likelihood of occurrence in specific habitats in the Irish landscape and maternity roost preferences. This modelling was carried out using roost and bat detector location data from 2000-2009 which is stored on the Bat Conservation Ireland bat database and includes records from monitoring schemes, BATLAS 2010 and records contributed by ecologists, academics and volunteers, among others. There have been no detailed field or lab-based ecological or behavioural studies published on the specie in Ireland, detailed information on feeding and other behaviours is, therefore, inferred from studies from the UK and continental Europe.
2.3.01 Surface area - Range	The range of 74,100km2 is based on distribution records for 606 x 10km cells collected between 2007 and 2012 (see 1.1.1). The Range Tool was run on this data with gap closure set at 20km.

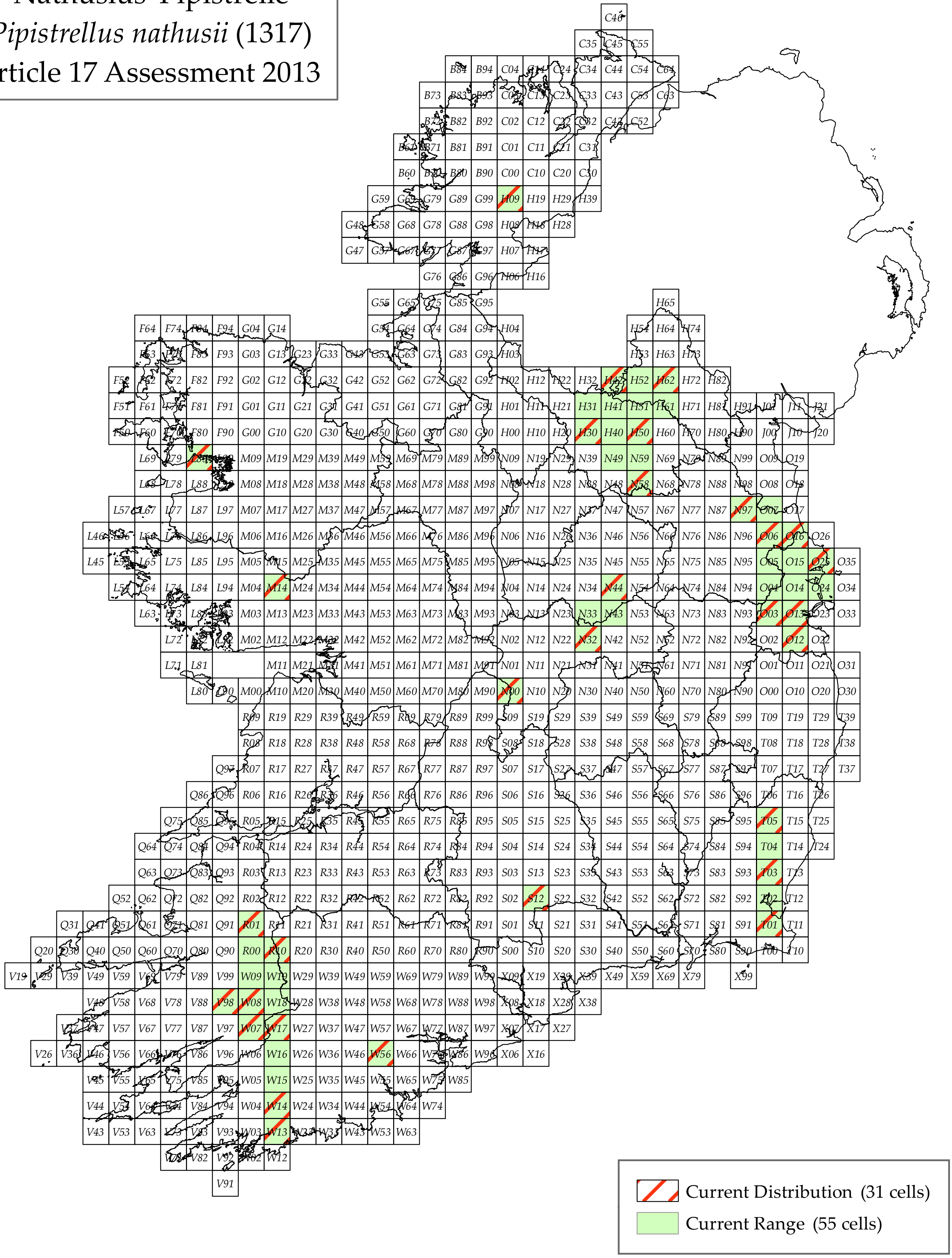
Species: 1317 Nathusius' pipistrelle

2.3.04 Short term trend - Trend direction	Range Trend is described as stable, although more squares are covered in the current reporting period than for the 2001-2006 reporting period. This may simply be due to increased survey effort rather than a true range increase for the species. The Car-based Bat Monitoring Scheme indicates that the species has been increasing since 2004. Insufficient information is available to determine whether this increasing trend has resulted in an expanded range or not, it may simply be due to improved information. Therefore 0 or Stable has been selected since it is, at the very least, stable at present.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	The apparent increase in range since 2007 is thought to be largely explained by the availability of better data, rather than true range increase. A considerable number of new records for the species have been collected since the last reporting round (e.g. Roche et al., 2012; Carden et al. 2010) providing a better reflection of true range.
2.4.01 a) Population size estimation (using individuals or agreed exceptions where possible) - Unit	Since all soprano pipistrelle bat roosts are not known it is not possible to count the population based on a complete census. Therefore, the population of mature (volant) individuals has been estimated using data from the Car-based Bat Monitoring Scheme. This population estimate is calculated based on the detection range for echolocating soprano pipistrelle bats (20-30m) and the approximate area that is detectable. The area of Ireland is divided by the approximate detectable area and multiplied by the probability of detecting a common pipistrelle bat along any given roadside (2007-2012) on any given evening, from Car-based Bat Monitoring data. The minimum end of the range is based on the wider detection range (30m) while the maximum end is based on the closer detection range (20m). This population estimate uses a number of assumptions which may be only approximately correct and it could be improved with more detailed information on size and shape of detectable areas, greater knowledge of soprano pipistrelle habitat use around roadsides and other factors. However, it may be considered a starting point from which to refine future estimates. See Roche et al. (2013) for further details.
2.4.04 Year or period	Population estimate is derived from the average probability of detecting a soprano pipistrelle bat from Car-based Bat Monitoring using 2007-2012 data inclusive, to correspond with the current reporting period. Also, since yearly estimates from monitoring schemes can vary considerably it was considered best practice to derive a mean from the six years of the reporting period, rather than using data from the last year of the series (Roche et al., 2013).
2.4.06 Short-term trend - Period	2004-2012 data is used because a smaller dataset was available in 2003 and it is better to use a second year as the base year in a trend index.
2.4.08 a) Short-term trend - Magnitude - Minimum	Trend in population of soprano pipistrelle bat is not expressed in change of absolute numbers since annual surveillance measures levels of activity along roadsides, rather than numbers of bats. Therefore, annual trend estimates can be considered an index of activity that is likely to mirror population levels. In order to facilitate easy interpretation of this trend the base year, 2004, is set as 100 so that deviations from the base year can be easily understood and visualised. For reporting purposes, the confidence intervals are expressed as the final year upper and lower (95%) estimates. If both upper and lower intervals are less than 100 this indicates a declining trend. Increasing trends will have an upper and lower interval both greater than 100. For the soprano pipistrelle General Linear Model (GLM) modelling with Generalised Additive Model (GAM) smoothing indicates that there has been a close to significant upwards trend since the base year, 2004. The lower 95%confidence limit of the trend only just encompasses the baseline, meaning that the lower interval reads as 99.2 (i.e. <100). The upper interval in 2012 was at 187. Therefore, the soprano pipistrelle appears to be increasing, but the increase is not quite significant at a 95% level (see Roche et al., 2013).
2.4.08 b) Short-term trend - Magnitude - Maximum	See 2.4.8a for explanation of population trend calculations.

Field label	Note
Species: 1317	**Nathusius' pipistrelle**
2.4.15 b) Reason for change - improved knowledge/more accurate data?	The Population for the species was set as a number of grid squares for the 2001-2006 reporting period. However, substantial information has been collected since then allowing an estimate of actual population size to be made.
2.4.15 c) Reason for change - use of different method	The Population for the species was set as a number of grid squares for the 2001-2006 reporting period. However, substantial information has been collected since then allowing an estimate of actual population size to be made (see Roche et al. 2013 for full details).
2.5.01 Area estimation	Habitat and roosting associations of all Irish bat species including the soprano pipistrelle bat, were modelled using a Maximum Entropy model by Lundy et al. (2011) to determine likelihood of occurrence in specific habitats in the Irish landscape and maternity roost preferences. This modelling was carried out using roost and bat detector location data from 2000-2009 which is stored on the Bat Conservation Ireland bat database and includes records from monitoring schemes, BATLAS 2010 and records contributed by ecologists, academics and volunteers, among others. CORINE landcover, altitude, climate data, soil pH and human bias layers were included in the model. Modelling was carried out to a 5km scale. Soprano pipistrelle bat records were found to be associated broadly with broadleaved woodland, riparian habitats and small amounts of urbanisation (Lundy et al. 2011). The area 57452km2 is derived from the model and is the estimated total core area of favourable landscape for the species for the Republic of Ireland.
2.5.02 Year or period	The Lundy et al (2011) analysis was carried out on available bat records for the years 2000-2009 which had been collated on the BCIreland National Bat Database.
2.5.03 Method used Habitat for the species	This is calculated from Maximum Entropy modelling of bat records (2000-2009) combined with CORINE landcover, altitude, soil pH, climate and human bias layers (see Lundy et al. 2011).
2.5.06 Short-term trend - Trend direction	This estimation of habitat for the species is based on modelling of known records from 2000-2009 along with various land cover and other layers (Lundy et al. 2011). Limited data on area of occupancy from the National Bat Survey in the 1980s (O'Sullivan 1994) suggests that there has been no losses in the area occupied by this population in the long term past (i.e. from 1985 onwards), even though the common and soprano pipistrelle were not distinguished at the time. These comparisons stretch beyond the trend period, however there is also no evidence to suggest losses since 2000. Also, there is no evidence of loss of important habitats for the species. Therefore the short term trend for habitat area is considered to be stable. This assessment is based mainly on expert opinion.
2.5.10 b) Reason for change - improved knowledge/more accurate data?	The habitat for the species has been modelled using a Maximum Entropy method described above (Lundy et al., 2011) and the resulting core area (57452) is assumed to more accurately represent available and potential habitat for the soprano pipistrelle than the higher figure (64000) that was included for the previous reporting period.
2.5.10 b) Reason for change - improved knowledge/more accurate data?	The habitat for the species has been modelled using a Maximum Entropy method described above (Lundy et al., 2011) and the resulting core area (57452km2) is assumed to more accurately represent available and potential habitat for the soprano pipistrelle than the higher figure (64000km2) that was included for the previous reporting period.
2.5.10 c) Reason for change - use of different method (e.g. 'Range tool')?	The habitat for the species has been modelled using a Maximum Entropy method described above (Lundy et al., 2011) and the resulting core area (57452) is assumed to more accurately represent available and potential habitat for the soprano pipistrelle than the higher figure (64000) that was included for the previous reporting period.

Field label	Note
Species: 1317	**Nathusius' pipistrelle**
2.6 Main pressures - Pressure	G05 refers to pressure from deliberate disturbance to or exclusion from roosts (with or without licence). Other pressures have been listed based on available literature and published research such as Eurobats guidelines for windfarms (Rodrigues et al. 2008), information on the use of trees by roosting soprano pipistrelle bats (e.g. BCIreland database), extrapolation from findings by Lundy et al. (2011) about areas avoided by the species such as dense urbanisation, and information on important habitats from studies overseas (e.g. Davidson-Watts et al., 2006), the importance of linear landscape features (e.g. Boughey et al., 2011) and observed detrimental impact of major roads (Berthinussen and Altringham, 2012). Ranking of importance is based on expert opinion on likely impact of each pressure on the species.
2.7 Threats - Threat	As there is no evidence that the current pressures will cease they are also listed as threats. Ranking of importance is based on expert opinion on likely impact of each threat on the species.
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The soprano pipistrelle is the most widespread of all our bat species and is found throughout the country. Range is not lower than the favourable reference value and is stable. It is assessed as Favourable.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The favourable reference value falls within the current population estimate of 502,000 to 1,129,000 individuals. Indications are that population has increased. It is assessed as Favourable.
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Lundy et al. (2011) demonstrated that there is sufficient good quality habitat to support the long term survival of the species. There is no evidence to suggest that the extent or quality of the habitat for the species has changed in the recent past. Habitat for the species is therefore assessed as Favourable.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	While a number of pressures act on the soprano pipistrelle such as roost loss and exclusion, or vulnerability in the vicinity of large motorways, on the whole, the species is widely dispersed, occurs commonly, is adaptable and has widespread available suitable habitat. There is no reason to believe that the population will be threatened with debilitating losses in the future, therefore, future prospects are considered good.
2.9.05 Overall assessment of Conservation Status	Considerable survey and research has been carried out since the last assessment. BATLAS 2010 (Carden et al., 2010) provided new data for distribution and range. Continued Car-based Bat Monitoring has provided new figures for population size and trends (Roche et al., 2012; Roche et al., 2013). All available records from 2000-2009 were modelled with land cover and other data to assess favourable habitat types for the species across the island (Lundy et al., 2011). There is evidence for a short term recent increase in the species and there is no evidence of decline in range or habitat. There is no evidence of any major pressures currently impacting populations. Future prospects are considered good. Therefore, all attributes have been assessed as Favourable.

Nathusius' Pipistrelle
Pipistrellus nathusii (1317)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 10 20 30 40 50 km

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Map - Léarscáil
V 1.0
Date - Dáta
27-05-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1320**
0.2.2 Species name	**Myotis brandtii**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	Brandt's bat (ialtóg Brandt)

1. National Level

1.1 Maps

1.1.1 Distribution Map	No
1.1.1a Sensitive species	No
1.1.2 Method used - map	N/A
1.1.3 Year or period	
1.1.4 Additional map	No
1.1.5 Range map	No

2. Biogeographical Or Marine Level

2.1 Biogeographical Region	**Atlantic (ATL)**
2.2 Published sources	

2.3 Range

2.3.1 Surface area - Range (km²)		
2.3.2 Method - Range surface area	N/A	
2.3.3 Short-term trend period		
2.3.4 Short-term trend direction	N/A	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	
	operator	N/A
	unknown	No
	method	
2.3.10 Reason for change		

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit N/A	
	min	max
2.4.2 Population size (other than individuals)	Unit N/A	
	min	max
2.4.3 Additional information	Definition of locality	
	Conversion method	
	Problems	
2.4.4 Year or period		
2.4.5 Method – population size	N/A	
2.4.6 Short-term trend period		
2.4.7 Short term trend direction	N/A	

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

2.4.8 Short-term trend magnitude	min	max	confidence interval
2.4.9 Short-term trend method	N/A		
2.4.10 Long-term trend period			
2.4.11 Long term trend direction	N/A		
2.4.12 Long-term trend magnitude	min	max	confidence interval
2.4.13 Long-term trend method	N/A		
2.4.14 Favourable reference population	number		
	operator	N/A	
	unknown	No	
	method		
2.4.15 Reason for change			

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km^2)	
2.5.2 Year or period	
2.5.3 Method used - habitat	N/A
2.5.4 a) Quality of habitat	
2.5.4 b) Quality of habitat - method	
2.5.5 Short term trend period	
2.5.6 Short term trend direction	N/A
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km^2)	
2.5.10 Reason for change	

2.6 Main Pressures

2.6.1 Method used – pressures	N/A

2.7 Main Threats

2.7.1 Method used – threats	N/A

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends

2.8.2 Other relevant Information

Whiskered and Brandt's bats are cryptic species and can only be told apart using DNA techniques. Brand't bat (Myotis brandtii) has been confirmed only once from Ireland; a single specimen found in 2003 in Wicklow (Mullen, 2006). Following this discovery, an intensive re-survey, involving DNA testing, was undertaken of all known whiskered bat roosts in Ireland, by the Centre for Irish Bat Research. Woodland mist-netting was also conducted for the species. Despite the extensive survey-work, no further Brandt's bats were identified. The most recent Red Data List for Irish Mammals (Marnell et al. 2009) lists Brandt's bat as data deficient. There is no evidence of any roosts for this species in the country and at present the single record for the species is considered an anomaly. Boston et al (2010) concluded that “M. brandtii …. cannot currently be considered a resident species."

This species is now considered a vagrant to the country and consequently, a detailed assessment has not been carried out.

Boston, E.S.M., Buckley, D., Bekaert, M.,Gager, Y., Lundy, M., Scott, D.D.,

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Marnell, F., Kingston, N. and Looney, D. (2009) Ireland Red List, 3: Terrestrial mammals. National Parks & Wildlife Service, Department of Environment, Heritage & Local Government, Dublin.
Mullen, E. 2006. Brandt's bat Myotis brandtii in Co. Wicklow. Irish Naturalist Journal, 28: 343.

2.8.3 Trans-boundary assessment

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment	N/A
	qualifiers	N/A
2.9.2. Population	assessment	N/A
	qualifiers	N/A
2.9.3. Habitat	assessment	N/A
	qualifiers	N/A
2.9.4. Future prospects	assessment	N/A
	qualifiers	N/A
2.9.5 Overall assessment of Conservation Status	N/A	
2.9.6 Overall trend in Conservation Status	N/A	

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	N/A		
	min		max	
3.1.2 Method used	N/A			
3.1.3 Trend of population size within	N/A			

3.2 Conservation Measures

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1322**
0.2.2 Species name	**Myotis nattereri**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	Natterer's bat (Ialtóg Natterer)

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	2001-2012
1.1.4 Additional map	Yes
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published sources

Carden, R., Aughney, T., Kelleher, C. and Roche, N. (2010) Irish Bat Monitoring Schemes: BATLAS Republic of Ireland, Report for 2008-2009. Unpublished Report. Bat Conservation Ireland. http://www.batconservationireland.org/pubs/reports/BATLAS2010_FinalReport.pdf
Casey, J. and Ryan. M. (2012) Situation and outlook for forestry 2011/2012. Forestry Development Department, Teagasc, Athenry, Co. Galway. http://www.teagasc.ie/forestry/docs/advice/Teagasc_Situation_Outlook_Forestry_2012.pd
CIBR (in prep) Ecology and genetics of Myotis spp. Natterer's, whiskered and Brandt's bats in Ireland. Centre for Irish Bat Research report to NPWS. www.npws.ie/publications/archive
Dietz, C., von Helverson, O. and Wolz, I. (2009) Bats of Britain, Europe and Northwest Africa. A&C Black Publishers, London. 400pp.
Lundy, M.G., Aughney, T., Montgomery, W.I., & Roche, N. (2011) Landscape conservation for Irish bats & species specific roosting characteristics. Unpublished Report. Bat Conservation Ireland. http://www.batconservationireland.org/pubs/reports/Landscape_Conservation_Irish_Bats.pdf
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Russ, J.M. & Montgomery, W.I. (2002) Habitat association of bats in Northern Ireland: Implications for conservation. Biological Conservation 108: 49-58.
Sheil, C.B., McAney C.M., and Fairley J.S. (1991) Analysis of the diet of Natterer's bat Myotis nattereri and the common long-eared bat Plecotus auritus in the west of Ireland. Journal of Zoology 223: 299-305.
Smiddy, P. (1991). Bats and Bridges. Irish Naturalists' Journal. Vol. 23: 425-426.

2.3 Range

2.3.1 Surface area - Range (km²)	37900	
2.3.2 Method - Range surface area	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	37900
	operator	N/A
	unknown	No
	method	The current range is also taken as the Favourable reference range. Extensive survey and research on this species during the current reporting period (CIBR in prep) has provided a much better understanding of its distribution. Although present throughout the country, this is not a common species. The current range, though disjunct, is considered to cover any ecological variation in the species in Ireland and appears to be sufficiently large to allow the long-term survival of the species.
2.3.10 Reason for change	Improved knowledge/more accurate data	

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	N/A		
	min		max	
2.4.2 Population size (other than individuals)	Unit	number of map 10x10 km grid cells (grids10x10)		
	min	379	max	379
2.4.3 Additional information	Definition of locality			
	Conversion method			
	Problems	This species roosts in small numbers making monitoring based on roost counts unviable. Furthermore, bat detector records of this species are very difficult to tell apart from other Myotis species. Until an effective method of population assessment is		

developed, the number of 10km grid cells is used as a proxy for population.

2.4.4 Year or period	2001-2012
2.4.5 Method – population size	Estimate based on partial data with some extrapolation and/or modelling (2)
2.4.6 Short-term trend period	2001-2012
2.4.7 Short term trend direction	stable (0)
2.4.8 Short-term trend magnitude	min max confidence interval
2.4.9 Short-term trend method	Estimate based on expert opinion with no or minimal sampling (1)
2.4.10 Long-term trend period	
2.4.11 Long term trend direction	N/A
2.4.12 Long-term trend magnitude	min max confidence interval
2.4.13 Long-term trend method	N/A
2.4.14 Favourable reference population	number 379 operator N/A unknown No method The current population, using the number of 10km grid cells as a proxy, is considered to be large enough to maintain the long term viability of the species and is taken as the favourable reference population.
2.4.15 Reason for change	Improved knowledge/more accurate data Use of different method

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	37900
2.5.2 Year or period	2001-2012
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Good
2.5.4 b) Quality of habitat - method	Based on a knowledge of the habitat requirements of the species and expert judgement.
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	increase (+)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	52864
2.5.10 Reason for change	Improved knowledge/more accurate data

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
agricultural intensification (A02.01)	medium importance (M)	N/A
Forest and Plantation management & use (B02)	medium importance (M)	N/A
continuous urbanisation (E01.01)	low importance (L)	N/A
diffuse pollution to surface waters due to agricultural and forestry activities (H01.05)	low importance (L)	N/A
Light pollution (H06.02)	medium importance (M)	N/A
demolishment of buildings & human structures (E06.01)	medium importance (M)	N/A
Other human intrusions and disturbances (G05)	medium importance (M)	N/A
roads, motorways (D01.02)	medium importance (M)	N/A

2.6.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
agricultural intensification (A02.01)	medium importance (M)	N/A
Forest and Plantation management & use (B02)	medium importance (M)	N/A
continuous urbanisation (E01.01)	low importance (L)	N/A
demolishment of buildings & human structures (E06.01)	medium importance (M)	N/A
diffuse pollution to surface waters due to agricultural and forestry activities (H01.05)	low importance (L)	N/A
Light pollution (H06.02)	medium importance (M)	N/A
Other human intrusions and disturbances (G05)	medium importance (M)	N/A
roads, motorways (D01.02)	medium importance (M)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant Information	
2.8.3 Trans-boundary assessment	Given the mobility of this species, and in particular the tendency for seasonal movements between roosts, it is likely that bats regularly cross the border from the Republic of Ireland into Northern Ireland and vice versa. A transboundary assessment in the next reporting period would allow a fuller appreciation of the range and status of this species.

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.9.2. Population	assessment	Favourable (FV)
	qualifiers	N/A
2.9.3. Habitat	assessment	Favourable (FV)
	qualifiers	N/A
2.9.4. Future prospects	assessment	Favourable (FV)
	qualifiers	N/A
2.9.5 Overall assessment of Conservation Status	Favourable (FV)	
2.9.6 Overall trend in Conservation Status	N/A	

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	N/A		
	min		max	
3.1.2 Method used	N/A			
3.1.3 Trend of population size within	N/A			

3.2 Conservation Measures

Article 17 - SPECIES NOTES

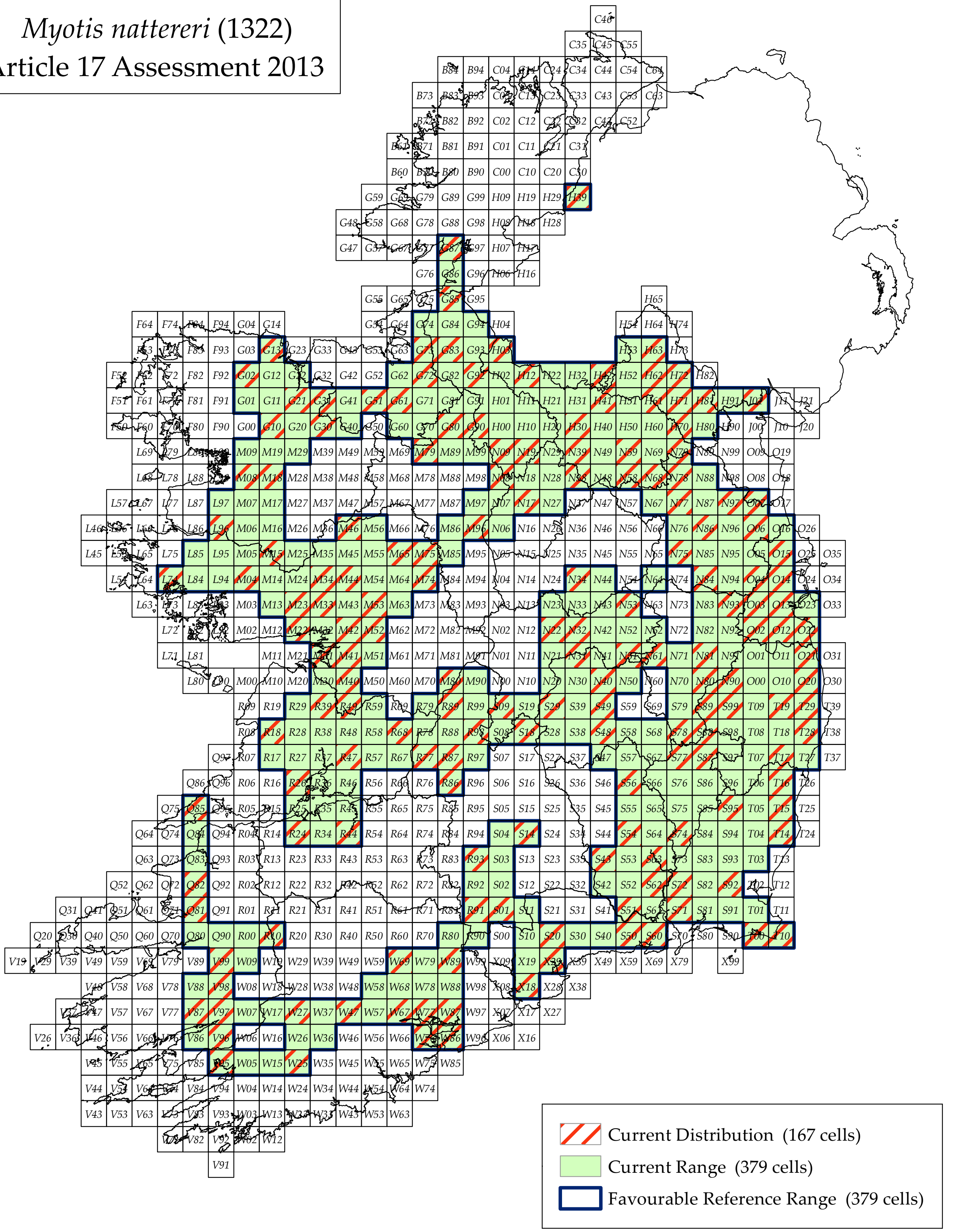
Field label	Note
Species: 1322	**Natterer's bat**
0.2.01 Species code	The Natterer's bat is widespread across Europe and found from Portugal and north-west Africa to the Urals and the near East (Mitchell-Jones et al., 1999). It is also widely distributed in Ireland, but seldom recorded (McAney, 2006; NPWS, 2007). Summer roosts are normally in buildings. Usually only small numbers of bats are present, often between rafters and felt and other narrow spaces where they are difficult to locate. Bridge roosts are also known (Smiddy, 1991). Larger roosts (>50 bats) have been found in Church of Ireland churches (McAney, 2006). Recent surveys of swarming roosts have also located this species (CIBR in prep). In winter individuals have been observed in bridges, mines and caves (McAney, 1994; 1997). This bat gleans most of its prey from foliage, rather than catching it in the air (Shiel et al., 1991). Woodland habitats and river corridors appear to be favoured for foraging (Mitchell-Jones et al., 1999; Lundy et al. 2011). Further work on the ecology and roosting behaviour of this species is required to determine whether it is at risk from specific threats. However, woodland management and building and bridge renovations are potential threats.
1.1.01 Distribution map	This map was derived from the transformation of the map referred to in 1.1.4 to the LAEA projection.
1.1.02 Method used - map	The distribution map shows the location of all records collected in the 2001-2012 period. Records are from the Centre for Irish Bat Research field surveys, BATLAS 2010 field surveys (Carden et al. 2010) which were carried out in 10km squares across the island and ad-hoc records collected by Bat Conservation Ireland staff and volunteers, NPWS staff, ecological consultants and academic institutions. The majority of records have been collected from bats roosts, including swarming roosts. This map does not include any extrapolation or modelling of the data, nor have all possible locations been surveyed for the species.
1.1.04 Additional distribution map	All records were intersected with the Irish 10km grid map to derive the additional map.
2.3.01 Surface area - Range	Range has been calculated by running the Range tool on the 167 x 10km cells containing distribution records from 2001-2012, with gap closure set at 20km.
2.3.04 Short term trend - Trend direction	Significantly more distribution data is available now for this species compared to the last reporting period, allowing range to be plotted at the 10km level. 167 x 10km cells are plotted this time, compared to 59 x 20km cells in 2007. However, the spread of records is very similar, with no records along the western seaboard or most of Donegal. Overall the trend in Range appears to have remained relatively stable.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	The Range in the last assessment was reported as 54,000km2 based on a 20km cell grid. The Current Range of 37,900km2 is based on more data, plotted at a finer scale, and is thought to be better reflect the true range of the species in Ireland.
2.4.02 a) Population size estimation (using population unit other than individuals) - Unit	The number of 10km grid cells in the Range is used as a proxy for population.
2.4.07 Short-term trend - Trend direction	CIBR (2011) were able to re-locate many of the original Natterer's maternity roosts identified by O'Sullivan (1994). Although some roosts had been lost and a direct comparison of numbers is not possible due to differences in methods used, it was clear that good numbers of bats had been maintained in most roosts, with some increasing in size. Overall, given no signs to the contrary, population trend is assessed as stable.

Field label	Note
Species: 1322	**Natterer's bat**
2.4.15 b) Reason for change - improved knowledge/more accurate data?	Population in the last assessment was based on the data for 59 grid cells. For this assessment, distribution data for 167 cells is available reflecting the significant increase in survey effort put into this species during the current reporting period.
2.4.15 c) Reason for change - use of different method	A 20km grid cell was used in last reporting period. A 10km grid cell is being used this time. This difference in approach has produced a smaller, but more accurate representation of the range, and by extension the population, of the species.
2.5.01 Area estimation	The area of the range is taken as the area of habitat for the species.
2.5.06 Short-term trend - Trend direction	Broadleaf woodland, mixed forests and pasture have been identified as the main habitats for Natterer's bat in Ireland (Lundy et al, 2011). Given that woodland habitats are, in general, increasing (Casey & Ryan, 2012) and that pasture is likely to be stable, bat habitat overall is assessed as increasing.
2.5.09 Area of suitable habitat for the species (km2)	Lundy et al. (2011) examined the habitat associations of Natterer's bat using maximum entropy models. They calculated the extent of habitat suitable for this species ("core favourable area") as 52,864km2.
2.5.10 b) Reason for change - improved knowledge/more accurate data?	A 20km grid cell was used in last reporting period. A 10km grid cell is being used this time. This difference in approach has produced a smaller, but more accurate representation of the range, and by extension the area of habitat, for the species.
2.6 Main pressures - Pressure	Pressures impacting on Natterer's bats can be divided into those affecting roosts and those reducing the quality of their foraging habitat. The former include the renovation/demolition of buildings used as summer roosts (E.06.01) or disturbance/exclusion of roosts from same (G05). The repair of road bridges over rivers (D01.02) is also a concern, as this species will roost in bridge crevices. Given that riparian habitats provide important foraging for this species, water quality is listed as a pressure. Mixed woodlands also provide important foraging habitat for these bats; unsympathetic management practises can have significant negative impacts (B.02). Continuous urban areas are avoided by this species as are areas of flood-lights or street lighting.
2.7 Threats - Threat	The current pressure are considered likely to continue into the future.
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The current range of the species is stable and is not smaller than the favourable reference range. This parameter is considered to be in favourable condition.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The current population is equal to the favourable reference population and is considered to be large enough to maintain the long term viability of the species. This parameter is considered to be favourable.
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	This bat uses a range of habitats including woodlands and pastures. These habitats are widespread and increasing. Overall habitat is considered Favourable.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	This species faces a number of threats in the coming years. Continued liaison with Coillte and the Forest Service will be important given the reliance on woodland habitats for foraging. Close cooperation with local authorities and the OPW with regard to bridge repairs will also remain critical. A growing awareness of bat protection and good working relations with these organisations indicate that these threats can be managed. Overall, Future Prospects are considered Favourable.
2.9.05 Overall assessment of Conservation Status	The Natterer's bat has a disjunct distribution, but its range and population are in a good condition and the area of suitable habitat appears to be increasing. Further work is required to establish a robust monitoring method for this species and protection for important swarming sites (e.g. as NHAs) should be considered. Overall, however, the conservation status of this species is considered favourable.

Natterer's bat

Myotis nattereri (1322)

Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 10 20 30 40 50 km

N
Map - Léarscáil
V 1.0
Date - Dáta
17-06-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1326**
0.2.2 Species name	**Plecotus auritus**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	Brown long-eared bat (Ialtóg fhad-chluasach)

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	2001-2012
1.1.4 Additional map	Yes
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published sources

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Roche, N., Aughney, T. and Langton, S. (2013) Population estimates, trends and background information for six Irish bat species: Article 17 2007-2012 supporting document. Report submitted to the National Parks and Wildlife Service by Bat Conservation Ireland.
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Sheil, C.B., McAney C.M., and Fairley J.S. (1991) Analysis of the diet of Natterer's bat Myotis nattereri and the common long-eared bat Plecotus auritus in the west of Ireland. Journal of Zoology 223: 299-305.
Swift, S.M. (1998). Long-eared Bats. T & AD Poyser Natural History, London. 182pp.

2.3 Range

2.3.1 Surface area - Range (km²)	60600	
2.3.2 Method - Range surface area	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	60600
	operator	N/A
	unknown	No
	method	The Favourable Reference Range has been set to the range for the present reporting period (60600 km2) as there is no evidence of decline since the Directive came into force but the previous reporting round (2001-2006) is thought to have overestimated the range for the species (66800km2). The distribution of the brown long-eared bat is widespread across the country, indicating sufficient availability of roosts and adaptability to foraging in a range of woodland, scrub and hedgerow habitats. There is also no reason to assume that the area is not large enough to allow the long term survival of the species.
2.3.10 Reason for change	Improved knowledge/more accurate dataUse of different method	

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	number of individuals (i)		
	min	62000	max	97000
2.4.2 Population size (other than individuals)	Unit	N/A		
	min		max	

2.4.3 Additional information	Definition of locality	
	Conversion method	
	Problems	Since all brown long-eared bat roosts are not known it is not possible to count the population based on a complete census. Therefore, the population of mature (volant) individuals has been estimated using roost count data from the Republic of Ireland. The median roost number and mean roost number from all roost count data recorded to the Bat Conservation Ireland database from 2000-2009 is used as the basis of this population estimate. This includes data from the Brown Long-eared Bat Roost Monitoring Scheme as well as ad-hoc roost records. The average foraging distance observed by Entwistle et al. (1996) from Scottish roosts is used to determine average area used by individuals around a roost, in absence of similar data for Ireland. The modelled core area for the species in the Republic of Ireland was determined by Maximum Entropy modelling by Lundy et al. (2011) (for further details see 2.5.1). To calculate the population of brown long-eared bats in the country, the total core area for the species was divided by the average foraging area for each roost and multiplied by mean and median roost numbers to give a population estimate range. This kind of population estimate is based on a number of assumptions some of which will be only approximately correct and it could be improved with more detailed information on size and shape of foraging areas around a roost, greater knowledge of foraging distances, more ad-hoc roost counts and information on sex ratios in the roosts that are counted. However, it may be considered a starting point from which to refine future estimates. See Roche et al. (2013) for further details

2.4.4 Year or period	2000-2009					
2.4.5 Method – population size	Estimate based on partial data with some extrapolation and/or modelling (2)					
2.4.6 Short-term trend period	2001-2012					
2.4.7 Short term trend direction	increase (+)					
2.4.8 Short-term trend magnitude	min	110.3	max	151.3	confidence interval	95
2.4.9 Short-term trend method	Estimate based on partial data with some extrapolation and/or modelling (2)					
2.4.10 Long-term trend period						
2.4.11 Long term trend direction	N/A					
2.4.12 Long-term trend magnitude	min		max		confidence interval	
2.4.13 Long-term trend method	N/A					

2.4.14 Favourable reference population	number	62000
	operator	N/A
	unknown	No
	method	There is no evidence that the population has declined since the Directive came into force and some indication that it has increased in recent years. Therefore, the Favourable Reference Population for

	the species is set to 62,000 for the current reporting period, which is the lower end of the estimated population range calculated for this assessment. This estimate is derived from the median roost size (all roost count data available from 2000-2009) along with the average foraging distance (based on Scottish data, Entwistle et al., 1996) and the available core area of favourable habitat (Lundy et al., 2011). The lower of the two estimates is selected as a Favourable Reference Population.
2.4.15 Reason for change	Improved knowledge/more accurate data Use of different method

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	48431
2.5.2 Year or period	2000-2009
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Good
2.5.4 b) Quality of habitat - method	Habitat and roosting associations of all Irish bat species including the brown long-eared bat, were modelled using a Maximum Entropy model by Lundy et al. (2011) to determine likelihood of occurrence in specific habitats in the Irish landscape and maternity roost preferences. Brown long-eared bat records were found to be associated broadly with broadleaved woodland, riparian habitats, mixed woodland and small amounts of urbanisation (Lundy et al. 2011). Since these habitat types are currently stable or increasing the habitat quality for the species is assessed as good.
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	stable (0)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	
2.5.10 Reason for change	Improved knowledge/more accurate data Use of different method

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
agricultural intensification (A02.01)	medium importance (M)	N/A
removal of hedges and copses or scrub (A10.01)	high importance (H)	N/A
forestry clearance (B02.02)	medium importance (M)	N/A
removal of forest undergrowth (B02.03)	medium importance (M)	N/A
removal of dead and dying trees (B02.04)	medium importance (M)	N/A
use of biocides, hormones and chemicals (forestry) (B04)	medium importance (M)	toxic inorganic chemicals (T)
		Mixed pollutants (X)
forest exploitation without replanting or natural regrowth (B03)	medium importance (M)	N/A
roads, motorways (D01.02)	medium importance (M)	N/A
continuous urbanisation (E01.01)	medium importance (M)	N/A
demolishment of buildings & human structures (E06.01)	medium importance (M)	N/A
reconstruction, renovation of buildings (E06.02)	medium importance (M)	N/A
Other human intrusions and disturbances (G05)	medium importance (M)	N/A

tree surgery, felling for public safety, removal of roadside trees (G05.06)	medium importance (M)	N/A
closures of caves or galleries (G05.08)	low importance (L)	N/A
death or injury by collision (G05.11)	low importance (L)	N/A
Light pollution (H06.02)	medium importance (M)	N/A
anthropogenic reduction of habitat connectivity (J03.02)	medium importance (M)	N/A

2.6.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
agricultural intensification (A02.01)	medium importance (M)	N/A
removal of hedges and copses or scrub (A10.01)	high importance (H)	N/A
forestry clearance (B02.02)	high importance (H)	N/A
removal of forest undergrowth (B02.03)	medium importance (M)	N/A
removal of dead and dying trees (B02.04)	medium importance (M)	N/A
use of biocides, hormones and chemicals (forestry) (B04)	medium importance (M)	toxic inorganic chemicals (T)
		Mixed pollutants (X)
forest exploitation without replanting or natural regrowth (B03)	high importance (H)	N/A
roads, motorways (D01.02)	medium importance (M)	N/A
continuous urbanisation (E01.01)	medium importance (M)	N/A
reconstruction, renovation of buildings (E06.02)	medium importance (M)	N/A
demolishment of buildings & human structures (E06.01)	medium importance (M)	N/A
Other human intrusions and disturbances (G05)	medium importance (M)	N/A
tree surgery, felling for public safety, removal of roadside trees (G05.06)	medium importance (M)	N/A
closures of caves or galleries (G05.08)	low importance (L)	N/A
death or injury by collision (G05.11)	medium importance (M)	N/A
Light pollution (H06.02)	medium importance (M)	N/A
anthropogenic reduction of habitat connectivity (J03.02)	medium importance (M)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant Information	
2.8.3 Trans-boundary assessment	Given the mobility of this species, and in particular the tendency for seasonal movements between roosts, it is likely that bats regularly cross the border from the Republic of Ireland into Northern Ireland and vice versa. A transboundary assessment in the next reporting period would allow a fuller appreciation of the range and status of this species.

2.9 Conclusions (assessment of conservation status at end of reporting period)

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

2.9.1 Range	assessment Favourable (FV) qualifiers N/A
2.9.2. Population	assessment Favourable (FV) qualifiers N/A
2.9.3. Habitat	assessment Favourable (FV) qualifiers N/A
2.9.4. Future prospects	assessment Favourable (FV) qualifiers N/A
2.9.5 Overall assessment of Conservation Status	Favourable (FV)
2.9.6 Overall trend in Conservation Status	N/A

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit N/A min max
3.1.2 Method used	N/A
3.1.3 Trend of population size within	N/A

3.2 Conservation Measures

Field label	Note
Species: 1326	**Brown long-eared bat**
0.2.01 Species code	The brown long-eared bat is a medium sized, slow-flying bat species. It is widely distributed in Ireland. It is often known as the 'whispering bat' because its sensitive hearing enables it to locate prey by passive listening (Anderson & Racey, 1993). As a consequence, its echolocation calls are of low intensity (Russ, 1999). The slow flight of brown long-eared bats may limit the distance that this species can travel at night-time. However, its manoeuvrability means that it can access cluttered habitats. Shiel et al (1991) found a large proportion of flightless arthropod prey remains in brown long-eared bat faecal pellets confirming the importance of gleaning as a foraging strategy for the species. Entwistle et al. (1996) reported that 92% of bats within their study area spent most of their time within 1.5km of the roost while the greatest distance flown by an individual (male bat) was 2.8km from the main roost. The Irish landscape model (Lundy et al., 2011) indicates that the brown long-eared bat selects areas with broadleaf woodland and riparian habitats on a small scale (0.5km), mixed woodland at a wider 20.5km scale. Low levels (<20%) of urbanisation are selected-for, whilst wetlands such as bog, marsh and heath are avoided (Lundy et al., 2011). Across Europe this species is considered typical of forests. Brown long-eared bats rely heavily on sinanthropic (artificial) roosts (Swift, 1998). 92% of roosts recorded in the Republic of Ireland are in buildings, with very small numbers in bridges, trees and bat boxes, although the natural summer roost of this species is tree holes. Brown long-eared bats show a high degree of roost fidelity and will often use traditional roosts in the long-term (Entwistle et al., 2000). While the species has been found in a range of building types, from old mills to bungalows, the majority of buildings included in the Brown Long-eared Bat Roost Monitoring Scheme are churches or large mansions (Aughney et al., 2013). The majority of maternity roosts that are included in the Brown Long-eared Bat Roost Monitoring Scheme are constructed of stone (80.7%) and have natural slate roofs (82.5%) (Aughney et al., 2011).
1.1.01 Distribution map	This map was derived from the transformation of the map referred to in 1.1.4 to the LAEA projection.
1.1.02 Method used - map	Distribution map shows location of all records collected in the 2001-2012 period. Records were collected during Brown Long-eared Bat Roost Monitoring Scheme (Aughney et al., 2011), BATLAS 2010 field surveys (Carden et al. 2010) which were carried out in 10km squares across the island and ad-hoc records collected by Bat Conservation Ireland staff and volunteers, NPWS staff, ecological consultants and academic institutions. The majority of brown long-eared bat records relate to bat roosts. This map does not include any extrapolation or modelling of the data, nor have all possible locations been surveyed for the species.
1.1.03 Year or period	This shows records for 2001-2012, collected as described for 1.1.2 above.
1.1.04 Additional distribution map	All Irish grid records were intersected with the Irish grid 10km grid map to derive this additional map.
1.1.05 Range map	Range Map has been generated using the Range Tool and is based on all records collated by BCIreland in the 2001-2012 period.

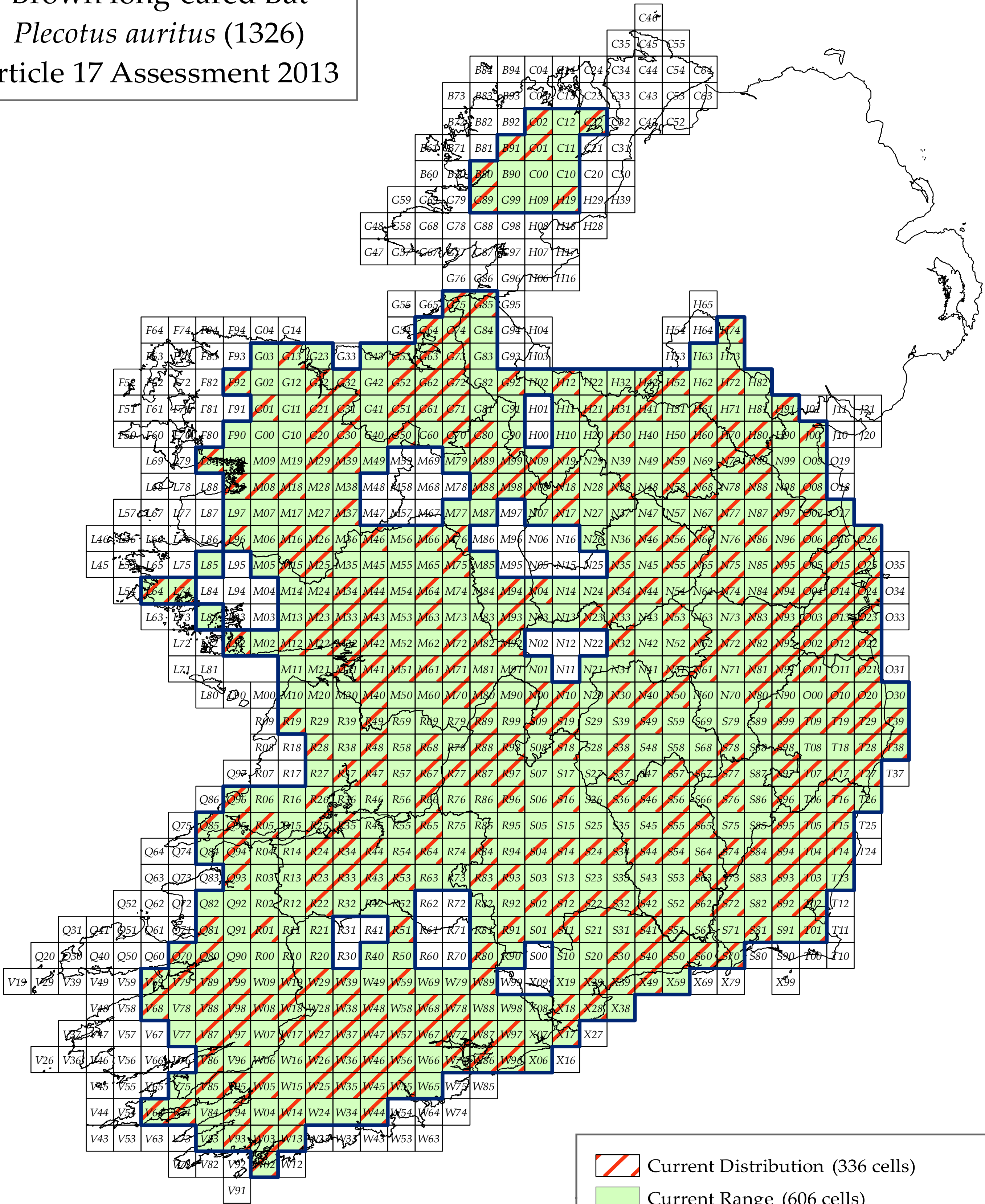
Species: 1326	Brown long-eared bat
2.2 Published sources	Population estimates for the island and yearly trend information for the brown long-eared bat have been derived from the Brown Long-eared Bat Roost Monitoring Scheme (Aughney et al., 2011; 2013). This scheme collects information on numbers of bats occupying maternity roosts during the active season from May to September in the Republic of Ireland. Additional information on distribution was collected during the BATLAS 2010 project which involved bat detector surveys at 3-4 locations within 10km squares across the island (Carden et al., 2010). Habitat and roosting associations were modelled using a Maximum Entropy model and CORINE landscape data by Lundy et al. (2011) to determine likelihood of occurrence in specific habitats in the Irish landscape and maternity roost preferences. This modelling was carried out using roost and bat detector location data from 2000-2009 which is stored on the Bat Conservation Ireland bat database and includes records from monitoring schemes, BATLAS 2010 and records contributed by ecologists, academics and volunteers, among others. There have been very few field or lab-based ecological or behavioural studies published on the species in Ireland, excepting one analysis of diet by Shiel et al. (1991). Detailed information on aspects of ecology and behaviour is, therefore, inferred from studies from the UK and continental Europe.
2.3.01 Surface area - Range	Records have been collected for the species from the Brown Long-eared Roost Monitoring Scheme as well as the BATLAS 2010 scheme (Carden et al. 2010). However, for other species, using the range tool and expert opinion, squares between known records were filled in to represent likely permeability of the landscape for these species. The brown long-eared bat may not, however, disperse to the same extent as other species since it is a slow flyer, so squares between known distribution records and that were not selected by the range tool, may represent genuine gaps in range and were not filled in in this case.
2.3.04 Short term trend - Trend direction	Range Trend is described as stable, although fewer squares are covered in the current reporting period than for the 2001-2006 reporting period. This is assumed to be due to improved accuracy in reporting rather than reflecting a true range decrease for the species, the Brown Long-eared Bat Roost Monitoring Scheme indicates that the species has been reasonably stable since 2007. This trend has been inferred back to 2001. See also 2.3.10b/c..
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Despite the apparent decrease in range, a considerable number of records for the species have been collected since the last reporting round. Therefore, as well as change due to new methods (see 2.3.10c), change in reported range is also due to improved information, rather than true range decrease.
2.3.10 c) Reason for change - use of different method?	The range recorded for the species for the 2007-2012 period, 60,600km2, is lower than that reported for 2000-2006 (66,800km2). This is, at least in part, due to the differing scale used for mapping range. In 2000-2006 range was mapped at a scale of 20km grid cells, whereas mapping has been carried out at a 10km resolution for the present reporting round. The use of the new Range tool will also have led to changes.

Field label	Note
Species: 1326	**Brown long-eared bat**
2.4.01 a) Population size estimation (using individuals or agreed exceptions where possible) - Unit	Since all brown long-eared bat roosts are not known it is not possible to count the population based on a complete census. Therefore, the population of mature (volant) individuals has been estimated using roost count data from the Republic of Ireland. The median roost number and mean roost number from all roost count data recorded on the Bat Conservation Ireland database from 2000-2009 is used as the basis of this population estimate. This includes data from the Brown Long-eared Bat Roost Monitoring Scheme as well as ad-hoc roost records. The average foraging distance observed by Entwistle et al. (1996) from Scottish roosts is used to determine average area used by individuals around a roost, in the absence of similar data for Ireland. The modelled core area for the species in the Republic of Ireland was determined by Maximum Entropy modelling by Lundy et al. (2011) (for further details see 2.5.1). To calculate the population of brown long-eared bats in the country, the total core area for the species was divided by the average foraging area for each roost and multiplied by mean and median roost numbers to give a population estimate range. This kind of population estimate is based on a number of assumptions some of which will be only approximately correct and it could be improved with more detailed information on size and shape of foraging areas around a roost, greater knowledge of foraging distances, more ad-hoc roost counts and information on sex ratios in the roosts that are counted. However, it may be considered a starting point from which to refine future estimates. See Roche et al. (2013) for further details.
2.4.04 Year or period	Population estimate range is derived from the median and mean roost counts for the species using 2000-2009 data inclusive. Also, since yearly counts from the roost-based monitoring scheme can vary considerably, and since the Brown Long-eared Bat Roost Monitoring Scheme includes many larger roosts it was considered best practice to derive the figures from all available roost counts over an extended period (Roche et al., 2013).
2.4.06 Short-term trend - Period	A 12 year window is set for short term trend, however, data is only available for this species since 2007. As there are no indications to the contrary, an assumption has been made that conditions and trends from 2001 – 2006 were stable. 2008-2012 data used because a smaller dataset was available in 2007 (the first year of roost monitoring) and it is better to use a second year as the base year in a trend index.
2.4.08 a) Short-term trend - Magnitude - Minimum	The trend in population of brown long-eared bat is based on data from 2008-2012. It is not expressed in change of absolute numbers since annual surveillance provides count data for just a sample of roosts around the country. Therefore, annual trend estimates are expressed as indices that are likely to mirror overall population levels. In order to facilitate easy interpretation of this trend the base year, 2008, is set as 100 so that deviations from the base year can be easily understood and visualised. For reporting purposes, the confidence intervals are expressed as the final year upper and lower (95%) estimates. If both upper and lower intervals are less than 100 this indicates a declining trend. Increasing trends will have an upper and lower interval both greater than 100. For the brown long-eared bat General Linear Model (GLM) modelling (with covariates for rain and internal/external counts during different parts of the season, see Aughney et al., 2013 for details) with Generalised Additive Model (GAM) smoothing indicates that there has been a slightly increasing trend since the base year, 2008. The lower 95% confidence limit of the trend exceeds the baseline, the lower interval reads as 110.3 (i.e. >100). The upper interval in 2012 was at 151.3. Therefore, the data indicates an increasing trend since 2008 (see Roche et al., 2013).
2.4.08 b) Short-term trend - Magnitude - Maximum	see 2.4.8a for explanation of population trend.
2.4.09 Short-term trend - Method used	See 2.4.8a and Roche et al. (2013) for further details of data and extrapolation used.

Field label	Note
Species: 1326	**Brown long-eared bat**
2.4.15 b) Reason for change - improved knowledge/more accurate data?	The Population for the species was set as a number of grid squares for the 2001-2006 reporting period. However, substantial information has been collected since then allowing an estimate of actual population size to be made.
2.4.15 c) Reason for change - use of different method	The Population for the species was set as a number of grid squares for the 2001-2006 reporting period. However, an actual estimate of actual population size has been made this time (see Roche et al 2013 for details).
2.5.01 Area estimation	Brown long-eared bat records were found to be associated broadly with broadleaved woodland, riparian habitats, mixed woodland and small amounts of urbanisation (Lundy et al. 2011). The area 48,431km2 is derived from the max entropy model and is the estimated total core area of favourable landscape for the species for the Republic of Ireland. [see also 2.5.3]
2.5.02 Year or period	The Lundy et al. (2011) analysis was carried out on available bat records for the years 2000-2009 which had been collated on the BCIreland National Bat Database.
2.5.03 Method used Habitat for the species	Habitat and roosting associations of all Irish bat species including the brown long-eared bat, were modelled using a Maximum Entropy model by Lundy et al. (2011) to determine likelihood of occurrence in specific habitats in the Irish landscape and maternity roost preferences. This modelling was carried out using roost and bat detector location data from 2000-2009 which is stored on the Bat Conservation Ireland bat database and includes records from monitoring schemes, BATLAS 2010 and records contributed by ecologists, academics and volunteers, among others. CORINE landcover, altitude, climate data, soil pH and human bias layers were included in the model. Modelling was carried out to a 5km scale.
2.5.06 Short-term trend - Trend direction	This estimation of habitat for the species is based on modelling of known records from 2000-2009 along with various land cover and other layers (Lundy et al. 2011). Limited data on area of occupancy from the National Bat Survey in the 1980s (O'Sullivan 1994) suggests that there has been no losses in the area occupied by this population in the long term past (i.e. from 1985 onwards). These comparisons stretch beyond the trend period, however there is also no evidence to suggest losses since 2000. Also, there is no evidence of loss of important habitats for the species. Therefore the short term trend for area is considered to be stable. This assessment is based mainly on expert opinion.
2.5.10 b) Reason for change - improved knowledge/more accurate data?	The habitat for the species has been modelled using a Maximum Entropy method described above (Lundy et al., 2011) and the resulting core area (48431km2) is assumed to more accurately represent available and potential habitat for the brown long-eared bat than the figure (66800km2) that was included for the previous reporting period, but does not represent a reduction in available habitat since the last reporting round.
2.5.10 b) Reason for change - improved knowledge/more accurate data?	The area of habitat reported (2.5.1) is less than that reported in 2007. However, the current estimate is based on more complete data which in turn has allowed a more robust estimate to be calculated. No decline in actual habitat has occurred.
2.5.10 c) Reason for change - use of different method (e.g. 'Range tool')?	The habitat for the species has been modelled using a Maximum Entropy method described above (Lundy et al., 2011) and the resulting core area (48431km2) is believed to more accurately represent available and potential habitat for the brown long-eared bat than the figure (66800km2) that was included for the previous reporting period, i.e. the decrease in habitat area since the last reporting round is due to the change in method of estimation, not a loss of habitat.

Field label	Note
Species: 1326	**Brown long-eared bat**
2.6 Main pressures - Pressure	G05 refers to pressure from deliberate disturbance at or exclusion from roosts (with or without licence).Other pressures have been listed based on available literature and published research such as the long-eared bat's dependence on woodland (Entwistle et al., 1996), information on the use of trees by brown long-eared bats (e.g. BCIreland database; Entwistle et al., 1996), extrapolation from findings by Lundy et al. (2011) about areas avoided by the species such as dense urbanisation, vulnerability to traffic-caused mortality and the importance of linear landscape features (Lesinski, 2008). Ranking of importance is based on expert opinion on likely impact of each pressure on the species.
2.7 Threats - Threat	As there is no evidence that the current pressures will cease they are also listed as threats. Ranking of importance is based on expert opinion. Given the importance of woodland for this species, concerns about future changes in forestry policy explain the elevated ranking for forestry operations.
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The brown long-eared bat is widespread across all parts of the country. There is no evidence of a decline since the Directive came into force and range is assessed as Favourable.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The population is estimated to be in the range of 62,000 to 97,000 individuals. As there is no evidence of a decline in population size since the Directive came into force, population is assessed as Favourable.
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Lundy et al. (2011) demonstrated that there is sufficient good quality habitat to support the long term survival of the species. There is no evidence to suggest that the extent or quality of the habitat for the species has changed in the recent past. Habitat for the species is therefore assessed as Favourable.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	While a number of pressures act on the brown long-eared bat such as roost loss and exclusion, and vulnerability to traffic-caused mortality, on the whole, the species is widely dispersed, occurs commonly and has widespread available suitable habitat. There is no reason to believe that the population will be threatened with debilitating losses in the future, therefore, future prospects are considered good.
2.9.05 Overall assessment of Conservation Status	Considerable survey and research has been carried out since the last assessment. BATLAS 2010 (Carden et al., 2010) provided new data for distribution and range. Continued roost monitoring has provided new figures for population size and trends (Aughney et al., 2011). All available records from 2000-2009 were modelled with land cover and other data to assess favourable habitat types for the species across the island (Lundy et al., 2011). There is evidence for a short term recent significant increase in the species and there is no evidence of decline in range or habitat. There is no evidence of any major pressures currently impacting populations. Future prospects are considered good. Therefore, all attributes have been assessed as Favourable.

Brown long-eared Bat
Plecotus auritus (1326)
Article 17 Assessment 2013



Current Distribution (336 cells)
Current Range (606 cells)
Favourable Reference Range (606 cells)

An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 10 20 30 40 50 km

N
Map - Léarscáil
V 1.0
Date - Dáta
27-05-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1330**
0.2.2 Species name	**Myotis mystacinus**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	Whiskered bat (Ialtóg ghiobach)

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	2001-2012
1.1.4 Additional map	Yes
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published sources

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2.3 Range

2.3.1 Surface area - Range (km²)	9300	
2.3.2 Method - Range surface area	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	9300
	operator	N/A
	unknown	No
	method	The current range is also taken as the Favourable reference range. Extensive survey and research on this species during the current reporting period (CIBR in prep) has provided a much better understanding of its distribution. Although present throughout the country, this is not a common species. The current range, though dispersed and disjunct, is considered to cover any ecological variation in the species in Ireland and appears to be sufficiently large to allow the long-term survival of the species.
2.3.10 Reason for change	Improved knowledge/more accurate data	

2.4 Population

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

2.4.1 Population size (individuals or agreed exception)	Unit N/A min max
2.4.2 Population size (other than individuals)	Unit number of map 10x10 km grid cells (grids10x10) min 93 max 93
2.4.3 Additional information	Definition of locality Conversion method Problems This species roosts in small numbers making monitoring based on roost counts unviable. Furthermore, bat detector records of this species are very difficult to tell apart from other Myotis species. Until an effective method of population assessment is developed, the number of 10km grid cells is used as a proxy for population.
2.4.4 Year or period	2001-2012
2.4.5 Method – population size	Estimate based on partial data with some extrapolation and/or modelling (2)
2.4.6 Short-term trend period	2001-2012
2.4.7 Short term trend direction	stable (0)
2.4.8 Short-term trend magnitude	min max confidence interval
2.4.9 Short-term trend method	Estimate based on expert opinion with no or minimal sampling (1)
2.4.10 Long-term trend period	
2.4.11 Long term trend direction	N/A
2.4.12 Long-term trend magnitude	min max confidence interval
2.4.13 Long-term trend method	N/A
2.4.14 Favourable reference population	number 93 operator N/A unknown No method The current population, using the number of 10km grid cells as a proxy, is considered to be large enough to maintain the long term viability of the species and is taken as the favourable reference population.
2.4.15 Reason for change	Improved knowledge/more accurate data Use of different method

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km^2)	9300
2.5.2 Year or period	2001-2012
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Good
2.5.4 b) Quality of habitat - method	Based on a knowledge of the habitat requirements of the species and expert judgement.
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	increase (+)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km^2)	29222
2.5.10 Reason for change	Improved knowledge/more accurate data

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
agricultural intensification (A02.01)	medium importance (M)	N/A
Forest and Plantation management & use (B02)	medium importance (M)	N/A
demolishment of buildings & human structures (E06.01)	medium importance (M)	N/A
diffuse pollution to surface waters due to agricultural and forestry activities (H01.05)	low importance (L)	N/A
Other human intrusions and disturbances (G05)	medium importance (M)	N/A
roads, motorways (D01.02)	medium importance (M)	N/A

2.6.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
agricultural intensification (A02.01)	medium importance (M)	N/A
Forest and Plantation management & use (B02)	medium importance (M)	N/A
roads, motorways (D01.02)	medium importance (M)	N/A
demolishment of buildings & human structures (E06.01)	medium importance (M)	N/A
Other human intrusions and disturbances (G05)	medium importance (M)	N/A
diffuse pollution to surface waters due to agricultural and forestry activities (H01.05)	low importance (L)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant Information	
2.8.3 Trans-boundary assessment	Given the mobility of this species, and in particular the tendency for seasonal movements between roosts, it is likely that bats regularly cross the border from the Republic of Ireland into Northern Ireland and vice versa. A transboundary assessment in the next reporting period would allow a fuller appreciation of the range and status of this species.

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment Favourable (FV) qualifiers N/A
2.9.2. Population	assessment Favourable (FV) qualifiers N/A
2.9.3. Habitat	assessment Favourable (FV) qualifiers N/A
2.9.4. Future prospects	assessment Favourable (FV) qualifiers N/A
2.9.5 Overall assessment of Conservation Status	Favourable (FV)
2.9.6 Overall trend in Conservation Status	N/A

3. Natura 2000 coverage and conservation measures - Annex II species

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

3.1 Population

3.1.1 Population Size	Unit	N/A		
	min		max	
3.1.2 Method used	N/A			
3.1.3 Trend of population size within	N/A			

3.2 Conservation Measures

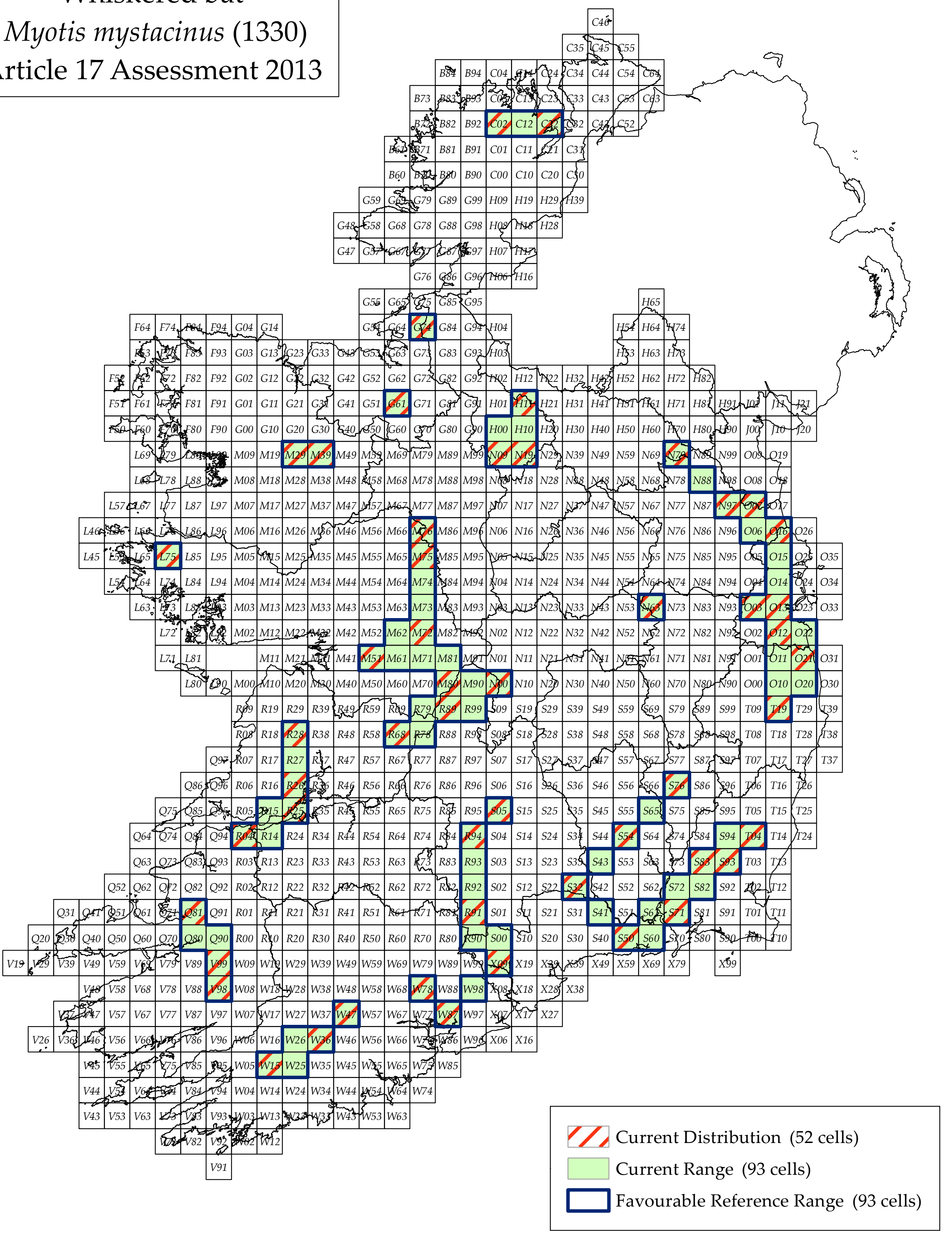
Article 17 - SPECIES NOTES

Field label	Note
Species: 1330	**Whiskered bat**
0.2.01 Species code	The whiskered bat is widespread across the Palearctic, from northern Iberia and Morocco to the far east. It is absent from northern Scotland and northern Scandinavia (Mitchell-Jones et al., 1999). There are records from throughout Ireland, from Donegal to Wexford (O'Sullivan, 1994; CIBR in prep.), but the species is not common and its distribution appears to be naturally dispersed and disjunct. Summer roosts are normally in old stone buildings. Usually only small numbers of bats are present, often between rafters and felt and in other narrow spaces where they are difficult to locate. Bridge roosts are also known (Smiddy, 1991; Shiel, 1999). Wintering animals are rarely found but a small number have been recorded in caves (McAney, 1994; 1997). Further survey work is requried to confirm Autumn swarming behaviour (CIBR in prep). This bat is known to be a woodland specialist, foraging selectively in broadleaved and mixed woodland as well as riparian corridors. Farmland pasture is also used for foraging. This species is very similar to Brandt's bat and following the discovery of Brandt's bat in Ireland in 2003 (Mullen, 2006) an intensive re-survey, involving DNA testing, was undertaken of all known whiskered bat roosts in Ireland, by the Centre for Irish Bat Research. All of these roosts were confirmed as whiskered roosts (Boston et al., 2010). Building renovation and loss of foraging habitat are potential threats for this species, but the most recent Red Data List for Irish Mammals (Marnell et al. 2009) lists whiskered bat as least concern.
1.1.01 Distribution map	This map was derived from the transformation of the map referred to in 1.1.4 to the LAEA projection.
1.1.02 Method used - map	The distribution map shows the location of all records collected in the 2001-2012 period. Records are from the Centre for Irish Bat Research field surveys, BATLAS 2010 field surveys (Carden et al. 2010) which were carried out in 10km squares across the island and ad-hoc records collected by Bat Conservation Ireland staff and volunteers, NPWS staff, ecological consultants and academic institutions. The majority of records have been collected from bats roosts. This map does not include any extrapolation or modelling of the data, nor have all possible locations been surveyed for the species.
1.1.04 Additional distribution map	All records were intersected with the Irish 10km grid map to derive the additional map.
2.3.01 Surface area - Range	Range has been calculated by running the Range tool on the 52 x 10km cells containing distribution points, with gap closure set at 20km.
2.3.04 Short term trend - Trend direction	Significantly more distribution data is available now for this species compared to the last reporting period, allowing range to be plotted at the 10km level. 52 x 10km cells are plotted this time, compared to 20 x 50km cells in 2007. However, the spread of records is very similar, with records from most eastern and midland counties and also Donegal and the western seaboard counties. Overall the trend in Range appears to have remained relatively stable.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	The Range in the last assessment was reported as 67,500km2 based on a 50km cell grid. The Current Range of 9,300km2 is based on more data, plotted at a finer scale, and is thought to better reflect the true range of the species in Ireland.
2.4.02 a) Population size estimation (using population unit other than individuals) - Unit	The number of 10km grid cells in the Range is used as a proxy for population.

Field label	Note
Species: 1330	**Whiskered bat**
2.4.07 Short-term trend - Trend direction	Boston et al., (2010) resurveyed many of the original Whiskered maternity roosts identified by O'Sullivan (1994). As some roosts had been lost and frequent roost switching appears to be a trait in this species, a direct comparison of numbers is not possible. However, it was clear that good numbers of bats had been maintained in most roosts, with some increasing in size. Furthermore, genetic investigations showed good genetic diversity within nursery colonies suggesting there were no barriers to gene flow in the landscape (CIBR in prep). Overall, given no signs to the contrary, population trend is assessed as stable.
2.4.15 b) Reason for change - improved knowledge/more accurate data?	Population in the last assessment was based on the data for 20 grid cells. For this assessment, distribution data for 52 cells is available reflecting the significant increase in survey effort put into this species during the current reporting period.
2.4.15 c) Reason for change - use of different method	A 50km grid cell was used in last reporting period. A 10km grid cell is being used this time. This difference in approach has produced a smaller, but more accurate representation of the range, and by extension the population, of the species.
2.5.01 Area estimation	The area of the range is taken as the area of habitat for the species.
2.5.06 Short-term trend - Trend direction	Broadleaf woodland, mixed forests, riparian woods and pasture have been identified as the main habitats for Whiskered bat in Ireland, with some evidence of urban areas and scrub being used too (Lundy et al, 2011). Given that woodland habitats are, in general, increasing (Casey & Ryan, 2012) and that pasture is likely to be stable, bat habitat overall is assessed as increasing.
2.5.09 Area of suitable habitat for the species (km2)	Lundy et al. (2011) examined the habitat associations of Whiskered bat using maximum entropy models. They calculated the extent of habitat suitable for this species ("core favourable area") as 29,222km2.
2.5.10 b) Reason for change - improved knowledge/more accurate data?	A 50km grid cell was used in last reporting period. A 10km grid cell is being used this time. This difference in approach has produced a smaller, but more accurate representation of the range, and by extension the area of habitat, for the species.
2.6 Main pressures - Pressure	Pressures impacting on Whiskered bats can be divided into those affecting roosts and those reducing the quality of their foraging habitat. The former include the renovation/demolition of buildings used as summer roosts (E.06.01) or disturbance/exclusion of roosts from same (G05). The repair of road bridges over rivers (D01.02) is also a concern, as this species will roost in bridge crevices. Given that riparian habitats provide important foraging for this species, water quality is listed as a pressure. Mixed woodlands also provide important foraging habitat for these bats; unsympathetic management practises can have significant negative impacts (B.02).
2.7 Threats - Threat	The current pressure are considered likely to continue into the future.
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The current range of the species is stable and is not smaller than the favourable reference range. This parameter is considered to be in favourable condition.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The current population is equal to the favourable reference population and considered to be large enough to maintain the long term viability of the species. This parameter is considered to be favourable.
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	This bat uses a range of habitats including woodlands and pastures. These habitats are widespread and increasing. Overall habitat is considered Favourable.

Field label	Note
Species: 1330	**Whiskered bat**
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	This species faces a number of threats in the coming years. Continued liaison with Coillte and the Forest Service will be important given the reliance on woodland habitats for foraging. Close cooperation with local authorities and the OPW with regard to bridge repairs will also remain critical. A growing awareness of bat protection and good working relations with these organisations indicate that these threats can be managed. Overall, Future Prospects are considered Favourable.
2.9.05 Overall assessment of Conservation Status	The Whiskered bat has a dispersed and disjunct distribution, but its range and population are in a good condition and the area of suitable habitat appears to be increasing. Further work is required to establish a robust monitoring method for this species and to confirm its use of swarming sites. Overall, however, the conservation status of this species is considered favourable.

Whiskered bat
Myotis mystacinus (1330)
Article 17 Assessment 2013



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Department of
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Scale - Scála
0 10 20 30 40 50 km

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Map - Léarscáil
V 1.0
Date - Dáta
17-06-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1331**
0.2.2 Species name	**Nyctalus leisleri**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	Leisler's bat (Ialtóg Leisler)

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	2007-2012
1.1.4 Additional map	Yes
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published sources

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Department of the Arts, Heritage and the Gaeltacht, Ireland.
Roche, N., Aughney, T. and Langton, S. (2013) Population estimates, trends and background information for six Irish bat species: Article 17 2007-2012 supporting document. Report submitted to the National Parks and Wildlife Service by Bat Conservation Ireland.
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Russ, J.M. (2008). Review of ASSI designation for bats in Northern Ireland. Northern Ireland Environment Agency, Research and Development Series 08/09.
Russ, J.M., Hopkirk, A.C., Guegen, S. & Boston, E.M. (2004). Roost selection, activity and dispersal of Leisler's bat, Nyctalus leisleri (Kuhl 1818), during the pre-hibernal and hibernal period. Unpublished report to the Environment and Heritage Service, Northern Ireland.
Russ, J.M. & Montgomery, W.I. (2002) Habitat association of bats in Northern Ireland: Implications for conservation. Biological Conservation 108: 49-58.
Shiel, C.B., and Fairley, J.S. (1998). Activity of Leisler's bat Nyctalus leisleri (Kuhl) in the field in south-east County Wexford, as revealed by a bat detector. Biology and Environment: Proceedings of the Royal Irish Academy. 98b: 105-112.
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Waters, D., Jones, G. & Furlong, M. (1999) Foraging ecology of Leisler's bat (Nyctalus leisleri) at two sites in southern Britain. Journal of Zoology, London 249: 173-180.

2.3 Range

2.3.1 Surface area - Range (km²)	69900	
2.3.2 Method - Range surface area	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	increase (+)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	62700
	operator	N/A
	unknown	No
	method	The Favourable Reference Range has been set as the FRR from the previous (2001-2006) reporting period. There is evidence to suggest that the area is large enough to allow the long term survival of the species given the increasing trend recorded for the species by the Car-based Bat Monitoring Scheme (Roche et al., 2012). The distribution of Leisler's bat is widespread across the country, indicating

sufficient availability of roosts and adaptability to foraging in a range of habitats.

2.3.10 Reason for change	Genuine Improved knowledge/more accurate data

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit: number of individuals (i) min: 63000 max: 113000
2.4.2 Population size (other than individuals)	Unit: N/A min: max:
2.4.3 Additional information	Definition of locality: Conversion method: Problems: Since all Leisler's bat roosts are not known it is not possible to count the population based on a complete census. Therefore, the population of mature (volant) individuals has been estimated using data from the Car-based Bat Monitoring Scheme. This population estimate is calculated based on the detection distance for echolocating Leisler's bats (60-80m) and the approximate area that is detectable. The area of Ireland is divided by the approximate detectable area and multiplied by the probability of detecting a Leisler's bat along any given roadside (2007-2012) on any given evening, from Car-based Bat Monitoring data. The minimum end of the range is based on the wider detection range (80m) while the maximum end is based on the closer detection range (60m). This population estimate uses a number of assumptions which may be only approximately correct and it could be improved with more detailed information on size and shape of detectable areas, better knowledge of Leisler's bat habitat use around roadsides and other factors. However, it may be considered a starting point from which to refine future estimates. See Roche et al. (2013) for further details.
2.4.4 Year or period	2007-2012
2.4.5 Method – population size	Estimate based on partial data with some extrapolation and/or modelling (2)
2.4.6 Short-term trend period	2001-2012
2.4.7 Short term trend direction	increase (+)
2.4.8 Short-term trend magnitude	min: 140.2 max: 213.9 confidence interval: 95
2.4.9 Short-term trend method	Estimate based on partial data with some extrapolation and/or modelling (2)
2.4.10 Long-term trend period	
2.4.11 Long term trend direction	N/A
2.4.12 Long-term trend magnitude	min: max: confidence interval:
2.4.13 Long-term trend method	N/A
2.4.14 Favourable reference population	number: 63000 operator: N/A unknown: No method: The Favourable Reference Population for the species was set as a number of grid squares (160) for the 2001-2006 reporting period.

	However, substantial information has been collected since then and there is evidence that the population has increased since 2004. Therefore, the Favourable Reference Population for the species is set to approximately 63,000 for the current reporting period, which is the lower end of the estimate range completed for this assessment.
2.4.15 Reason for change	Genuine Improved knowledge/more accurate data Use of different method

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	48806
2.5.2 Year or period	2000-2009
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Good
2.5.4 b) Quality of habitat - method	Leisler's bat records were found to be associated broadly with broadleaved woodland, mixed woodland and riparian habitats and small amounts of urbanisation (Lundy et al. 2011). Since these habitat types are at least stable or, in the case of broadleaved woodland, increasing, the habitat quality for the species is considered good.
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	stable (0)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	48806
2.5.10 Reason for change	Improved knowledge/more accurate data Use of different method

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
agricultural intensification (A02.01)	medium importance (M)	N/A
use of biocides, hormones and chemicals (A07)	medium importance (M)	toxic inorganic chemicals (T)
		Mixed pollutants (X)
removal of hedges and copses or scrub (A10.01)	medium importance (M)	N/A
forestry clearance (B02.02)	medium importance (M)	N/A
removal of dead and dying trees (B02.04)	medium importance (M)	N/A
use of biocides, hormones and chemicals (forestry) (B04)	medium importance (M)	toxic inorganic chemicals (T)
		Mixed pollutants (X)
wind energy production (C03.03)	medium importance (M)	N/A
continuous urbanisation (E01.01)	low importance (L)	N/A
demolishment of buildings & human structures (E06.01)	low importance (L)	N/A
reconstruction, renovation of buildings (E06.02)	low importance (L)	N/A
tree surgery, felling for public safety, removal of roadside trees (G05.06)	medium importance (M)	N/A
Other human intrusions and disturbances (G05)	medium importance (M)	N/A
anthropogenic reduction of habitat connectivity (J03.02)	low importance (L)	N/A

2.6.1 Method used – pressures	mainly based on expert judgement and other data (2)

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2.7 Main Threats

Threat	ranking	pollution qualifier(s)
use of biocides, hormones and chemicals (A07)	medium importance (M)	toxic inorganic chemicals (T)
		Mixed pollutants (X)
removal of hedges and copses or scrub (A10.01)	medium importance (M)	N/A
forestry clearance (B02.02)	medium importance (M)	N/A
removal of dead and dying trees (B02.04)	medium importance (M)	N/A
use of biocides, hormones and chemicals (forestry) (B04)	medium importance (M)	toxic inorganic chemicals (T)
		Mixed pollutants (X)
wind energy production (C03.03)	high importance (H)	N/A
continuous urbanisation (E01.01)	medium importance (M)	N/A
demolishment of buildings & human structures (E06.01)	low importance (L)	N/A
reconstruction, renovation of buildings (E06.02)	low importance (L)	N/A
tree surgery, felling for public safety, removal of roadside trees (G05.06)	medium importance (M)	N/A
Other human intrusions and disturbances (G05)	medium importance (M)	N/A
anthropogenic reduction of habitat connectivity (J03.02)	low importance (L)	N/A
migration of species (natural newcomers) (M02.04)	low importance (L)	N/A
agricultural intensification (A02.01)	medium importance (M)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant Information	
2.8.3 Trans-boundary assessment	Given the mobility of this species, and in particular the tendency for seasonal movements between roosts, it is likely that bats regularly cross the border from the Republic of Ireland into Northern Ireland and vice versa. A transboundary assessment in the next reporting period would allow a fuller appreciation of the range and status of this species.

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment Favourable (FV) qualifiers N/A
2.9.2. Population	assessment Favourable (FV) qualifiers N/A
2.9.3. Habitat	assessment Favourable (FV) qualifiers N/A
2.9.4. Future prospects	assessment Favourable (FV) qualifiers N/A
2.9.5 Overall assessment of Conservation Status	Favourable (FV)
2.9.6 Overall trend in Conservation Status	N/A

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	N/A	
	min		max
3.1.2 Method used	N/A		
3.1.3 Trend of population size within	N/A		

3.2 Conservation Measures

Article 17 - SPECIES NOTES

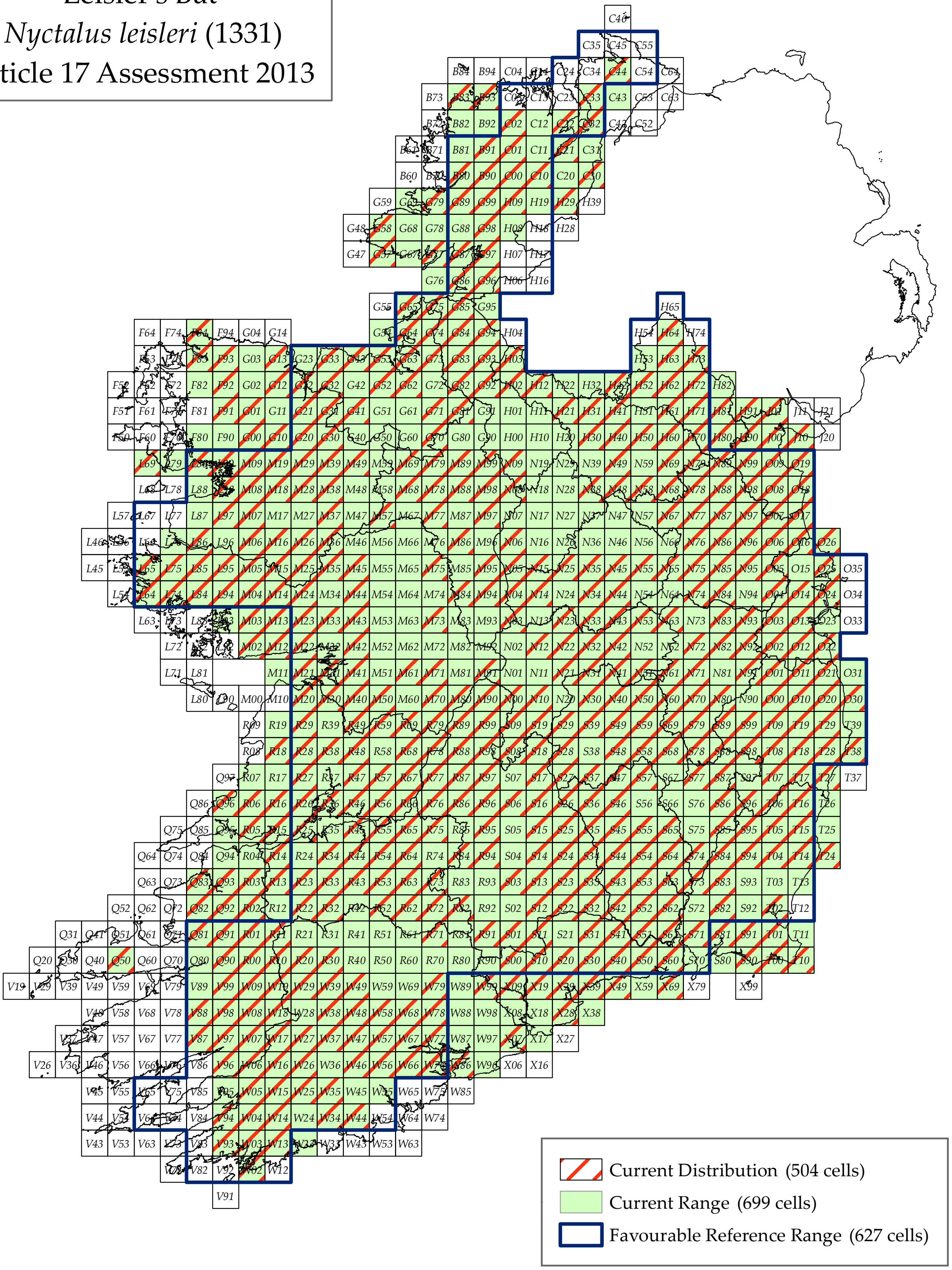
Field label	Note
Species: 1331	**Leisler's bat**
0.2.01 Species code	Leisler's bat is the only member of the genus Nyctalus in Ireland. It has been described as a 'typically Irish bat' (Fairley, 2001) due to its abundance in Ireland compared to the rest of the Europe, where it is considered to be vulnerable (Mitchell-Jones et al., 1999). Its abundance in Ireland has been attributed to the absence of larger competing species, such as the closely related noctule Nyctalus noctula. Possibly due to absence of competitors, its echolocation calls in Ireland cover a lower range of frequencies than conspecifics in Britain (Buckley et al., 2011). Studies by researchers at Queens University Belfast, have shown that many Irish Leisler's bats are more closely related to the Azores noctule (Nyctalus azoreum) than to the continental European Leisler's bat (E. Boston pers. comm). The majority of roosts of this species have been found in buildings but 13% of all roost records are in trees, with occasional records in bat boxes. On continental Europe, however, this species is considered a tree-dwelling bat across most of its distribution (Dietz et al., 2007).
1.1.01 Distribution map	This map was derived from the transformation of the map referred to in 1.1.4 to the LAEA projection.
1.1.02 Method used - map	Distribution map shows location of all records collected in the 2007-2012 period. Records are based on BATLAS 2010 field surveys (Carden et al., 2010) which were carried out in 10km squares across the island, Car-based Bat Monitoring Scheme data (e.g. Roche et al., 2011) & ad-hoc records collected by Bat Conservation Ireland staff and volunteers, NPWS staff, ecological consultants and academic institutions. The majority of records have been collected using bat detectors from bats in flight. This map does not include any extrapolation or modelling of the data, nor have all possible locations been surveyed for the species.
1.1.03 Year or period	This shows records for 2007-2012, collected as described for 1.1.2 above.
1.1.04 Additional distribution map	All Irish grid records were intersected with the Irish grid 10km grid map to derive this additional map.
1.1.05 Range map	Range Map has been generated using the Range Tool and is based on all records collated by BCIreland in the 2007-2012 period.
2.2 Published sources	Population estimates for the island and yearly trend information for Leisler's bat have been derived from car-based bat monitoring (Roche et al., 2009; 2011; 2012). This scheme collects information on relative activity levels for the species along roadsides across the island from surveys carried out in July and August every year. Information on distribution was collected during the BATLAS 2010 project which involved bat detector surveys at 3-4 locations within 10km squares across the island (Carden et al., 2010). Habitat and roosting associations were modelled using a Maximum Entropy model and CORINE landscape data by Lundy et al. (2011) to determine likelihood of occurrence in specific habitats in the Irish landscape and maternity roost preferences. This modelling was carried out using roost and bat detector location data from 2000-2009 which is stored on the Bat Conservation Ireland bat database and includes records from monitoring schemes, BATLAS 2010 and records contributed by ecologists, academics and volunteers, among others. It is the only vespertilionid bat species that has been studied in detail in Ireland, with seven published papers on varying aspects of its ecology in the Republic of Ireland. In Northern Ireland its pre-hibernal and hibernation behaviour has also been studied by Russ et al. (2004).

Field label	Note
Species: 1331	**Leisler's bat**
2.3.01 Surface area - Range	The range recorded for the species for the 2007-2012 period, 69,900km2, is higher than that noted for 2000-2006 (64,000km2). This is, at least in part, due to the extended survey during the BATLAS scheme (Carden et al. 2010), but may also represent a true increase in range since the species has been increasing year on year since 2004, according to data collected during the Car-based Bat Monitoring Scheme (Roche et al., 2012). In addition, a number of 10km squares were included in the range, despite not having been filled in by the Range Tool (12 x10 km squares: H20, N19, N29, N17, N27, N26, M54, M64, R51, R40, R50 and R60). These 12 squares, which are surrounded by known distribution records, were included because the species is a very wide ranging one and the habitats present in the filled squares do not represent a barrier to movement and include areas that are likely to be suitable for foraging Leisler's.
2.3.04 Short term trend - Trend direction	Range Trend from 2001 - 2012 is described as increasing. The Car-based Bat Monitoring Scheme (Roche et al. 2012) indicates that the species has increased yearly since 2004. However some of the range expansion can also be explained by increased survey effort for the species (Carden et al. 2012). Insufficient information is available to determine whether the reported range change is primarily due to improved information, or population increase and expansion, or both.
2.3.10 a) Reason for change - genuine change?	The Car-based Bat Monitoring Scheme (Roche et al. 2012) indicates that the species has increased yearly since 2004.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Some of the range expansion can be explained by increased survey effort for the species (Carden et al. 2012). Insufficient information is available to determine whether the reported range change is primarily due to improved information, or population increase and expansion, or both.
2.4.01 a) Population size estimation (using individuals or agreed exceptions where possible) - Unit	Since all Leisler's bat roosts are not known it is not possible to count the population based on a complete census. Therefore, the population of mature (volant) individuals has been estimated using data from the Car-based Bat Monitoring Scheme data. This population estimate is calculated based on the detection distance for echolocating Leisler's bats (60-80m) and the approximate area that is detectable. The area of Ireland is divided by the approximate detectable area and multiplied by the probability of detecting a Leisler's bat along any given roadside (2007-2012) on any given evening, from Car-based Bat Monitoring data. The minimum end of the range is based on the wider detection range (80m) while the maximum end is based on the closer detection range (60m). This population estimate uses a number of assumptions which may be only approximately correct and it could be improved with more detailed information on size and shape of detectable areas, better knowledge of Leisler's bat habitat use around roadsides and other factors. However, it may be considered a starting point from which to refine future estimates. See Roche et al. (2013) for further details.
2.4.04 Year or period	Population estimate is derived from the average probability of detecting a Leisler's bat from Car-based Bat Monitoring using 2007-2012 data inclusive, to correspond with the current reporting period. Also, since yearly estimates from monitoring schemes can vary considerably it was considered best practice to derive a mean from the six years of the reporting period, rather than using data from the last available year of the series. See Roche et al. (2013) for more details.
2.4.06 Short-term trend - Period	A 12 year reporting period is prescribed (2001-12). Car-based Bat Monitoring, which is the surveillance scheme used to determine Leisler's bat population trends, began in 2003. However, since slight modifications were made to the scheme following the pilot in 2003, and because fewer sites were included in the first year, 2004 is used as the base year for establishing trends in the species (Roche et al., 2012).

Field label	Note
Species: 1331	**Leisler's bat**
2.4.08 a) Short-term trend - Magnitude - Minimum	Trend in population of Leisler's bat is not expressed in change of absolute numbers since annual surveillance measures levels of activity along roadsides, rather than numbers of bats. Therefore, annual trend estimates can be considered an index of activity that is likely to mirror population levels. In order to facilitate easy interpretation of this trend the base year, 2004, is set as 100 so that deviations from the base year can be easily understood and visualised. For reporting purposes, the confidence intervals are expressed as the final year upper and lower (95%) estimates. If both upper and lower intervals are less than 100 this indicates a declining trend. Increasing trends will have an upper and lower interval both greater than 100. For the Leisler's bat, General Linear Model (GLM) modelling with Generalised Additive Model (GAM) smoothing indicates that there has been a significantly increasing trend since the base year, 2004. The lower 95% confidence limit of the trend, at 140.19, exceeds the baseline (i.e. >100). Therefore, there has potentially been a minimum 40.2% increase since the baseline year (see Roche et al., 2013).
2.4.08 b) Short-term trend - Magnitude - Maximum	See field 2.4.8a for explanation of trend. The upper 95% confidence limit of the trend indicates that the index in 2012 was at 213.86, therefore, there has potentially been a maximum 113.86% increase in population since the baseline year (see Roche et al., 2013).
2.4.15 a) Reason for change - genuine change?	Population monitoring suggests an increase of between 40 and 114% since 2004 (see Roche et al. 2013).
2.4.15 b) Reason for change - improved knowledge/more accurate data?	Extended survey effort also explains some of the apparent increase (Carden et al. 2010)
2.4.15 c) Reason for change - use of different method	The number of occupied grid squares was used as a proxy for the the Favourable Reference Population for the species in the 2007 report. However, substantial information has been collected since then allowing an actual population estimate to be made (see 2.4.1a and Roche et al 2013).
2.5.01 Area estimation	Habitat and roosting associations of all Irish bat species including Leisler's bat, were modelled using a Maximum Entropy model by Lundy et al. (2011) to determine likelihood of occurrence in specific habitats in the Irish landscape and maternity roost preferences. This modelling was carried out using roost and bat detector location data from 2000-2009 which is stored on the Bat Conservation Ireland bat database and includes records from monitoring schemes, BATLAS 2010 and records contributed by ecologists, academics and volunteers, among others. CORINE landcover, altitude, climate data, soil pH and human bias layers were included in the model. Modelling was carried out to a 5km scale. Leisler's bat records were found to be associated broadly with broadleaved woodland, mixed woodland and riparian habitats and small amounts of urbanisation (Lundy et al. 2011). The area 48806km2 is derived from the model and is the estimated total core area of favourable landscape for the species for the Republic of Ireland.
2.5.02 Year or period	The Lundy et al (2011) analysis was carried out on available bat records for the years 2000-2009 which had been collated on the BCIreland National Bat Database.
2.5.06 Short-term trend - Trend direction	Although a 12 year window is prescribed, this estimation of habitat for the species is based on modelling of known records from 2000-2009 along with various land cover and other layers (Lundy et al. 2011). Limited data on area of occupancy from the National Bat Survey in the 1980s (O'Sullivan 1994) suggests that there has been no losses in the area occupied by this population in the long term past (i.e. from 1985 onwards). These comparisons stretch beyond the trend period, however there is also no evidence to suggest losses since 2000. Also, there is no evidence of loss of important habitats for the species. Therefore the short term trend for area is considered to be stable. This assessment is based mainly on expert opinion.

Field label	Note
Species: 1331	**Leisler's bat**
2.5.09 Area of suitable habitat for the species (km2)	The Area of suitable habitat is considered to be equal to the Habitat for the species since there is no evidence of absence of the species from modelled core areas.
2.5.10 b) Reason for change - improved knowledge/more accurate data?	The habitat for the species has been modelled using a Maximum Entropy method described above (Lundy et al., 2011) and the resulting core area is assumed to more accurately represent available and potential habitat for Leisler's bat than the larger figure that was included for the previous (2000-2006) reporting period.
2.5.10 c) Reason for change - use of different method (e.g. 'Range tool')?	The habitat for the species has been modelled using a Maximum Entropy method described above (Lundy et al., 2011) and the resulting core area is assumed to more accurately represent available and potential habitat for Leisler's bat than the larger figure that was included for the previous (2000-2006) reporting period.
2.6 Main pressures - Pressure	G05 refers to pressure from deliberate disturbance to or exclusion from roosts (with or without licence). Other pressures have been listed based on available literature and published research such as Eurobats guidelines for windfarms (Rodrigues et al 2008), information on the importance of trees for roosting Leisler's bats (e.g. BCIreland database, Russ et al 2004), extrapolation from findings by Lundy et al. (2011) about areas avoided by the species such as dense urbanisation and intensive cultivation.
2.7 Threats - Threat	As there is no evidence that the current pressures will cease they are also listed as threats. The possibility of additional bat species establishing in Ireland in the future (M.02.04) and potentially competing with Leislers (e.g. Noctule) is also flagged. Due to the likely increase in Wind Energy production and Urbanisation the ranking for these as threats have been elevated.
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The Leisler's bat is widespread across all parts of the country. Range is greater than the favourable reference value and is increasing. It is assessed as Favourable.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The population is estimated to be in the range of 63,000 to 113,000 individuals. As there is no evidence of a decline in population size since the Directive came into force and good evidence of an increase in recent years, population is assessed as Favourable.
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Lundy et al. (2011) demonstrated that there is sufficient good quality habitat to support the long term survival of the species. There is no evidence to suggest that the extent or quality of the habitat for the species has changed in the recent past. Habitat for the species is therefore assessed as Favourable.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	While a number of pressures act on Leisler's bat such as roost losses, on the whole, the species is widely dispersed, occurs commonly, has no competitors in Ireland and has widespread available suitable habitat. There is no reason to believe that the population will be threatened with debilitating losses in the future, therefore, future prospects are considered good.
2.9.05 Overall assessment of Conservation Status	Considerable survey and research has been carried out since the last assessment. BATLAS 2010 (Carden et al., 2010) provided new data for distribution and range. Continued Car-based Bat Monitoring has provided new figures for population size and trends (Roche et al., 2012; Roche et al., 2013). All available records from 2000-2009 were modelled with land cover and other data to assess favourable habitat types for the species across the island (Lundy et al., 2011). There is evidence for a short term recent significant increase in the population and there is no evidence of decline in range or habitat. There is no evidence of any major pressures currently impacting populations. Future prospects are considered good. Therefore, all attributes have been assessed as Favourable.

Leisler's Bat
Nyctalus leisleri (1331)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála

0 10 20 30 40 50 km

N

Map - Léarscáil
V 1.0
Date - Dáta
27-05-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1334**
0.2.2 Species name	**Lepus timidus**
0.2.3 Alternative species scientific name	Lepus timidus hibernicus
0.2.4 Common name	Mountain hare; Irish hare (Giorria)

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	2007-2012
1.1.4 Additional map	Yes
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region	**Atlantic (ATL)**
2.2 Published sources	Dingerkus, S.K. & Montgomery, W.I. (2002) A review of the status and decline in abundance of the Irish hare (Lepus timidus hibernicus) in Northern Ireland. Mammal Review, 32, 1-11. Hughes, M., Montgomery, I. and Prodöhl, P. (2006) Population genetic structure and systematics of the Irish hare. A report prepared by Quercus for the Environment and Heritage Service, Belfast. Reid, N., Dingerkus, K., Montgomery, W.I., Marnell, F., Jeffrey, R., Lynn, D., Kingston, N. & McDonald, R.A. (2007) Status of hares in Ireland: Hare Survey of Ireland. Irish Wildlife Manuals, No. 30. National Parks and Wildlife Service, Department of Environment, Heritage and Local Government, Dublin, Ireland. Reid N., McDonald R. A. and Montgomery W. I. (2007a) Mammals and agri-environment schemes: hare haven or pest paradise? Journal of Applied Ecology 44: 1200–1208. Reid, N. & Montgomery, W.I. (2010) Retrospective analysis of the Northern Ireland Irish hare survey data from 2002-2010. Report prepared by Quercus, Queen's University Belfast for the Northern Ireland Environment Agency. Northern Ireland Environment Agency Research and Development Series No. 11/16. Reid N., Magee C. and Montgomery W. I. 2010. Integrating field sports, hare population management and conservation. Acta Theriologica 55: 61–71. Thulin C.G. (2003) The distribution of mountain hares Lepus timidus in Europe: a challenge from brown hares L. europaeus? Mammal Review 33: 29-42.

2.3 Range

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

2.3.1 Surface area - Range (km²)	78000	
2.3.2 Method - Range surface area	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	unknown (x)	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	78000
	operator	N/A
	unknown	No
	method	The favourable reference range is set as the current range.
2.3.10 Reason for change	Improved knowledge/more accurate data	

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	number of individuals (i)		
	min	338000	max	999000
2.4.2 Population size (other than individuals)	Unit	N/A		
	min		max	
2.4.3 Additional information	Definition of locality			
	Conversion method			
	Problems	Large fluctuations between years make population size estimates problematic.		
2.4.4 Year or period	2007			
2.4.5 Method – population size	Estimate based on partial data with some extrapolation and/or modelling (2)			
2.4.6 Short-term trend period	2001-2012			
2.4.7 Short term trend direction	stable (0)			
2.4.8 Short-term trend magnitude	min	max	confidence interval	
2.4.9 Short-term trend method	Estimate based on partial data with some extrapolation and/or modelling (2)			
2.4.10 Long-term trend period				
2.4.11 Long term trend direction	unknown (x)			
2.4.12 Long-term trend magnitude	min	max	confidence interval	
2.4.13 Long-term trend method	N/A			
2.4.14 Favourable reference population	number	233000		
	operator	N/A		
	unknown	No		
	method	This figure is based on the data from Reid et al. (2007) and corresponds to the national population estimated for 2006. It is equivalent to 3.33 hares/km2. See Reid et al. (2007) for details of how this figure was calculated.		
2.4.15 Reason for change	Improved knowledge/more accurate data			

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	68571
2.5.2 Year or period	2007-2012
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Moderate
2.5.4 b) Quality of habitat - method	Best expert judgement, based on published findings of habitat usage and hare

	densities, plus information on land usage change in Ireland.
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	unknown (x)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	unknown (x)
2.5.9 Area of suitable habitat (km²)	
2.5.10 Reason for change	Use of different method

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
modification of cultivation practices (A02)	high importance (H)	N/A
intensive mowing or intensification (A03.01)	high importance (H)	N/A
roads, motorways (D01.02)	low importance (L)	N/A
Urbanised areas, human habitation (E01)	low importance (L)	N/A
Hunting and collection of wild animals (terrestrial) (F03)	low importance (L)	N/A

2.6.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
modification of cultivation practices (A02)	high importance (H)	N/A
intensive mowing or intensification (A03.01)	high importance (H)	N/A
roads, motorways (D01.02)	low importance (L)	N/A
Urbanised areas, human habitation (E01)	low importance (L)	N/A
Hunting and collection of wild animals (terrestrial) (F03)	low importance (L)	N/A
invasive non-native species (I01)	medium importance (M)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant Information	
2.8.3 Trans-boundary assessment	

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment Favourable (FV) qualifiers N/A
2.9.2. Population	assessment Favourable (FV) qualifiers N/A
2.9.3. Habitat	assessment Favourable (FV) qualifiers N/A
2.9.4. Future prospects	assessment Favourable (FV) qualifiers N/A
2.9.5 Overall assessment of Conservation Status	Favourable (FV)
2.9.6 Overall trend in Conservation Status	N/A

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	N/A
	min	max
3.1.2 Method used	N/A	
3.1.3 Trend of population size within	N/A	

3.2 Conservation Measures

Article 17 - SPECIES NOTES

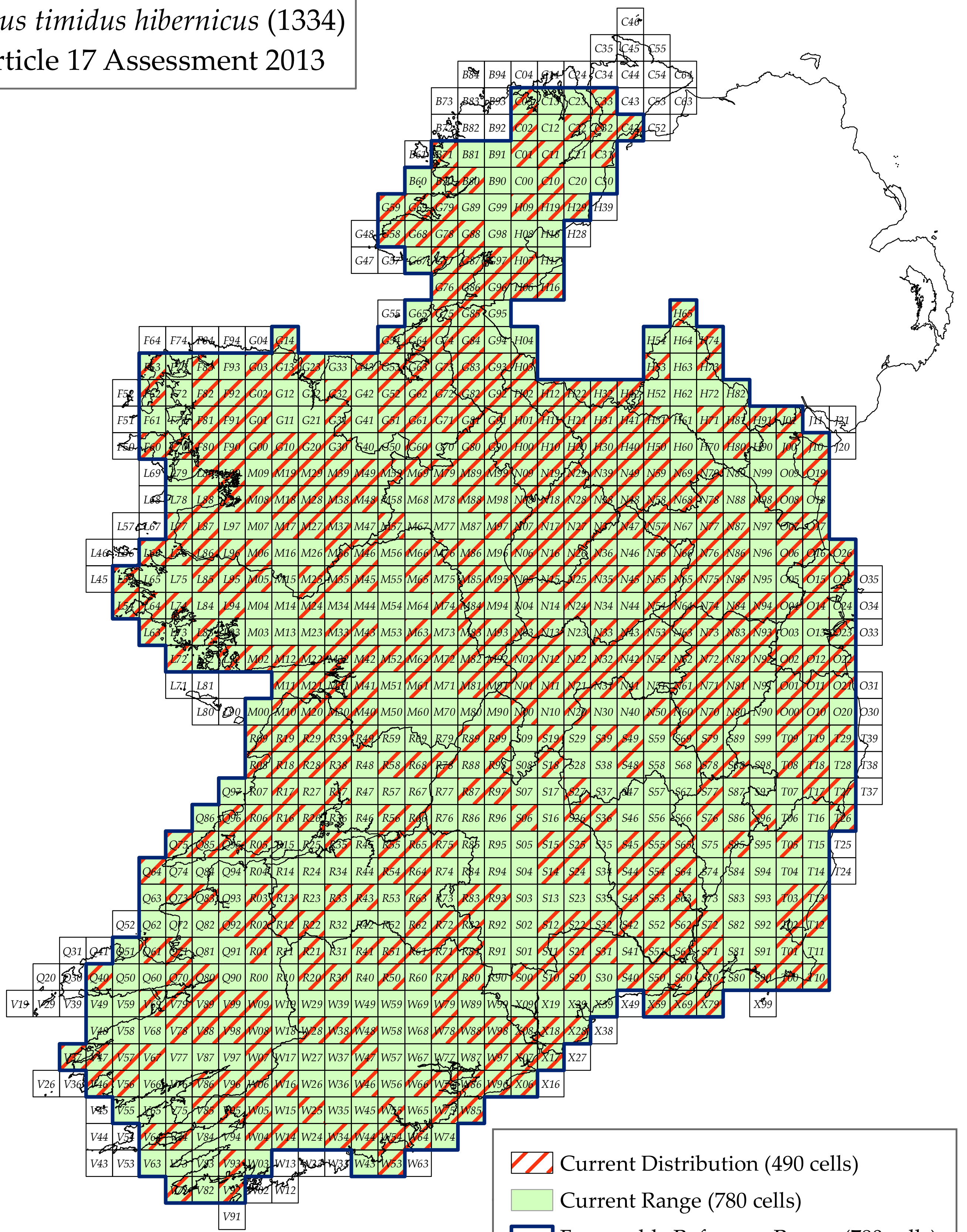
Field label	Note
Species: 1334	**Mountain hare; Irish hare**
0.2.01 Species code	Lepus timidus (Mountain hare) is widely distributed across northern Europe and Asia, ranging from Ireland in the west to Japan in the east. In Ireland, Lepus timidus occurs as a distinct, endemic sub-species, Lepus timidus hibernicus, the Irish hare. This is the only hare present in the Republic of Ireland and it is found throughout the country from coastal habitats to upland heath and bog. Diet in all these habitats tends to be dominated by grass species, but can also include herbs and shrubby species, where they are available. Leverets can be born at any time of year but peak breeding in spring is typical with a second litter later in the summer under suitable conditions. In good years, significant population increases can occur, but poor years with low breeding success and high mortality can lead to significant declines. Consequently, the species can show significant inter-annual fluctuations in population making it difficult to estimate trends. Density estimates stratified by habitat show that hares are more abundant in lowland, farmland habitat, while upland areas support lower densities of this species. As a result changes in agricultural practices can have a significant impact on hare populations.
0.2.03 Alternative species scientific name	In Ireland, Lepus timidus occurs as a distinct, endemic sub-species, Lepus timidus hibernicus, the Irish hare. Lepus timidus is widely distributed across northern Europe and Asia, ranging from Ireland in the west to Japan in the east. Recent work indicates that the Irish hare's unique morphology and ecology is the result of genetic adaptation due to the isolation from other Lepus timidus populations for at least 35,000 - 57,000 years (Hughes et al., 2006). One of the notable differences between the Irish hare and Lepus timidus in other regions is that the former does not undergo complete winter whitening. The Irish hare is the only native hare in Ireland and while a number of introductions of the brown hare (Lepus europaeus) are known from the nineteenth century, this latter species is only currently known from isolated populations in Northern Ireland (Fairley, 2001; Sheppard, 2004; Neil Reid, pers. comm).
1.1.01 Distribution map	Records derived from NBDC, roadkill data (www.biology.ie) and NPWS staff in the period 2007-2012.
1.1.04 Additional distribution map	Distribution data was intersected with the Irish 10 km2 grid.
1.1.05 Range map	Distribution data for the period 2007 - 2012 covered a total of 490 x 10km cells. The application of the Range Tool produced a range envelope of 771 x 10km squares. Nine cells within this range (R85, R95, R94, S57, S67, S56, S84, S83, S93) were excluded by the Range Tool but included in the final range based on expert opinion.
2.3.01 Surface area - Range	Based on distribution data from 2007 - 2012 inclusive, the hare was shown to be widespread throughout the country. Records from 490 x 10km cells produced a range of 771 x 10km cells. An additional 9 cells were also included based on expert opinion to give the total range of 780 x 10km cells. See 2.3.2.
2.3.02 Method used - Surface area of Range	Distribution data for the period 2007 - 2012 was collated from NBDC, the roadkill survey (biology.ie) and NPWS staff. This covered a total of 490 x 10km cells. The application of the Range Tool produced a range envelope of 771 x 10km squares. Nine cells within this range (R85, R95, R94, S57, S67, S56, S84, S83, S93) were excluded by the Range Tool but included in the final range based on expert opinion, giving a final range of 78,000km2.
2.3.04 Short term trend - Trend direction	Hare numbers are known to fluctuate significantly between years, but the range appears to remain stable.
2.3.09 a) Favourable reference range - In km2	The FRR has been set as the current range.

Field label	Note
Species: 1334	**Mountain hare; Irish hare**
2.3.10 b) Reason for change - improved knowledge/more accurate data?	The range has increased slightly from the last report in 2007 (from 749 to 780 x 10km cells). This is largely due to improved data on hare occurrence particularly in western and southern coastal areas.
2.4.01 a) Population size estimation (using individuals or agreed exceptions where possible) - Unit	The figures used for population size are based on the most recent national survey - 2007. Mean density nationally was estimated as 7.66 hares/km2, or 535,000 hares (95% C.I. 338,000-999,000). See Reid et al. (2007) for full details of survey methods and analysis.
2.4.01 b) Population size estimation (using individuals or agreed exceptions where possible) - Minimum	Minimum population size estimate is derived from lower confidence interval for the 2007 population estimate. See Reid et al. (2007) for full details.
2.4.01 c) Population size estimation (using individuals or agreed exceptions where possible) - Maximum	Maximum population size estimate is derived from upper confidence interval for the 2007 population estimate.See Reid et al. (2007) for full details.
2.4.04 Year or period	2007.
2.4.05 Method used - Population size	Based on night counts along point transects in a large sample of stratified random 1km squares spread across the whole country. A customised version of Distance sampling corrected for biases inherent in the Irish Landscape was then used to extrapolate nationally. See Reid et al. (2007) for full details.
2.4.07 Short-term trend - Trend direction	Reid et al. (2007) provides population estimates for Ireland for 2006 and 2007. A statistically significant difference was observed between the estimates for the two years. The detailed analysis of the Northern Ireland hare survey data from 2002 to 2010 (Reid & Montgomery, 2010) also demonstrates signficant inter-annual fluctuation in hare populations. This phenomenon has also been observed with mountain hare populations elsewhere. It is difficult to detect trends in the midst of such variations, but the available evidence suggests that hares can bounce back quickly after poor years. There is no evidence to suggest that the hare population overall is either increasing or decreasing. Consequently it is taken to be stable.
2.4.09 Short-term trend - Method used	The assessment of short term trend is based on a review of available data from both the Republic of Ireland and Northern Ireland.
2.4.14 d) Favourable reference population - Indicate method used to set reference value if other than operators	Hare densities (and therefore population size) fluctuate significantly from year to year and this makes it very difficult to pick a favourable reference population. The EC Guidance defines favourable reference population as: "Population in a given biogeographical region considered the minimum necessary to ensure the long-term viability of the species." The figure of 233,000 comes from Reid et al. (2007) and corresponds to the national population estimated for 2006. (It comes with 95% CI of 138,000 to 434,000.) It is noted that this population level was sufficient to produce a population of over 500,000 hares in 2007. 233,000 is equivalent to 3.33 hares/km2, but it is recognised that hare densities will vary significantly between habitats. See Reid et al (2007) for details of how this figure was calculated.
2.5.01 Area estimation	Although most common in Ireland in lowland agricultural grasslands, the mountain hare can be found in a wide variety of habitats, from seashore and coastal dunes, airports and recreational parklands right up into mountain heath and bog. The only generally unsuitable habitats are waterbodies. Woodlands/forests are difficult to survey but hares are known to use woodland edges and the more open areas of these habitats. The habitat area has been calculated as the total range minus the area of waterbodies.

Field label	Note
Species: 1334	**Mountain hare; Irish hare**
2.5.04 a) Quality of the habitat - Good / moderate / bad / unknown	The mountain hare is an adaptable species with a wide habitat niche in Ireland. The species can reach high densities in suitable habitat. Irish hares have been shown to be associated with a habitat matrix of improved farmland providing good quality grassland for forage interspersed with areas of tall vegetation providing cover and shelter for diurnal lie-up sites, for example, Juncus spp. (Reid et al. 2007a). A review of CORINE landcover from 1990 to 2000, showed that the most significant change in absolute areas of land cover was a reduction in land used as pasture and mixed farmland (www.epa.ie), with a concommitant rise in improved grassland (silage). While these changes may not lead to a reduction in actual extent of habitat available to the hare, they can lead to reduced habitat quality and increased population pressures - death of leverets during silage cutting is thought to be a major source of annual mortality. Hares do occur in woodland, but this habitat is considered marginal for them. Consequently, the increase in afforestation in recent decades is a potential cause for concern. Increased urbanisation, particularly suburban expansion, has reduced the extent of suitable habitats for hare. Furthermore, habitat fragmentation as a result of the recent road development programme is also a concern. Overall, these changes will have reduced the extent and quality of habitat for hares in Ireland, although this is not apparent at the 10km level. The hare is an adaptable species with a wide habitat niche in Ireland, but further research is required to determine what impact these changes are having on the hare population.
2.5.10 b) Reason for change - improved knowledge/more accurate data?	In 2007, the area of habitat was taken to equal the total extent of occurrence - 74, 900km2. For this assessment, the current range has also been used as the basis for habitat calculation, but from this figure (78,000km2) the area of waterbodies (considered unsuitable habitat) has been removed.
2.6 Main pressures - Pressure	Changes in agricultural practises are the main pressure, in particular intensification of grassland usage (switches from extensive grazing/rough grazing to silage production). Significant mortality of leverets (and perhaps adults) has been associated with intensive mowing operations i.e. silage harvesting. However the hare population continues to be resilient to these pressures which are assigned as high importance; the ranking relates to the fact that these pressures act over large areas. Road kill remains a concern; disturbance and mortality due to uncontrolled hunting (e.g. use of lurchers) is also a localised problem although the full impact on population not known. Coursing leads to some mortality each year, but management of coursing reserves has also been shown to be beneficial to hares leading to higher hare densities (Reid et al. 2010).
2.7 Threats - Threat	Current pressures are expected to continue into the future with added threat of genetic introgression from brown hare (Lepus europaeus). This non-native species is established in at least one area of Northern Ireland and genetic mixing has been shown (P. Prodohl pers comm.). Evidence from Sweden (e.g. Thulin, 2003) suggests that significant genetic mixing can result when these species overlap.
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The hare is widespread throughout Ireland with no evidence of a decline in range. This parameter is taken as favouable.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Hare populations fluctuate significantly between years. The 2006 population estimate has been taken as the reference population. The most recent population estimate (2007) is above this value and there is no evidence of a decline below the reference value since then. This parameter is taken as favourable.

Field label	Note
Species: 1334	**Mountain hare; Irish hare**
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Hares occupy a wide niche in Ireland and much of the Irish agricultural landscape provides excellent habitat for them. The move towards more intensive grassland provides some cause for concern but the extensive range of the hare in Ireland and the healthy population figures suggest that there is sufficient habitat to maintain a robust population nationally. This parameter is taken as favourable.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	While there is some pressure from habitat decline due to agricultural intensification, and possible risk of population fragmentation, the species is not expected to be significantly impacted. This parameter is taken as favouable.
2.9.05 Overall assessment of Conservation Status	The hare is widespread and common in Ireland with a broad habitat niche. None of the identified threats are considered likely to impact on its conservation status in the forseeable future.

Irish Hare
Lepus timidus hibernicus (1334)
Article 17 Assessment 2013



Current Distribution (490 cells)
Current Range (780 cells)
Favourable Reference Range (780 cells)

An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 10 20 30 40 50 km

N
Map - Léarscáil
V 1.0
Date - Dáta
31-05-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1345**
0.2.2 Species name	**Megaptera novaeangliae**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	Humpback whale

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	1995-2012
1.1.4 Additional map	No
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Marine Atlantic (MATL)

2.2 Published sources

DEHLG. (2009). Conservation Plan for Cetaceans in Irish Waters. Department of the Environment, Heritage and Local Government, 7 Ely Place, Dublin. 97pp.

Reilly, S.B., Bannister, J.L., Best, P.B., Brown, M., Brownell Jr., R.L., Butterworth, D.S., Clapham, P.J., Cooke, J., Donovan, G.P., Urbán, J. & Zerbini, A.N. (2008). Megaptera novaeangliae. In IUCN 2012. IUCN Red List of Threatened Species. Version 2012.2. http://www.iucnredlist.org.

Charif, R.A. & Clark, C.W. (2009). Acoustic monitoring of large whales in deep waters north and west of the British Isles: 1996-2005. Technical Report 08-07 for the UK DECC. Cornell University Bioacoustics Research Program, Laboratory of Ornithology, Cornell University, New York. 40pp.

Berrow, S.D., Whooley, P. & Ferriss, S. (2002). Irish Whale and Dolphin Group Cetacean Sighting Review (1991-2001). Irish Whale and Dolphin Group, Kilrush, Co. Clare. 34 pp.

Berrow, S.D., Whooley, P., O'Connell, M. & Wall, D. (2010). Irish Cetacean Review (2000-2009). Irish Whale and Dolphin Group, Kilrush, Co. Clare. 60pp.

Ó Cadhla, O., Mackey, M., Aguilar de Soto, N., Rogan, E. & Connolly, N. (2004). Cetaceans and Seabirds of Ireland's Atlantic Margin. Volume II - Cetacean distribution and abundance. Report on research carried out under the Irish Petroleum Infrastructure Programme (PIP): Rockall Studies Group (RSG) projects 98/6 and 00/13, Porcupine Studies Group project P00/15 and Offshore Support Group (OSG) project 99/38. 82pp.

Wall, D., O'Brien, J., Kavanagh, L., Ryan, C., Hunt, L. & Fennelly, S. (2012). Monitoring of spatial and temporal habitat use and abundance of cetaceans. In S.D. Berrow, J.O'Brien, I. O'Connor, D. McGrath & D. Wall. Marine Mammals and Megafauna in Irish Waters – behaviour, distribution and habitat use. Final project report for Grant-Aid Agreement No. PBA/ME/07/005(02) under the Sea Change

Strategy with the support of the Marine Institute, the Marine Research Sub-Programme of the National Development Plan 2007–2013 and the Department of Arts, Heritage and the Gaeltacht. Galway-Mayo Institute of Technology, Galway. p.1-187.

Clapham, P.J. (2009). Humpback whale. Megaptera novaeangliae. In W.F. Perrin, B. Würsig, J.G.M. Thewissen (eds.). Encyclopedia of Marine Mammals – 2nd edition. Academic Press, Elsevier Inc. p.582-584.

IWDG. (2012). Irish Whale and Dolphin Group website and online databases. Irish Whale and Dolphin Group, Kilrush, Co. Clare. http://www.iwdg.ie .

IWC. (2012). International Whaling Commission species status and population estimates. International Whaling Commission, Cambridge. http://iwc.int/home .

Ryan, C.G. (2012). On the ecology of rorqual whales (Balaenopteridae) in Irish waters using intrinsic markers. Unpublished PhD. thesis submitted to the Higher Education and Training Awards Council. Galway-Mayo Institute of Technology. 227pp.

Wall, D., Murray, C., O'Brien, J., Kavanagh, L., Wilson, C., Ryan, C., Glanville, B., Williams, D., Enlander, I., O'Connor, I., McGrath, D., Whooley, P. & Berrow, S. (2013). Atlas of the distribution and relative abundance of marine mammals in Irish offshore waters 2005 - 2011. Irish Whale and Dolphin Group, Kilrush, Co. Clare. 62pp.

Pollock, C.M., Reid, J.R., Webb, A. & Tasker, M.L. (1997). The distribution of seabirds and cetaceans in the waters around Ireland. JNCC Report No. 267. Joint Nature Conservation Committee, Peterborough. 167pp.

2.3 Range

2.3.1 Surface area - Range (km²)	570000	
2.3.2 Method - Range surface area	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	570000
	operator	N/A
	unknown	No
	method	The range value derived from the range map referred to in 1.1.5 is considered to be the baseline for this species. As there is no evidence of a decline since the Directive came into force the current range is set as the FRR.
2.3.10 Reason for change	Improved knowledge/more accurate data	

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	number of individuals (i)		
	min	21	max	12000

2.4.2 Population size (other than individuals)	Unit N/A min max
2.4.3 Additional information	Definition of locality Conversion method Problems: Sighting records from Irish offshore waters have been infrequent (Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012), but the species is seen more regularly off the south and southwest/southeast coasts, where 1-3 animals are most commonly recorded and up to six individuals may be recorded on occasion (IWDG, 2012 - unpublished data). Associated photo-identification efforts have so far identified a total of 21 individual whales, several of which have returned in subsequent years to the same foraging areas off southern Ireland (IWDG, 2012 - unpublished data). This identification process provides a rudimentary figure for the minimum population size but a reliable figure for the maximum population size cannot be provided due to ongoing data limitations. Instead a provisional maximum figure is given based on approximate population estimates for the species in the central and western North Atlantic (Clapham, 2009; IWC, 2012 - unpublished data).
2.4.4 Year or period	2001-2012
2.4.5 Method – population size	Estimate based on expert opinion with no or minimal sampling (1)
2.4.6 Short-term trend period	2001-2012
2.4.7 Short term trend direction	unknown (x)
2.4.8 Short-term trend magnitude	min max confidence interval
2.4.9 Short-term trend method	Estimate based on expert opinion with no or minimal sampling (1)
2.4.10 Long-term trend period	
2.4.11 Long term trend direction	N/A
2.4.12 Long-term trend magnitude	min max confidence interval
2.4.13 Long-term trend method	N/A
2.4.14 Favourable reference population	number operator N/A unknown Yes method: Robust data on humpback whale population size and trends in Irish waters are not available, mirroring uncertainty regarding this depleted species in parts of its North Atlantic range. Since it has not been possible to determine a realistic baseline value since the Directive came into force the FRP is unknown.
2.4.15 Reason for change	Improved knowledge/more accurate data

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km^2)	570000
2.5.2 Year or period	2001-2012
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Good
2.5.4 b) Quality of habitat - method	The quality of habitat for this species was determined by consideration of the relevant direct and indirect pressures thought to be acting on the species and/or

	its functional group, and its habitat within its natural environment. These pressures were evaluated in development of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009) using available scientific data concerning inter alia habitat use, population size, distribution and ecology, and threats to the species' protection (e.g., via natural/biological sources, human sectoral activities, management gaps, etc).
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	stable (0)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km^2)	570000
2.5.10 Reason for change	Improved knowledge/more accurate data

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	medium importance (M)	N/A
wildlife watching (G02.09)	low importance (L)	N/A
death or injury by collision (G05.11)	low importance (L)	N/A
Noise nuisance, noise pollution (H06.01)	low importance (L)	N/A
Seismic exploration, explosions (H06.05)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A

2.6.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	medium importance (M)	N/A
wildlife watching (G02.09)	low importance (L)	N/A
death or injury by collision (G05.11)	low importance (L)	N/A
Noise nuisance, noise pollution (H06.01)	low importance (L)	N/A
Seismic exploration, explosions (H06.05)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	Research into the appropriate use of statistics and a range of data sources for population trend analysis is currently under way. Until the results of this work become available, it is not considered scientifically valid to attempt to determine population trends.
2.8.2 Other relevant Information	
2.8.3 Trans-boundary assessment	Given the mobility of this marine species, and in particular the potential for seasonal movements in response to breeding requirements, prey distribution and abundance, and other natural processes, it is likely that individuals and/or groups of this species move between Irish waters and adjacent marine jurisdictions. A transboundary assessment in the next reporting period would allow a fuller appreciation of the range and status of this species.

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment Favourable (FV) qualifiers N/A
2.9.2. Population	assessment Unknown (XX) qualifiers N/A
2.9.3. Habitat	assessment Favourable (FV) qualifiers N/A
2.9.4. Future prospects	assessment Unknown (XX) qualifiers N/A
2.9.5 Overall assessment of Conservation Status	Unknown (XX)
2.9.6 Overall trend in Conservation Status	N/A

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit N/A min max
3.1.2 Method used	N/A
3.1.3 Trend of population size within	N/A

3.2 Conservation Measures

Article 17 - SPECIES NOTES

Field label	Note
Species: 1345	**Humpback whale**
0.1 Member State	Ireland
0.2.01 Species code	The humpback whale is the fourth largest baleen whale species found in Irish waters with adults averaging up to 15-16m in body length. It is quite readily identifiable at close range due to several diagnostic features, including its characteristic low 'bushy' exhalation blow, its small coarse-looking and irregularly-shaped dorsal fin, uniquely long white flexible pectoral fins, and the presence of individually-distinct white colouration patterning on the underside of the tail flukes. Having been intensively exploited in the late 19th and early 20th centuries by industrial whaling throughout the North Atlantic including off the Atlantic seaboard of Ireland (DEHLG, 2009), it is now classified as a species of Least Concern having shown signs of post-whaling population recovery in key parts of its range (Reilly et al., 2008). While it is possible that the species is under-recorded due to difficulties in distinguishing individual whales from other large whales in the open sea (e.g., sei whale, fin whale), its seasonal and predominantly oceanic occurrence off western Europe (Charif & Clark, 2009; DEHLG, 2009) may also explain why records remain low compared to more ubiquitous whale
0.2.04 Common name	Humpback whale = Míol mór dronnach
1.1.01 Distribution map	The distribution map presented for this species represents a significant proportion of all live sightings recorded during targeted scientific surveillance in Irish waters between 1994/95 and 2012. The surveillance programmes that contributed data to this projection are cited as follows: Pollock et al. (1997), Reid et al. (2003), Ó Cadhla et al. (2004) and Wall et al. (2013). These data and the results of other survey effort (e.g., SCANS-II, 2008; CODA, 2009; Berrow et al., 2010) were integrated into the development of the species range map presented under section 1.1.5. This distribution map for the species has been drawn in 50km x 50km resolution and is mapped in the LAEA projection.
1.1.02 Method used - map	Overall, observations of this depleted and somewhat elusive migratory species in Irish waters have been relatively infrequent over the last century but recently analysed acoustic data from the eastern Atlantic (Charif & Clark, 2009) and sighting records from coastal waters off the southwest, south and southeast of Ireland (Berrow et al., 2002; Berrow et al., 2010) have provided important information on the species' seasonal occurrence and distribution in western European waters. While the compilation of recent sightings might suggest the species' predominant occurrence in southern Irish continental shelf waters <200m deep (Berrow et al., 2010) this may be partly linked to observer effort; there are also data (e.g., Ó Cadhla et al., 2004; Charif & Clark, 2009; Wall et al., 2012) which indicate the species' principal distribution in deeper Atlantic waters including waters overlying the continental slope. While all reliable cetacean records obtained in Irish waters were not available for use in this exercise, the map drawn for this species provides a good sample of the species' observed distribution.
1.1.03 Year or period	The period selected for mapping the distribution of this species represents a period of intensive surveillance for cetaceans in Irish waters across a range of research and monitoring programmes.
1.1.05 Range map	The species' natural range in Irish waters is a small component of its wider North Atlantic migratory range (DEHLG, 2009; Clapham, 2009). The range map provided consists of its recorded and likely natural range based on recent data (2001-2012) and expert judgement, and is partly derived from 1.1.1. It consists of a block of contiguous 50km x 50km grid cells distributed in Irish marine waters, excluding enclosed shallow bays.
2.3.02 Method used - Surface area of Range	This figure has been derived from the range map referred to in 1.1.5.

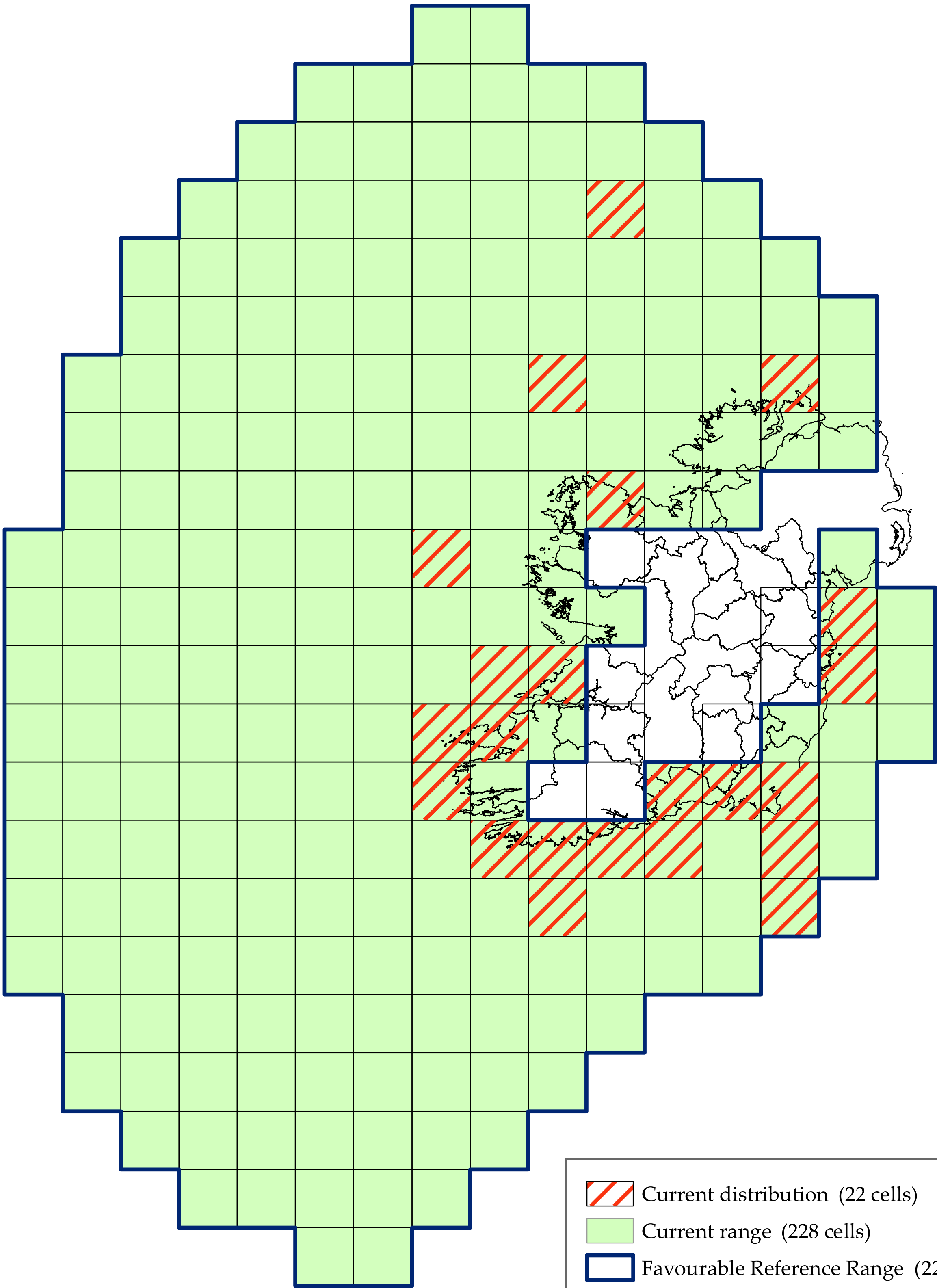
Field label	Note
Species: 1345	**Humpback whale**
2.3.03 Short-term trend - Period	Prior to 1999-2000, survey effort targeting cetacean species in Irish offshore waters was comparatively limited in coverage, both spatially and temporally. Since 1999-2000 a number of dedicated multi-annual surveillance programmes for cetaceans have operated in Irish waters, with survey effort extending to the limits of Ireland's EEZ and beyond. Consequently, with regard to this species it is considered that the years 2001-2012 represent an appropriate period for the evaluation of short-term trends.
2.3.04 Short term trend - Trend direction	Sighting and acoustic records from dedicated surveillance effort in Irish waters (Ó Cadhla et al., 2004; Charif & Clark, 2009; Berrow et al., 2010; Wall et al., 2012) provide no evidence of a decline in distribution/range in the recent past; therefore accordingly the short-term trend for range is considered to be stable.
2.3.06 Long-term trend - Period	A long-term trend period for this species is not considered appropriate, for reasons outlined in 2.3.3.
2.3.09 a) Favourable reference range - In km2	The range value derived from the range map referred to in 1.1.5 is considered to be the baseline for this species. As there is no evidence of a decline since the Directive came into force the current range is set as the FRR. [Note: (1) The species is known to be migratory; thus its range in Irish waters is likely to represent only a small component of its range in marine waters covered by the Directive and the wider North Atlantic Ocean; (2) There is an assumption that the current range in Irish waters is large enough (a) to encompass all of the ecological variation required by this species during its occurrences therein and (b) to contribute to the long-term survival of the species.]
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Additional sighting records of this distinctive and comparatively identifiable large whale species have been obtained since the previous reporting round (e.g., Berrow et al., 2010; Wall et al., 2012). Along with previous data from a range of sources, this has resulted in an improved knowledge and ability to assess the range from that reported in 2007. There is no scientific reason to assume that the species was not similarly present in 2001-2006.
2.4.04 Year or period	The period 2001-2012 has been selected in order to represent the most current population information available for this species.
2.4.05 Method used - Population size	Sighting records from Irish offshore waters have been infrequent (Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012), but the species is seen more regularly off the south and southwest/southeast coasts, where 1-3 animals are most commonly recorded and up to six individuals may be recorded on occasion (IWDG, 2012 - unpublished data). Associated photo-identification efforts have so far identified a total of 21 individual whales, several of which have returned in subsequent years to the same foraging areas off southern Ireland (IWDG, 2012 - unpublished data). This identification process provides a rudimentary figure for the minimum population size but a reliable figure for the maximum population size cannot be provided due to ongoing data limitations. Instead a provisional maximum figure is given based on approximate population estimates for the species in the central and western North Atlantic (Clapham, 2009; IWC, 2012 - unpublished data).
2.4.06 Short-term trend - Period	The period 2001-2012 has been selected, consistent with 2.3.3.

Field label	Note
Species: 1345	**Humpback whale**
2.4.09 Short-term trend - Method used	While current data indicate a recovery to perhaps pre-exploitation levels in the central and western North Atlantic (Reilly et al., 2008; IWC, 2012 - unpublished data), evidence of an increase in the northeast Atlantic population(s) of humpback whale is currently very limited. The origin/stock identity of those whales occurring in Irish and neighbouring waters of western Europe is not known and efforts have been under way to investigate this aspect further (e.g., Ryan, 2012). Considering these key data gaps and the small numbers of positive records from Irish waters, with the exception of a few individuals per annum sighted off southern coasts, there is insufficient evidence to reliably determine the short-term population trend for this species.
2.4.10 Long-term trend - Period	A long-term trend period for this species is not considered appropriate for reasons outlined in 2.3.3.
2.4.14 d) Favourable reference population - Indicate method used to set reference value if other than operators	Robust data on population size and trends for this species in Irish waters are not available, mirroring continued uncertainty regarding stocks and movements of this depleted species in parts of its North Atlantic range. Since it has not been possible to determine a realistic baseline value since the Directive came into force the FRP is unknown.
2.5.01 Area estimation	The surface area estimate for range (derived from the range map referred to 1.1.5) is used as a proxy for habitat surface area.
2.5.02 Year or period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.5.03 Method used Habitat for the species	Use of the range descriptor as a proxy for habitat is judged appropriate for this wide-ranging pelagic species.
2.5.04 b) Quality of the habitat - Explain how the quality was assessed	The quality of habitat for humpback whale was determined by consideration of the relevant direct and indirect pressures thought to be acting on the species and/or its functional group, and its habitat within its natural environment. These pressures were evaluated in development of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009) using available scientific data concerning inter alia habitat use, population size, distribution and ecology, and threats to the species' protection (e.g., via natural/biological sources, human sectoral activities, management gaps, etc). Humpback whale may be subject to a number of local and/or regional environmental pressures throughout its range in Irish waters (see 2.3, 2.6; DEHLG, 2009). However based on current data available none are considered to be of sufficient spatial or temporal impact on the species to be causing a significant deterioration in overall habitat quality in Ireland from a "good" status.
2.5.05 Short-term trend - Period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.5.06 Short-term trend - Trend direction	The trend for range in 2.3.4 is applied as a proxy for habitat.
2.5.07 Long-term trend - Period	A long-term trend period for this species is not considered appropriate, for reasons outlined in 2.3.3.
2.5.09 Area of suitable habitat for the species (km2)	Acoustic records obtained from deep Atlantic waters to the west of Ireland between 1996 and 2005 (Charif & Clark, 2009) indicated a strong seasonal (i.e., migratory) component to the species' occurrence in the Rockall Trough region. However sighting records from both offshore and continental shelf waters now suggest a broader species occurrence in space and time with habitat use extending into coastal waters of the Celtic Sea and even the Irish Sea on occasion. The Area of suitable habitat is therefore considered to be equal to the Habitat for the species.

Field label	Note
Species: 1345	**Humpback whale**
2.6 Main pressures - Pressure	In the development and preparation of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009), a comprehensive review of the pressures believed and/or documented to be acting on this species and/or its functional group (i.e., threats to their protection) was undertaken. The main pressures thought to be acting on this species are considered to occur primarily on a local or regional scale and/or on a temporary or intermittent basis (e.g., impacts arising from shipping movements; DEHLG, 2009). Since humpback whale distribution is likely to be broadly offshore in nature, the ranking given in most cases is one of low importance; but where a pressure may be regionally intensive (e.g., seasonal fisheries for shared target species or seismic exploration) the ranking given is one of medium importance. It should be noted that in relation to seismic exploration, which tends to occur on a local or occasionally regional scale in the waters of Ireland's EEZ and is comparatively low in coverage relative to several other member states, a robust regulatory and management regime applies in order to avoid potentially significant impacts on all species of marine mammal. The impact on this species of current wildlife watching, changes in sea temperature and other abiotic factors in the marine environment can also not be discounted.
2.7 Threats - Threat	There is no evidence to suggest a change in the main pressures thought to be acting on this species in the near future. However surveillance of the species and the pressures potentially acting upon it will continue into the future, while the application of strong management measures (e.g., via the statutory/regulatory process) to avoid potentially significant impacts is also expected to continue.
2.8.01 Justification of % thresholds for trends	A detailed analysis of the statistical ability and power to robustly determine population trends for cetacean species occurring in western European waters is under way via the Joint Cetacean Protocol (JCP) project in the UK. This phased work is due for completion in 2013 and it will inform whether and for which species the measurement of population trends may be possible based on survey data from a range of sources.
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	While records of this species appear to be increasing in Ireland, particularly in coastal waters, the humpback whale is widely recorded from continental shelf to deep oceanic areas. Hence the Range is considered to be favourable.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	While current data indicate a recovery to perhaps pre-exploitation levels in the central and western North Atlantic, evidence of an increase in the northeast Atlantic population(s) of humpback whale is currently very limited. In addition, the origin/stock identity of those whales occurring in Irish and neighbouring waters of western Europe is not known. Considering these key data gaps and the small numbers of positive records from Irish waters, with the exception of a few individuals per annum sighted off southern coasts, the population parameter is considered unknown.
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The habitat for this species in Ireland is considered favourable given the broad distribution of records from deeper oceanic waters to those overlying the continental shelf.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	A number of pressures have been identified. While the effect of these pressures may act on a temporary and/or regional scale and some are likely continue to act as pressures into the future, the impacts on individuals or populations of humpback whale in Irish waters are not well understood. This is largely due to limited data on its numbers and ecology within Ireland's marine area. While ongoing threats as listed or identified into the future via surveillance will be managed appropriately, the future prospects for the species are therefore considered to be unknown.

Field label	Note
Species: 1345	**Humpback whale**
2.9.05 Overall assessment of Conservation Status	Based on the assessments for the Range, Population, Habitat and Future Prospects parameters, the overall conclusion is that the conservation status of humpback whale in Ireland is considered "Unknown". This overall result is the same as in the previous Article 17 assessment due to limited ongoing information on this depleted species' occurrence and population ecology in Irish waters. However improvements are reported in the assessments for the Range and Habitat parameters, due to improved knowledge.

Humpback whale - *Megaptera novaeangliae* (1345)
Article 17 Assessment 2013



Current distribution (22 cells)
Current range (228 cells)
Favourable Reference Range (228 cells)

An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 25 50 75 100 km

N
Map - Léarscáil
V 1.0
Date - Dáta
11-06-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1348**
0.2.2 Species name	**Eubalaena glacialis**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	Northern right whale

1. National Level

1.1 Maps

1.1.1 Distribution Map	No
1.1.1a Sensitive species	No
1.1.2 Method used - map	N/A
1.1.3 Year or period	
1.1.4 Additional map	No
1.1.5 Range map	No

2. Biogeographical Or Marine Level

2.1 Biogeographical Region	**Marine Atlantic (MATL)**
2.2 Published sources	

2.3 Range

2.3.1 Surface area - Range (km²)		
2.3.2 Method - Range surface area	N/A	
2.3.3 Short-term trend period		
2.3.4 Short-term trend direction	N/A	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	
	operator	N/A
	unknown	No
	method	
2.3.10 Reason for change		

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	N/A
	min	max
2.4.2 Population size (other than individuals)	Unit	N/A
	min	max
2.4.3 Additional information	Definition of locality	
	Conversion method	
	Problems	
2.4.4 Year or period		
2.4.5 Method – population size	N/A	
2.4.6 Short-term trend period		
2.4.7 Short term trend direction	N/A	

2.4.8 Short-term trend magnitude	min	max	confidence interval
2.4.9 Short-term trend method	N/A		
2.4.10 Long-term trend period			
2.4.11 Long term trend direction	N/A		
2.4.12 Long-term trend magnitude	min	max	confidence interval
2.4.13 Long-term trend method	N/A		
2.4.14 Favourable reference population	number		
	operator N/A		
	unknown No		
	method		
2.4.15 Reason for change			

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	
2.5.2 Year or period	
2.5.3 Method used - habitat	N/A
2.5.4 a) Quality of habitat	
2.5.4 b) Quality of habitat - method	
2.5.5 Short term trend period	
2.5.6 Short term trend direction	N/A
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	
2.5.10 Reason for change	

2.6 Main Pressures

2.6.1 Method used – pressures	N/A

2.7 Main Threats

2.7.1 Method used – threats	N/A

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant Information	
2.8.3 Trans-boundary assessment	

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment	Unknown (XX)
	qualifiers	N/A
2.9.2. Population	assessment	Unknown (XX)
	qualifiers	N/A
2.9.3. Habitat	assessment	Unknown (XX)
	qualifiers	N/A
2.9.4. Future prospects	assessment	Unknown (XX)
	qualifiers	N/A
2.9.5 Overall assessment of Conservation Status	Unknown (XX)	
2.9.6 Overall trend in Conservation Status	N/A	

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	N/A		
	min		max	
3.1.2 Method used	N/A			
3.1.3 Trend of population size within	N/A			

3.2 Conservation Measures

Article 17 - SPECIES NOTES

Field label	Note
Species: 1348	**Northern right whale**
0.1 Member State	Ireland
0.2.04 Common name	Northern Right whale = Míol mór an Oighir / Ceartmhíol mór an Tuaiscirt
1.1.02 Method used - map	No live records of this species have been obtained from Ireland within the current reporting round or since the Directive came into force.
2.9.05 Overall assessment of Conservation Status	Since no live records of this species have been obtained from Ireland within the current reporting round or since the Directive came into force, the conservation status of this vagrant species is assessed as unknown.

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1349**
0.2.2 Species name	**Tursiops truncatus**
0.2.3 Alternative species scientific name	Common bottlenose dolphin
0.2.4 Common name	Bottlenose dolphin

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	1995-2012
1.1.4 Additional map	No
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Marine Atlantic (MATL)

2.2 Published sources

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2.3 Range

2.3.1 Surface area - Range (km²)	580000	
2.3.2 Method - Range surface area	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	580000
	operator	N/A
	unknown	No
	method	The range value derived from the range map referred to in 1.1.5 is considered to be the baseline for this species. As there is no evidence of a decline since the Directive came into force the current range is set as the FRR.
2.3.10 Reason for change	Improved knowledge/more accurate data	

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	number of individuals (i)		
	min	10539	max	27982
2.4.2 Population size (other than individuals)	Unit	N/A		
	min		max	
2.4.3 Additional information	Definition of locality			
	Conversion method			
	Problems	Evidence from multi-annual surveillance programmes (Ó Cadhla et al., 2004; Berrow et al., 2010a; Wall et al., 2012) indicate that bottlenose dolphins occur widely in Irish waters and do so throughout the year. Recent estimates of total abundance in the waters overlying the western European continental shelf and slope		

	margin numbered approximately 12,650 animals in 2005 (95%CL = 7,504-21,307; SCANS-II, 2008) approximately 50% of which were attributed to Irish waters (DEHLG, 2009). Estimates from summer 2007 for deeper oceanic waters numbered approximately 19,300 animals (95%CL = 11,842-31,440; CODA, 2009), approximately 17,250 of which were attributed to the offshore Atlantic waters of Britain and Ireland (DEHLG, 2009). In seeking to approximate population size range for Irish waters from these broad-scale datasets, there are significant difficulties due (i) to the species' wide pelagic distribution throughout European waters making jurisdictional separation somewhat arbitrary, (ii) to problems associated with the narrow temporal focus of such surveys (e.g., one month in one season in one year, widely separated survey years, or different years for coverage of shelf and off-shelf sectors), and (iii) to high CVs (i.e., estimation uncertainty) particularly from regions where recorded numbers of sightings have been low. The population estimates given for this species are based on the summation of regional area-based estimates presented in CODA (2009), which collectively attribute almost 90% of animals to Irish waters and those shared with adjacent Member States (i.e., UK and France). The minimum and maximum figures are therefore 0.89 x [the estimated 95%CL derived via CODA]. These estimates assume the free ranging of animals across and between the broad survey regions covered in 2005 and 2007 (e.g., Celtic Sea, Porcupine shelf, Porcupine Seabight, Rockall Trough, Bay of Biscay). While the notional Irish population estimate approximated from SCANS-II survey data (DEHLG, 2009) falls below the minimum figure presented here, when the relevant 95%CL about the estimate are taken into account this discrepancy is resolved.
2.4.4 Year or period	2001-2012
2.4.5 Method – population size	Estimate based on partial data with some extrapolation and/or modelling (2)
2.4.6 Short-term trend period	2001-2012
2.4.7 Short term trend direction	unknown (x)
2.4.8 Short-term trend magnitude	min / max / confidence interval
2.4.9 Short-term trend method	Estimate based on expert opinion with no or minimal sampling (1)
2.4.10 Long-term trend period	
2.4.11 Long term trend direction	N/A
2.4.12 Long-term trend magnitude	min / max / confidence interval
2.4.13 Long-term trend method	N/A
2.4.14 Favourable reference population	number operator: N/A unknown: Yes method: Robust data on bottlenose dolphin population trends throughout Irish waters are not available although knowledge of the species'

	distribution and summer abundance has improved since the Directive came into force. Nevertheless the use of current population figures as descriptors for FRP require further work. The FRP for this species is therefore considered to be unknown.
2.4.15 Reason for change	Improved knowledge/more accurate data

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	580000
2.5.2 Year or period	2001-2012
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Good
2.5.4 b) Quality of habitat - method	The quality of habitat for this species was determined by consideration of the relevant direct and indirect pressures thought to be acting on the species and/or its functional group, and its habitat within its natural environment. These pressures were evaluated in development of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009) using available scientific data concerning inter alia habitat use, population size, distribution and ecology, and threats to the species' protection (e.g., via natural/biological sources, human sectoral activities, management gaps, etc).
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	stable (0)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	580000
2.5.10 Reason for change	Improved knowledge/more accurate data

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	medium importance (M)	N/A
wildlife watching (G02.09)	medium importance (M)	N/A
death or injury by collision (G05.11)	low importance (L)	N/A
Marine water pollution (H03)	low importance (L)	N/A
Noise nuisance, noise pollution (H06.01)	low importance (L)	N/A
Seismic exploration, explosions (H06.05)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A

2.6.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	medium importance (M)	N/A
wildlife watching (G02.09)	medium importance (M)	N/A
death or injury by collision (G05.11)	low importance (L)	N/A
Marine water pollution (H03)	low importance (L)	N/A
Noise nuisance, noise pollution (H06.01)	low importance (L)	N/A
Seismic exploration, explosions (H06.05)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	Research into the appropriate use of statistics and a range of data sources for population trend analysis is currently under way. Until the results of this work become available, it is not considered scientifically valid to attempt to determine population trends.
2.8.2 Other relevant Information	
2.8.3 Trans-boundary assessment	Given the mobility of this marine species, and in particular the potential for seasonal movements in response to breeding requirements, prey distribution and abundance, and other natural processes, it is now known that individuals and/or groups of this species can and do move between Irish waters and adjacent marine jurisdictions (e.g., Robinson et al., 2012). A transboundary assessment in the next reporting period would allow a fuller appreciation of the range and status of this species.

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment Favourable (FV) qualifiers N/A
2.9.2. Population	assessment Favourable (FV) qualifiers N/A
2.9.3. Habitat	assessment Favourable (FV) qualifiers N/A
2.9.4. Future prospects	assessment Favourable (FV) qualifiers N/A
2.9.5 Overall assessment of Conservation Status	Favourable (FV)
2.9.6 Overall trend in Conservation Status	N/A

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit number of individuals (i) min 10539 max 27982
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)
3.1.3 Trend of population size within	stable (0)

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Establish protected areas/sites (6.1)	Legal Administrative Recurrent	high importance (H)	Inside	Maintain
Legal protection of habitats and species (6.3)	Legal Administrative Recurrent	high importance (H)	Both	Maintain

Regulation/ Management of hunting and taking (7.1)	Legal Administrative Recurrent	medium importance (M)	Both	Maintain
Regulation/ Management of fishery in marine and brackish systems (7.3)	Legal Administrative Recurrent	high importance (H)	Both	Maintain
Regulating/Managing exploitation of natural resources on sea (9.2)	Legal Administrative Recurrent	high importance (H)	Both	Maintain

Article 17 - SPECIES NOTES

Field label	Note
Species: 1349	**Bottlenose dolphin**
0.1 Member State	Ireland
0.2.01 Species code	The common bottlenose dolphin is one of the most frequently recorded and familiar cetacean species occurring in Irish waters. A distinctive medium-sized dolphin, its adults average up to 3.0-3.8m in body length. Found throughout the world's tropical and temperate marine waters, the species' range does not commonly extend into sub-polar waters and in the eastern Atlantic it is rarely recorded in the Baltic Sea or north of the Faroe Islands (Hammond et al., 2012). It is classified as a species of Least Concern since its widespread global distribution and abundance indicate that the species is well above the thresholds for a threatened category and no major threats to the species have been identified. Bottlenose dolphins are regularly recorded in Irish coastal and offshore waters (Ó Cadhla et al., 2004; Berrow et al., 2010a; Wall et al., 2012) and may show a level of residency in certain coastal areas (DEHLG, 2009). They are quite readily identifiable when they break clear of the water surface, bearing a substantial curved grey dorsal fin, a short but pronounced rounded beak, and lacking an obvious pattern in their grey body colouration except for a paler ventral surface. The overall taxonomy of this species is confused however, due to geographical variation (Hammond et al., 2012). Although genetic and ecological separation of coastal and offshore populations has been demonstrated in the western North Atlantic (Wells & Scott, 2009), separate breeding stocks and clear seasonal or latitudinal/longitudinal patterns in movement by populations in the northeast Atlantic are not apparent (e.g., DEHLG, 2009; Robinson et al., 2012). An exception may be the population inhabiting the Shannon Estuary which has been shown to be genetically distinct from other populations sampled thus far (Mirimin et al., 2011).
0.2.04 Common name	Bottlenose dolphin = Deilf bholgshrónach
1.1.01 Distribution map	The distribution map presented for this species represents a significant proportion of all live sightings recorded during targeted scientific surveillance in Irish waters between 1994/95 and 2012. The surveillance programmes that contributed data to this projection are cited as follows: Pollock et al. (1997), Reid et al. (2003), Ó Cadhla et al. (2004) and Wall et al. (2013). These data and the results of other survey effort (e.g., SCANS-II, 2008; CODA, 2009; Berrow et al., 2010a) were integrated into the development of the species range map presented under section 1.1.5. This distribution map for the species has been drawn in 50km x 50km resolution and is mapped in the LAEA projection.
1.1.02 Method used - map	Over the last 2-3 decades records of the occurrence of this species in Irish waters have been far more numerous than records of most cetaceans with the exception of the short-beaked common dolphin and harbour porpoise. Simultaneous to more rigorous surveillance in the last 15-20 years numerous bottlenose dolphin records have continued to emerge, from deep oceanic and continental shelf waters to the north, west and southwest of Ireland as well as in the Celtic Sea and the Irish Sea (Ó Cadhla et al., 2004; SCANS-II, 2008; CODA, 2009; Berrow et al., 2010a; Wall et al., 2012). The distribution of recent sightings along with regional sighting records obtained across three preceding decades (Berrow et al., 2002; Reid et al., 2003) indicate a predominant distribution in waters overlying the continental shelf and continental slope, although records in the deep Rockall Trough and Porcupine Seabight are not uncommon. While all reliable cetacean records obtained in Irish waters were not available for use in this exercise, the map drawn for this species provides a good sample of the species' observed distribution.
1.1.03 Year or period	The period selected for mapping the distribution of this species represents a period of intensive surveillance for cetaceans in Irish waters across a range of research and monitoring programmes.

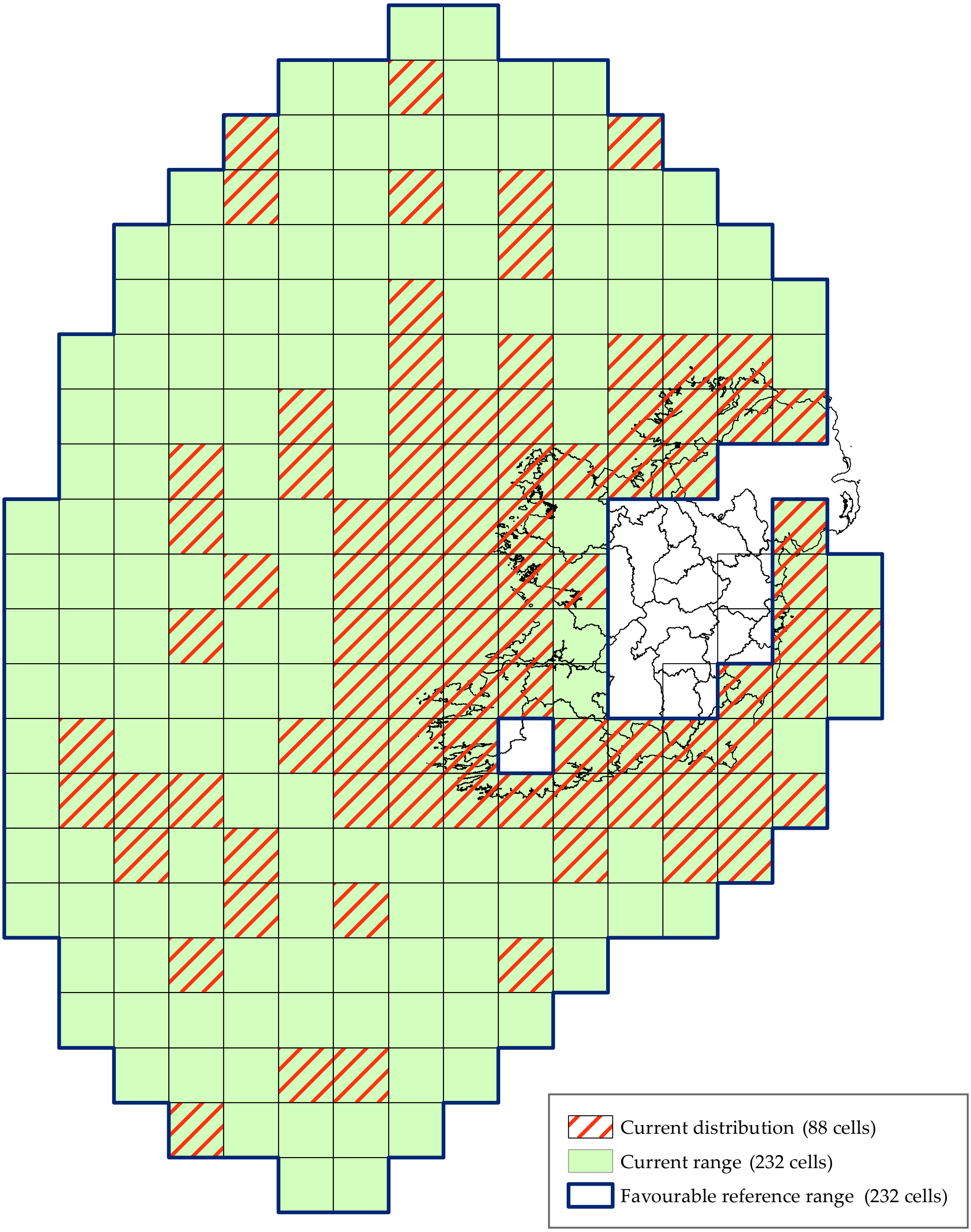
Field label	Note
Species: 1349	**Bottlenose dolphin**
1.1.05 Range map	The species' natural range in Irish waters is believed to be a small component of its wider range in the waters of western Europe and the North Atlantic (DEHLG, 2009; Wells & Scott, 2009; Hammond et al., 2012). The range map provided consists of its recorded and likely natural range based on recent data (2001-2012) and expert judgement, and is partly derived from 1.1.1. It consists of a block of contiguous 50km x 50km grid cells distributed in Irish marine waters, and including shallow coastal bays and estuaries.
2.3.02 Method used - Surface area of Range	This figure has been derived from the range map referred to in 1.1.5.
2.3.03 Short-term trend - Period	Prior to 1999-2000, survey effort targeting cetacean species in Irish offshore waters was comparatively limited in coverage, both spatially and temporally. Since 1999-2000 a number of dedicated multi-annual surveillance programmes for cetaceans have operated in Irish waters, with survey effort extending to the limits of Ireland's EEZ and beyond. Consequently, with regard to this species it is considered that the years 2001-2012 represent an appropriate period for the evaluation of short-term trends.
2.3.04 Short term trend - Trend direction	Sighting records from dedicated surveillance effort in Irish waters (Ó Cadhla et al., 2004; Berrow et al., 2010a; Wall et al., 2012) provide no evidence of a decline in distribution/range in the recent past; therefore accordingly the short-term trend for range is considered to be stable.
2.3.06 Long-term trend - Period	A long-term trend period for this species is not considered appropriate, for reasons outlined in 2.3.3.
2.3.09 a) Favourable reference range - In km2	The range value derived from the range map referred to in 1.1.5 is considered to be the baseline for this species. As there is no evidence of a decline since the Directive came into force the current range is set as the FRR. [Note: (1) The species is thought to be wide-ranging with some element of seasonal variation therein while regional population components (e.g., in the Shannon Estuary, west of Ireland) may be present year-round; Nevertheless the species' range in Irish waters is likely to represent only a component of its range in marine waters covered by the Directive and the northeast Atlantic Ocean; (2) There is an assumption that the current range in Irish waters is large enough (a) to encompass all of the ecological variation required by this species during its occurrences therein and (b) to contribute to the long-term survival of the species.]
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Additional sighting records of this distinctive and commonly identified small cetacean species have been obtained since the previous reporting round (e.g., SCANS-II, 2008; CODA, 2009; Berrow et al., 2010a; Wall et al., 2012). Along with previous data from a range of sources, this has resulted in an improved knowledge and ability to assess the range from that reported in 2007. There is no scientific reason to assume that the species was not similarly present in 2001-2006.
2.4.04 Year or period	The period 2001-2012 has been selected in order to represent the most current population information available for this species.

Field label	Note
Species: 1349	**Bottlenose dolphin**
2.4.05 Method used - Population size	Evidence from multi-annual surveillance programmes (Ó Cadhla et al., 2004; Berrow et al., 2010a; Wall et al., 2012) indicate that bottlenose dolphins occur widely in Irish waters and do so throughout the year. Recent estimates of total abundance in the waters overlying the western European continental shelf and slope margin numbered approximately 12,650 animals in 2005 (95%CL = 7,504-21,307; SCANS-II, 2008) approximately 50% of which were attributed to Irish waters (DEHLG, 2009). Estimates from summer 2007 for deeper oceanic waters numbered approximately 19,300 animal (95%CL = 11,842-31,440; CODA, 2009), approximately 17,250 of which were attributed to the offshore Atlantic waters of Britain and Ireland (DEHLG, 2009). In seeking to approximate population size range for Irish waters from these broad-scale datasets, there are significant difficulties due (i) to the species' wide pelagic distribution throughout European waters making jurisdictional separation somewhat arbitrary, (ii) to problems associated with the narrow temporal focus of such surveys (e.g., one month in one season in one year, widely separated survey years, or different years for coverage of shelf and off-shelf sectors), and (iii) to high CVs (i.e., estimation uncertainty) particularly from regions where recorded numbers of sightings have been low. The population estimates given for this species are based on the summation of regional area-based estimates presented in CODA (2009), which collectively attribute almost 90% of animals to Irish waters and those shared with adjacent Member States (i.e., UK and France). The minimum and maximum figures are therefore 0.89 x [the estimated 95%CL derived via CODA]. These estimates assume the free ranging of animals across and between the broad survey regions covered in 2005 and 2007 (e.g., Celtic Sea, Porcupine shelf, Porcupine Seabight, Rockall Trough, Bay of Biscay). While the notional Irish population estimate approximated from SCANS-II survey data (DEHLG, 2009) falls below the minimum figure presented here, when the relevant 95%CL about the estimate are taken into account this discrepancy is resolved.
2.4.06 Short-term trend - Period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.4.09 Short-term trend - Method used	There is little evidence of growth in the northeast Atlantic population(s) of bottlenose dolphin, although assessments of overall population status in the North Atlantic indicate that the species is in a healthy state (Hammond et al., 2012). However, given that recent population estimates for the species (SCANS-II, 2008; CODA, 2009) are the only figures for western European waters since the Directive came into force, the reliable determination of short-term population trend for this species is not possible.
2.4.10 Long-term trend - Period	A long-term trend period for this species is not considered appropriate for reasons outlined in 2.3.3.
2.4.14 d) Favourable reference population - Indicate method used to set reference value if other than operators	Robust data on bottlenose dolphin population trends throughout Irish waters are not available. Broad-scale population figures have been obtained for the European Atlantic based on comparable surveys of the continental shelf area (SCANS-II, 2008) and deepe oceanic waters (CODA, 2009). In addition, summer abundance estimates have been derived for the Shannon Estuary population over several years of study (Ingram, 2000; Ingram & Rogan, 2003; Englund et al., 2007; Englund et al., 2008; Berrow et al., 2010b) while minimum numbers occurring locally in the south and west/northwest of Ireland have recently been estimated (Ingram et al., 2009; Oudejans et al., 2010; Ryan et al., 2011). With the exception of bottlenose dolphins inhabiting the Shannon Estuary, the figures derived collectively represent the first comparatively robust population estimates since the Directive came into force, they are all captured from a short snapshot in time, the associated Lower and Upper 95% Confidence Limits are significantly different, and their use as descriptors for FRP require further work. The FRP for this species is therefore considered to be unknown.
2.5.01 Area estimation	The surface area estimate for range (derived from the range map referred to in 1.1.5) i used as a proxy for habitat surface area.

Field label		Note
Species:	**1349**	**Bottlenose dolphin**
2.5.02 Year or period		The period 2001-2012 has been selected, consistent with 2.3.3.
2.5.03 Method used Habitat for the species		Use of the range descriptor as a proxy for habitat is judged appropriate for this wide-ranging pelagic species.
2.5.04 b) Quality of the habitat - Explain how the quality was assessed		The quality of habitat for common bottlenose dolphin was determined by consideration of the relevant direct and indirect pressures thought to be acting on the species and/or its functional group, and its habitat within its natural environment. These pressures were evaluated in development of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009) using available scientific data concerning inter alia habitat use, population size, distribution and ecology, and threats to the species' protection (e.g., via natural/biological sources, human sectoral activities, management gaps, etc). Bottlenose dolphin may be subject to a number of local and/or regional environmental pressures throughout its range in Irish waters (see 2.3, 2.6; DEHLG, 2009). However based on current data available none are considered to be of sufficient spatial or temporal impact on the species to be causing a significant deterioration in overall habitat quality in Ireland from a "good" status.
2.5.05 Short-term trend - Period		The period 2001-2012 has been selected, consistent with 2.3.3.
2.5.06 Short-term trend - Trend direction		The trend for range in 2.3.4 is applied as a proxy for habitat.
2.5.07 Long-term trend - Period		A long-term trend period for this species is not considered appropriate, for reasons outlined in 2.3.3.
2.5.09 Area of suitable habitat for the species (km2)		Common bottlenose dolphins have been widely recorded in Irish waters both historically and to the present day and the known habitats for this cosmopolitan species include coastal and continental shelf waters as well as deeper waters overlying the continental slope and those in excess of 2,000-3,000m. The Area of suitable habitat is therefore considered to be equal to the Habitat for the species.
2.6 Main pressures - Pressure		In the development and preparation of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009), a comprehensive review of the pressures believed and/or documented to be acting on this species and/or its functional group (i.e., threats to their protection) was undertaken. With the exception of pressures arising from some commercial fishing activity, most of the main pressures thought to be acting on this species are not considered to occur over large regional areas but may be more local in scale and/or on a temporary or intermittent basis (e.g., noise disturbance, wildlife watching, seismic exploration; DEHLG, 2009). Since common bottlenose dolphin distribution is very broad in nature, where a pressure may be regionally intensive the ranking given is one of medium importance. It should be noted that in relation to seismic exploration, which tends to occur on a local or occasionally regional scale in the waters of Ireland's EEZ and is comparatively low in coverage relative to several other member states, a robust regulatory and management regime applies in order to avoid potentially significant impacts on all species of marine mammal. The impact on this species of wildlife watching, pollutant burdens or changes in sea temperature and other abiotic factors in the marine environment can also not be discounted.
2.7 Threats - Threat		There is no evidence to suggest a change in the main pressures thought to be acting on this species in the near future. However surveillance of the species and the pressures potentially acting upon it will continue into the future, while the application of strong management measures (e.g., via the statutory/regulatory process) to avoid potentially significant impacts is also expected to continue.

Field label	Note
Species: 1349	**Bottlenose dolphin**
2.8.01 Justification of % thresholds for trends	A detailed analysis of the statistical ability and power to robustly determine population trends for cetacean species occurring in western European waters is under way via the Joint Cetacean Protocol (JCP) project in the UK. This phased work is due for completion in 2013 and it will inform whether and for which species the measurement of population trends may be possible based on survey data from a range of sources.
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The bottlenose dolphin is widely recorded in Irish waters from deep oceanic areas to coastal waters. Hence the Range is considered to be favourable.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	While robust data on bottlenose dolphin population size and trends in Irish waters as a whole are not available, knowledge of the species' coastal and offshore populations, seasonal distribution and summer abundance in western European waters has improved greatly since the Directive came into force. This indicates that bottlenose dolphins number in the tens of thousands regionally (see 2.4). Given the available estimates and the species' wide occurrence in Irish waters, the population parameter is considered favourable.
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The habitat for this species in Ireland is considered favourable, as it supports a favourable population across a very large marine area.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	A number of pressures have been identified. While the effect of these pressures may act on a temporary and/or regional scale and some are likely to continue to act as pressures into the future, none is considered to be of sufficient magnitude to be causing an adverse impact on populations of bottlenose dolphin in Irish waters. Ongoing threats as listed or identified into the future via surveillance will be managed appropriately. Hence the future prospects for the species are considered favourable.
2.9.05 Overall assessment of Conservation Status	Based on the assessments for Range, Population, Habitat and Future Prospects parameters, the overall conclusion is that the conservation status of common bottlenose dolphin in Ireland is considered "Favourable". This overall result is the same as in the previous Article 17 assessment while an improvement is reported in the assessment for the Population parameter, due to improved knowledge.
3.1.02 Method used	The minimum and maximum population sizes given for this wide ranging dolphin species are derived from the results of the CODA survey conducted in the summer of 2007 (CODA, 2009). Details concerning the method used are presented in 2.4.3. and 2.4.5.
3.1.03 Trend of population size within the network (short-term trend)	Evidence from five population estimation surveys carried out since 1997 indicates that the population (within the Natura 2000 network designated for the species in Ireland) has maintained itself at a relatively stable trajectory (Berrow et al., 2010b). The ability to accurately determine population trends in this species is dependent on the frequency and precision of population surveys undertaken (Englund et al., 2008). Ongoing high quality surveillance will assist in the continued determination and verification of population trend data.
3.2 Conservation measures	All measures taken during the reporting period are designed to ensure the maintenance of bottlenose dolphin at a favourable conservation status in Ireland and to ensure that the conservation provisions for this species, as underpinned by Articles 6 and 12 of the Habitats Directive in particular, are robustly implemented including via national legislation (i.e., EC Birds and Natural Habitats Regulations S.I. No. 477/2011, etc). Key ongoing actions and protection measures for the species (e.g., protection from disturbance/harassment) were also identified in the Conservation Plan for Cetaceans in Irish Waters (DEHLG, 2009) and these are being pursued.

Bottlenose dolphin - *Tursiops truncatus* (1349)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 25 50 75 100 km

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Map - Léarscáil
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11-06-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1350**
0.2.2 Species name	**Delphinus delphis**
0.2.3 Alternative species scientific name	Common dolphin
0.2.4 Common name	Short-beaked common dolphin

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	1995-2012
1.1.4 Additional map	No
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Marine Atlantic (MATL)

2.2 Published sources

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2.3 Range

2.3.1 Surface area - Range (km^2)	572500	
2.3.2 Method - Range surface area	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km^2)	572500
	operator	N/A
	unknown	No
	method	The range value derived from the range map referred to in 1.1.5 is considered to be the baseline for this species. As there is no evidence of a decline since the Directive came into force the current range is set as the FRR.
2.3.10 Reason for change	Improved knowledge/more accurate data	

2.4 Population

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

2.4.1 Population size (individuals or agreed exception)	Unit	number of individuals (i)		
	min	13487	max	74433
2.4.2 Population size (other than individuals)	Unit	N/A		
	min		max	
2.4.3 Additional information	Definition of locality			
	Conversion method			
	Problems	Evidence from multi-annual surveillance programmes (Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012) indicate that common dolphins occur widely in Irish waters and do so throughout the year. Recent estimates of total abundance in the waters overlying the western European continental shelf and slope margin numbered approximately 63,400 animals (95%CL = 26,973-148,865; SCANS-II, 2008). Estimates from summer 2007 for deeper oceanic waters numbered approximately 116,709 animals (95%CL = 61,397-221,849; CODA, 2009), approximately 57,000 of which were attributed to the offshore Atlantic waters of Britain and Ireland (DEHLG, 2009). In seeking to approximate population size range for Irish waters from these broad-scale datasets, there are significant difficulties due (i) to the species' wide pelagic distribution throughout European waters making jurisdictional separation somewhat arbitrary, (ii) to problems associated with the narrow temporal focus of such surveys (e.g., one month in one season in one year, widely separated survey years, or different years for coverage of shelf and off-shelf sectors), and (iii) to high CVs (i.e., estimation uncertainty) particularly from regions where recorded numbers of sightings have been low. The population estimates given for this species are based on the summation of regional area-based estimates presented in SCANS-II (2008), which collectively attribute approximately 50% of all animals to Irish waters and those shared with adjacent Member States (e.g., Irish Sea, Celtic Sea). The minimum and maximum estimates are therefore half of the estimated 95%CL derived via SCANS-II (2008) and they assume the free ranging of animals across and within the regions concerned (e.g., Celtic Sea). The relevant abundance estimate from the follow-up CODA survey (CODA, 2009) falls within the minimum-maximum range presented.		

2.4.4 Year or period	2001-2012					
2.4.5 Method – population size	Estimate based on partial data with some extrapolation and/or modelling (2)					
2.4.6 Short-term trend period	2001-2012					
2.4.7 Short term trend direction	stable (0)					
2.4.8 Short-term trend magnitude	min		max		confidence interval	
2.4.9 Short-term trend method	Estimate based on expert opinion with no or minimal sampling (1)					
2.4.10 Long-term trend period						

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2.4.11 Long term trend direction	N/A
2.4.12 Long-term trend magnitude	min / max / confidence interval
2.4.13 Long-term trend method	N/A
2.4.14 Favourable reference population	number: operator: N/A unknown: Yes method: Robust data on common dolphin population trends in Irish waters are not available although knowledge of the species' distribution and summer abundance has improved since the Directive came into force. Nevertheless the use of current population figures as descriptors for FRP require further work. The FRP for this species is therefore considered to be unknown.
2.4.15 Reason for change	Improved knowledge/more accurate data

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	572500
2.5.2 Year or period	2001-2012
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Good
2.5.4 b) Quality of habitat - method	The quality of habitat for this species was determined by consideration of the relevant direct and indirect pressures thought to be acting on the species and/or its functional group, and its habitat within its natural environment. These pressures were evaluated in development of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009) using available scientific data concerning inter alia habitat use, population size, distribution and ecology, and threats to the species' protection (e.g., via natural/biological sources, human sectoral activities, management gaps, etc).
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	stable (0)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	572500
2.5.10 Reason for change	Improved knowledge/more accurate data

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	medium importance (M)	N/A
death or injury by collision (G05.11)	low importance (L)	N/A
Marine water pollution (H03)	low importance (L)	N/A
Noise nuisance, noise pollution (H06.01)	low importance (L)	N/A
Seismic exploration, explosions (H06.05)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A

2.6.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	medium importance (M)	N/A
death or injury by collision (G05.11)	low importance (L)	N/A
Marine water pollution (H03)	low importance (L)	N/A
Noise nuisance, noise pollution (H06.01)	low importance (L)	N/A
Seismic exploration, explosions (H06.05)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	Research into the appropriate use of statistics and a range of data sources for population trend analysis is currently under way. Until the results of this work become available, it is not considered scientifically valid to attempt to determine population trends.
2.8.2 Other relevant Information	
2.8.3 Trans-boundary assessment	Given the mobility of this marine species, and in particular the potential for seasonal movements in response to breeding requirements, prey distribution and abundance, and other natural processes, it is likely that individuals and/or groups of this species move between Irish waters and adjacent marine jurisdictions. A transboundary assessment in the next reporting period would allow a fuller appreciation of the range and status of this species.

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.9.2. Population	assessment	Favourable (FV)
	qualifiers	N/A
2.9.3. Habitat	assessment	Favourable (FV)
	qualifiers	N/A
2.9.4. Future prospects	assessment	Favourable (FV)
	qualifiers	N/A
2.9.5 Overall assessment of Conservation Status	Favourable (FV)	
2.9.6 Overall trend in Conservation Status	N/A	

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	N/A		
	min		max	
3.1.2 Method used	N/A			
3.1.3 Trend of population size within	N/A			

3.2 Conservation Measures

Field label	Note
Species: 1350	**Short-beaked common dolphin**
0.1 Member State	Ireland
0.2.01 Species code	The short-beaked common dolphin is one of the smallest dolphin species occurring in Irish waters with adults averaging to just 1.7-2.0m in body length. Found throughout the world's oceans and in the eastern North Atlantic from Norway to West Africa (Perrin, 2009), it is classified as a species of Least Concern since abundance estimates indicate that the species is well above the thresholds for a threatened category (Hammond et al., 2008). Common dolphins are the most frequently recorded dolphin species in Irish waters (Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012) and are quite readily identifiable when they break clear of the water surface showing the species' characteristic pronounced beak, relatively tall curved dorsal fin and an extended horizontal 'hourglass' colour pattern on the flanks. Although the species may conduct seasonal movements in some jurisdictions (DEHLG, 2009; Perrin, 2009), separate breeding stocks and clear latitudinal patterns in movement by populations in the eastern North Atlantic are not apparent (Perrin, 2009).
0.2.04 Common name	Short-beaked common dolphin = Deilf choiteann
1.1.01 Distribution map	The distribution map presented for this species represents a significant proportion of all live sightings recorded during targeted scientific surveillance in Irish waters between 1994/95 and 2012. The surveillance programmes that contributed data to this projection are cited as follows: Pollock et al. (1997), Reid et al. (2003), Ó Cadhla et al. (2004) and Wall et al. (2013). These data and the results of other survey effort (e.g., SCANS-II, 2008; CODA, 2009; Berrow et al., 2010) were integrated into the development of the species range map presented under section 1.1.5. This distribution map for the species has been drawn in 50km x 50km resolution and is mapped in the LAEA projection.
1.1.02 Method used - map	Over the last 2-3 decades records of the occurrence of this species in Irish waters have been far more numerous than records of other dolphin species. Simultaneous to more rigorous surveillance in the last 15-20 years numerous common dolphin records have continued to emerge, from deep oceanic and continental shelf waters to the west and southwest of Ireland as well as in the Celtic Sea and the Irish Sea (Ó Cadhla et al., 2004; SCANS-II, 2008; CODA, 2009; Berrow et al., 2010; Wall et al., 2012). The distribution of recent sightings along with regional sighting records obtained across three preceding decades (Berrow et al., 2002; Reid et al., 2003) indicate a predominant distribution in waters overlying the continental shelf and continental slope, although records in the deep Rockall Trough and Porcupine Seabight are not uncommon. While all reliable cetacean records obtained in Irish waters were not available for use in this exercise, the map drawn for this species provides a good sample of the species' observed distribution.
1.1.03 Year or period	The period selected for mapping the distribution of this species represents a period of intensive surveillance for cetaceans in Irish waters across a range of research and monitoring programmes.
1.1.05 Range map	The species' natural range in Irish waters is believed to be a small component of its wider North Atlantic range (DEHLG, 2009; Perrin, 2009). The range map provided consists of its recorded and likely natural range based on recent data (2001-2012) and expert judgement, and is partly derived from 1.1.1. It consists of a block of contiguous 50km x 50km grid cells distributed in Irish marine waters, excluding enclosed shallow bays.
2.3.02 Method used - Surface area of Range	This figure has been derived from the range map referred to in 1.1.5.

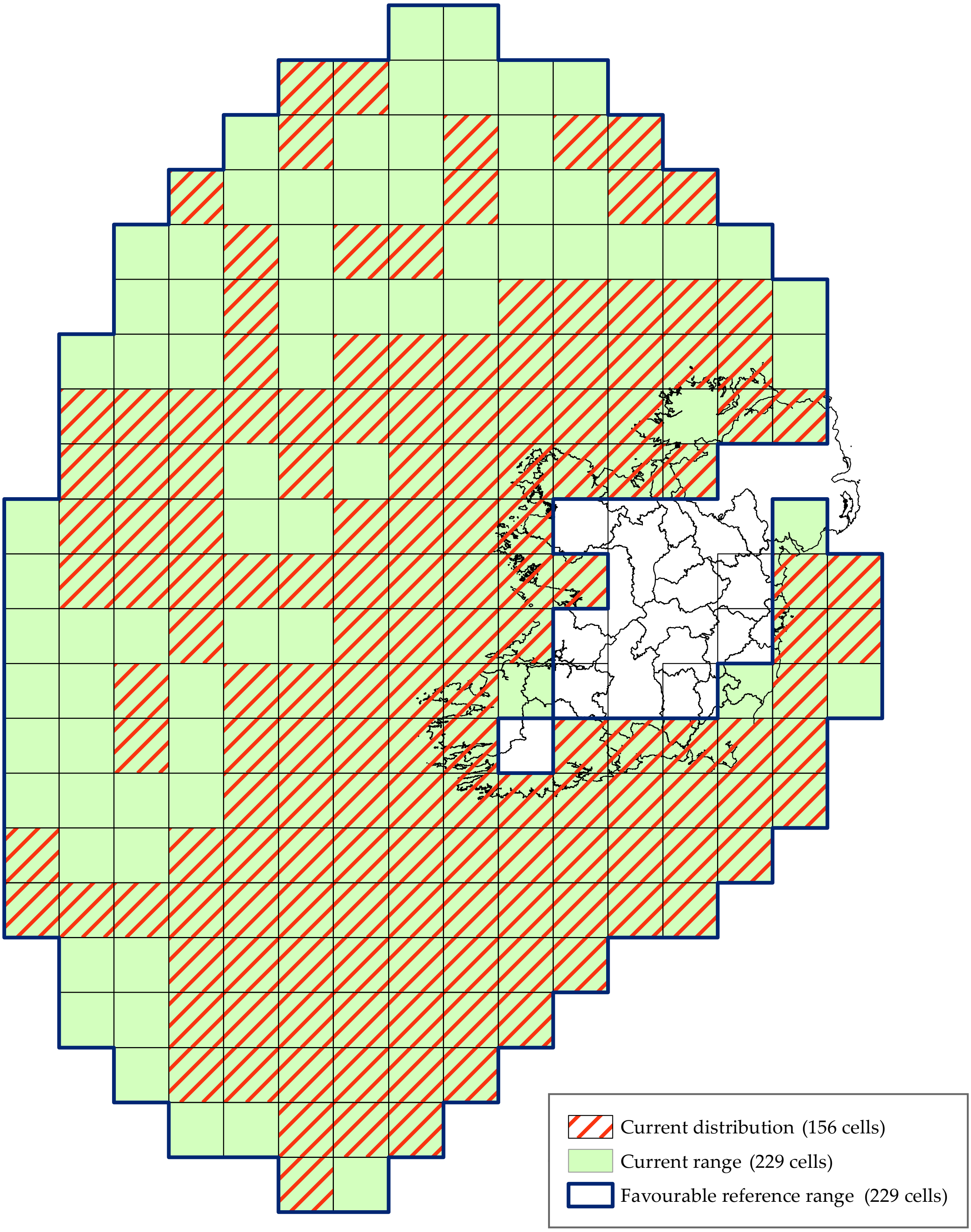
Field label	Note
Species: 1350	**Short-beaked common dolphin**
2.3.03 Short-term trend - Period	Prior to 1999-2000, survey effort targeting cetacean species in Irish offshore waters was comparatively limited in coverage, both spatially and temporally. Since 1999-2000 a number of dedicated multi-annual surveillance programmes for cetaceans have operated in Irish waters, with survey effort extending to the limits of Ireland's EEZ and beyond. Consequently, with regard to this species it is considered that the years 2001-2012 represent an appropriate period for the evaluation of short-term trends.
2.3.04 Short term trend - Trend direction	Sighting records from dedicated surveillance effort in Irish waters (Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012) provide no evidence of a decline in distribution/range in the recent past; therefore accordingly the short-term trend for range is considered to be stable.
2.3.06 Long-term trend - Period	A long-term trend period for this species is not considered appropriate, for reasons outlined in 2.3.3.
2.3.09 a) Favourable reference range - In km2	The range value derived from the range map referred to in 1.1.5 is considered to be the baseline for this species. As there is no evidence of a decline since the Directive came into force the current range is set as the FRR. [Note: (1) The species is thought to be wide-ranging with some element of seasonal variation therein while regional population components may be present year-round; nevertheless the species' range in Irish waters is likely to represent only a component of its range in marine waters covered by the Directive and the northeast Atlantic Ocean. (2) There is an assumption that the current range in Irish waters is large enough (a) to encompass all of the ecological variation required by this species during its occurrences therein and (b) to contribute to the long-term survival of the species.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Additional sighting records of this commonly identified dolphin species (e.g., DEHLG, 2009; Berrow et al., 2010; Wall et al., 2012) have been obtained since the previous reporting round. Along with previous data from a range of sources, this has resulted in an improved knowledge and ability to assess the range from that reported in 2007. There is no scientific reason to assume that the species was not similarly present in 2001-2006.
2.4.04 Year or period	The period 2001-2012 has been selected in order to represent the most current population information available for this species.

Field label	Note
Species: 1350	**Short-beaked common dolphin**
2.4.05 Method used - Population size	Evidence from multi-annual surveillance programmes (Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012) indicate that common dolphins occur widely in Irish waters and do so throughout the year. Recent estimates of total abundance in the waters overlying the western European continental shelf and slope margin numbered approximately 63,400 animals (95%CL = 26,973-148,865; SCANS-II, 2008). Estimates from summer 2007 for deeper oceanic waters numbered approximately 116,709 animals (95%CL = 61,397-221,849; CODA, 2009), approximately 57,000 of which were attributed to the offshore Atlantic waters of Britain and Ireland (DEHLG, 2009). In seeking to approximate population size range for Irish waters from these broad-scale datasets, there are significant difficulties due (i) to the species' wide pelagic distribution throughout European waters making jurisdictional separation somewhat arbitrary, (ii) to problems associated with the narrow temporal focus of such surveys (e.g., one month in one season in one year, widely separated survey years, or different years for coverage of shelf and off-shelf sectors), and (iii) to high CVs (i.e., estimation uncertainty) particularly from regions where recorded numbers of sightings have been low. The population estimates given for this species are based on the summation of regional area-based estimates presented in SCANS-II (2008), which collectively attribute approximately 50% of all animals to Irish waters and those shared with adjacent Member States (e.g., Irish Sea, Celtic Sea). The minimum and maximum estimates are therefore half of the estimated 95%CL derived via SCANS-II (2008) and they assume the free ranging of animals across and within the regions concerned (e.g., Celtic Sea). The relevant abundance estimate from the follow-up CODA survey (CODA, 2009) falls within the minimum-maximum range presented.
2.4.06 Short-term trend - Period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.4.09 Short-term trend - Method used	There is little evidence of growth in the northeast Atlantic population(s) of common dolphin, although assessments of overall population status in the North Atlantic indicate that the species is in a healthy state (Hammond et al., 2008). However, given that recent population estimates for the species (SCANS-II, 2008; CODA, 2009) are the only figures for western European waters since the Directive came into force, the reliable determination of short-term population trend for this species is not possible.
2.4.10 Long-term trend - Period	A long-term trend period for this species is not considered appropriate for reasons outlined in 2.3.3.
2.4.14 d) Favourable reference population - Indicate method used to set reference value if other than operators	Robust data on common dolphin population trends in Irish waters are not available. However regional and local abundance estimates have been derived for the west of Ireland in mid-summer (Ó Cadhla et al., 2004; Berrow et al., 2010) while broad-scale population estimates have also been obtained for the European Atlantic based on comparable surveys of the continental shelf area (SCANS-II, 2008) and deeper oceanic waters (CODA, 2009). While the population figures derived represent the first comparatively robust estimates since the Directive came into force, they are all captured from a short snapshot in time, the associated Lower and Upper 95% Confidence Limits are significantly different, and their use as descriptors for FRP require further work. The FRP for this species is therefore considered to be unknown.
2.5.01 Area estimation	The surface area estimate for range (derived from the range map referred to in 1.1.5) is used as a proxy for habitat surface area.
2.5.02 Year or period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.5.03 Method used Habitat for the species	Use of the range descriptor as a proxy for habitat is judged appropriate for this wide-ranging pelagic species.

Field label	Note
Species: 1350	**Short-beaked common dolphin**
2.5.04 b) Quality of the habitat - Explain how the quality was assessed	The quality of habitat for short-beaked common dolphin was determined by consideration of the relevant direct and indirect pressures thought to be acting on the species and/or its functional group, and its habitat within its natural environment. These pressures were evaluated in development of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009) using available scientific data concerning inter alia habitat use, population size, distribution and ecology, and threats to the species' protection (e.g., via natural/biological sources, human sectoral activities, management gaps, etc). Common dolphin may be subject to a number of local and/or regional environmental pressures throughout its range in Irish waters (see 2.3, 2.6; DEHLG, 2009). However based on current data available none are considered to be of sufficient spatial or temporal impact on the species to be causing a significant deterioration in overall habitat quality in Ireland from a "good" status.
2.5.05 Short-term trend - Period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.5.06 Short-term trend - Trend direction	The trend for range in 2.3.4 is applied as a proxy for habitat.
2.5.07 Long-term trend - Period	A long-term trend period for this species is not considered appropriate, for reasons outlined in 2.3.3.
2.5.09 Area of suitable habitat for the species (km2)	Common dolphins have been widely recorded in Irish waters both historically and to the present day and the known habitats for this cosmopolitan species include continental shelf waters as well as deeper waters overlying the continental slope and those in excess of 2,000-3,000m. The Area of suitable habitat is therefore considered to be equal to the Habitat for the species.
2.6 Main pressures - Pressure	In the development and preparation of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009), a comprehensive review of the pressures believed and/or documented to be acting on this species and/or its functional group (i.e., threats to their protection) was undertaken. With the exception of indirect and direct pressures arising from commercial fishing activity (e.g., Deaville & Jepson, 2013), most of the main pressures thought to be acting on this species are not considered to occur primarily over large areas but may be more regional or intermittent (e.g., seismic exploration; DEHLG, 2009). Since short-beaked common dolphin distribution is very broad in nature, where a pressure may be regionally intensive the ranking given is one of medium importance. It should be noted that in relation to seismic exploration, which tends to occur on a local or occasionally regional scale in the waters of Ireland's EEZ and is comparatively low in coverage relative to several other member states, a robust regulatory and management regime applies in order to avoid potentially significant impacts on all species of marine mammal. The impact on this species of pollutant burdens or changes in sea temperature and other abiotic factors in the marine environment can also not be discounted.
2.7 Threats - Threat	There is no evidence to suggest a change in the main pressures thought to be acting on this species in the near future. However surveillance of the species and the pressures potentially acting upon it will continue into the future, while the application of strong management measures (e.g., via the statutory/regulatory process) to avoid potentially significant impacts is also expected to continue.
2.8.01 Justification of % thresholds for trends	A detailed analysis of the statistical ability and power to robustly determine population trends for cetacean species occurring in western European waters is under way via the Joint Cetacean Protocol (JCP) project in the UK. This phased work is due for completion in 2013 and it will inform whether and for which species the measurement of population trends may be possible based on survey data from a range of sources.

Field label	Note
Species: 1350	**Short-beaked common dolphin**
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The short-beaked common dolphin is widely recorded in Irish waters from deep oceanic areas to coastal waters. Hence the Range is considered to be favourable.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	While robust data on short-beaked common dolphin population size and trends in Irish waters as a whole are not available, knowledge of the species' seasonal distribution and summer abundance in western European waters has improved significantly since the Directive came into force. This indicates that common dolphins continue to number in the tens of thousands regionally (see 2.4). Given the available estimates and the species' wide occurrence in Irish waters, the population parameter is considered favourable.
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The habitat for this species in Ireland is considered favourable, as it supports a favourable population across a very large marine area.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	A number of pressures have been identified. While the effect of these pressures may act on a temporary and/or regional scale and some are likely to continue to act as pressures into the future, none is considered to be of sufficient magnitude to be causing an adverse impact on populations of short-beaked common dolphin in Irish waters. Ongoing threats as listed or identified into the future via surveillance will be managed appropriately. Hence the future prospects for the species are considered
2.9.05 Overall assessment of Conservation Status	Based on the assessments for Range, Population, Habitat and Future Prospects parameters, the overall conclusion is that the conservation status of short-beaked common dolphin in Ireland is considered "Favourable". This overall result is the same as in the previous Article 17 assessment while an improvement is reported in the assessment for the Population parameter, due to improved knowledge.

Common dolphin - *Delphinus delphis* (1350)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 25 50 75 100 km

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Map - Léarscáil
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11-06-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1351**
0.2.2 Species name	**Phocoena phocoena**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	Harbour porpoise

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	1995-2012
1.1.4 Additional map	No
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region: **Marine Atlantic (MATL)**

2.2 Published sources:

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2.3 Range

2.3.1 Surface area - Range (km²)	397500	
2.3.2 Method - Range surface area	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	397500
	operator	N/A
	unknown	No
	method	The range value derived from the range map referred to in 1.1.5 is considered to be the baseline for this species. As there is no evidence of a decline since the Directive came into force the current range is set as the FRR.
2.3.10 Reason for change	Improved knowledge/more accurate data	

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	number of individuals (i)		
	min	87088	max	189718
2.4.2 Population size (other than individuals)	Unit	N/A		
	min		max	
2.4.3 Additional information	Definition of locality			
	Conversion method			
	Problems	Evidence from multi-annual surveillance programmes (Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012) indicate that harbour porpoises occur widely in Irish waters and do so throughout the year. Recent estimates of total abundance in the waters overlying the western European continental shelf and slope margin numbered approximately 385,600 animals (95%CL = 261,266-569,153; SCANS-II, 2008). Previously, abundance in 1994 in the North Sea and adjacent waters (excl. western Ireland/Scotland and the Irish Sea) was estimated at c. 341,000 (Hammond et al., 2008). In seeking to approximate population size range for Irish waters from these broad-scale datasets, there are significant difficulties due (i) to the species' wide pelagic distribution throughout European waters making jurisdictional separation somewhat arbitrary, (ii) to problems associated with the narrow temporal focus of such surveys (e.g., one month in one season in one year or widely separated years), and (iii) to high CVs (i.e., estimation uncertainty) particularly from regions where recorded numbers of sightings have		

been low. The population estimates given for this species are based on the summation of regional area-based estimates presented in SCANS-II (2008), which collectively attribute approximately 33% of all animals to Irish waters and those shared with adjacent Member States (e.g., Irish Sea, Celtic Sea). The minimum and maximum figures approximate one third of the estimated 95%CL derived via SCANS-II (2008) and they assume the free ranging of animals across and within the regions concerned (e.g., Celtic Sea).

2.4.4 Year or period	2001-2012
2.4.5 Method – population size	Estimate based on partial data with some extrapolation and/or modelling (2)
2.4.6 Short-term trend period	2001-2012
2.4.7 Short term trend direction	unknown (x)
2.4.8 Short-term trend magnitude	min max confidence interval
2.4.9 Short-term trend method	Estimate based on expert opinion with no or minimal sampling (1)
2.4.10 Long-term trend period	
2.4.11 Long term trend direction	N/A
2.4.12 Long-term trend magnitude	min max confidence interval
2.4.13 Long-term trend method	N/A
2.4.14 Favourable reference population	number operator N/A unknown Yes method Robust data on harbour porpoise population size and trends in Irish waters are not available although knowledge of the species' distribution and summer abundance has improved since the Directive came into force. Nevertheless the use of current population figures as descriptors for FRP require further work. The FRP for this species is therefore considered to be unknown.
2.4.15 Reason for change	Improved knowledge/more accurate data

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	397500
2.5.2 Year or period	2001-2012
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Good
2.5.4 b) Quality of habitat - method	The quality of habitat for this species was determined by consideration of the relevant direct and indirect pressures thought to be acting on the species and/or its functional group, and its habitat within its natural environment. These pressures were evaluated in development of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009) using available scientific data concerning inter alia habitat use, population size, distribution and ecology, and threats to the species' protection (e.g., via natural/biological sources, human sectoral activities, management gaps, etc).
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	stable (0)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	397500
2.5.10 Reason for change	Improved knowledge/more accurate data

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	medium importance (M)	N/A
death or injury by collision (G05.11)	low importance (L)	N/A
Marine water pollution (H03)	low importance (L)	N/A
Noise nuisance, noise pollution (H06.01)	low importance (L)	N/A
Seismic exploration, explosions (H06.05)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A

2.6.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	medium importance (M)	N/A
death or injury by collision (G05.11)	low importance (L)	N/A
Marine water pollution (H03)	low importance (L)	N/A
Noise nuisance, noise pollution (H06.01)	low importance (L)	N/A
Seismic exploration, explosions (H06.05)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	Research into the appropriate use of statistics and a range of data sources for population trend analysis is currently under way. Until the results of this work become available, it is not considered scientifically valid to attempt to determine population trends.
2.8.2 Other relevant Information	
2.8.3 Trans-boundary assessment	Given the mobility of this marine species, and in particular the potential for seasonal movements in response to breeding requirements, prey distribution and abundance, and other natural processes, it is likely that individuals and/or groups of this species move between Irish waters and adjacent marine jurisdictions. A transboundary assessment in the next reporting period would allow a fuller appreciation of the range and status of this species.

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment Favourable (FV) qualifiers N/A
2.9.2. Population	assessment Favourable (FV) qualifiers N/A
2.9.3. Habitat	assessment Favourable (FV) qualifiers N/A
2.9.4. Future prospects	assessment Favourable (FV) qualifiers N/A
2.9.5 Overall assessment of Conservation Status	Favourable (FV)
2.9.6 Overall trend in Conservation Status	N/A

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	number of individuals (i)		
	min	87088	max	189718
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3 Trend of population size within	unknown (x)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Establish protected areas/sites (6.1)	Legal Administrative Recurrent	high importance (H)	Inside	Maintain
Legal protection of habitats and species (6.3)	Legal Administrative Recurrent	high importance (H)	Both	Maintain
Regulation/ Management of hunting and taking (7.1)	Legal Administrative Recurrent	medium importance (M)	Both	Maintain
Regulation/ Management of fishery in marine and brackish systems (7.3)	Legal Administrative Recurrent	high importance (H)	Both	Maintain
Regulating/Managing exploitation of natural resources on sea (9.2)	Legal Administrative Recurrent	high importance (H)	Both	Maintain

Field label	Note
Species: 1351	**Harbour porpoise**
0.1 Member State	Ireland
0.2.01 Species code	The harbour porpoise is the smallest cetacean species occurring in Irish waters with adults averaging just 1.4-1.8m in body length. Inhabiting only the Northern Hemisphere the species is predominantly found in cold temperate and sub-polar waters, in the northeastern Atlantic from Iceland and northern Norway to northwest Africa (Hammond et al., 2008; Bjørge & Tolley, 2009). While it is the only cetacean species that currently regularly occupies the Baltic Sea, in which it is critically endangered, it does not regularly occur in the Mediterranean Sea (Hammond et al., 2008) although a geographically and reproductively isolated population also occurs in the Black Sea (Bjørge & Tolley, 2009). The harbour porpoise is classified as a species of Least Concern due to its widespread occurrence and overall abundance estimates (Hammond et al., 2008) which indicate that the species is well above the thresholds for a threatened category. Harbour porpoises are the most frequently recorded cetacean species around the Irish coast (Berrow et al., 2010) but are recorded with greater difficulty offshore (Ó Cadhla et al., 2004; Wall et al., 2012) due to their small size and inconspicuous nature. When encountered, the species is quite readily identifiable due to its very small size and commonly brief surfacing roll, displaying the porpoise's short, near-triangular dark grey/black dorsal fin. Harbour porpoises don't commonly breach clear of the sea surface. Where the animal's body is more visible its characteristic rounded head profile and often stocky appearance, the absence of a beak, and a two-tone colour pattern along its body length(i.e., dark grey-black dorsal and pale grey-white ventral components) also aid in its identification. Although members of the species may conduct large scale and/or seasonal movements in some jurisdictions, the identification of distinct breeding stocks and patterns in movement/distribution by populations in the eastern North Atlantic and western Europe require further investigation (Bjørge & Tolley, 2009; DEHLG, 2009).
0.2.04 Common name	Harbour porpoise = Muc mhara
1.1.01 Distribution map	The distribution map presented for this species represents a significant proportion of all live sightings recorded during targeted scientific surveillance in Irish waters between 1994/95 and 2012. The surveillance programmes that contributed data to this projection are cited as follows: Pollock et al. (1997), Reid et al. (2003), Ó Cadhla et al. (2004) and Wall et al. (2013). These data and the results of other survey effort (e.g., SCANS-II, 2008; CODA, 2009; Berrow et al., 2010) were integrated into the development of the species range map presented under section 1.1.5. This distribution map for the species has been drawn in 50km x 50km resolution and is mapped in the LAEA projection.
1.1.02 Method used - map	Over the last 2-3 decades records of the occurrence of this species in Irish waters have been far more numerous than records of most cetaceans with the exception of the short-beaked common dolphin. Simultaneous to more rigorous surveillance in the last 15-20 years numerous harbour porpoise records have continued to emerge, from continental shelf waters to the north, west and southwest of Ireland as well as in the Celtic Sea and the Irish Sea (e.g., Ó Cadhla et al., 2004; SCANS-II, 2008; Berrow et al., 2010; Ryan et al., 2010; Berrow et al., 2011; Berrow et al., 2012; Wall et al., 2012). The distribution of recent sightings along with regional sighting records obtained across three preceding decades (Berrow et al., 2002; Reid et al., 2003) indicate a predominant distribution in waters <200-300m deep overlying the continental shelf, although some records have occurred in waters overlying the continental slope. While all reliable cetacean records obtained in Irish waters were not available for use in this exercise, the map drawn for this species provides a good sample of the species' observed distribution.

Field label	Note
Species: 1351	**Harbour porpoise**
1.1.03 Year or period	The period selected for mapping the distribution of this species represents a period of intensive surveillance for cetaceans in Irish waters across a range of research and monitoring programmes.
1.1.05 Range map	The species' natural range in Irish waters is believed to be a small component of its wider range in the waters of western Europe and the northeast Atlantic (DEHLG, 2009; Bjørge & Tolley, 2009). The range map provided consists of its recorded and likely natural range based on recent data (2001-2012) and expert judgement, and is partly derived from 1.1.1. It consists of a block of contiguous 50km x 50km grid cells distributed in Irish marine waters up to 1,000m deep, and including the eastern margin of the Rockall Bank and many shallow coastal bays.
2.3.02 Method used - Surface area of Range	This figure has been derived from the range map referred to in 1.1.5.
2.3.03 Short-term trend - Period	Prior to 1999-2000, survey effort targeting cetacean species in Irish offshore waters was comparatively limited in coverage, both spatially and temporally. Since 1999-2000 a number of dedicated multi-annual surveillance programmes for cetaceans have operated in Irish waters, with survey effort extending to the limits of Ireland's EEZ and beyond. Consequently, with regard to this species it is considered that the years 2001-2012 represent an appropriate period for the evaluation of short-term trends.
2.3.04 Short term trend - Trend direction	Sighting records from dedicated surveillance effort in Irish waters (Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012) provide no evidence of a decline in distribution/range in the recent past; therefore accordingly the short-term trend for range is considered to be stable.
2.3.06 Long-term trend - Period	A long-term trend period for this species is not considered appropriate, for reasons outlined in 2.3.3.
2.3.09 a) Favourable reference range - In km2	The range value derived from the range map referred to in 1.1.5 is considered to be the baseline for this species. As there is no evidence of a decline since the Directive came into force the current range is set as the FRR. [Note: (1) The species is thought to be wide-ranging with some element of seasonal variation therein while regional population components may be present year-round; Nevertheless the species' range in Irish waters is likely to represent only a component of its range in marine waters covered by the Directive and the northeast Atlantic Ocean. (2) There is an assumption that the current range in Irish waters is large enough (a) to encompass all of the ecological variation required by this species during its occurrences therein and (b) to contribute to the long-term survival of the species.]
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Additional sighting records of this distinctive and commonly identified small cetacean species (e.g., Berrow et al., 2008a; Berrow et al., 2008b; SCANS-II, 2008; Berrow et al., 2010; Ryan et al., 2010; Berrow et al., 2011; Wall et al., 2012) have been obtained since the previous reporting round. Along with previous data from a range of sources, this has resulted in an improved knowledge and ability to assess the range from that reported in 2007. There is no scientific reason to assume that the species was not similarly present in 2001-2006.
2.4.04 Year or period	The period 2001-2012 has been selected in order to represent the most current population information available for this species.

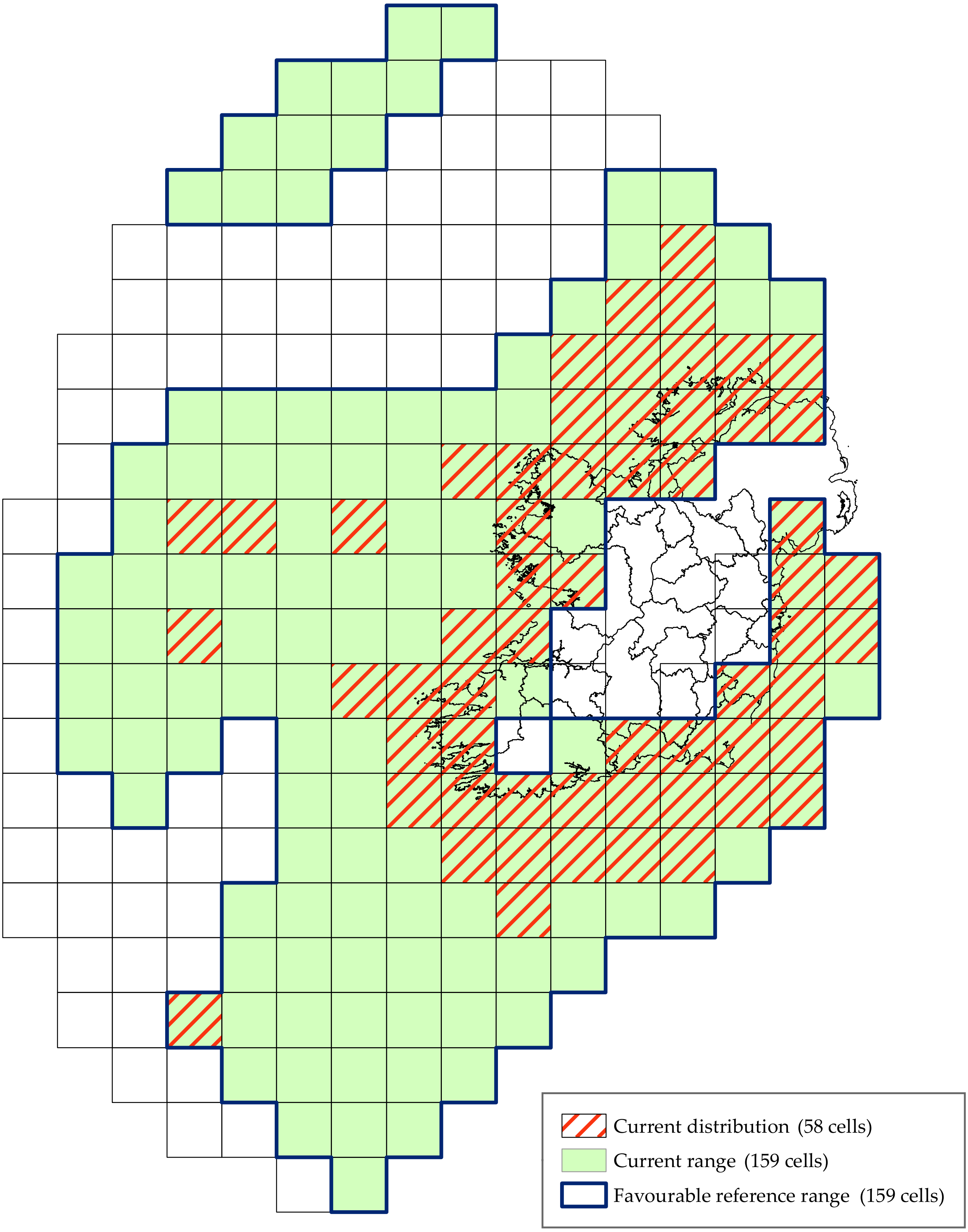
Field label	Note
Species: 1351	**Harbour porpoise**
2.4.05 Method used - Population size	Evidence from multi-annual surveillance programmes (Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012) indicate that harbour porpoises occur widely in Irish waters and do so throughout the year. Recent estimates of total abundance in the waters overlying the western European continental shelf and slope margin numbered approximately 385,600 animals (95%CL = 261,266-569,153; SCANS-II, 2008). In 1994 the number of animals in the North Sea and adjacent waters (excl. western Ireland/Scotland and the Irish Sea) was estimated at c. 341,000 porpoises (Hammond et al., 2008). In seeking to approximate population size range for Irish waters from these broad-scale datasets, there are significant difficulties due (i) to the species' wide pelagic distribution throughout European waters making jurisdictional separation somewhat arbitrary, (ii) to problems associated with the narrow temporal focus of such surveys (e.g., one month in one season in one year or widely separated years), and (iii) to high CVs (i.e., estimation uncertainty) particularly from regions where recorded numbers of sightings have been low. The population estimates given for this species are based on the summation of regional area-based estimates presented in SCANS-II (2008), which collectively attribute approximately 33% of all animals to Irish waters and those shared with adjacent Member States (e.g., Irish Sea, Celtic Sea). The minimum and maximum figures approximate one third of the estimated 95%CL derived via SCANS-II (2008) and they assume the free ranging of animals across and within the regions concerned (e.g., Celtic Sea).
2.4.06 Short-term trend - Period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.4.09 Short-term trend - Method used	There is little evidence of growth or decline in the northeast Atlantic population(s) of harbour porpoise, although assessments of overall population size in the northeast and North Atlantic indicate that the species is likely to be in a healthy state, with the exception of regional seas: the Black Sea and Baltic Sea (Hammond et al., 2008). However, given that recent population estimates for the species (SCANS-II, 2008) are the only comprehensive figures for west European shelf waters since the Directive came into force, the reliable determination of short-term population trend for this species is not possible. Information from comparable surveys carried out 11 years apart in the Celtic Sea and North Sea (Hammond et al., 2002; SCANS-II, 2008) demonstrate the potential for large scale changes in the species' distribution, regional abundance and density between individual survey years.
2.4.10 Long-term trend - Period	A long-term trend period for this species is not considered appropriate for reasons outlined in 2.3.3.
2.4.14 d) Favourable reference population - Indicate method used to set reference value if other than operators	Robust data on harbour porpoise population trends in Irish waters are not available. However local abundance estimates have been derived for specific areas off the southwest and east of Ireland in summer (Berrow et al., 2007; Berrow et al., 2008a; Berrow et al., 2008b; Berrow et al., 2011). In addition, broad-scale population estimates have been obtained for the European Atlantic based on comparable mid-summer line transect surveys of the continental shelf area (SCANS-II, 2008) and deeper oceanic waters. With the exception of the Celtic Sea which was surveyed in a similar manner in 1994 (Hammond et al., 2002), most population figures represent the first comparatively robust estimates since the Directive came into force and their use as descriptors for FRP require further work. This is underlined by the Celtic Sea population data which describe a more than two-fold positive difference between the survey years 1994 and 2005 (DEHLG, 2009) and one which warrants further investigation. The FRP for this species is therefore considered to be unknown.
2.5.01 Area estimation	The surface area estimate for range (derived from the range map referred to in 1.1.5) is used as a proxy for habitat surface area.
2.5.02 Year or period	The period 2001-2012 has been selected, consistent with 2.3.3.

Field label	Note
Species: 1351	**Harbour porpoise**
2.5.03 Method used Habitat for the species	Use of the range descriptor as a proxy for habitat is judged appropriate for this wide-ranging pelagic species.
2.5.04 b) Quality of the habitat - Explain how the quality was assessed	The quality of habitat for harbour porpoise was determined by consideration of the relevant direct and indirect pressures thought to be acting on the species and/or its functional group, and its habitat within its natural environment. These pressures were evaluated in development of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009) using available scientific data concerning inter alia habitat use, population size, distribution and ecology, and threats to the species' protection (e.g., via natural/biological sources, human sectoral activities, management gaps, etc). Harbour porpoise may be subject to a number of local and/or regional environmental pressures throughout its range in Irish waters (see 2.3, 2.6; DEHLG, 2009). However based on current data available none are considered to be of sufficient spatial or temporal impact on the species to be causing a significant deterioration in overall habitat quality in Ireland from a "good" status.
2.5.05 Short-term trend - Period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.5.06 Short-term trend - Trend direction	The trend for range in 2.3.4 is applied as a proxy for habitat.
2.5.07 Long-term trend - Period	A long-term trend period for this species is not considered appropriate, for reasons outlined in 2.3.3.
2.5.09 Area of suitable habitat for the species (km2)	Harbour porpoises have been widely recorded in Irish waters both historically and to the present day and the known habitats for this cosmopolitan species include all continental shelf waters as well those along margins of the shelf <1,000m deep. There are also limited data indicating the species' presence in shallow waters overlying the Rockall Bank. Harbour porpoises regularly occur coastally, their habitat extending into many enclosed bays and the outer reaches of some estuaries. The Area of suitable habitat is considered to be equal to the Habitat for the species.
2.6 Main pressures - Pressure	In the development and preparation of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009), a comprehensive review of the pressures believed and/or documented to be acting on this species and/or its functional group (i.e., threats to their protection) was undertaken. With the exception of the pressures arising from some commercial fishing activity, most of the main pressures thought to be acting on this species are not considered to occur over large regional areas but may be acting on a more local scale and/or on a temporary or intermittent basis (e.g., noise impacts; DEHLG, 2009). Since harbour porpoise distribution is broadly continental shelf in nature, where a pressure may be regionally intensive the ranking given is one of medium importance. It should be noted that in relation to seismic exploration, which tends to occur on a local or occasionally regional scale in the waters of Ireland's EEZ and is comparatively low in coverage relative to several other member states, a robust regulatory and management regime applies in order to avoid potentially significant impacts on all species of marine mammal. The impact on this species of pollutant burdens or changes in sea temperature and other abiotic factors in the marine environment can also not be discounted.
2.7 Threats - Threat	There is no evidence to suggest a change in the main pressures thought to be acting on this species in the near future. However surveillance of the species and the pressures potentially acting upon it will continue into the future, while the application of strong management measures (e.g., via the statutory/regulatory process) to avoid potentially significant impacts is also expected to continue.

Field label	Note
Species: 1351	**Harbour porpoise**
2.8.01 Justification of % thresholds for trends	A detailed analysis of the statistical ability and power to robustly determine population trends for cetacean species occurring in western European waters is under way via the Joint Cetacean Protocol (JCP) project in the UK. This phased work is due for completion in 2013 and it will inform whether and for which species the measurement of population trends may be possible based on survey data from a range of sources.
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The harbour porpoise is widely recorded in Irish waters overlying the continental shelf and slope and also occurs in coastal waters. Hence the Range is considered to be favourable.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	While robust data on harbour porpoise population size and trends in Irish waters as a whole are not available, knowledge of the species' seasonal distribution and summer abundance in western European waters has improved greatly since the Directive came into force. This indicates that harbour porpoises continue to number at least in the high tens of thousands regionally (see 2.4). Evidence from population estimation surveys carried out since 2005-07 also indicates that the population continues to be in a healthy state with comparatively high animal densities and good adult:calf ratios commonly recorded during the summer months (e.g., Berrow et al., 2007; Berrow et al., 2008a; Berrow et al., 2008b; Berrow et al., 2011). Given the available estimates and the species' wide occurrence in Irish waters, the population parameter is considered favourable.
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The habitat for this species in Ireland is considered favourable, as it supports a favourable population across a very large marine area.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	A number of pressures have been identified. While the effect of these pressures may act on a temporary and/or regional scale and some are likely continue to act as pressures into the future, none is considered to be of sufficient magnitude to be causing an adverse impact on populations of harbour porpoise in Irish waters. Ongoing threats as listed or identified into the future via surveillance will be managed appropriately. Hence the future prospects for the species are considered favourable.
2.9.05 Overall assessment of Conservation Status	Based on the assessments for Range, Population, Habitat and Future Prospects parameters, the overall conclusion is that the conservation status of harbour porpoise in Ireland is considered "Favourable". This overall result and the results for each assessment parameter (i.e., "Favourable") are the same as in the previous Article 17 assessment.
3.1.02 Method used	The minimum and maximum population sizes given for this wide ranging porpoise species are derived from the results of the SCANS-II survey conducted in the summer of 2005 (SCANS-II, 2008). Details concerning the method used are presented in 2.4.3. and 2.4.5.
3.1.03 Trend of population size within the network (short-term trend)	Evidence from population estimation surveys carried out since 2005-07 indicates that the population continues to be in a healthy state with comparatively high animal densities and good adult:calf ratios commonly recorded during the summer months, particularly within the Natura 2000 network designated for the species in Ireland (Berrow et al., 2007; Berrow et al., 2008a; Berrow et al., 2008b; Berrow et al., 2011). The ability to accurately determine population trends in this species is dependent on the frequency and precision of population surveys. Large-scale high quality surveys for this species (e.g., SCANS, SCANS-II) have been infrequent however, meaning that the ability to determine trends on a regional or transnational scale is currently limited. Surveillance within and outside Ireland's Natura 2000 network continues and it is expected that these efforts will assist in the future determination and verification of population trend data for harbour porpoise.

Field label	Note
Species: 1351	**Harbour porpoise**
3.2 Conservation measures	All measures taken during the reporting period are designed to ensure the maintenance of harbour porpoise at a favourable conservation status in Ireland and to ensure that the conservation provisions for this species, as underpinned by Articles 6 and 12 of the Habitats Directive in particular, are robustly implemented including via national legislation (i.e., EC Birds and Natural Habitats Regulations S.I. No. 477/2011, etc). Key ongoing actions and protection measures for the species (e.g., protection from disturbance/harassment or sectoral impacts) were also identified in the Conservation Plan for Cetaceans in Irish Waters (DEHLG, 2009) and these are being pursued.

Harbour porpoise - *Phocoena phocoena* (1351)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 25 50 75 100 km

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Map - Léarscáil
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Date - Dáta
11-06-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1355**
0.2.2 Species name	**Lutra lutra**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	European otter (madra uisce/dobharcú)

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Complete survey/Complete survey or a statistically robust estimate (3)
1.1.3 Year or period	2007-2012
1.1.4 Additional map	Yes
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published sources

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2.3 Range

2.3.1 Surface area - Range (km²)	81200	
2.3.2 Method - Range surface area	Complete survey/Complete survey or a statistically robust estimate (3)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	increase (+)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period	1988-2012	
2.3.7 Long-term trend direction	stable (0)	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	81200
	operator	N/A
	unknown	No
	method	Current range, which incorporates almost the entire landmass of Ireland, is taken to be favourable reference range.
2.3.10 Reason for change	Genuine Improved knowledge/more accurate dataUse of different method	

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	N/A		
	min		max	
2.4.2 Population size (other than individuals)	Unit	number of breeding females (bfemales)		
	min	7218	max	10186
2.4.3 Additional information	Definition of locality			
	Conversion method			
	Problems	Available otter habitat is normally divided up between adult females with little overlap; male territories are less clear cut and can overlap. Hence the number of adult females was used to underpin the population estimate.		

2.4.4 Year or period	2010-2011		
2.4.5 Method – population size	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.6 Short-term trend period	2001-2012		
2.4.7 Short term trend direction	increase (+)		
2.4.8 Short-term trend magnitude	min	max	confidence interval
2.4.9 Short-term trend method	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.10 Long-term trend period	1988-2012		

2.4.11 Long term trend direction	stable (0)
2.4.12 Long-term trend magnitude	min / max / confidence interval
2.4.13 Long-term trend method	Estimate based on partial data with some extrapolation and/or modelling (2)
2.4.14 Favourable reference population	number: 7046 operator: N/A unknown: No method: The figure calculated in 2007 is still valid. This was based on returning all otter SACs to the population levels recorded in the Chapman & Chapman survey (1982), while simultaneously ensuring that no loss of status occurs outside SACs (see Background document to Lutra lutra (1355) Conservation Status Assessment, 2007 for full details).
2.4.15 Reason for change	Genuine Improved knowledge/more accurate data

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	3115
2.5.2 Year or period	2007-2007
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Good
2.5.4 b) Quality of habitat - method	Expert judgement based on overall assessment of riparian, lacustrine and coastal waters; the widespread nature of otters and the apparent population recovery seen.
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	stable (0)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	3115
2.5.10 Reason for change	

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
roads, motorways (D01.02)	medium importance (M)	N/A
Professional passive fishing (F02.01)	low importance (L)	N/A
Pollution to surface waters (limnic & terrestrial, marine & brackish) (H01)	low importance (L)	N/A

2.6.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
roads, motorways (D01.02)	medium importance (M)	N/A
Professional passive fishing (F02.01)	low importance (L)	N/A
Pollution to surface waters (limnic & terrestrial, marine & brackish) (H01)	low importance (L)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

2.8.2 Other relevant Information	Otter population size within NATURA 2000 [3.1] has only been calculated for SACs where otter is a qualifying interest.
2.8.3 Trans-boundary assessment	

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.9.2. Population	assessment	Favourable (FV)
	qualifiers	N/A
2.9.3. Habitat	assessment	Favourable (FV)
	qualifiers	N/A
2.9.4. Future prospects	assessment	Favourable (FV)
	qualifiers	N/A
2.9.5 Overall assessment of Conservation Status		Favourable (FV)
2.9.6 Overall trend in Conservation Status		N/A

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	number of breeding females (bfemales)		
	min	468	max	660
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3 Trend of population size within	increase (+)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Both	Long term
Other forestry-related measures (3.0)	Administrative	low importance (L)	Both	Unknown
Restoring/improving water quality (4.1)	Legal Administrative	medium importance (M)	Both	Long term
Regulation/ Management of hunting and taking (7.1)	Legal	low importance (L)	Both	Unknown
Urban and industrial waste management (8.1)	Legal	medium importance (M)	Both	Long term
Specific management of traffic and energy transport systems (8.2)	Legal	medium importance (M)	Both	Long term

Article 17 - SPECIES NOTES

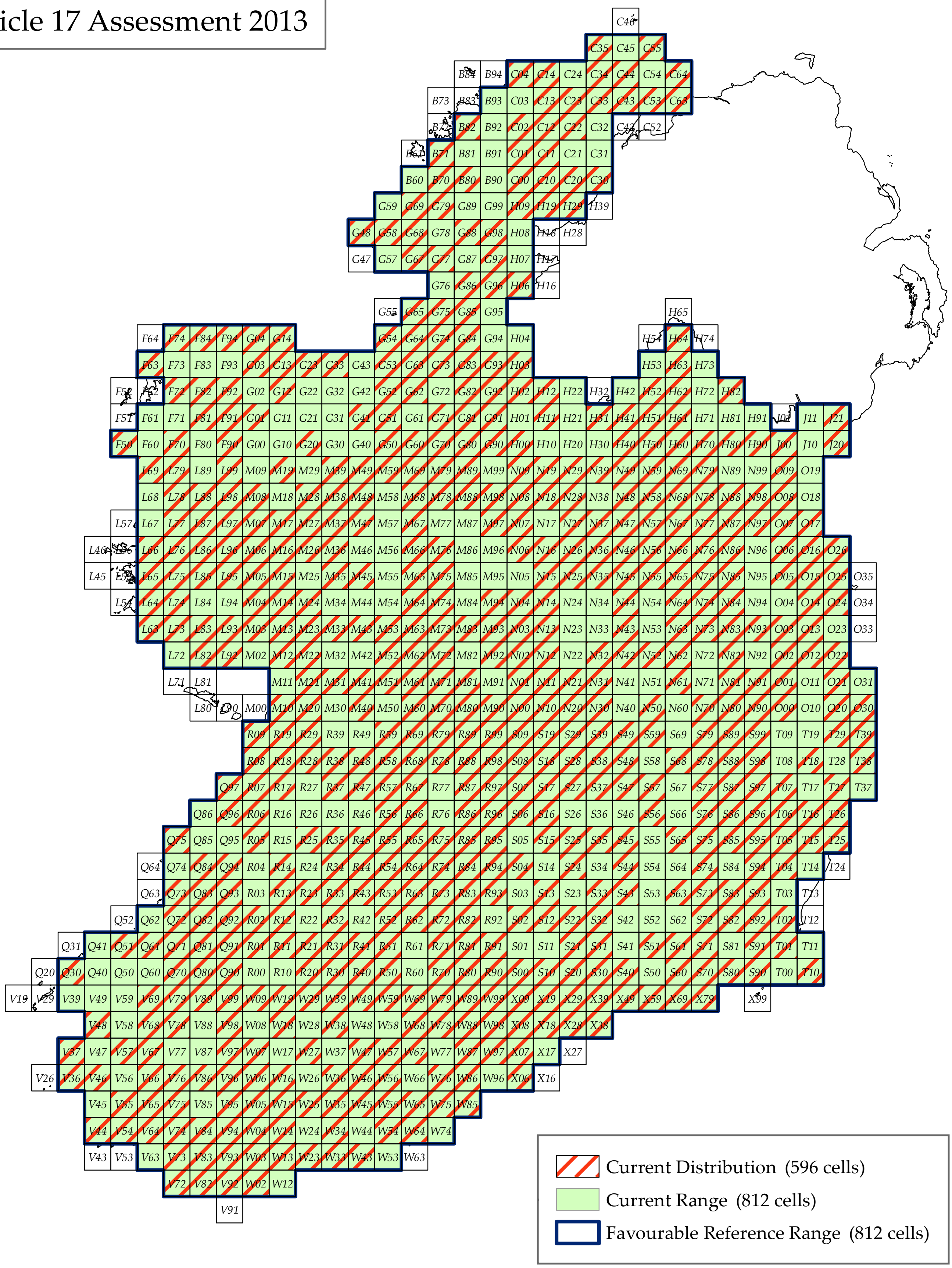
Field label	Note
Species: 1355	**European otter**
0.2.01 Species code	The otter is a large carnivore with a long slim body, short legs and a tapered tail. Adult males can reach 1m in total length and 10kg in weight. The otter's feet are webbed and it swims low in the water with only its head showing. Dramatic declines occurred in many European otter populations during the latter half of the 20th Century. As a result, otters became extinct in several countries. However, Ireland has remained a strong-hold for the species and the latest estimate puts the population at approximately 15-20,000 animals. Four national surveys of otters have been conducted in Ireland. The first in 1980/81 found signs of otters throughout the country, at 88% of sites surveyed. There was some suggestion of declines in the survey results of 1990/91 and 2004/05 but the latest survey (2010) indicates recovery to 1980 levels. Otters have two basic requirements: aquatic prey and safe refuges where they can rest. In Ireland, otter populations are found along clean rivers and lakes, where fish and other prey are abundant, and where the adjacent habitat offers plenty of cover. Otters maintain territories and will defend their stretches of river bank or lake shore from other otters. In lowland rivers and fish-rich lakes otters only need to maintain small territories, but on smaller rivers and in upland areas, where food tends to be less abundant, otter territories can stretch to 10 or 20 km. Along coasts otters require sources of freshwater to wash their coats and their territories will always include a stream or spring. The otter is an opportunistic predator with a broad and varied diet. In coastal areas rockling, wrasse, eel, sea scorpion, blenny and molluscs are known to be eaten. In freshwater areas a variety of fish from sticklebacks to salmon and eels will be taken, while crayfish and frogs can be important locally or seasonally. Birds and mammals are taken infrequently. Otters are protected by Irish and European law. 44 SACs have been designated for the otter in Ireland. These sites comprise extensive stretches of river channels and coastline (including off-shore islands) as well as lakes and blanket bog systems. Otters are subject to pressures on land and in water (freshwater and marine). Impacts that reduce the availability or quality of, or cause disturbance to, their terrestrial or aquatic habitats are likely to affect otters. The main threats to otters in Ireland are thought to be: habitat destruction (including river drainage and the clearance of bank-side vegetation); pollution, particularly organic pollution resulting in fish kills; and accidental deaths (road traffic and fishing gear).
1.1.01 Distribution map	Distribution records came from NPWS survey (2010/2011 - see Reid et al, 2013 for details) and the NBDC, with additional records from NPWS staff and members of the public.
2.3.02 Method used - Surface area of Range	Range tool was used to calculate Range based on 2007-2012 distribution records. Distribution records came from the NPWS survey (2010/2011 - see Reid et al, 2013 for details) and the NBDC, with additional records from NPWS staff and members of the public.

Field label	Note
Species: 1355	**European otter**
2.3.04 Short term trend - Trend direction	An increase in range has occurred, however it is difficult to untangle from increases due to an expanded sampling regime. Range in 2007 was reported as 665 cells (10km squares); current range = 812 cells. This is based on distribution records for 596 10km squares (compared to 358 in 2007). The Range Tool was then used to calculate Range.
2.3.06 Long-term trend - Period	Only allowed to use a 24 year period here, so have taken it to be 24 years up to 2012 and interpolated from 1980 and 1990 survey results.
2.3.07 Long-term trend - Trend direction	Results from the otter survey in the early 80s and the otter survey in 2010/11 are similar, inidicating a stable overall trend although some fluctuations may have occurred within the 24 year period.
2.3.10 a) Reason for change - genuine change?	The latest survey reports an increase in the % of positive survey squares for otter and notwithstanding all the caveats included in the survey report (Reid et al 2013), some recovery in otter population appears to have occurred.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	The current range is significantly larger than that reported in 2007. This is to some extent due to better data. In particular there is an apparent expansion in range of the otter into coastal squares. This is because the 2010/11 national otter survey specifically targeted coastal squares which had received no previous survey effort.
2.3.10 c) Reason for change - use of different method?	The use of the new Range Tool also explains the change in range to some extent, together with an increased sampling regime referred to in 2.3.10b.
2.4.02 a) Population size estimation (using population unit other than individuals) - Unit	Number of adult (breeding) females is used. The population estimate is based on the number of female otter territories available (assuming no overlap) and occupied across coastal and freshwater habitats in Ireland. See Reid et al. (2013) for full details. The methods are the same as those used in the 2007 report.
2.4.05 Method used - Population size	Available otter habitat is normally divided up between adult females; male territories are less clear cut and can overlap. Hence the number of adult females was used to underpin the population estimate. Female territory sizes in coastal, lake and river habitats were estimated based on a combination of radio-tracking, GSM tracking, and modelling and extrapolation. This allowed an estimate of the total carrying capacity of the country for female otters to be made (i.e. the total number of available territories). This figure was multiplied by the proportion of positive survey sites as observed during the 2010/11 national survey (after correcting for biases) i.e. x 0.93. See Reid et al. and NPWS 2009 for further details of these methods.
2.4.07 Short-term trend - Trend direction	An increase in population since the last national survey (04/05) is demonstrated in Reid et al. (2013)
2.4.08 a) Short-term trend - Magnitude - Minimum	Reid et al. (2013) provides estimates of population increase (min and max) compared to the 2004/05 survey, but given that extensive corrections for survey biases are built into the 2010/11 survey results and are not available for the 2004/05 survey, the true extent of the increase is unclear and the max min figures calculated by Reid et al (2013) are not included here.
2.4.10 Long-term trend - Period	24 year period is the recommended reporting option, so some interpolation between 1980/81 and 1990 datasets was requried.
2.4.13 Long term trend - Method used	Results of national otter surveys used. Despite an apparent dip in otter numbers in 2004/05 (see Bailey & Rochford), the otter population in 2012 would appear to be at similar levels to that found 24 years earlier (i.e. in 1988, between original Chapman and Chapman survey 1982 and Lunnon survey 1991), indicating a stable long term trend.
2.4.14 d) Favourable reference population - Indicate method used to set reference value if other than operators	The figure calculated in 2007 is still valid. This was based on returning all otter SACs to the population levels recorded in the Chapman & Chapman survey (1982), while simultaneously ensuring that no loss of status occurs outside SACs (see Background document to Lutra lutra (1355) Conservation Status Assessment, 2007 for full details).

Field label	Note
Species: 1355	**European otter**
2.4.15 a) Reason for change - genuine change?	The latest survey reports an increase in the % of positive survey squares for otter and notwithstanding all the caveats included in the survey report (Reid et al 2013), some genuine recovery in the otter population appears to have occurred.
2.4.15 b) Reason for change - improved knowledge/more accurate data?	The current population is larger than that reported in 2007. This is to some extent due to better data. In particular there is an apparent expansion of the otter into coastal squares. This is because the 2010/11 national otter survey specifically targeted coastal squares which had received no previous survey effort.
2.5.01 Area estimation	Same figure as used in the 2007 report. See background document to 2007 assessment for details: http://www.npws.ie/publications/euconservationstatus/
2.5.04 b) Quality of the habitat - Explain how the quality was assessed	Expert judgement based on overall assessment of riparian, lacustrine and coastal waters; the widespread nature of otters and the apparent population recovery seen.
2.5.09 Area of suitable habitat for the species (km2)	Same figure as used in the 2007 report. See background document to 2007 assessment for details: http://www.npws.ie/publications/euconservationstatus/
2.6 Main pressures - Pressure	Roadkill data from 2007-2012 (from biology.ie) indicates 10-30 otters reported killed on roads each year. Entanglement in fixed fishing nets (e.g. tangle nets) and pots (e.g. fyke nets / lobster pots) is also a concern although it is difficult to estimate the level of mortality due to limited reporting. Diffuse and point source pollution of freshwaters and coastal waters is likely to have indirect effect on otters through impacts on prey abundance.
2.7 Threats - Threat	Identified pressures (2.6) are considered likely to continue into the future.
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The otter is found throughout the country and the current range encompasses almost the entire country, hence the Range is considered favourable.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The previous assessment highlighted concerns about the otter population as the results of the 2004/05 national survey indicated a decline. The most recent survey concludes that otter numbers have recovered and now exceed the targets set in the SAP for the species (i.e. the Favourable reference population). Consequently Population is considered favourable.
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Otter habitat is considered favourable. The species is widespread in Ireland occurring on streams, rivers and lakes throughout the country as well as around the coast.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	A number of pressures have been identified but none of these appears to be having anything more than very local impacts. These pressures are likely to continue in the future although with increased awareness of otter road traffic related mortality and a growing understanding of the potential threats posed by fisheries activities it is hoped that these concerns will receive additional attention and slowly abate.
2.9.05 Overall assessment of Conservation Status	The most recent national survey of the otter shows the species to be widespread throughout Ireland and present in a wide variety of habitat types. Similar results have been reported from N. Ireland. Previous concerns about population decline have been allayed by these results with the latest estimates suggesting a very healthy adult female population of between 7,000 and 10,000. Overall, the otter is considered to be in good conservation status.

Field label	Note
Species: 1355	**European otter**
3.1.01 b) Population size - Minimum	The otter population within the SAC network has been estimated on the basis of available otter habitat. The total area of otter habitat in the country has been calculated as 3,115km2. The area of suitable habitat within SACs is 711km2 (see O'Neill, 2008; NPWS, 2009), i.e. 22% of available habitat occurs within the SAC network. Given that otters are widely distributed throughout the country wherever suitable habitat is available (O'Neill, 2013), it is fair to assume that SACs support approximately 22% of the national otter population. The minimum otter population present within the SAC network is therefore based on the following calculation. The minimum number of breeding females – 7,218 (from 2.4.2) - multiplied by 0.22 = 1,588.
3.1.01 c) Population size - Maximum	Following the rationale outlined in 3.1.1b the maximum number of breeding females – 10,186 (from 2.4.2) multiplied by 0.22 = 2,241.
3.2 Conservation measures	See Otter Threat Response Plan for detailed commentary: http://www.npws.ie/publications/speciesactionplans/2009_Otter_TRP.pdf

Otter - *Lutra lutra* (1355)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

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Scale - Scála
0 10 20 30 40 50 km

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Map - Léarscáil
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Date - Dáta
10-05-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1357**
0.2.2 Species name	**Martes martes**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	Pine marten (Cat crainn)

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	2007-2012
1.1.4 Additional map	Yes
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published sources

Casey, J. and Ryan. M. (2012) Situation and outlook for forestry 2011/2012. Forestry Development Department,Teagasc, Athenry, Co. Galway. http://www.teagasc.ie/forestry/docs/advice/Teagasc_Situation_Outlook_Forestry_2012.pdf

Fairley, J. (2001) A basket of weasels. Privately published. Belfast, Northern Ireland.

Lynch, A.B., Brown, M.J.F. & Rochford, J.M. (2006) Fur snagging as a method of evaluating the presence and abundance of a small carnivore, the pine marten (Martes martes). J. Zoology 270: 330-339.

Marnell, F., Kingston, N. & Looney, D. (2009) Ireland Red List No. 3: Terrestrial Mammals, National Parks and Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland.

O'Mahony, D., O'Reilly, C. & Turner, P. (2007) National pine marten survey of Ireland: an assessment of the current distribution of pine marten in the Republic of Ireland. Unpublished report to the Forest Service and National Parks & Wildlife Service.

O'Mahony, D., O'Reilly, C. and Turner, P. (2012) Pine marten (Martes martes) distribution and abundance in Ireland: A cross-jurisdictional analysis using non-invasive genetic survey techniques. Mammalian Biology 77: 351–357.

O'Sullivan, P. (1983) Distribution of the pine marten in the Republic of Ireland. Mammal Review 13: 39-44.

Zalewski, A. & Jedrzejewski, W. (2006) Spatial organisation and dynamics of the pine marten Martes martes population in Bialowieza Forest (E. Poland) compared with other European woodlands. Ecography 29: 31-43.

Whilde, A. (1993) Irish red data book 2: vertebrates. HMSO, Belfast.

2.3 Range

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

2.3.1 Surface area - Range (km²)	52000	
2.3.2 Method - Range surface area	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	increase (+)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period	1988-2012	
2.3.7 Long-term trend direction	increase (+)	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	38200
	operator	N/A
	unknown	No
	method	The FRR reported in 2007 has been retained. The value is considered to be large enough to support a viable pine marten population and is higher than the estimated range of the species when the Habitats Directive came into force in Ireland.
2.3.10 Reason for change	Genuine	

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	number of individuals (i)		
	min	1350	max	4330
2.4.2 Population size (other than individuals)	Unit	N/A		
	min		max	
2.4.3 Additional information	Definition of locality			
	Conversion method			
	Problems	As a complete survey of all individuals is not feasible, population estimates must rely on partial surveys producing occurrence and habitat data together with estimates of density in different habitats/regions. This is further complicated in Ireland by the varying densities of the species across its range.		

2.4.4 Year or period	2012-2012		
2.4.5 Method – population size	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.6 Short-term trend period	2001-2012		
2.4.7 Short term trend direction	increase (+)		
2.4.8 Short-term trend magnitude	min	max	confidence interval
2.4.9 Short-term trend method	Estimate based on expert opinion with no or minimal sampling (1)		
2.4.10 Long-term trend period	1988-2012		
2.4.11 Long term trend direction	increase (+)		
2.4.12 Long-term trend magnitude	min	max	confidence interval
2.4.13 Long-term trend method	N/A		
2.4.14 Favourable reference population	number	2740	
	operator	N/A	
	unknown	No	
	method	The current population estimate is taken as the favourable value. The population estimate is based on the recent work by O'Mahony et al. (2012). Using a combination of occupied habitat and average territory size they produced an estimate for the Republic of Ireland	

of 2740 pine martens (with 90% CI of 1350-4330). Although this number is low, it is clear that this species has recovered from much lower numbers and the current population is considered aedquate to ensure the long term viability of the species.

2.4.15 Reason for change	Use of different method

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km^2)	7057
2.5.2 Year or period	2012-2012
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Good
2.5.4 b) Quality of habitat - method	The ongoing expansion of the pine marten range and population recovery were taken as indicators of the availability of good quality habitat.
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	increase (+)
2.5.7 Long-term trend period	1988-2012
2.5.8 Long term trend direction	increase (+)
2.5.9 Area of suitable habitat (km^2)	9500
2.5.10 Reason for change	Genuine

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
Forest and Plantation management & use (B02)	medium importance (M)	N/A
roads, motorways (D01.02)	medium importance (M)	N/A
predator control (F03.02.04)	medium importance (M)	N/A

2.6.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
Forest and Plantation management & use (B02)	medium importance (M)	N/A
roads, motorways (D01.02)	medium importance (M)	N/A
predator control (F03.02.04)	low importance (L)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant Information	
2.8.3 Trans-boundary assessment	

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.9.2. Population	assessment	Favourable (FV)
	qualifiers	N/A
2.9.3. Habitat	assessment	Favourable (FV)
	qualifiers	N/A

2.9.4. Future prospects	assessment Favourable (FV) qualifiers N/A
2.9.5 Overall assessment of Conservation Status	Favourable (FV)
2.9.6 Overall trend in Conservation Status	N/A

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	N/A		
	min		max	
3.1.2 Method used	N/A			
3.1.3 Trend of population size within	N/A			

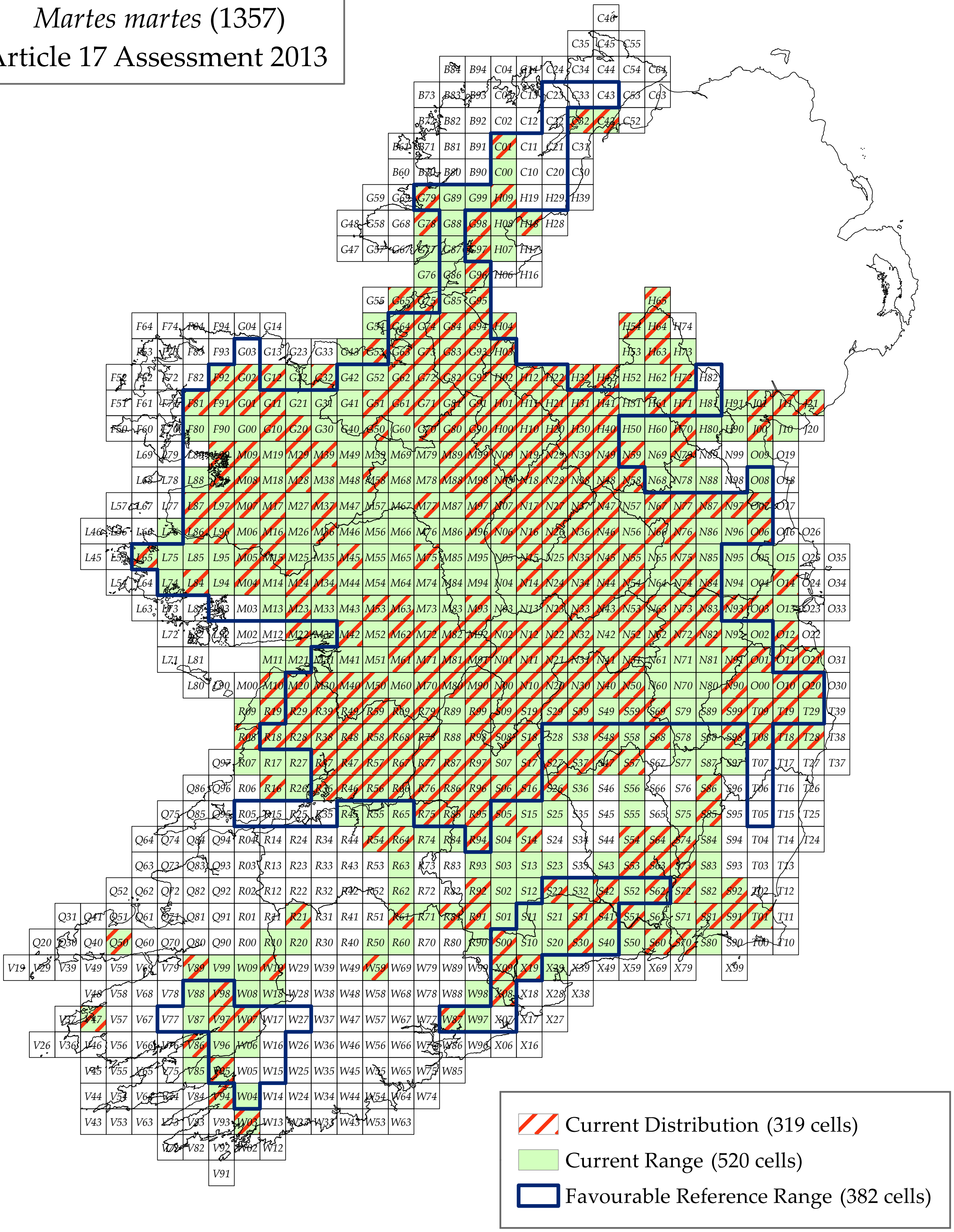
3.2 Conservation Measures

Field label	Note
Species: 1357	**Pine marten**
0.2.01 Species code	The pine marten (Martes martes) is a medium sized arboreal carnivore, typically inhabiting forested ecosystems or landscapes with substantial woodland or scrub. It is an opportunistic feeder on small mammals, berries, nuts, frogs, lizards, birds and invertebrates. The pine marten was formerly widespread in Ireland but suffered serious decline in the 17th century with the deforestation of the country. Pine martens suffered further in the 19th and early 20th centuries due to persecution by gamekeepers and trappers (Hayden & Harrington, 2000). The 1993 Red Data Book of Irish vertebrates listed the pine marten population in Ireland as internationally important (Whilde 1993). Fairley (2001) referred to it as the rarest of all Irish mammals. In recent decades, however, the species has shown signs of recovery in Ireland with significant range expansion. This is attributed to the significant increase in afforestation, the legal protection afforded the species in 1976 under the Wildlife Act, and the deliberate release of individuals into regions where they were historically present but were thought to have been locally extirpated e.g. Killarney and Glengarriff. The 2009 Red Data List of Irish Mammals listed pine marten as Least Concern (Marnell et al., 2009).
1.1.01 Distribution map	This map was derived from the transformation of the map referred to in 1.1.4 to the LAEA projection.
1.1.02 Method used - map	Distribution data for the period 2007 - 2012 covered a total of 319 x 10km cells. Records were derived from NBDC, roadkill data (www.biology.ie) and NPWS staff.
1.1.04 Additional distribution map	Distribution data was intersected with the Irish 10 km2 grid.
1.1.05 Range map	Distribution data for the period 2007 - 2012 covered a total of 319 x 10km cells. The application of the Range Tool (with gap closure set at 20km) produced a range envelope of 514 x 10km squares. Six cells within this range (M56, M57, M66, N70, N71, N80) were excluded by the Range Tool but included in the final range based on expert opinion.
2.3.02 Method used - Surface area of Range	See 1.1.5.
2.3.04 Short term trend - Trend direction	The increasing trend is ongoing since the start of the trend period (i.e. 2001), with a simple comparison of the maps submitted with the 2007 assessment and the current assessment showing a ~30% increase.
2.3.07 Long-term trend - Trend direction	O'Mahony et al. (2007) reported a 125% increase in occupied squares over a 26 year period from 52 x 10km squares (1980) to 117 x 10km squares (2006). While the results of this distributional survey are not directly equivalent to a comparison of ranges, it is clear that a significant increase in range occurred between the 1980s and 2006 and that this has continued into the present reporting period.
2.3.10 a) Reason for change - genuine change?	The range of the pine marten is clearly increasing, with consolidation in the west andconsiderable expansion across the midlands and east of the country. The two outlier populations in the south-west and in Waterford also appear to be expanding with evidence of the latter joining up with the expanding front of the main population in the south-east. It would appear that the species is in a phase of re-colonisation.
2.4.01 a) Population size estimation (using individuals or agreed exceptions where possible) - Unit	Population estimates are based on the recent work by O'Mahony et al (2012). Using a combination of occupied habitat and average territory size they produced an estimate for the Republic of Ireland of 2740 pine martens (with 90% CI of 1350-4330).

Field label	Note
Species: 1357	**Pine marten**
2.4.07 Short-term trend - Trend direction	There is good evidence of range expansion in Ireland in recent decades. This is assumed to reflect population expansion. However, it is recognised that population densities in the areas of expansion will be significantly lower that those in the established core areas (largely in the west).
2.4.11 Long-term trend - Trend direction	There is good evidence of range expansion in Ireland since the 1980s. This is assumed to reflect population expansion. However, it is recognised that population densities in the areas of expansion will be significantly lower that those in the established core areas (largely in the west).
2.4.14 a) Favourable reference population - Number of individuals/agreed exceptions/other units	The current population estimate (from O'Mahony et al. 2012) is taken as the favourable reference value.
2.4.15 c) Reason for change - use of different method	The 2007 assessment used occupied grid cells as a proxy for population.
2.5.01 Area estimation	Taken as the extent of forest/woodland and scrub within the current range of the species.
2.5.03 Method used Habitat for the species	See 2.5.9. The Pine marten range extends to approximately 74% of the national territory (52,000/70,000). The area of suitable habitat within the range was calculated using the same assumption as the last assessment i.e. that the suitable habitats occur on a simple porportional basis both inside and outside the pine marten range allowing us to calculate the area of suitable habitat available to the pine marten within its range thus: 9,500km2 x 0.74 = 7057km2.
2.5.06 Short-term trend - Trend direction	Accurate data on area of scrub is difficult to source, however, forestry expansion has continued year on year with an average of c14,000ha planted per annum in 2001 and 2002. This level of planting decreased thereafter, but still an average of c7,000ha has been added to the forest estate per annum since 2003 (Casey & Ryan, 2012).
2.5.09 Area of suitable habitat for the species (km2)	The extent of forestry in Ireland - 7,500km2 - was taken from Casey and Ryan (2012). The area of scrub/transitional vegetation suitable for pine marten - 2,000km2 - was taken from O'Mahony's estimate (2007). This gives a total area of suitable habitat of 9,500km2.
2.5.10 a) Reason for change - genuine change?	Both the area of available habitat (see 2.5.6) and the extent of occupied range have increased during the current reporting period.
2.6 Main pressures - Pressure	Pine martens rely on woodlands and the majority of woodland in Ireland is managed for commerical purposes. The expansion of this estate has facilitated pine marten expansion, but felling, thinning, re-planting and related forestry practise can have a significant impact on pine marten populations. A significant number of pine martens are killed on Irish roads annually (see www.biology.ie). The return of pine martens to areas where they have not been seen in a generation can lead to conflict, in particular with gun clubs who rear game birds and with farmers who have unprotected hen runs, both of which can be prone to pine marten predation.
2.7 Threats - Threat	Future expansion of the national forest estate will facilitate continued pine marten expansion, but felling, thinning, re-planting and related forestry practise are also expected to continue to impact on pine marten populations. A significant number of pine martens are killed on Irish roads annually and this is expected to continue as mitigation for this wide-ranging species is problematic. The conflict between gun clubs who rear game birds and with farmers who have unprotected hen runs, both of which can be prone to pine marten predation, may be expected to expand as the pine marten expands its range. However, an education and awareness campaign is planned, which, together with increased law enforcement, should help manage this situation.

Field label	Note
Species: 1357	**Pine marten**
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The pine marten is expanding its range. The current range is larger than the favourable reference value. This parameter is considered favourable.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Although population estimates indicate that this is still a rare mammal in Ireland, population is believed to be rising and the current value is not lower than the favourable value. This parameter is considered favourable.
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Although Ireland has one of the lowest levels of forest cover in Europe, the area of forestry has increased significantly in recent decades and is still expanding. The pine marten has yet to colonise all the suitable habitat available to it in Ireland.This parameter is considered favourable.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	While some threats have been identified, none of them are considered sufficiently serious to undermine the continued recovery of the pine marten in Ireland. This parameter is considered favourable.
2.9.05 Overall assessment of Conservation Status	The pine marten is undergoing a phase of re-colonisation in Ireland. It has greatly increased its range in recent decades and although its population is still low, it is expanding. There is ample habitat available across the country to allow it to continue its spread. While some threats have been identified, none of them are considered sufficiently serious to undermine the continued recovery of the species. Overall, the conservation status of the pine marten is considered favourable.

Pine marten
Martes martes (1357)
Article 17 Assessment 2013



An Roinn Ealaíon, Oidhreachta agus Gaeltachta
Department of Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 10 20 30 40 50 km

N
Map - Léarscáil
V 2.0
Date - Dáta
14-11-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1364**
0.2.2 Species name	**Halichoerus grypus**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	Grey seal

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Complete survey/Complete survey or a statistically robust estimate (3)
1.1.3 Year or period	2001-2012
1.1.4 Additional map	No
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Marine Atlantic (MATL)

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2.3 Range

2.3.1 Surface area - Range (km²)	273500	
2.3.2 Method - Range surface area	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	273500
	operator	N/A
	unknown	No
	method	The range value derived from the range map referred to in 1.1.5 is considered to be the baseline for this species. As there is no evidence of a decline since the Directive came into force the current range is set as the FRR.
2.3.10 Reason for change	Improved knowledge/more accurate data	

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	number of individuals (i)		
	min	7284	max	9365
2.4.2 Population size (other than individuals)	Unit	N/A		
	min		max	
2.4.3 Additional information	Definition of locality			
	Conversion method			
	Problems	The minimum and maximum population sizes provided are based on (i) updated pup production estimates from the seven most important breeding areas for grey seals in Ireland (i.e., c. 84% of the total breeding population according to comprehensive assessment in 2005; Ó Cadhla et al., 2008). These areas were subject to renewed aerial surveillance over three breeding seasons (2009 - east/southeast, 2011 - west/southwest, 2012 - west/northwest). The resultant pup production figures for all seven areas were combined with (ii) pupping data from 2005 for sites of lesser importance on national/regional scales, to yield a total Irish production estimate (P) of 2,081 pups. This figure was then scaled up to minimum and maximum all-age population estimates using standard multipliers (3.5x[P] and 4.5x[P], respectively) that have been applied consistently in Irish studies (Ó Cadhla et al., 2008). While some interannual variability in grey seal pup production is commonplace, the overall population figures are considered a representative sample within the current reporting period. An		

assumption is made that the breeding sites of lesser importance (c. 16% of the 2005 total) have not seen nationally/regionally significant increases or declines in pup production since they were last surveyed.

2.4.4 Year or period	2005-2012
2.4.5 Method – population size	Estimate based on partial data with some extrapolation and/or modelling (2)
2.4.6 Short-term trend period	2001-2012
2.4.7 Short term trend direction	increase (+)
2.4.8 Short-term trend magnitude	min / max / confidence interval
2.4.9 Short-term trend method	Estimate based on partial data with some extrapolation and/or modelling (2)
2.4.10 Long-term trend period	
2.4.11 Long term trend direction	N/A
2.4.12 Long-term trend magnitude	min / max / confidence interval
2.4.13 Long-term trend method	N/A
2.4.14 Favourable reference population	number operator: N/A unknown: Yes method: Robust statistical data on grey seal population viability and trends in Ireland are not available, while numerical information preceding the Directive was subject to significant spatial, temporal and methodological data gaps. However knowledge of the species' distribution and terrestrial/intertidal abundance associated with breeding, moulting and summer phases of the annual life cycle have improved very significantly since the Directive came into force. Nevertheless the use of current or previous population figures as descriptors for FRP require further work. The FRP for this species is therefore considered to be unknown.
2.4.15 Reason for change	Genuine

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	273500
2.5.2 Year or period	2001-2012
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Good
2.5.4 b) Quality of habitat - method	Expert judgement, based on available scientific research concerning habitat use, population size, ecology and distribution.
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	stable (0)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	273500
2.5.10 Reason for change	Improved knowledge/more accurate data

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	medium importance (M)	N/A
Illegal taking/ removal of marine fauna (F05)	low importance (L)	N/A
Marine water pollution (H03)	low importance (L)	N/A
Noise nuisance, noise pollution (H06.01)	low importance (L)	N/A
Seismic exploration, explosions (H06.05)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A

2.6.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	medium importance (M)	N/A
Illegal taking/ removal of marine fauna (F05)	low importance (L)	N/A
Marine water pollution (H03)	low importance (L)	N/A
Noise nuisance, noise pollution (H06.01)	low importance (L)	N/A
Seismic exploration, explosions (H06.05)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant Information	
2.8.3 Trans-boundary assessment	Given the mobility of this marine species, and in particular the potential for seasonal movements in response to breeding and energetic requirements, prey distribution and abundance, and other natural processes, it is likely that many individual grey seals move between Irish waters/haul-out sites and adjacent jurisdictions. This assertion is supported by substantial tagging, photo-identification and telemetry-based data spanning several decades of research. A transboundary assessment in the next reporting period would allow a fuller appreciation of the range, habitat and status of this species.

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment Favourable (FV) qualifiers N/A
2.9.2. Population	assessment Favourable (FV) qualifiers N/A
2.9.3. Habitat	assessment Favourable (FV) qualifiers N/A
2.9.4. Future prospects	assessment Favourable (FV) qualifiers N/A
2.9.5 Overall assessment of Conservation Status	Favourable (FV)
2.9.6 Overall trend in Conservation Status	N/A

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	number of individuals (i)		
	min	6850	max	8850
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3 Trend of population size within	increase (+)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Establish protected areas/sites (6.1)	Legal Administrative Recurrent	high importance (H)	Inside	Maintain
Legal protection of habitats and species (6.3)	Legal Administrative Recurrent	high importance (H)	Both	Maintain
Regulation/ Management of hunting and taking (7.1)	Legal Administrative Recurrent	medium importance (M)	Both	Maintain
Regulation/ Management of fishery in marine and brackish systems (7.3)	Legal Administrative Recurrent	high importance (H)	Both	Maintain
Regulating/Managing exploitation of natural resources on sea (9.2)	Legal Administrative Recurrent	high importance (H)	Both	Maintain

Field label	Note
Species: 1364	**Grey seal**
0.1 Member State	Ireland
0.2.01 Species code	The grey seal is the larger of two species of true seal (Phocidae) that commonly breed around the coast of Ireland and inhabit its inshore and offshore waters. Notable by a pronounced sexual dimorphism, adult males of the species can measure 2.0-2.5m in length and weigh up to 300kg in comparison to adult females which tend to be less than 2m in length and generally weigh up to 180-190kg. Grey seals inhabit only the Northern Hemisphere and are predominantly found in cold temperate and sub-polar waters, in the northeastern Atlantic from Iceland and northern Norway to the French coast (Thompson & Härkönen, 2008; Hall & Thompson, 2009). Populations of grey seal in the east and west Atlantic are genetically distinct, while the population in the Baltic Sea appears to be largely isolated from adjacent Atlantic-dwelling grey seals (Boskovic et al., 1996). Grey seal is classified as a species of Least Concern due to overall abundance estimates for the North Atlantic and evidence that populations are increasing in most areas of study (Thompson & Härkönen, 2008). In Ireland grey seals occur in estuarine, coastal and offshore marine areas. Individual grey seals may also occasionally travel upstream within river systems to a distance several kilometres from the coast. In addition to its aquatic ecology the species inhabits established terrestrial colonies (known as haul-out sites or haul-outs) at which individual seals breed, moult, rest and engage in social activity, for example (Bonner, 1990). Use of these haul-out sites follows an annual cycle and in Ireland there is a tendency for the species to select more remote locations on which to come ashore such as uninhabited islands, offshore rocky skerries, caves and isolated cliff-bound beaches. Adult grey seals and newborn pups are quite readily identifiable, though sub-adults/juveniles can be more difficult to distinguish in the field. Pups are born bearing a distinctive white or off-white coat of fur (pelage) which is moulted after 3-4 weeks to reveal a new grey-black mottled or speckled coat. Adults of both sexes may retain a mottled or blotchy colouration although in both cases pelage patterns can be highly variable (Hall & Thompson, 2009) ranging from a slate grey dorsal surface and a lighter, mottled ventral surface to uniformly dark grey-brown. Where the animal's head is more visible, grey seals can also be identified by their characteristic long muzzle and comparatively straight or convex snout from forehead to nose (Duck, 2007). Grey seals in Ireland are generally considered part of a larger population or metapopulation that also inhabits adjacent jurisdictions (i.e., the UK and France at least).
0.2.04 Common name	Grey seal = Rón glas
1.1.01 Distribution map	The distribution map for this species represents all terrestrial and intertidal haul-out sites at which grey seals were recorded during targeted surveillance between 2001 and 2012. The primary surveillance programmes that contributed data to this projection are cited as follows: Cronin et al. (2004); Ó Cadhla & Strong (2007), Ó Cadhla et al. (2008), Duck & Morris (2012a, 2012b). Additional grey seal distribution data integrated into this map were collected during annual monitoring for harbour seals and grey seals (Lyons, 2004; NPWS, 2013 - unpublished data). This distribution map for the species has been drawn in 10km x 10km resolution and is mapped in the LAEA projection.

Field label	Note
Species: 1364	**Grey seal**
1.1.02 Method used - map	Over the last two decades records of the occurrence of this species around Ireland have increased considerably in parallel with more active surveillance & assessment (see Cronin et al., 2004; Ó Cadhla et al., 2008) and continued seal population monitoring since 2005-06 (Ó Cadhla & Strong, 2007; NPWS, 2013 - unpublished data). As in other countries, surveillance and monitoring of grey seals in Ireland has concentrated on the shore-based aspect of their natural history and particularly the breeding season (Ó Cadhla et al., 2008) since the animals are more aggregated and available for study when located at terrestrial or intertidal haul-out sites. In contrast the accurate assessment of grey seal occurrence at sea presents significant challenges, particularly when attempting to work at a regional or population scale and offshore. Sighting records may be obtained incidentally during ship-based surveys (e.g., Pollock et al., 2000; Wall et al., 2013) but in general seals are not easily detected and identified in the open sea except at close range and such data may be recorded erratically (Baines & Evans, 2009), introducing uncertainty into the assessment of true distribution. Knowledge of grey seal distribution in Ireland is therefore concentrated on records gathered at haul-out sites within the current and previous reporting period (i.e., 2001-2012) including during the annual moult (Ó Cadhla & Strong, 2007), breeding (Ó Cadhla et al., 2008; NPWS, 2013 - unpublished data) and summer seasons (Cronin et al., 2004; Duck & Morris, 2012a, 2012b; NPWS, 2013 - unpublished data). The data highlight a very widespread distribution by grey seals around the entire coastline of Ireland including many offshore islands and skerries. It should be noted that the described distribution may not fully represent the localised use of certain caves for resting or breeding (e.g., along parts of the south and west coasts). Nevertheless the map drawn for this species provides a good representation of its principal observed distribution.
1.1.03 Year or period	The period selected for mapping the distribution of this species represents a period of intensive broad-scale surveillance of Ireland's grey seal population across a range of research and monitoring programmes.
1.1.05 Range map	The species' natural range in Irish waters has been shown to be part of its wider range in the waters of western Europe, particularly those of neighbouring states the UK and France (e.g., Vincent et al., 2002; Matthiopoulos et al., 2004; Cronin, 2011; ICES, 2012), with offshore movements primarily occurring in waters overlying the continental shelf and upper continental slope. The range map provided consists of its recorded and likely predominant natural range based on recent data (2001-2012) and expert judgement. It consists of a block of contiguous 10km x 10km grid cells distributed in Irish coastal and marine waters up to 1,000m deep including shallow coastal bays and estuaries and excluding the eastern margin of the Rockall Bank.
2.3.02 Method used - Surface area of Range	This figure has been derived from the range map referred to in 1.1.5.
2.3.03 Short-term trend - Period	Prior to the mid-late 1990s there was limited information available concerning the population status and distribution of grey seals around Ireland and the extent to which these animals travelled within Irish and neighbouring waters. From 1998 the results of several research projects involving key Irish breeding and non-breeding haul-out sites began to emerge. In time, increased emphasis was placed on completion of (i) a national evaluation of grey seal population size and distribution and (ii) the first studies of grey seal movement within Irish waters and further afield. Consequently, with regard to this species it is considered that the years 2001-2012 represent an appropriate period for the evaluation of short-term trends.

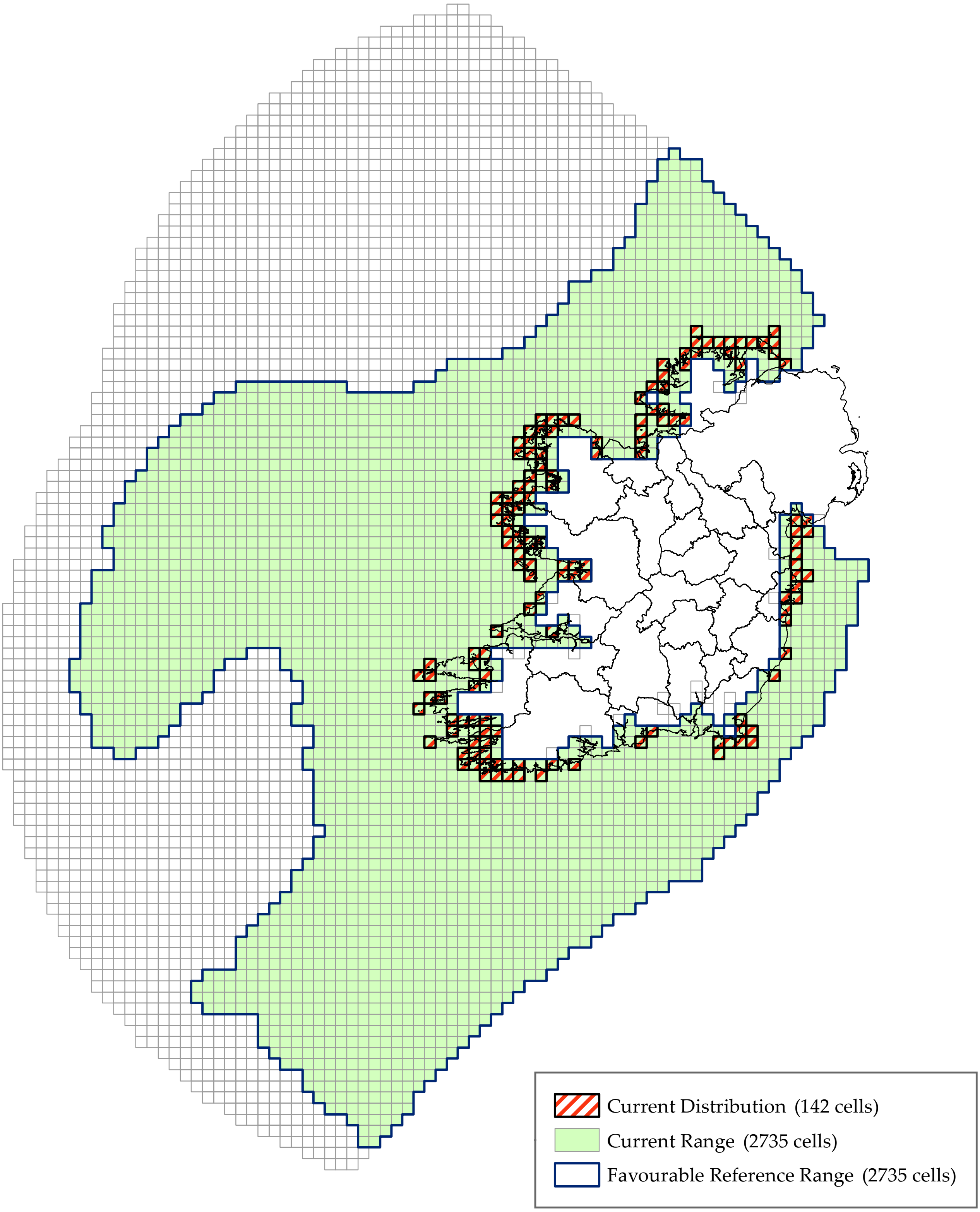
Field label	Note
Species: 1364	**Grey seal**
2.3.04 Short term trend - Trend direction	Records from collaborative transnational photo-identification (e.g., Kiely et al., 2000), telemetry studies conducted since the 1990s (McConnell et al., 1999; Vincent et al., 2002; Matthiopoulos et al., 2004; Hammond et al., 2005; Cronin, 2011; ICES, 2012) and vessel-based sightings (e.g., Baines & Evans, 2009; Wall et al., 2013) demonstrate this species' capacity for wide-ranging travel at sea as first suggested by early flipper-tagging experiments. This information, along with current distribution data, show no evidence of a decline in range in the recent past; therefore accordingly the short-term trend for range is considered to be stable.
2.3.06 Long-term trend - Period	A long-term trend period for this species is not considered appropriate, for reasons outlined in 2.3.3.
2.3.09 a) Favourable reference range - In km2	The range value derived from the range map referred to in 1.1.5 is considered to be the baseline for this species. As there is no evidence of a decline since the Directive came into force the current range is set as the FRR. [Note: (1) The species is shown to be wide-ranging with some elements of seasonal and interannual variation therein while regional population components may be present year-round; Nevertheless the species' range in Irish waters is likely to represent only a component of its range in marine waters covered by the Directive and the northeast Atlantic Ocean; (2) There is an assumption that the current range in Ireland is large enough (a) to encompass all of the ecological variation required by this species (b) to contribute to the long-term survival of the species.]
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Additional records of this wide-ranging seal species have been obtained since the previous reporting round (e.g., Ó Cadhla & Strong, 2007; Ó Cadhla et al., 2008; Baines & Evans, 2009; Duck & Morris, 2012a, 2012b; Wall et al., 2013). These data and the results of telemetry studies undertaken over the last two decades (e.g., McConnell et al., 1999; Vincent et al., 2002; Matthiopoulos et al., 2004; Hammond et al., 2005; Cronin, 2011; ICES, 2012) have resulted in an improved knowledge and ability to assess the range from that reported in 2007. There is no scientific reason to assume that the species was not similarly present in 2001-2006.
2.4.04 Year or period	The years spanning 2005-2012 have been selected in order to represent the most current population information available for this species and to best match the current reporting period.
2.4.05 Method used - Population size	The minimum and maximum population sizes provided are based on (i) updated pup production estimates from the seven most important breeding areas for grey seals in Ireland (i.e., c. 84% of the total breeding population according to comprehensive assessment in 2005; Ó Cadhla et al., 2008). These areas were subject to renewed aerial surveillance over three breeding seasons (2009 - east/southeast, 2011 - west/southwest, 2012 - west/northwest). The resultant pup production figures for all seven areas were combined with (ii) pupping data from 2005 for sites of lesser importance on national/regional scales, to yield a total Irish production estimate (P) of 2,081 pups. This figure was then scaled up to minimum and maximum all-age population estimates using standard multipliers (3.5x[P] and 4.5x[P], respectively) that have been applied consistently in Irish studies. For further details concerning grey seal population estimation, previous studies in Ireland and the breeding sites concerned see Ó Cadhla et al. (2008). While some interannual variability in grey seal pup production is commonplace, the overall population figures are considered a representative sample within the current reporting period. An assumption is made that the breeding sites of lesser importance (c. 16% of the 2005 total) have not seen nationally/regionally significant increases or declines in pup production since they were last surveyed.
2.4.06 Short-term trend - Period	The period 2001-2012 has been selected, consistent with 2.3.3.

Field label	Note
Species: 1364	**Grey seal**
2.4.09 Short-term trend - Method used	There is some emerging evidence of grey seal population growth in Ireland since the 1980s, centred around a number of breeding areas of key importance in a national context. Prior to a comprehensive assessment of the breeding population in 2005, studies at two regional colonies in the west and southwest were describing positive differences in pup production between 1995-1996 and 2002-2003 (Ó Cadhla & Strong, 2003; Cronin et al., 2007). While this could indicate improved fecundity in the adult populations associated with these particular sites and the data were snapshots across a survey gap of seven years, the possibility of some wider all-age population growth (e.g., more animals of breeding age in the population) was further suggested when all principal and secondary breeding colonies around Ireland were surveyed in 2005 and additional positive changes in pup production were evident (Ó Cadhla et al., 2008). Although interannual variation in grey seal pup production within a breeding area is common and these studies are all relatively recent in ecological terms, continued surveillance of seven key Irish breeding areas supports the emerging evidence of a modest level of grey seal population growth in Ireland, with the current minimum and maximum population estimates derived via annual pup production (see 2.4.1, 2.4.5) higher than those recorded in 2005 (5,509-7083 seals of all ages; Ó Cadhla et al., 2008). It should be noted however, that (1) the observed changes in pup production between survey years are highly variable across the different breeding areas under surveillance, (2) statistical data on pup production trends at individual breeding colonies are not available and further scientific work will be necessary to populate a robust analysis and monitor the species' status, (3) information is limited concerning the many secondary breeding sites surveyed/identified in 2005, (4) overall numbers of grey seals recorded in Ireland remain low compared with the UK (90,100-137,700; SCOS, 2011) especially considering the extent and availability of apparently suitable coastal habitat (Duck & Morris, 2012a, 2012b).
2.4.10 Long-term trend - Period	A long-term trend period for this species is not considered appropriate for reasons outlined in 2.3.3.
2.4.14 d) Favourable reference population - Indicate method used to set reference value if other than operators	Robust statistical data on grey seal population viability and trends in Ireland are not available, while numerical information preceding the Directive was subject to significant spatial, temporal and methodological data gaps. However knowledge of the species' distribution and terrestrial/intertidal abundance associated with breeding, moulting and summer phases of the annual life cycle have improved very significantly since the Directive came into force. Nevertheless the use of current or previous population figures as descriptors for FRP require further work. The FRP for this species is therefore considered to be unknown.
2.5.01 Area estimation	The surface area estimate for range (derived from the range map referred to in 1.1.5) is used as a proxy for habitat surface area.
2.5.02 Year or period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.5.03 Method used Habitat for the species	Use of the range descriptor as a proxy for habitat is judged appropriate for this wide-ranging pelagic species.
2.5.04 b) Quality of the habitat - Explain how the quality was assessed	The habitat used by grey seals in Ireland is diverse and dynamic, from coastal and estuarine waters close to human activity and undisturbed offshore islands to deeper Atlantic shelf waters and shallow seas shared with adjacent member states. Current information broadly indicates that grey seals of all ages move freely about this diverse habitat and, based on the population size and distribution data available and knowledge of its population ecology, all indications are that sufficient high quality habitat is available to support the maintenance and/or expansion of the species in Ireland into the future. Consequently the habitat quality is considered good.
2.5.05 Short-term trend - Period	The period 2001-2012 has been selected, consistent with 2.3.3.

Field label	Note
Species: 1364	**Grey seal**
2.5.06 Short-term trend - Trend direction	The trend for range in 2.3.4 is applied as a proxy for habitat.
2.5.07 Long-term trend - Period	A long-term trend period for this species is not considered appropriate, for reasons outlined in 2.3.3.
2.5.09 Area of suitable habitat for the species (km2)	Grey seals have been widely recorded in Irish waters both historically and to the present day and the predominant habitats for this wide-ranging species are considered to include all continental shelf waters as well as those along the margins of the shelf <1,000m deep. Grey seals commonly occur coastally in Ireland, whether for the use of terrestrial/intertidal haul-out sites or shallower coastal waters, and the species' habitat extends into many enclosed bays and estuaries. The Area of suitable habitat is considered to be equal to the Habitat for the species.
2.6 Main pressures - Pressure	With the exception of pressures arising from regional commercial fishing activity and intermittent seismic exploration activity in Irish continental shelf waters, most of the main pressures thought to be acting on this species are considered to be of low and localised importance. Since grey seal distribution is broadly continental shelf in nature, where a pressure may be regionally intensive and acting directly or indirectly on the species in a significant manner the ranking given is one of medium importance. It should be noted that in relation to seismic exploration, which tends to occur on a local or occasionally regional scale in the waters of Ireland's EEZ and is comparatively low in coverage relative to several other member states, a robust regulatory and management regime applies in order to avoid potentially significant impacts on all species of marine mammal. The impact on this species of pollutant burdens or changes in sea temperature and other abiotic factors in the marine environment, for example, can also not be discounted. However current population size and distribution information for the species indicate that such pressures are not impacting with sufficient intensity in Ireland to constitute a threat to its grey seal population.
2.7 Threats - Threat	There is no evidence to suggest a change in the main pressures thought to be acting on this species in the near future. However surveillance of the species and the pressures potentially acting upon it will continue into the future, while the application of strong management measures (e.g., via the statutory/regulatory process) to avoid potentially significant impacts is also expected to continue.
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The grey seal is widely recorded around the coastline of Ireland and in Irish waters overlying the continental shelf and upper continental slope. It also occurs in many enclosed bays and estuaries. Hence the Range is considered to be favourable.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	While robust statistical data on grey seal population trends in Ireland are not available, knowledge of the species' distribution and terrestrial/intertidal abundance associated with breeding, moulting and summer phases of the annual life cycle have improved very significantly since the Directive came into force. This indicates that grey seals continue to number in the several thousands nationally and that populations associated with a few key breeding areas have increased in size prior to and/or within the reporting period (see 2.4). Given the available estimates and the species' wide occurrence in Ireland, the population parameter is considered favourable.
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The habitat for this species in Ireland is considered favourable. Grey seals have been widely recorded around the coastline of Ireland and in Irish waters both historically and to the present day. In addition to its observed extensive use of terrestrial/intertidal haul-out sites in Ireland, the known habitats for this species include coastal, estuarine and continental shelf waters as well as those along the margins of the shelf <1,000m deep.

Field label	Note
Species: 1364	**Grey seal**
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	Based on current available information a number of pressures have been identified. While the effect of these pressures may act on a temporary and/or regional scale and some are likely to continue to act as pressures into the future, based on current information none is considered to be of sufficient magnitude to be causing an adverse impact on the population of grey seal in Ireland. Ongoing threats as listed or identified into the future via surveillance will be managed appropriately. Hence the future prospects for the species are considered favourable.
2.9.05 Overall assessment of Conservation Status	Based on the assessments for Range, Population, Habitat and Future Prospects parameters, the overall conclusion is that the conservation status of grey seal in Ireland is considered "Favourable". This overall result and the results for three assessment parameters are the same as in the previous Article 17 assessment (i.e., "Favourable"). An improvement is reported in the current assessment for the Range parameter, due to improved knowledge.
3.1.02 Method used	The minimum and maximum population sizes within Ireland's Natura 2000 network are derived from the combined results of grey seal breeding population surveillance between 2005 and 2012 (see 2.4). They are based on the most current pup production estimates for all breeding sites detected within the network during this period. This exercise yielded a minimum production estimate (P) of 1,962 pups. This figure was then scaled up to minimum and maximum all-age population estimates using standard multipliers (3.5x[P] and 4.5x[P], respectively) that have been applied consistently in Irish studies, and rounded to the nearest 50 animals.
3.1.03 Trend of population size within the network (short-term trend)	Evidence from population estimation surveys carried out since the Directive came into force indicates that the all-age population of grey seals (within the Natura 2000 network designated for the species in Ireland) has increased, driven largely by local increases in pup production within a few key breeding areas. The ability to accurately and statistically determine population trends in this species is dependent on the frequency and precision of population surveys undertaken. Ongoing high quality surveillance will assist in the continued determination and verification of population trend data.
3.2 Conservation measures	All measures taken during the reporting period are designed to ensure the maintenance of grey seal at a favourable conservation status in Ireland and to ensure that the conservation provisions for this species, as underpinned by Articles 6 of the Habitats Directive in particular, are robustly implemented including via national legislation (i.e., EC Birds and Natural Habitats Regulations S.I. No. 477/2011, etc).

Grey seal - *Halichoerus grypus* (1364)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

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Scale - Scála
0 25 50 75 100 km

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Map - Léarscáil
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Date - Dáta
19-06-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1365**
0.2.2 Species name	**Phoca vitulina**
0.2.3 Alternative species scientific name	Common seal
0.2.4 Common name	Harbour seal

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Complete survey/Complete survey or a statistically robust estimate (3)
1.1.3 Year or period	2001-2012
1.1.4 Additional map	No
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region: **Marine Atlantic (MATL)**

2.2 Published sources:

Baines, M.E. & Evans, P.G.H. (2009). Atlas of the Marine Mammals of Wales. CCW Monitoring Report No. 68. Countryside Council for Wales. 88pp.

Bonner, W.N. (1990). The natural history of seals. Facts on File Inc. New York. 196pp.

Burns, J.J. (2009). Harbor seal and Spotted seal. Phoca vitulina and P.largha. In W.F. Perrin, B. Würsig, J.G.M. Thewissen (eds.). Encyclopedia of Marine Mammals – 2nd edition. Academic Press, Elsevier Inc. p.533-542.

Cronin, M. & Ó Cadhla, O. (2007). NPWS phocid monitoring methods and interval assessment. Recommendations for monitoring of the harbour seal (Phoca vitulina vitulina) & grey seal (Halichoerus grypus) populations in the Republic of Ireland. Report commissioned by the National Parks & Wildlife Service. Coastal & Marine Resources Centre, University College, Cork. 47pp.

Cronin, M. A. (2007). The abundance, habitat use and haul-out behaviour of harbour seals (Phoca vitulina vitulina) in southwest Ireland. Unpublished PhD thesis, University College Cork. 262 pp.

Cronin, M., Duck, C., Ó Cadhla, O., Nairn, R., Strong, D. & O'Keeffe, C. (2004). Harbour seal population assessment in the Republic of Ireland: August 2003. Irish Wildlife Manuals No. 11. National Parks & Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland. 34pp.

Cronin, M.A. (2011). The conservation of seals in Irish waters: How research informs policy. Marine Policy 35 (6), 748-755.

Cronin, M.A., Kavanagh, A. & Rogan, E. (2008). Foraging ecology of the harbour seal (Phoca vitulina vitulina) in Ireland. Final report to the Marine Institute - Project ST/05/12. Coastal and Marine Resources Centre, University College, Cork. 145pp.

Duck, C. & Morris, C. (2012a). An aerial survey of harbour seals and grey seals in Ireland. Part 1: Lough Foyle to Galway Bay August 2011. A report for the National Parks & Wildlife Service of the Department of Arts, Heritage and the Gaeltacht (DAHG). NERC Sea Mammal Research Unit, Scottish Oceans Institute, University of St. Andrews. 18pp.

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report for the National Parks & Wildlife Service of the Department of Arts, Heritage and the Gaeltacht (DAHG). NERC Sea Mammal Research Unit, Scottish Oceans Institute, University of St. Andrews. 27pp.
Duck, C.D. (2007). Seals (naturally Scottish). Scottish Natural Heritage Design and Publications, Redgorton, Perth. 56pp.
Goodman, S.J. (1998). Patterns of extensive genetic differentiation and variation among European harbor seals (Phoca vitulina vitulina) revealed using microsatellite DNA polymorphisms. Molecular Biology and Evolution 15(2), 104-118.
Heardman, C., O'Donnell, D. & McMahon, D. (2006). The status of the harbour seal Phoca vitulina L. in inner Bantry Bay, Co Cork and inner Kenmare River, Co. Kerry: 1964-2004. Irish Naturalists' Journal 28(5), 181-191.
ICES. (2012). Report of the Working Group on Marine Mammal Ecology (WGMME), March 5-8, Copenhagen, Denmark. ICES CM 2012/ACOM:27.
Lyons, D.O. (2004). Summary of National Parks & Wildlife Service surveys for common (harbour) seals (Phoca vitulina) and grey seals (Halichoerus grypus), 1978 to 2003. Irish Wildlife Manuals No. 13. National Parks & Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland. 67pp.
NPWS. (2010). Harbour seal population monitoring 2009-2012: Report no. 1. Report on a pilot monitoring study carried out in southern and western Ireland, 2009. National Parks & Wildlife Service, Department of the Environment, Heritage and Local Government. Dublin. 11pp.
NPWS. (2011). Harbour seal pilot monitoring project, 2010. National Parks & Wildlife Service, Department of Arts, Heritage and the Gaeltacht. Dublin. 15pp.
NPWS. (2012). Harbour seal pilot monitoring project, 2011. National Parks & Wildlife Service, Department of Arts, Heritage and the Gaeltacht. Dublin. 15pp.
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SCOS. (2011). Scientific advice on matters relating to the management of seal populations: 2011. NERC Special Committee on Seals. UK. 133pp.
Thompson, D. & Härkönen, T. (IUCN SSC Pinniped Specialist Group) (2008). Phoca vitulina. In IUCN 2012. IUCN Red List of Threatened Species. Version 2012.2. http://www.iucnredlist.org .
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2.3 Range

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

2.3.1 Surface area - Range (km²)	183700	
2.3.2 Method - Range surface area	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	183700
	operator	N/A
	unknown	No
	method	The range value derived from the range map referred to in 1.1.5 is considered to be the baseline for this species. As there is no evidence of a decline since the Directive came into force the current range is set as the FRR.
2.3.10 Reason for change	Improved knowledge/more accurate data	

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	number of individuals (i)		
	min	3489	max	
2.4.2 Population size (other than individuals)	Unit	N/A		
	min		max	
2.4.3 Additional information	Definition of locality			
	Conversion method			
	Problems	The minimum population size provided is derived from a comprehensive survey of the entire coastline of Ireland carried out in two parts between 2011 and 2012 (Duck & Morris, 2012a, 2012b). A relevant assumption here is that no significant change in seal haul-out behaviour or regional distribution occurred between the two successive survey legs, thus the results should be interpreted with a level of caution. Production of a robust maximum or best all-age population estimate is more difficult since the proportion of all animals hauled out ashore during the period of survey is required in order to correct for the animals not available for counting and scale up appropriately (see Cronin & Ó Cadhla, 2007). Evidence from annual monitoring in Ireland (NPWS, 2010, 2011, 2012) and a range of international studies suggests that the proportion of harbour seals available for counting can be highly variable depending on the site, environmental covariates and ecological factors, for example. Since there are no statistical data available for this parameter across the broad range of Irish sites surveyed in 2011-2012 an accurate population maximum could not be determined and the minimum estimate remains the appropriate descriptor of population size.		

2.4.4 Year or period	2007-2012
2.4.5 Method – population size	Complete survey/Complete survey or a statistically robust estimate (3)
2.4.6 Short-term trend period	2001-2012
2.4.7 Short term trend direction	stable (0)
2.4.8 Short-term trend magnitude	min max confidence interval
2.4.9 Short-term trend method	Estimate based on partial data with some extrapolation and/or modelling (2)
2.4.10 Long-term trend period	
2.4.11 Long term trend direction	N/A
2.4.12 Long-term trend magnitude	min max confidence interval
2.4.13 Long-term trend method	N/A
2.4.14 Favourable reference population	number operator N/A unknown Yes method Robust statistical data on harbour seal population viability and trends in Ireland are not available, while numerical information preceding the Directive was subject to significant spatial, temporal and methodological data gaps. However knowledge of the species' distribution and intertidal/terrestrial abundance associated with summer breeding, moulting and winter-spring phases of the annual life cycle have improved since the Directive came into force. Nevertheless the use of current or previous population figures as descriptors for FRP require further work. The FRP for this species is therefore considered to be unknown.
2.4.15 Reason for change	Genuine

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	183700
2.5.2 Year or period	2001-2012
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Good
2.5.4 b) Quality of habitat - method	Expert judgement, based on available scientific research concerning habitat use, population size, ecology and distribution.
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	stable (0)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	183700
2.5.10 Reason for change	Improved knowledge/more accurate data

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
Marine and Freshwater Aquaculture (F01)	low importance (L)	N/A
Fishing and harvesting aquatic resources (F02)	medium importance (M)	N/A
Illegal taking/ removal of marine fauna (F05)	low importance (L)	N/A
Outdoor sports and leisure activities, recreational activities (G01)	low importance (L)	N/A
Marine water pollution (H03)	low importance (L)	N/A
Noise nuisance, noise pollution (H06.01)	low importance (L)	N/A

Seismic exploration, explosions (H06.05)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A

2.6.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
Marine and Freshwater Aquaculture (F01)	low importance (L)	N/A
Fishing and harvesting aquatic resources (F02)	medium importance (M)	N/A
Illegal taking/ removal of marine fauna (F05)	low importance (L)	N/A
Outdoor sports and leisure activities, recreational activities (G01)	low importance (L)	N/A
Marine water pollution (H03)	low importance (L)	N/A
Noise nuisance, noise pollution (H06.01)	low importance (L)	N/A
Seismic exploration, explosions (H06.05)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant Information	
2.8.3 Trans-boundary assessment	Given the mobility of this marine species, and in particular the potential for seasonal movements in response to breeding and energetic requirements, prey distribution and abundance, and other natural processes, it is likely that harbour seals move regionally within Irish waters and that some move between Irish waters/haul-out sites and adjacent jurisdictions. This assertion is supported by telemetry-based data spanning several years of research. A transboundary assessment in the next reporting period would allow a fuller appreciation of the range, habitat and status of this species.

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment Favourable (FV) qualifiers N/A
2.9.2. Population	assessment Favourable (FV) qualifiers N/A
2.9.3. Habitat	assessment Favourable (FV) qualifiers N/A
2.9.4. Future prospects	assessment Favourable (FV) qualifiers N/A
2.9.5 Overall assessment of Conservation Status	Favourable (FV)
2.9.6 Overall trend in Conservation Status	N/A

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

3.1.1 Population Size	Unit	number of individuals (i)		
	min	2750	max	2800
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3 Trend of population size within	stable (0)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Establish protected areas/sites (6.1)	Legal Administrative Recurrent	high importance (H)	Inside	Maintain
Legal protection of habitats and species (6.3)	Legal Administrative Recurrent	high importance (H)	Both	Maintain
Regulation/ Management of hunting and taking (7.1)	Legal Administrative Recurrent	medium importance (M)	Both	Maintain
Regulation/ Management of fishery in marine and brackish systems (7.3)	Legal Administrative Recurrent	high importance (H)	Both	Maintain
Regulating/Managing exploitation of natural resources on sea (9.2)	Legal Administrative Recurrent	high importance (H)	Both	Maintain

Article 17 - SPECIES NOTES

Field label	Note
Species: 1365	**Harbour seal**
0.1 Member State	Ireland
0.2.01 Species code	The harbour seal is the smaller of two species of true seal (Phocidae) that commonly breed around the coast of Ireland and inhabit its inshore and offshore waters. Notable by its preferential use of enclosed sheltered coastal bays and estuaries in which it occupies established intertidal/terrestrial resting sites known as haul-out sites (or haul-outs, most of which are intertidal), the species is also widely known as the common sea possibly due to its regular and historic occurrence in or near areas of human settlement. Unlike grey seals, harbour seals do not show a very pronounced sexual dimorphism when mature. Adult males of the species can measure up to 1.9m in length and weigh between 70kg and 150kg, while adult females may be up to 1.7m in length and weigh between 60kg and 110kg (Thompson & Härkönen, 2008), though typical adult weights fall into the 80-100kg range. Harbour seals are one of the most widespread species of pinniped, inhabiting the Northern Hemisphere from warm temperate and even subtropical waters to northern polar regions (Burns, 2009). Five subspecies are recognised, with the European subspecies (Phoca vitulina vitulina) distributed from Svalbard, Northern Norway and the Barents Sea to the French coast, and including the Baltic Sea (Thompson & Härkönen, 2008; Burns, 2009). Information on the genetic structure of regional harbour seal populations in Europe is limited to date but significant genetic differentiation is suggested (Goodman, 1998) with samples indicating that populations in Ireland-Scotland, eastern England and the Wadden Sea could be considered as distinct units. On a global scale, harbour seal is classified as a species of Least Concern due to its large and either stable or increasing population (Thompson & Härkönen, 2008). However substantial declines and die-offs have been recorded both historically and recently in this species, including via viral disease in Europe and elsewhere (Burns, 2009). Further significant yet unexplained decreases in harbour seal numbers have been recorded within parts of Scotland since the mid-1990s (SCOS, 2011). In Ireland the species occurs in estuarine, coastal and fully marine areas. Individual harbour seals may also travel upstream within river systems to a distance several kilometres from the coast. In addition to its aquatic ecology the species occupies regular haul-out sites about which animals breed, moult, rest and engage in social activity, for example, according to an annual cycle (Bonner, 1990). With practice most harbour seals are quite readily distinguished visually from grey seals though sub-adults/juveniles of both species can be more difficult to identify in the field. In general most harbour seal pups shed their natal coat in the uterus before birth and they subsequently bear a grey-black or brown speckled coat similar to that of adults. At all ages harbour seal fur (pelage) colouration patterns can be highly variable (Burns, 2009) ranging from yellow-brown, tan or mid-brown to grey-black and with variable spotted, dappled or speckled markings along the body length. Animals may appear quite plump or short-necked when seen on land and where a seal's comparatively small head is more visible, this species can also be identified by their characteristic short, blunt muzzle and obvious bridged, dog-like snout from forehead to nose (Duck, 2007).
0.2.04 Common name	Harbour seal = Rón beag
1.1.01 Distribution map	The distribution map for this species represents all intertidal/terrestrial haul-out sites at which harbour seals were recorded during targeted surveillance between 2001 and 2012. The primary surveillance programmes that contributed data to this projection are cited as follows: Cronin et al. (2004), Duck & Morris (2012a, 2012b). Additional harbour seal distribution data integrated into this map were collected during annual site monitoring for harbour seals (Lyons, 2004; NPWS, 2010, 2011, 2012). This distribution map for the species has been drawn in 10km x 10km resolution and is mapped in the LAEA projection.

Field label	Note
Species: 1365	**Harbour seal**
1.1.02 Method used - map	Over the last two decades in particular records of the occurrence of this species around Ireland have increased considerably in parallel with more active surveillance & assessment (see Lyons, 2004; Cronin et al., 2004; Heardman et al., 2006) and continued seal population monitoring since 2003 (NPWS, 2010, 2011, 2012; Duck & Morris, 2012a, 2012b). As in other countries, surveillance and monitoring of harbour seals in Ireland has concentrated on the shore-based aspect of their natural history and particularly the moult season since the animals are more aggregated and available for study when located for extended periods at intertidal/terrestrial haul-out sites. In contrast the accurate assessment of harbour seal occurrence at sea presents significant challenges, particularly when attempting to work at a regional or population scale and offshore. Sighting records of harbour seals may be obtained incidentally during ship-based surveys (e.g., Pollock et al., 2000; Wall et al., 2013) but in general seals are not easily detected and identified in the open sea except at close range and such data may be recorded erratically (Baines & Evans, 2009), introducing uncertainty into the assessment of true distribution. Knowledge of harbour seal distribution in Ireland is therefore concentrated on records gathered at haul-out sites within the current and previous reporting period (i.e., 2001-2012) during the annual moult, breeding and winter-spring seasons (Lyons, 2004; Cronin et al., 2004; NPWS, 2010, 2011, 2012; Duck & Morris, 2012a, 2012b). The data highlight a widespread distribution by harbour seals around the entire coastline of Ireland including many enclosed bays and estuaries, and several islands and skerries. It should be noted that the described distribution may not be fully representative of the annual cycle, since harbour seals tend to disperse and spend more time at sea during the winter and early spring, reducing their numbers and availability for detection at local haul-out sites (Cronin, 2007). Nevertheless the map drawn for this species provides a good representation of its principal observed distribution.
1.1.03 Year or period	The period selected for mapping the distribution of this species represents a period of more intensive broad-scale surveillance of Ireland's harbour seal population across a range of research and monitoring programmes.
1.1.05 Range map	The species' natural range in Irish waters is likely to be part of its wider range in the waters of western Europe, especially those of the UK according to information currently available on regional harbour seal movements (e.g., ICES, 2012). However some degree of geographic and possibly even genetic isolation by distance of Irish harbour seal communities (e.g., in the west of Ireland) cannot be ruled out at this time, based on the comparatively short-range movements shown by a sample of animals tagged in the southwest of Ireland (Cronin et al., 2008; Cronin, 2011). While individual harbour seal movements measuring several hundred kilometres have been recorded (ICES, 2012) these have tended to occur in the waters of shallow regional seas (e.g., the North Sea) and/or overlying the continental shelf. The range map provided consists of the species' recorded and likely predominant natural range based on recent data (2001-2012) and expert judgement. It consists of a block of contiguous 10km x 10km grid cells distributed in Irish coastal and marine waters up to 200m deep, including shallow coastal bays and estuaries and excluding the offshore Porcupine Bank.
2.3.02 Method used - Surface area of Range	This figure has been derived from the range map referred to in 1.1.5.

Field label	Note
Species: 1365	**Harbour seal**
2.3.03 Short-term trend - Period	Prior to the early 2000s there was limited information available concerning the population status and distribution of harbour seals around Ireland and the extent to which these animals travelled within Irish and neighbouring waters. From 2004 the results of research and monitoring involving key Irish breeding and non-breeding haul-out sites began to emerge (e.g., Lyons, 2004; Cronin et al., 2004; Heardman et al., 2006). Increased emphasis was placed on completion of (i) a national evaluation of harbour seal population size and distribution and (ii) the first in-depth regional studies of harbour seal ecology and movement within Irish waters (Cronin, 2007). Consequently, with regard to this species it is considered that the years 2001-2012 represent an appropriate period for the evaluation of short-term trends.
2.3.04 Short term trend - Trend direction	Records from a range of collaborative telemetry studies conducted since the 1990s (summarised by ICES, 2012) demonstrate this species' capacity for wide-ranging travel at sea as first suggested by early flipper-tagging experiments. This information, along with current harbour seal distribution data for Ireland, indicate that a decline in range within Irish waters is unlikely to have occurred in the recent past; therefore accordingly the short-term trend for range is considered to be stable.
2.3.06 Long-term trend - Period	A long-term trend period for this species is not considered appropriate, for reasons outlined in 2.3.3.
2.3.09 a) Favourable reference range - In km2	The range value derived from the range map referred to in 1.1.5 is considered to be the baseline for this species. As there is no evidence of a decline since the Directive came into force the current range is set as the FRR. [Note: (1) While considered less extensive in its movements than the grey seal, this species has shown the capacity for wide-ranging movement with some element of seasonal variation therein, while regional population components may be present year-round; Nevertheless the species' range in Irish waters is thought to represent a component of its range in marine waters covered by the Directive and the northeast Atlantic Ocean; (2) There is an assumption that the current range in Ireland is large enough (a) to encompass all of the ecological variation required by this species and (b) to contribute to the long-term survival of the species.]
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Additional records of this seal species have been obtained since the previous reporting round (e.g., NPWS, 2010, 2011, 2012; Duck & Morris, 2012a, 2012b). These data and the results of telemetry studies undertaken over the last two decades (e.g., Cronin et al., 2008; Cronin, 2011; ICES, 2012) have resulted in an improved knowledge and ability to assess the range from that reported in 2007. There is no scientific reason to assume that the species was not similarly present in 2001-2006.
2.4.04 Year or period	The years spanning 2007-2012 have been selected in order to represent the most current population information available for this species and to best match the current reporting period.

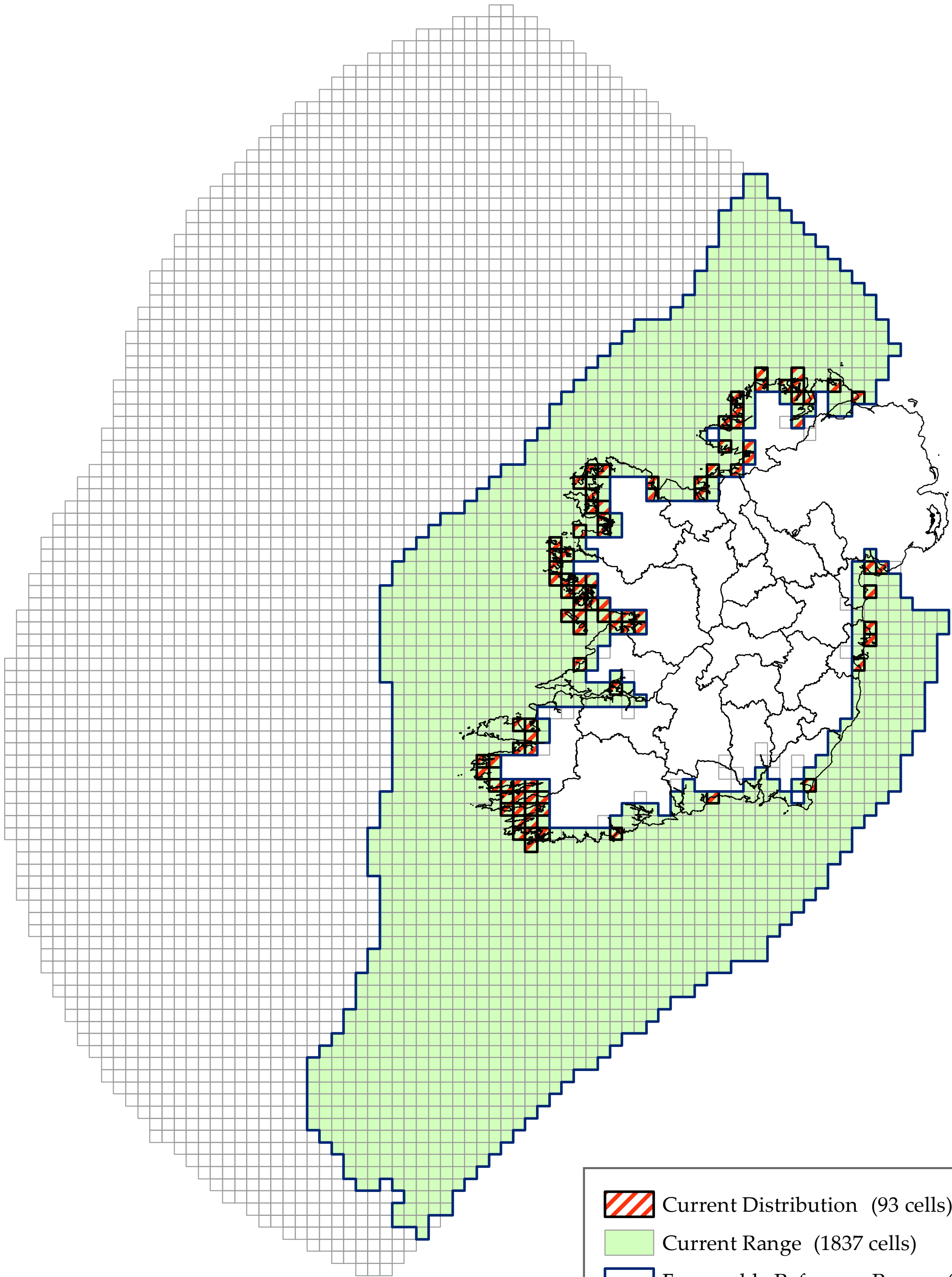
Field label	Note
Species: 1365	**Harbour seal**
2.4.05 Method used - Population size	The minimum population size provided is derived from a comprehensive survey of the entire coastline of Ireland carried out in two parts between 2011 and 2012 (Duck & Morris, 2012a, 2012b). A relevant assumption here is that no significant change in seal haul-out behaviour or regional distribution occurred between the two successive survey legs, thus the results should be interpreted with a level of caution. Production of a robust maximum or best all-age population estimate is more difficult since the proportion of all animals hauled out ashore during the period of survey is required in order to correct for the animals not available for counting and scale up appropriately (see Cronin & Ó Cadhla, 2007). Evidence from annual monitoring in Ireland (NPWS, 2010, 2011, 2012) and a range of international studies suggests that the proportion of harbour seals available for counting can be highly variable depending on the site, environmental covariates and ecological factors, for example. Since there are no statistical data available for this parameter across the broad range of Irish sites surveyed in 2011-2012 an accurate population maximum could not be determined and the minimum estimate remains the appropriate descriptor of population size.
2.4.06 Short-term trend - Period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.4.09 Short-term trend - Method used	While there is some initial evidence of localised harbour seal population growth in Ireland since the 1980s (Heardman et al., 2006), the scientific context in which such data were placed was uncertain prior to more recent comprehensive national assessments of population size and distribution (Cronin et al., 2004; Duck & Morris, 2012a, 2012b) and coordinated regional monitoring within the current reporting period. Ongoing surveillance of key sites for the species in the southwest, west and northwest of Ireland (NPWS, 2010, 2011, 2012) shows that even with use of a relatively rigorous and standardised monitoring protocol there is a substantial degree of variation observed in the numbers of harbour seals ashore during peak counting periods, both (a) within individual sites and (b) within/between survey years. Therefore, while the current minimum population estimate derived via moult data gathered in 2011-2012 (see 2.4.1, 2.4.5) is higher than that recorded via a comparable aerial survey in 2003 (2,905-2,955 harbour seals of all ages; Cronin et al., 2004; Duck & Morris, 2012b), there are insufficient data available at this stage to statistically determine a population trend for this species and further scientific work is required. Nevertheless, the short-term trend in Ireland's harbour seal population is considered to be stable given the similarity in national population estimates between 2003 and 2011-2012, and the results of site surveillance within the current reporting period which indicate comparatively stable numbers at a wide range of sites (NPWS, 2012). Overall numbers of harbour seals recorded during the moult in Ireland remain low compared with the UK (c.25,950 seals; SCOS, 2011). Significant declines have been recorded within several UK areas of importance for the species including Shetland, the Orkney Islands and the Outer Hebrides (SCOS, 2011), although this is not consistent throughout the UK and further work is required in Northern Ireland to determine population trends.
2.4.10 Long-term trend - Period	A long-term trend period for this species is not considered appropriate for reasons outlined in 2.3.3.
2.4.14 d) Favourable reference population - Indicate method used to set reference value if other than operators	Robust statistical data on harbour seal population viability and trends in Ireland are not available, while numerical information preceding the Directive was subject to significant spatial, temporal and methodological data gaps. However knowledge of the species' distribution and intertidal/terrestrial abundance associated with summer breeding, moulting and winter-spring phases of the annual life cycle have improved since the Directive came into force. Nevertheless the use of current or previous population figures as descriptors for FRP require further work. The FRP for this species is therefore considered to be unknown.

Field label	Note
Species: 1365	**Harbour seal**
2.4.15 a) Reason for change - genuine change?	The value is higher than recorded in 2007, however further scientific work is required t determine whether this is statistically significant (see 2.4.9).
2.5.01 Area estimation	The surface area estimate for range (derived from the range map referred to in 1.1.5) is used as a proxy for habitat surface area.
2.5.02 Year or period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.5.03 Method used Habitat for the species	Use of the range descriptor as a proxy for habitat is judged appropriate for this wide-ranging pelagic species.
2.5.04 b) Quality of the habitat - Explain how the quality was assessed	The habitat used by harbour seals in Ireland is diverse and dynamic, from coastal and estuarine waters close to human activity and selected undisturbed offshore islands to deeper Atlantic shelf waters and shallow seas shared with adjacent member states. Current information broadly suggests that harbour seals of all ages move freely about this diverse habitat and, based on the population size and distribution data available and knowledge of its population ecology, all indications are that sufficient high quality habitat is available to support the maintenance of the species in Ireland into the future Consequently the habitat quality is considered good.
2.5.05 Short-term trend - Period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.5.06 Short-term trend - Trend direction	The trend for range in 2.3.4 is applied as a proxy for habitat.
2.5.07 Long-term trend - Period	A long-term trend period for this species is not considered appropriate, for reasons outlined in 2.3.3.
2.5.09 Area of suitable habitat for the species (km2)	Harbour seals have been widely recorded in Ireland both historically and to the present day and given current information on harbour seal movements at sea (e.g., ICES, 2012) the predominant habitats for this species are considered to include all continental shelf waters less than 200m deep. Harbour seals commonly occur coastally in Ireland, whether for the use of intertidal/terrestrial haul-out sites or shallower coastal waters, and the species' habitat extends into many enclosed bays and estuaries. The Area of suitable habitat is considered to be equal to the Habitat for the species.
2.6 Main pressures - Pressure	With the exception of pressures arising from regional commercial fishing activity and intermittent seismic exploration activity in Irish continental shelf waters, most of the main pressures thought to be acting on this species are considered to be of low and localised importance. Since harbour seal distribution is considered to be broadly coasta or inner continental shelf in nature, where a pressure may be regionally intensive and acting directly or indirectly on the species in a significant manner the ranking given is one of medium importance. It should be noted that in relation to seismic exploration, which tends to occur on a local or occasionally regional scale in the waters of Ireland's EEZ and is comparatively low in coverage relative to several other member states, a robust regulatory and management regime applies in order to avoid potentially significant impacts on all species of marine mammal. The impact on this species of disturbance due to the proximity of haul-out sites to many coastal activities, pollutant burdens or changes in sea temperature and other abiotic factors in the marine environment, for example, can also not be discounted. However current population siz and distribution information for the species indicate that such pressures may not be impacting with sufficient intensity in Ireland to constitute a threat to its harbour seal population.
2.7 Threats - Threat	There is no evidence to suggest a change in the main pressures thought to be acting on this species in the near future. However surveillance of the species and the pressures potentially acting upon it will continue into the future, while the application of strong management measures (e.g., via the statutory/regulatory process) to avoid potentially significant impacts is also expected to continue.

Field label	Note
Species: 1365	**Harbour seal**
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The harbour seal is widely recorded around the coastline of Ireland and is likely to occur in Irish waters overlying the continental shelf, particularly those less than 200m depth. The species also occurs in many enclosed bays and estuaries. Hence the Range is considered to be favourable.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	While robust statistical data on harbour seal population trends in Ireland are not available, knowledge of the species' distribution and intertidal/terrestrial abundance associated with different phases of the annual life cycle, and moulting in particular, have improved significantly since the Directive came into force. This indicates that harbour seals continue to number in the several thousands nationally (see 2.4). Given the available estimates and the species' wide occurrence in Ireland, the population parameter is considered favourable.
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The habitat for this species in Ireland is considered favourable. Harbour seals have been widely recorded around the coastline of Ireland, and to some extent in Irish waters, both historically and to the present day. In addition to its observed extensive use of intertidal/terrestrial haul-out sites in Ireland, the known habitats for this species include coastal, estuarine and continental shelf waters, most likely up to 200m deep according to the information currently available.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	Based on currently available information a number of pressures have been identified. While the effect of these pressures may act on a temporary and/or regional scale and some are likely to continue to act as pressures into the future, based on current information none is considered to be of sufficient magnitude to be causing an adverse impact on the population of harbour seal in Ireland. Ongoing threats as listed or identified into the future via surveillance will be managed appropriately. Hence the future prospects for the species are considered favourable.
2.9.05 Overall assessment of Conservation Status	Based on the assessments for Range, Population, Habitat and Future Prospects parameters, the overall conclusion is that the conservation status of harbour seal in Ireland is considered "Favourable". This overall result and the results for three assessment parameters are the same as in the previous Article 17 assessment (i.e., "Favourable"). An improvement is reported in the current assessment for the Range parameter, due to improved knowledge.
3.1.02 Method used	The minimum and maximum population sizes within Ireland's Natura 2000 network are approximations derived from the combined results of a national aerial survey for harbour seals conducted during the annual moulting season in 2011 and 2012 (Duck & Morris, 2012a, 2012b). It should be noted that they are indicative measures only, since the proportion of seals hauled out ashore and available for counting during these surveys was not determined and may vary between sites, survey days, etc (see 2.4). The figures provided are based on counts of harbour seals obtained within the overall Natura 2000 network, including those sites designated for the species, and rounded to the nearest 50 animals.
3.1.03 Trend of population size within the network (short-term trend)	Evidence from population estimation surveys and surveillance carried out since the Directive came into force indicates that the all-age population of harbour seals (within the Natura 2000 network designated for the species in Ireland) has remained relatively stable, although comparatively little is known about changes in harbour seal distribution and local/regional population size within and between seasons or phases in the annual cycle. The ability to accurately and statistically determine population trends in this species is dependent on the frequency and precision of population surveys undertaken. Ongoing high quality surveillance will assist in the continued determination and verification of population trend data.

Field label	Note
Species: 1365	**Harbour seal**
3.2 Conservation measures	All measures taken during the reporting period are designed to ensure the maintenance of harbour seal at a favourable conservation status in Ireland and to ensure that the conservation provisions for this species, as underpinned by Articles 6 of the Habitats Directive in particular, are robustly implemented including via national legislation (i.e., EC Birds and Natural Habitats Regulations S.I. No. 477/2011, etc).

Common seal - *Phoca vitulina vitulina* (1365)
Article 17 Assessment 2013



Current Distribution (93 cells)
Current Range (1837 cells)
Favourable Reference Range (1837 cells)

An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 25 50 75 100 km

N
Map - Léarscáil
V 1.0
Date - Dáta
19-06-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1376**
0.2.2 Species name	**Lithothamnium coralloides**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	maerl

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	1998-2012
1.1.4 Additional map	Yes
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Marine Atlantic (MATL)

2.2 Published sources

CMRC (2006-12). Marine Irish Digital Atlas. http://mida.ucc.ie/.

Crowe et al. (2011). A framework for managing sea bed habitats in near shore Special Areas of Conservation. A report to National Parks & Wildlife Service. 99pp.

De Grave et al. (2000). A Study of Selected Maërl Beds in Irish Waters and their Potential for Sustainable Extraction. Marine Resource Series 10. Published by the Marine Institute.

EPA. (2013). EPA Ireland GeoPortal. http://gis.epa.ie/DataDownload.aspx.

Hall-Spencer et al. (2007). Assessment of maerl beds in the OSPAR area and the development of a monitoring program. Prepared for the Department of the Environment, Heritage & Local Government(DEHLG), Ireland.

McCormack. (2006). Carraroenia ruthae gen. et sp. nov. (Copepoda, Harpacticoida, Laophontidae) from maërl substrates of the Irish west coast. Zootaxa 1202: 39–52

MERC (2005). Surveys of sensitive subtidal benthic communities in Kilkieran Bay & Islands SAC & Kingstown Bay SAC. A report to National Parks & Wildlife Service. 114 pp.

MERC (2006). Surveys of sensitive subtidal benthic communities in Slyne Head Peninsula SAC, Clew Bay Complex SAC, Galway Bay Complex SAC. A report to National Parks & Wildlife Service. 155 pp.

MERC. (2007). Surveys of sensitive subtidal benthic communities in Roaringwater Bay and Islands SAC, Lough Hyne Nature Reserve and Environs SAC, Valentia Harbour and Portmagee Channel SAC, and Broadhaven Bay SAC. A report to National Parks & Wildlife Service. 210 pp.

MERC. (2008). Surveys of sensitive sublittoral benthic communities in Mullet/Blacksod Bay Complex SAC, Rutland Island and Sound SAC, and Mulroy Bay SAC. A report to National Parks & Wildlife Service. 169 pp.

MERC. (2009). Surveys of sensitive sublittoral benthic communities in Kenmare River SAC, Tralee Bay & Magharee Islands West to Cloghane. A report to National Parks & Wildlife Service. 126 pp.

MERC. (2010). Report of a Diving Survey of Maërl Communities in County Galway. A report to National Parks & Wildlife Service. 69 pp.

NPWS. (2011/2). Conservation Objective Series. ISSN 2009-4086.

2.3 Range

2.3.1 Surface area - Range (km²)	3200	
2.3.2 Method - Range surface area	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	3200
	operator	N/A
	unknown	No
	method	The current Range is considered to be the baseline value. The FRR has been adjusted to the current Range as there is no evidence of a decline since the Directive came into force and is likely to encompass all geographical and ecological variation.
2.3.10 Reason for change	Improved knowledge/more accurate dataUse of different method	

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	area covered by population in m2 (area)		
	min	69340969	max	69340969
2.4.2 Population size (other than individuals)	Unit	N/A		
	min		max	
2.4.3 Additional information	Definition of locality			
	Conversion method			
	Problems			
2.4.4 Year or period	1998-2012			
2.4.5 Method – population size	Estimate based on partial data with some extrapolation and/or modelling (2)			
2.4.6 Short-term trend period	2001-2012			
2.4.7 Short term trend direction	stable (0)			
2.4.8 Short-term trend magnitude	min	max	confidence interval	
2.4.9 Short-term trend method	Estimate based on partial data with some extrapolation and/or modelling (2)			
2.4.10 Long-term trend period				

2.4.11 Long term trend direction	N/A		
2.4.12 Long-term trend magnitude	min	max	confidence interval
2.4.13 Long-term trend method	N/A		
2.4.14 Favourable reference population	number	69340969	
	operator	N/A	
	unknown	No	
	method	The current Population is considered to be the baseline value. The FRP has been adjusted to the current Population as there is no evidence of a decline since the Directive came into force.	
2.4.15 Reason for change	Improved knowledge/more accurate data Use of different method		

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km^2)	69
2.5.2 Year or period	2005-2012
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Moderate
2.5.4 b) Quality of habitat - method	It was not possible to extrapolate from operating pressures/perceived threats to an actual measure of habitat quality.
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	stable (0)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km^2)	69
2.5.10 Reason for change	Improved knowledge/more accurate data Use of different method

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	high importance (H)	N/A
bottom culture (F01.03)	high importance (H)	N/A
suspension culture (F01.02)	high importance (H)	N/A
intensive fish farming, intensification (F01.01)	low importance (L)	N/A
nautical sports (G01.01)	low importance (L)	N/A

2.6.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	medium importance (M)	N/A
suspension culture (F01.02)	low importance (L)	N/A
intensive fish farming, intensification (F01.01)	low importance (L)	N/A
bottom culture (F01.03)	low importance (L)	N/A
nautical sports (G01.01)	low importance (L)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant Information	

2.8.3 Trans-boundary assessment

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.9.2. Population	assessment	Favourable (FV)
	qualifiers	N/A
2.9.3. Habitat	assessment	Inadequate (U1)
	qualifiers	improving (+)
2.9.4. Future prospects	assessment	Favourable (FV)
	qualifiers	N/A
2.9.5 Overall assessment of Conservation Status	Inadequate (U1)	
2.9.6 Overall trend in Conservation Status	improving (+)	

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	N/A		
	min		max	
3.1.2 Method used	N/A			
3.1.3 Trend of population size within	N/A			

3.2 Conservation Measures

Field label	Note
Species: 1376	**Lithothamnion corallioides (maerl)**
0.2.01 Species code	Lithothamnion corallioides is an Annex V species of calcified red seaweed and one of a number of species that are collectively known as maërl (which also include Lithophyllum dentatum and Lithophyllum fasciculatum). These species live freely over mud, sand or gravel substrates. They are slow growing species and morphology is variable but frequently presents as branched nodules. Differentiation in the field can be difficult but Phymatolithon calcareum may be slightly larger than Lithothamnion corallioides and may form a more pronounced stag-horn morphotype. Individuals may be 4-7 cm across and whilst alive are usually pink or brownish in colour but appear a blanched white when dead. Maërl species in Ireland are considered habitat forming species and are often frequently incorrectly thought of as coral because of the calcareous bodies and broad similarity in shape. The distribution of maërl species are influenced by temperature, salinity and light penetration. Although they are slow growing; only growing when temperatures exceed 12-13o C, where abundant they can form an extensive covering of the underlying substrate. Rhodolith algae require fully saline bottom conditions and are consequently frequently associated with the Annex I habitat Large Shallow Inlet and Bay. Both species are limited by the penetration of light to the substrate and are usually found within a depth of less than 20m, occasionally 30m, but always subtidally. In Ireland more than 85% of maërl habitat is recorded within these bays sheltered to some extent from large swell waves on the Atlantic coast from Roaringwater Bay in Cork to Mulroy Bay in Donegal. There are no records for the Irish Sea or the majority of the Celtic Sea. Maërl beds are frequently considered a living mixed coarse substrate associated with clean water and strong bottom currents. Burial or disturbance to maërl or the surrounding area that increases sedimentation or turbidity over the thalli results in significant mortality. The accumulation of calcalareous thalli over time can generate a three-dimensional habitat that is suitable for colonisation both superficially and in the associated interstices by a wide range of species. The structure of dead thalli which cannot be closely packed together unless damaged allows a significant exchange of water and nutrients with the surrounding waters. Surveys have shown about 138 distinct maërl beds with the largest area within Galway Bay Complex SAC, mostly in Co Clare. In recent surveys for maërl habitat all were comprised of Lithothamnion corallioides and 78% (or seven sites) of them also contain Phymatolithon calcareum. The rare species Lithophyllum dentatum and Lithophyllum fasciculatum are recorded in 56% (5 sites) and 44% (4 sites) respectively. Maërl exists in a number of forms; it may be live maërl, dead maërl or a mixture of both and on occasion forms dunes. It also occurs as a combination of gravel, mud and maërl. The fauna within this community type is very diverse, with a large number of species being recorded in low abundance. However a number of species are commonly seen within the beds in most of the sites. These include the anthozoans Anthopleura ballii, Anemonia viridis and Cereus pedunculatus, the crustaceans Phtisica marina, Pisidia longicornis and Caprella acanthifera and the polychaetes Chaetopterus variopedatus and Polyophthalmus pictus and the free living calcareous algae Corallina officinalis. The holothurian Neopentadactyla mixta is recorded from a number of the maërl sites and in Kilkieran Bay it is estimated to occur in densities of several hundred per square metre in a duned maërl bed off Ardmore Point. In Valencia and Kilkieran the bivalve Pecten maximus has been recorded within the beds, Ostrea edulis occurs in the beds in Kilkieran. A number of rare species occur within maërl beds. In Roaringwater Bay, the rare filamentous red alga Spyridia filimentosa has been recorded. In Kilkieran Bay, a number of rare anemones, Edwardsia claparedii, Scolanthus callimorphus, Mesacmaea mitchellii and Aureliana heterocera occur within the beds. In Kingstown Bay the possibly endemic epiphytic algae Gelidiella calcicola has also been recorded.

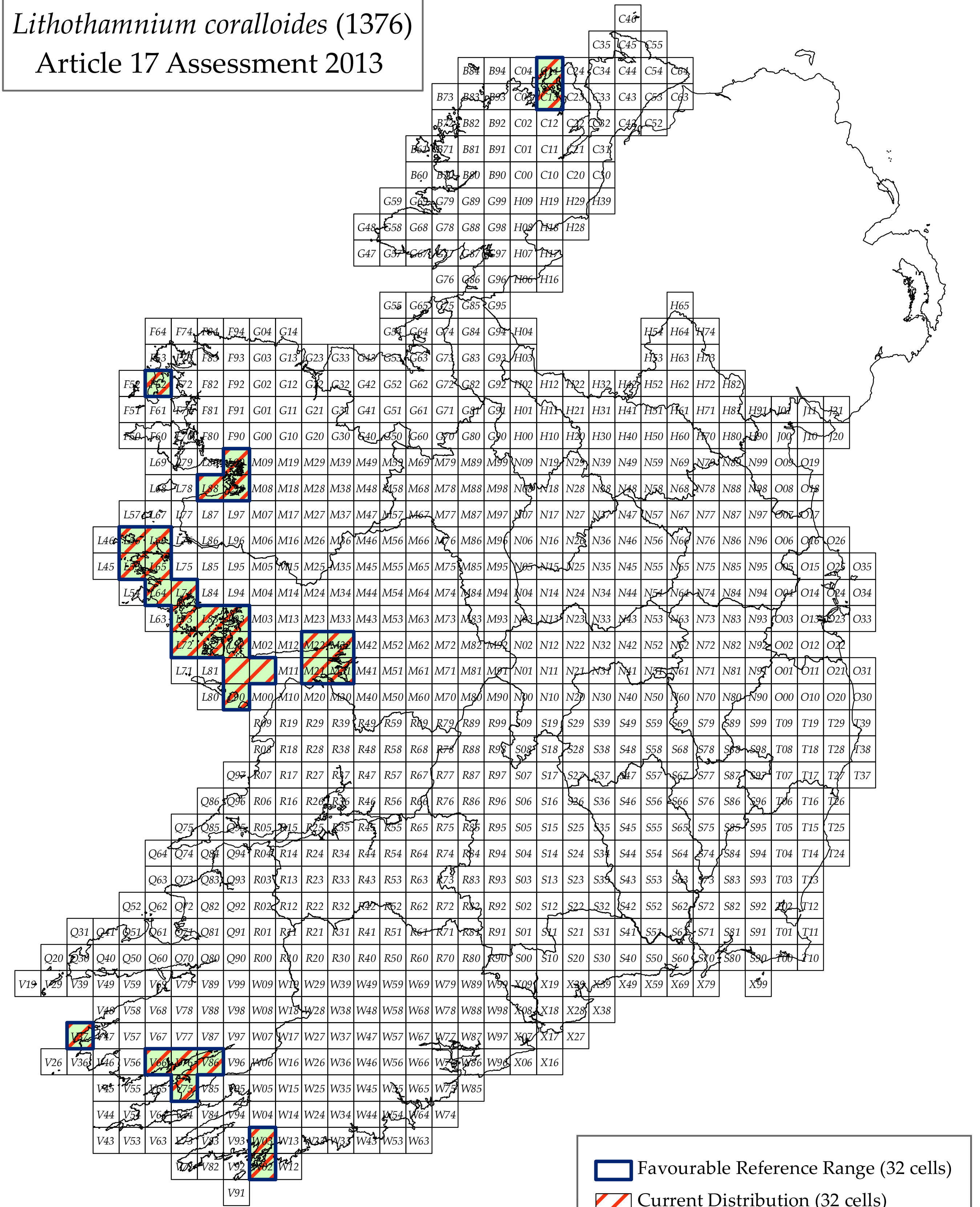
Field label	Note
Species: 1376	**Lithothamnion corallioides (maerl)**
1.1.01 Distribution map	The distribution map was generated in Irish National Grid and transformed to the prescribed LAEA GCS.
1.1.02 Method used - map	Mapping of this habitat/species was undertaken using line-transect SCUBA surveys of the shallow subtidal. These observations were used to generate a polygon feature of the resource where this species was the dominant benthic species.
1.1.05 Range map	The Range Map for this species is the intersection of the polygon generated through the mapping of the feature with a 100 km2 grid generated on Irish National Grid. The intersection of this transformed ING grid was used to intersect with the 100 km2 LAEA grid.
2.3.02 Method used - Surface area of Range	The Range Map for this species is the intersection of the polygon generated through the mapping of the feature with a 100 km2 grid generated on Irish National Grid. The intersection of this transformed ING grid was used to intersect with the 100 km2 LAEA grid.
2.3.03 Short-term trend - Period	The default trend period was used.
2.3.04 Short term trend - Trend direction	There is no indication that there is a significant change in range.
2.3.10 a) Reason for change - genuine change?	There has been no significant change in the distribution of these species between reporting periods.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	The change in range area for maërl between 2006 and 2012 reporting periods should not be interpreted as a change in range.
2.3.10 c) Reason for change - use of different method?	The difference in the Range of Maërl species between 2006 and 2012 reporting periods should not be interpreted as a change in habitat range. The Range reported in 2006 (for both species) was calculated as 4,000 km2 (40 x 100 km2) and in 2013 this figure is 3200 km2 (32 x 100 km2). The 2006 figure was based on expert judgement and a small dataset of historical data. The current estimate is only based on recent data sets from dedicated surveys for sensitive species and Annex I habitats.
2.4.01 a) Population size estimation (using individuals or agreed exceptions where possible) - Unit	The recommended unit (m2) was used.
2.4.01 b) Population size estimation (using individuals or agreed exceptions where possible) - Minimum	69,340,969 m2 is the total area mapped within polygons generated from field mapping surveys for maërl species.
2.4.03 c) Additional information on population estimates / conversion - Problems encountered	This species does not readily allow estimations of the population in an area as the calcareous structures grow together and on top of each other and it is not possible to distinguish individual algae contributing to the population. This species is habitat forming in extensive areas and is better considered by estimation of the area occupied rather than the individuals contributing to it.
2.4.07 Short-term trend - Trend direction	There is no indication that there is a significant reduction in the area occupied by this species.
2.4.09 Short-term trend - Method used	There are currently no indications that the population or area of habitat occupied by maërl habitat is changing.
2.4.14 b) Favourable reference population - Indicate if operators were used	No symbol is utilised as the current area is considered to equal the Favourable Reference Population

Field label	Note
Species: 1376	**Lithothamnion corallioides (maerl)**
2.4.15 b) Reason for change - improved knowledge/more accurate data?	The change in range area for maërl between 2006 and 2012 reporting periods should not be interpreted as a change in habitat prevalence
2.4.15 c) Reason for change - use of different method	Yes. The difference in the population/area of Maërl habitat between 2006 and 2012 reporting periods should not be interpreted as a change in habitat prevalence. No “population” or resolved habitat maps were generated in 2006 for this measure, only range was calculated across a grid. The current estimate is only based on recent data sets from dedicated surveys for sensitive species and Annex I habitats with the polygons delineating the boundary of the dominance of the species.
2.5.03 Method used Habitat for the species	The area occupied by this species is considered to equate to the Habitat for the species. See 1.1.2 and 2.4.1a.
2.5.04 a) Quality of the habitat - Good / moderate / bad / unknown	It was not possible to extrapolate from operating pressures/perceived threats to an actual measure of habitat quality
2.5.05 Short-term trend - Period	The default trend period was used.
2.5.06 Short-term trend - Trend direction	There is currently no indication that significant reductions or increases in habitat area are operating.
2.5.09 Area of suitable habitat for the species (km2)	69km2. The area for the suitable habitat for this species is reported as equal to the habitat surface area as there is apparently no barrier to the spread of this species.
2.5.10 b) Reason for change - improved knowledge/more accurate data?	Yes. The change in range area for maërl between 2006 and 2012 reporting periods should not be interpreted as a change in habitat prevalence
2.5.10 c) Reason for change - use of different method (e.g. 'Range tool')?	Yes. The difference in the population/area of Maërl habitat between 2006 and 2012 reporting periods should not be interpreted as a change in habitat prevalence. No “population” or resolved habitat maps were generated in 2006 for this measure, only range was calculated across a grid. The current estimate is only based on recent data sets from dedicated surveys for sensitive species and Annex I habitats with the polygons delineating the boundary of the dominance of the species. The habitat for this species is judged to be the same as the recorded habitat on the basis that no barriers appear to be restricting specifically the spread of this species in the marine environment.

Field label	Note
Species: 1376	**Lithothamnion corallioides (maerl)**
2.6.01 Method used - Pressures	Pressures are factors or activities that are acting to influence the habitat now or within the reporting period. Article 17 reporting guidance indicates that a national list of these activities could be ranked by the relative prevalence and/or nature of influence of the activity. An objective methodology to marine pressure assessment is undoubtedly challenging but preferable nonetheless. At this time, some elements of activity prevalence can be captured in a quantitative or semi-quantitative manner; however, the full extent and nature of their influence can not be fully mapped spatially. Thus, an element of expert judgement is necessary on this reporting occasion. Available national data sources were aligned with the prescribed Activity Descriptions provided by the Commission to interrogate the potential prevalence of those activities against the mapped Annex habitat resource. In this compilation exercise 111 different sources across a range of distinct described Activities were used to form a spatial map. These included data related to fishing effort, aquaculture activities, coastal management, water quality, infrastructure development, recreational activities, commercial activities, and other activities in the marine environment. It is not a complete list of the activities occurring within the marine environment but is likely to account for the majority of activities. It should also be acknowledged that for some described activities the data generated under-reports prevalence and particularly in relation to fishing activities. However, all of the noted pressures were active during the reporting period from 2006-2012. It should be noted that some of the activities described for this species includes. Fishing and harvesting aquatic resources includes not only the harvesting of resources associated with this species habitat (professional active and passive fishing methods) but also it is the most appropriate Activity Code to capture the small area of direct harvesting by dredging of this species itself (mainly dead maërl) for use in the fertiliser industry. Based on this mapping exercise, experts recorded their ranking of the relative importance of pressures based on their likely influence and/or distribution.
2.7.01 Method used ? Threats	Threats are factors which will be acting in the next reporting period. Based on the pressure mapping exercise, experts considered the likely changes that could reasonably be expected to arise during the forthcoming reporting period in ranking threats. The estimation of the potential threats to this habitat is modified by management measures that are currently operated or under development e.g. fisheries management is actively being developed in the inshore environment particularly in relation to Natura sites.
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The Range for this species is judged to be favourable on the basis that there has been no significant loss or interruption of natural processes that form this habitat
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The population (area) of this species is judged to be favourable on the basis that there has been no significant permanent loss of this feature nationally. The extraction of this species was previously licensed for a small area in Bantry but only allowed the use of dead maërl.
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Unfavourable-Inadequate. Following extensive sampling of the benthic environment nationally, experts consider that there are excellent examples of good quality maërl habitat found around the Irish coastline. However, looking across the sites sampled experts did not have confidence that all maërl habitats were completely free from adverse impact. This species is particular sensitive to disturbance of the substrate that results in greater turbidity, sedimentation or changes in environmental conditions. Activities such as professional fishing or aquaculture can subject these effects to this species and result in reduced viability or mortality. This species is noted to be slow growing and reduced resilience and recoverability can prolong impacts.

Field label	Note
Species: 1376	**Lithothamnion corallioides (maerl)**
2.9.03 b) Habitat for the species - If CS is U1 or U2, use of qualifiers is recommended	Improving- significant measures are currently operating or will operate in the future that would reduce the likelihood of threats to this measure particularly within Special Areas of Conservation.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	Using the evaluation matrix of IV.a.iii of the Guidance document the Future Prospects for maërl was judged to be good. Legislative changes should see regulatory improvements and greater clarity in the conservation condition of sites inside the Natura 2000 network. For the significantly large area of the national habitat resource outside the Natura 2000 network and corresponding protection regimes, it is envisaged that sustainable practices will be delivered through the Marine Strategy Framework Directive. It should be noted that the direct extraction of dead maërl in Ireland is no longer allowed since 2010.
2.9.05 Overall assessment of Conservation Status	Since there are three Favourable results in Range, Population and Future Prospects, and Habitat for species is judged Unfavourable-Inadequate, the overall conclusion is the habitat is currently “Unfavourable-Inadequate”.
2.9.06 Overall trend in Conservation Status	There is likely to be a trend towards improvement in the conditions for this species in the future.

Maerl
Lithothamnium coralloides (1376)
Article 17 Assessment 2013



Favourable Reference Range (32 cells)
Current Distribution (32 cells)
Current Range (32 cells)

An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 10 20 30 40 50 km

N
Map - Léarscáil
V 1.0
Date - Dáta
6-06-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1377**
0.2.2 Species name	**Phymatolithon calcareum**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	maerl

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	1998-2012
1.1.4 Additional map	Yes
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region	**Marine Atlantic (MATL)**
2.2 Published sources	CMRC (2006-12). Marine Irish Digital Atlas. http://mida.ucc.ie/.

Crowe et al. (2011). A framework for managing sea bed habitats in near shore Special Areas of Conservation. A report to National Parks & Wildlife Service. 99pp.

De Grave et al. (2000). A Study of Selected Maërl Beds in Irish Waters and their Potential for Sustainable Extraction. Marine Resource Series 10. Published by the Marine Institute.

EPA. (2013). EPA Ireland GeoPortal. http://gis.epa.ie/DataDownload.aspx.

Hall-Spencer et al. (2007). Assessment of maerl beds in the OSPAR area and the development of a monitoring program. Prepared for the Department of the Environment, Heritage & Local Government(DEHLG), Ireland.

McCormack. (2006). Carraroenia ruthae gen. et sp. nov. (Copepoda, Harpacticoida, Laophontidae) from maërl substrates of the Irish west coast. Zootaxa 1202: 39–52

MERC (2005). Surveys of sensitive subtidal benthic communities in Kilkieran Bay & Islands SAC & Kingstown Bay SAC. A report to National Parks & Wildlife Service. 114 pp.

MERC (2006). Surveys of sensitive subtidal benthic communities in Slyne Head Peninsula SAC, Clew Bay Complex SAC, Galway Bay Complex SAC. A report to National Parks & Wildlife Service. 155 pp.

MERC. (2007). Surveys of sensitive subtidal benthic communities in Roaringwater Bay and Islands SAC, Lough Hyne Nature Reserve and Environs SAC, Valentia Harbour and Portmagee Channel SAC, and Broadhaven Bay SAC. A report to National Parks & Wildlife Service. 210 pp.

MERC. (2008). Surveys of sensitive sublittoral benthic communities in Mullet/Blacksod Bay Complex SAC, Rutland Island and Sound SAC, and Mulroy Bay SAC. A report to National Parks & Wildlife Service. 169 pp.

MERC. (2009). Surveys of sensitive sublittoral benthic communities in Kenmare River SAC, Tralee Bay & Magharee Islands West to Cloghane. A report to National Parks & Wildlife Service. 126 pp.

MERC. (2010). Report of a Diving Survey of Maërl Communities in County Galway. A report to National Parks & Wildlife Service. 69 pp.

NPWS. (2011/2). Conservation Objective Series. ISSN 2009-4086.

2.3 Range

2.3.1 Surface area - Range (km²)	3200	
2.3.2 Method - Range surface area	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	3200
	operator	N/A
	unknown	No
	method	The current Range is considered to be the baseline value. The FRR has been adjusted to the current Range as there is no evidence of a decline since the Directive came into force and is likely to encompass all geographical and ecological variation.
2.3.10 Reason for change	Improved knowledge/more accurate dataUse of different method	

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	area covered by population in m2 (area)		
	min	69340969	max	69340969
2.4.2 Population size (other than individuals)	Unit	N/A		
	min		max	
2.4.3 Additional information	Definition of locality			
	Conversion method			
	Problems			
2.4.4 Year or period	1998-2012			
2.4.5 Method – population size	Estimate based on partial data with some extrapolation and/or modelling (2)			
2.4.6 Short-term trend period	2001-2012			
2.4.7 Short term trend direction	stable (0)			
2.4.8 Short-term trend magnitude	min	max	confidence interval	
2.4.9 Short-term trend method	Estimate based on partial data with some extrapolation and/or modelling (2)			
2.4.10 Long-term trend period				

2.4.11 Long term trend direction	N/A
2.4.12 Long-term trend magnitude	min max confidence interval
2.4.13 Long-term trend method	N/A
2.4.14 Favourable reference population	number 69340969
	operator N/A
	unknown No
	method The current Population is considered to be the baseline value. The FRP has been adjusted to the current Population as there is no evidence of a decline since the Directive came into force.
2.4.15 Reason for change	Improved knowledge/more accurate data Use of different method

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	69
2.5.2 Year or period	2005-2012
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Unknown
2.5.4 b) Quality of habitat - method	It was not possible to extrapolate from operating pressures/perceived threats to an actual measure of habitat quality.
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	stable (0)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	69
2.5.10 Reason for change	Improved knowledge/more accurate data Use of different method

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	high importance (H)	N/A
bottom culture (F01.03)	high importance (H)	N/A
suspension culture (F01.02)	high importance (H)	N/A
intensive fish farming, intensification (F01.01)	low importance (L)	N/A
nautical sports (G01.01)	low importance (L)	N/A

2.6.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	medium importance (M)	N/A
suspension culture (F01.02)	low importance (L)	N/A
intensive fish farming, intensification (F01.01)	low importance (L)	N/A
bottom culture (F01.03)	low importance (L)	N/A
nautical sports (G01.01)	low importance (L)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant Information	

2.8.3 Trans-boundary assessment	

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.9.2. Population	assessment	Favourable (FV)
	qualifiers	N/A
2.9.3. Habitat	assessment	Inadequate (U1)
	qualifiers	improving (+)
2.9.4. Future prospects	assessment	Favourable (FV)
	qualifiers	N/A
2.9.5 Overall assessment of Conservation Status	Inadequate (U1)	
2.9.6 Overall trend in Conservation Status	improving (+)	

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	N/A		
	min		max	
3.1.2 Method used	N/A			
3.1.3 Trend of population size within	N/A			

3.2 Conservation Measures

Field label	Note
Species: 1377	**Phymatolithon calcareum (maerl)**
0.2.01 Species code	Phymatolithon calcareum is an Annex V species of calcified red seaweed and one of a number of species that are collectively known as maërl (which also include Lithophyllum dentatum and Lithophyllum fasciculatum). These species live freely over mud, sand or gravel substrates. They are slow growing species and morphology is variable but frequently presents as branched nodules. Differentiation in the field can be difficult but Phymatolithon calcareum may be slightly larger than Lithothamnion corallioides and may form a more pronounced stag-horn morphotype. Individuals may be 4-7 cm across and whilst alive are usually pink or brownish in colour but appear a blanched white when dead. Maërl species in Ireland are considered habitat forming species and are often frequently incorrectly thought of as coral because of the calcareous bodies and broad similarity in shape. The distribution of maërl species are influenced by temperature, salinity and light penetration. Although they are slow growing; only growing when temperatures exceed 12-13o C, where abundant they can form an extensive covering of the underlying substrate. Rhodolith algae require fully saline bottom conditions and are consequently frequently associated with the Annex I habitat Large Shallow Inlet and Bay. Both species are limited by the penetration of light to the substrate and are usually found within a depth of less than 20m, occasionally 30m, but always subtidally. In Ireland more than 85% of maërl habitat is recorded within these bays sheltered to some extent from large swell waves on the Atlantic coast from Roaringwater Bay in Cork to Mulroy Bay in Donegal. There are no records for the Irish Sea or the majority of the Celtic Sea. Maërl beds are frequently considered a living mixed coarse substrate associated with clean water and strong bottom currents. Burial or disturbance to maërl or the surrounding area that increases sedimentation or turbidity over the thalli results in significant mortality. The accumulation of calcalareous thalli over time can generate a three-dimensional habitat that is suitable for colonisation both superficially and in the associated interstices by a wide range of species. The structure of dead thalli which cannot be closely packed together unless damaged allows a significant exchange of water and nutrients with the surrounding waters. Surveys have shown about 138 distinct maërl beds with the largest area within Galway Bay Complex SAC, mostly in Co Clare. In recent surveys for maërl habitat all were comprised of Lithothamnion corallioides and 78% (or seven sites) of them also contain Phymatolithon calcareum. The rare species Lithophyllum dentatum and Lithophyllum fasciculatum are recorded in 56% (5 sites) and 44% (4 sites) respectively. Maërl exists in a number of forms; it may be live maërl, dead maërl or a mixture of both and on occasion forms dunes. It also occurs as a combination of gravel, mud and maërl. The fauna within this community type is very diverse, with a large number of species being recorded in low abundance. However a number of species are commonly seen within the beds in most of the sites. These include the anthozoans Anthopleura ballii, Anemonia viridis and Cereus pedunculatus, the crustaceans Phtisica marina, Pisidia longicornis and Caprella acanthifera and the polychaetes Chaetopterus variopedatus and Polyophthalmus pictus and the free living calcareous algae Corallina officinalis. The holothurian Neopentadactyla mixta is recorded from a number of the maërl sites and in Kilkieran Bay it is estimated to occur in densities of several hundred per square metre in a duned maërl bed off Ardmore Point. In Valencia and Kilkieran the bivalve Pecten maximus has been recorded within the beds, Ostrea edulis occurs in the beds in Kilkieran. A number of rare species occur within maërl beds. In Roaringwater Bay, the rare filamentous red alga Spyridia filimentosa has been recorded. In Kilkieran Bay, a number of rare anemones, Edwardsia claparedii, Scolanthus callimorphus, Mesacmaea mitchellii and Aureliana heterocera occur within the beds. In Kingstown Bay the possibly endemic epiphytic algae Gelidiella calcicola has also been recorded.

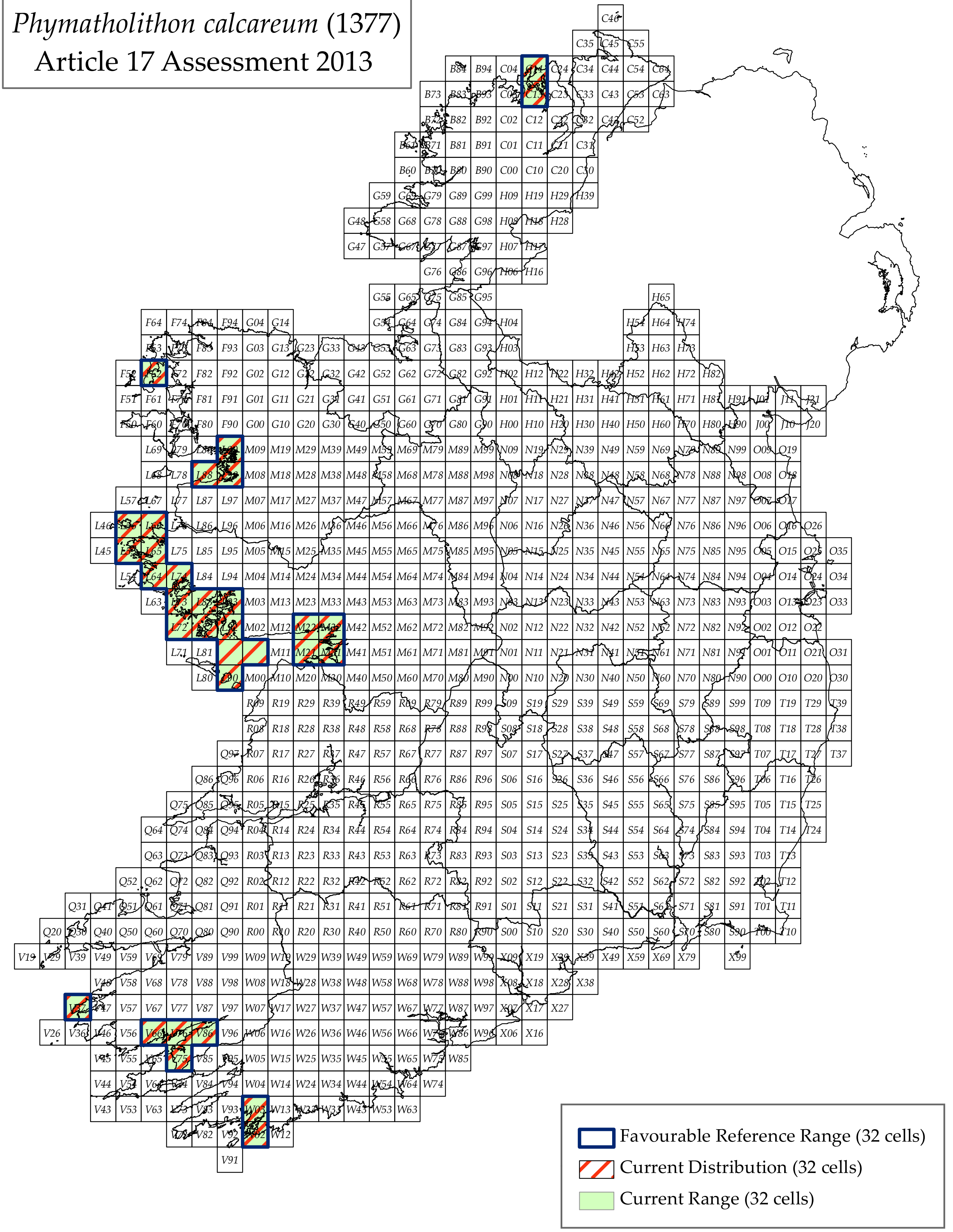
Field label	Note
Species: 1377	**Phymatolithon calcareum (maerl)**
1.1.01 Distribution map	The distribution map was generated in Irish National Grid and transformed to the prescribed LAEA GCS.
1.1.02 Method used - map	Mapping of this habitat/species was undertaken using line-transect SCUBA surveys of the shallow subtidal. These observations were used to generate a polygon feature of the resource where this species was the dominant benthic species.
1.1.05 Range map	The Range Map for this species is the intersection of the polygon generated through the mapping of the feature with a 100 km2 grid generated on Irish National Grid. The intersection of this transformed ING grid was used to intersect with the 100 km2 LAEA grid.
2.3.02 Method used - Surface area of Range	The Range Map for this species is the intersection of the polygon generated through the mapping of the feature with a 100 km2 grid generated on Irish National Grid. The intersection of this transformed ING grid was used to intersect with the 100 km2 LAEA grid.
2.3.03 Short-term trend - Period	The default trend period was used.
2.3.04 Short term trend - Trend direction	There is no indication that there is a significant change in range.
2.3.10 a) Reason for change - genuine change?	There has been no significant change in the distribution of these species between reporting periods.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	The change in range area for maërl between 2006 and 2012 reporting periods should not be interpreted as a change in range.
2.3.10 c) Reason for change - use of different method?	The difference in the Range of Maërl species between 2006 and 2012 reporting periods should not be interpreted as a change in habitat range. The Range reported in 2006 (for both species) was calculated as 4,000 km2 (40 x 100 km2) and in 2013 this figure is 3200 km2 (32 x 100 km2). The 2006 figure was based on expert judgement and a small dataset of historical data. The current estimate is only based on recent data sets from dedicated surveys for sensitive species and Annex I habitats.
2.4.01 a) Population size estimation (using individuals or agreed exceptions where possible) - Unit	The recommended unit (m2) was used.
2.4.01 b) Population size estimation (using individuals or agreed exceptions where possible) - Minimum	69,340,969 m2 is the total area mapped within polygons generated from field mapping surveys for maërl species.
2.4.03 c) Additional information on population estimates / conversion - Problems encountered	This species does not readily allow estimations of the population in an area as the calcareous structures grow together and on top of each other and it is not possible to distinguish individual algae contributing to the population. This species is habitat forming in extensive areas and is better considered by estimation of the area occupied rather than the individuals contributing to it.
2.4.07 Short-term trend - Trend direction	There is no indication that there is a significant reduction in the area occupied by this species.
2.4.09 Short-term trend - Method used	There are currently no indications that the population or area of habitat occupied by maërl habitat is changing.
2.4.15 b) Reason for change - improved knowledge/more accurate data?	The change in range area for maërl between 2006 and 2012 reporting periods should not be interpreted as a change in habitat prevalence

Field label	Note
Species: 1377	**Phymatolithon calcareum (maerl)**
2.4.15 c) Reason for change - use of different method	The difference in the population/area of Maërl habitat between 2006 and 2012 reporting periods should not be interpreted as a change in habitat prevalence. No “population” or resolved habitat maps were generated in 2006 for this measure, only range was calculated across a grid. The current estimate is only based on recent data sets from dedicated surveys for sensitive species and Annex I habitats with the polygons delineating the boundary of the dominance of the species.
2.5.03 Method used Habitat for the species	The area occupied by this species is considered to equate to the Habitat for the species. See 1.1.2 and 2.4.1a.
2.5.04 b) Quality of the habitat - Explain how the quality was assessed	It was not possible to extrapolate from operating pressures/perceived threats to an actual measure of habitat quality
2.5.05 Short-term trend - Period	The default trend period was used.
2.5.06 Short-term trend - Trend direction	There is currently no indication that significant reductions or increases in habitat area are operating.
2.5.09 Area of suitable habitat for the species (km2)	69km2. The area for the suitable habitat for this species is reported as equal to the habitat surface area as there is apparently no barrier to the spread of this species.
2.5.10 b) Reason for change - improved knowledge/more accurate data?	The change in range area for maërl between 2006 and 2012 reporting periods should not be interpreted as a change in habitat prevalence
2.5.10 c) Reason for change - use of different method (e.g. 'Range tool')?	The difference in the population/area of Maërl habitat between 2006 and 2012 reporting periods should not be interpreted as a change in habitat prevalence. No “population” or resolved habitat maps were generated in 2006 for this measure, only range was calculated across a grid. The current estimate is only based on recent data sets from dedicated surveys for sensitive species and Annex I habitats with the polygons delineating the boundary of the dominance of the species. The habitat for this species is judged to be the same as the recorded habitat on the basis that no barriers appear to be restricting specifically the spread of this species in the marine environment.

Field label	Note
Species: 1377	**Phymatolithon calcareum (maerl)**
2.6.01 Method used - Pressures	Pressures are factors or activities that are acting to influence the habitat now or within the reporting period. Article 17 reporting guidance indicates that a national list of these activities could be ranked by the relative prevalence and/or nature of influence of the activity. An objective methodology to marine pressure assessment is undoubtedly challenging but preferable nonetheless. At this time, some elements of activity prevalence can be captured in a quantitative or semi-quantitative manner; however, the full extent and nature of their influence can not be fully mapped spatially. Thus, an element of expert judgement is necessary on this reporting occasion. Available national data sources were aligned with the prescribed Activity Descriptions provided by the Commission to interrogate the potential prevalence of those activities against the mapped Annex habitat resource. In this compilation exercise 111 different sources across a range of distinct described Activities were used to form a spatial map. These included data related to fishing effort, aquaculture activities, coastal management, water quality, infrastructure development, recreational activities, commercial activities, and other activities in the marine environment. It is not a complete list of the activities occurring within the marine environment but is likely to account for the majority of activities. It should also be acknowledged that for some described activities the data generated under-reports prevalence and particularly in relation to fishing activities. However, all of the noted pressures were active during the reporting period from 2006-2012. It should be noted that some of the activities described for this species includes. Fishing and harvesting aquatic resources includes not only the harvesting of resources associated with this species habitat (professional active and passive fishing methods) but also it is the most appropriate Activity Code to capture the small area of direct harvesting by dredging of this species itself (mainly dead maërl) for use in the fertiliser industry. Based on this mapping exercise, experts recorded their ranking of the relative importance of pressures based on their likely influence and/or distribution.
2.7.01 Method used ? Threats	Threats are factors which will be acting in the next reporting period. Based on the pressure mapping exercise, experts considered the likely changes that could reasonably be expected to arise during the forthcoming reporting period in ranking threats. The estimation of the potential threats to this habitat is modified by management measures that are currently operated or under development e.g. fisheries management is actively being developed in the inshore environment particularly in relation to Natura sites.
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The Range for this species is judged to be favourable on the basis that there has been no significant loss or interruption of natural processes that form this habitat
2.9.01 b) Range - If CS is U1 or U2, use of qualifiers is recommended	Not applicable because the Range is judged favourable
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The population (area) of this species is judged to be favourable on the basis that there has been no significant permanent loss of this feature nationally. The extraction of this species was previously licensed for a small area in Bantry but only allowed the use of dead maërl.

Field label	Note
Species: **1377**	**Phymatolithon calcareum (maerl)**
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Unfavourable-Inadequate. Following extensive sampling of the benthic environment nationally, experts consider that there are excellent examples of good quality maërl habitat found around the Irish coastline. However, looking across the sites sampled experts did not have confidence that all maërl habitats were completely free from adverse impact. This species is particular sensitive to disturbance of the substrate that results in greater turbidity, sedimentation or changes in environmental conditions. Activities such as professional fishing or aquaculture can subject these effects to this species and result in reduced viability or mortality. This species is noted to be slow growing and reduced resilience and recoverability can prolong impacts.
2.9.03 b) Habitat for the species - If CS is U1 or U2, use of qualifiers is recommended	Improving- significant measures are currently operating or will operate in the future that would reduce the likelihood of threats to this measure particularly within Special Areas of Conservation.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	Using the evaluation matrix of IV.a.iii of the Guidance document the Future Prospects for maërl was judged to be good. Legislative changes should see regulatory improvements and greater clarity in the conservation condition of sites inside the Natura 2000 network. For the significantly large area of the national habitat resource outside the Natura 2000 network and corresponding protection regimes, it is envisaged that sustainable practices will be delivered through the Marine Strategy Framework Directive. It should be noted that the direct extraction of dead maërl in Ireland is no longer allowed since 2010.
2.9.05 Overall assessment of Conservation Status	Since there are three Favourable results in Range, Population and Future Prospects, and Habitat for species is judged Unfavourable-Inadequate, the overall conclusion is the habitat is currently “Unfavourable-Inadequate”.
2.9.06 Overall trend in Conservation Status	There is likely to be a trend towards improvement in the conditions for this species in the future.

Maerl
Phymatolithon calcareum (1377)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

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Scale - Scála
0 10 20 30 40 50 km

N
Map - Léarscáil
V 1.0
Date - Dáta
6-06-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1378**
0.2.2 Species name	**Cladonia spp. (subgenus Cladina)**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	N/A

1. National Level

1.1 Maps

1.1.1 Distribution Map	No
1.1.1a Sensitive species	No
1.1.2 Method used - map	N/A
1.1.3 Year or period	
1.1.4 Additional map	No
1.1.5 Range map	No

2. Biogeographical Or Marine Level

2.1 Biogeographical Region	**Atlantic (ATL)**
2.2 Published sources	

2.3 Range

2.3.1 Surface area - Range (km²)		
2.3.2 Method - Range surface area	N/A	
2.3.3 Short-term trend period		
2.3.4 Short-term trend direction	N/A	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	
	operator	N/A
	unknown	No
	method	
2.3.10 Reason for change		

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit N/A	
	min	max
2.4.2 Population size (other than individuals)	Unit N/A	
	min	max
2.4.3 Additional information	Definition of locality	
	Conversion method	
	Problems	
2.4.4 Year or period		
2.4.5 Method – population size	N/A	
2.4.6 Short-term trend period		
2.4.7 Short term trend direction	N/A	

2.4.8 Short-term trend magnitude	min	max	confidence interval
2.4.9 Short-term trend method	N/A		
2.4.10 Long-term trend period			
2.4.11 Long term trend direction	N/A		
2.4.12 Long-term trend magnitude	min	max	confidence interval
2.4.13 Long-term trend method	N/A		
2.4.14 Favourable reference population	number		
	operator	N/A	
	unknown	No	
	method		
2.4.15 Reason for change			

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	
2.5.2 Year or period	
2.5.3 Method used - habitat	N/A
2.5.4 a) Quality of habitat	
2.5.4 b) Quality of habitat - method	
2.5.5 Short term trend period	
2.5.6 Short term trend direction	N/A
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	
2.5.10 Reason for change	

2.6 Main Pressures

2.6.1 Method used – pressures	N/A

2.7 Main Threats

2.7.1 Method used – threats	N/A

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends

2.8.2 Other relevant Information

In Ireland the Cladonia subgenus Cladina (Reindeer Moss) is represented by Cladonia arbuscula, C. azorica, C. ciliata, C. portentosa and C. rangiferina. Records of C. mitis and C. stellaris are regarded as doubtful due to the lack of voucher specimens, and thus omitted from the latest edition of the Census Catalogue (Seaward, M.R.D. (2010). Census Catalogue of Irish Lichens. 3rd Edn. National Museums Northern Ireland, Holywood).

These species occur across heaths, bogs, dunes and screes.
Any combined assessment of this group is complicated by mis-identification and under-recording, and the widespread distribution of three species, C. arbuscula, C. ciliata and C. portentosa, masks the distribution of the rarer C. azorica and C. rangiferina.
There is no evidence of exploitation of any of the species in this group.
The Overall assessment has been given Unfavourable inadequate due to ongoing pressures on the habitats where these species occur.

2.8.3 Trans-boundary assessment

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment	N/A
	qualifiers	N/A
2.9.2. Population	assessment	N/A
	qualifiers	N/A
2.9.3. Habitat	assessment	N/A
	qualifiers	N/A
2.9.4. Future prospects	assessment	N/A
	qualifiers	N/A
2.9.5 Overall assessment of Conservation Status	Inadequate (U1)	
2.9.6 Overall trend in Conservation Status	stable (=)	

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	N/A		
	min		max	
3.1.2 Method used	N/A			
3.1.3 Trend of population size within	N/A			

3.2 Conservation Measures

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1393**
0.2.2 Species name	**Drepanocladus vernicosus**
0.2.3 Alternative species scientific name	Hamatocaulis vernicosus
0.2.4 Common name	Slender green feather moss/Shining sickle moss

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Complete survey/Complete survey or a statistically robust estimate (3)
1.1.3 Year or period	1999-2012
1.1.4 Additional map	No
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published sources

Blockeel, T.L. 1997. A revision of British (and Irish) specimens of Drepanocladus vernicosus. Unpublished report to JNCC.
Campbell, C. 2013. Conservation of selected legally protected and Red Listed bryophytes in Ireland. Unpublished Ph.D. thesis, Trinity College Dublin.
Hedenäs, L. 1989. The genera Scorpidium and Hamatocaulis, gen. nov., in northern Europe. Lindbergia 15: 8-36.
Hodgetts, N.G. 2007. Survey of Rare and Threatened Bryophytes in County Waterford. Unpublished report to National Parks and Wildlife Service, Dublin.
Holyoak, D.T. 2003. The distribution of bryophytes in Ireland. An annotated review of the occurrence of liverworts and mosses in the Irish vice-counties based mainly on the records of the British Bryological Society. Dinas Powys, Vale of Glamorgan: Broadleaf Books.
Holyoak, D.T. 2004. Survey of Rare and Threatened Bryophytes in County Galway. Unpublished report to National Parks and Wildlife Service, Dublin.
Lockhart, N., Hodgetts, N. & Holyoak, D. 2012. Rare and threatened bryophytes of Ireland. National Museums Northern Ireland.

2.3 Range

2.3.1 Surface area - Range (km²)	1100	
2.3.2 Method - Range surface area	Complete survey/Complete survey or a statistically robust estimate (3)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	1100
	operator	N/A
	unknown	No
	method	The distribution and consequential range value derived from the 1999-2012 field survey (Campbell (2013) and additional NPWS records) is considered to be the H.

	vernicosus baseline. As there is no evidence of a decline since the Directive came into force the current range is set as the FRR.				
2.3.10 Reason for change	Improved knowledge/more accurate data				
2.4 Population					
2.4.1 Population size (individuals or agreed exception)	Unit	area covered by population in m2 (area)			
	min	32500	max	32500	
2.4.2 Population size (other than individuals)	Unit	number of localities (localities)			
	min	11	max	11	
2.4.3 Additional information	Definition of locality	A discrete location where a Hamatocaulis vernicosus population has been recorded between 1999 and 2012.			
	Conversion method				
	Problems	The area covered by the population can be difficult to quantify accurately and consistently. Campbell (2013) demonstrated higher genetic diversity among rather than within populations. Conservation of the total number of localities (populations) has therefore greater value.			
2.4.4 Year or period	1999-2012				
2.4.5 Method – population size	Estimate based on partial data with some extrapolation and/or modelling (2)				
2.4.6 Short-term trend period	2001-2012				
2.4.7 Short term trend direction	stable (0)				
2.4.8 Short-term trend magnitude	min		max		confidence interval
2.4.9 Short-term trend method	Estimate based on partial data with some extrapolation and/or modelling (2)				
2.4.10 Long-term trend period					
2.4.11 Long term trend direction	N/A				
2.4.12 Long-term trend magnitude	min		max		confidence interval
2.4.13 Long-term trend method	N/A				
2.4.14 Favourable reference population	number	32500			
	operator	N/A			
	unknown	No			
	method	The population figure derived from the 1999-2012 field estimates (Campbell (2013) and submissions to NPWS) is considered to represent the population baseline. As there is no evidence of any significant decline in population size since the Directive came into force the current population estimate is set as the Favourable Reference Population.			
2.4.15 Reason for change					
2.5 Habitat for the Species					
2.5.1 Surface area - Habitat (km^2)	0.032				
2.5.2 Year or period	1999-2012				
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)				
2.5.4 a) Quality of habitat	Good				
2.5.4 b) Quality of habitat - method	Habitat quality indicators were derived from 7 of the 11 populations (Campbell, 2013) including tree, shrub, grass and bryophyte cover, hydrology, cover of Calliergonella cuspidata and mean vegetation height.				

2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	stable (0)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km^2)	0.032
2.5.10 Reason for change	Improved knowledge/more accurate data

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
No threats or pressures (X)	()	N/A

2.6.1 Method used – pressures	based exclusively or to a larger extent on real data from sites/occurrences or other data sources (3)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
No threats or pressures (X)	()	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant Information	The 'number of localities' as an alternative population size unit may be a better alternative to use than 'area covered by population (m2)' as the area measured may be difficult to quantify consistently. The number of localities, i.e. 11, is deemed adequate to ensure the species survival in Ireland. The recently discovered (2012) H. vernicosus population at Commas (ca. 2 m2) is within the Cuilcagh-Anierin Uplands SAC (000584) but H. vernicosus is not yet listed as a qualifying feature for this SAC. All populations of H. vernicosus are protected under the Flora Protection Order 1999 (Statutory Instrument No. 94).
2.8.3 Trans-boundary assessment	

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment Favourable (FV) qualifiers N/A
2.9.2. Population	assessment Favourable (FV) qualifiers N/A
2.9.3. Habitat	assessment Favourable (FV) qualifiers N/A
2.9.4. Future prospects	assessment Favourable (FV) qualifiers N/A
2.9.5 Overall assessment of Conservation Status	Favourable (FV)
2.9.6 Overall trend in Conservation Status	N/A

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

3.1.1 Population Size	Unit	area covered by population in m2 (area)		
	min	32500	max	32500
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3 Trend of population size within	stable (0)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Both	Maintain

Field label	Note
Species: 1393	**Slender green feather moss/Shining sickle moss**
0.1 Member State	Republic of Ireland
0.2.01 Species code	Hamatocaulis vernicosus is a medium-sized perennial pleurocarpous moss with pinnately branched stems with branches held circa 90° to the stem. It forms green to yellowish green patches. It has distinctive hooked shoot tips and the etymology of the genus name reflects this, as hamatus means 'hook-like' and caulis means 'stem'. The leaves are strongly falcate-secund, are often longitudinally plicate and frequently tinged with red at the bases. The function of the red pigmentation is thought to be protection against damaging levels of solar radiation. H. vernicosus can appear similar to other fen species, such as Warnstorfia exannulata, but differs in the lack of a central strand and hyalodermis, lack of differentiated alar cells and distinctly plicate leaves. H. vernicosus is a dioicous species and sporophytes have never been recorded in Ireland (nor Great Britain) and are very rare across its distribution, maturing in summer. Specialised vegetative propagules are unknown, thus asexual reproduction must be the means of propagation and dispersal through gametophytic fragmentation.
0.2.03 Alternative species scientific name	The species was known as Drepanocladus vernicosus (Mitt.) Warnst. before Hedenäs (1989) transferred it to Hamatocaulis, a new genus.
1.1.02 Method used - map	There are currently 11 extant populations, contained within 9 sites (i.e. 9 SACs), in the Republic of Ireland, occurring in the counties Donegal, Mayo, Galway, Westmeath, Waterford and Cavan. Mapping (using GPS) of 7 of the 11 populations was undertaken by Campbell (2013) as part of a Ph.D. research project; the remaining populations were recorded by NPWS permanent staff and contract staff.
1.1.03 Year or period	1999-2012; 7 of the 11 populations, including the largest known populations, and those representing the geographic distribution in Ireland, have been recently resurveyed by Campbell (2009-2011) as part of a Ph.D. research project (Campbell, 2013).
1.1.04 Additional distribution map	All field-verified records from 1999-2012 were intersected with the ING 10km square grid.
1.1.05 Range map	The range map consists of the 11 current range squares which correspond to the 11 current distribution cells representing the 11 populations recorded in the period 1999-2012.

Species:	1393	Slender green feather moss/Shining sickle moss
2.2 Published sources		Campbell (2013) completed a Ph.D. research project that partly focused on the conservation biology of H. vernicosus. This research gathered information on population size & density, population biology, population genetic structure, associated vegetation and pressures. Indicators and targets were derived to assess the conservation status of Population, Habitat for the Species and Future Prospects at 7 of the 11 known populations of H. vernicosus in the Republic of Ireland. Other useful references include: Atherton, A., Bosanquet, S. & Lawley, M. (Eds.) 2010. Mosses and Liverworts of Britain and Ireland. British Bryological Society, Cardiff Blockeel, T.L. 1997. A revision of British (and Irish) specimens of Drepanocladus vernicosus. Unpublished report to JNCC Blockeel, T.L. 2000. The identification of Drepanocladus revolvens and D. cossonii, and their distribution in Britain and Ireland. Bulletin of the British Bryological Society 75: 32-40 Blockeel, T.L. & Long, D.G. 1998. A checklist and census catalogue of British and Irish bryophytes. British Bryological Society, Cardiff Boesen, D.F., Lewinsky, J & Rasmussen, L. 1975. A checklist of the bryophytes of the Faroes. Lindbergia 3: 69-78 Bosanquet, S.D.S., Hale, A.D., Motley, G.S. & Woods, R.G. 2006. Recent work on Hamatocaulis vernicosus in mid and south Wales. Field Bryology 90: 2-8 Church, J.M., Hodgetts, N.G., Preston, C.D. & Stewart, N.F. 2001. British Red Data Books. Mosses and liverworts. Peterborough, Joint Nature Conservation Committee Crum, H.A. & Anderson, L.E. 1981. Mosses of eastern North America. Volume 2. New York, Columbia University Press Erzberger, P. & Papp, B. 2007. New and noteworthy bryophyte records from Montenegro and Serbia. Willdenowia 37: 339-351 European Committee for the Conservation of Bryophytes (Ed.) 1995. Red Data Book of European Bryophytes. Trondheim, European Committee for the Conservation of Bryophytes Hedenäs, L. 1989a. The genera Scorpidium and Hamatocaulis, gen. nov., in northern Europe. Lindbergia 15: 8-36 Hedenäs, L. 1989b. Drepanocladus vernicosus in the Dominican Republic. The Bryologist 92:128-129 Hedenäs, L. 2003. The European species of the Calliergon-Scorpidium-Drepanocladus complex, including some related or similar species. Meylania 28: 1-116 Hedenäs, L. & Eldenäs, P. 2007. Cryptic speciation, habitat differentiation, and geography in Hamatocaulis vernicosus (Calliergonaceae, Bryophyta). Plant Systematics and Evolution 268: 131-145 Heras, P. & Infante, M. 2000. On the presence of Hamatocaulis vernicosus (Mitt.) Hedenäs (Amblystegiaceae) in Spain. Journal of Bryology 22 (4): 297-298 Hill, M.O. & Preston, C.D. 1998. The geographical relationships of British and Irish bryophytes. Journal of Bryology 20: 127-226 Hill, M.O., Preston, C.D. & Smith, A.J.E. (Eds.) 1994. Atlas of the bryophytes of Britain and Ireland. Volume 3 Mosses (Diplolepideae). Colchester, Harley Books Hugonnot, V., Celle, J. & Gourvil, J. 2012. Hamatocaulis vernicosus (Mitt.) Hedenäs. Fédération des Conservatoires botaniques nationaux Ignatov, M.S., Afonina, E.A. & Ignatova, E.A. 2006. Checklist of mosses of East Europe and North Asia. Arctoa 15: 1-130 Irish Statute Book, 1997. Statutory Instrument No. 94 of 1997. European Communities (Natural Habitats) Regulations, 1997. The Stationery Office, Dublin Irish Statute Book, 1999. Statutory Instrument No. 94 of 1999. Flora (Protection) Order, 1999. The Stationery Office, Dublin Joint Nature Conservation Committee. 2007. Second report by the UK under Article 17 on the implementation of the Habitats Directive from January 2001 to December 2006. Joint Nature Conservation Committee, Peterborough

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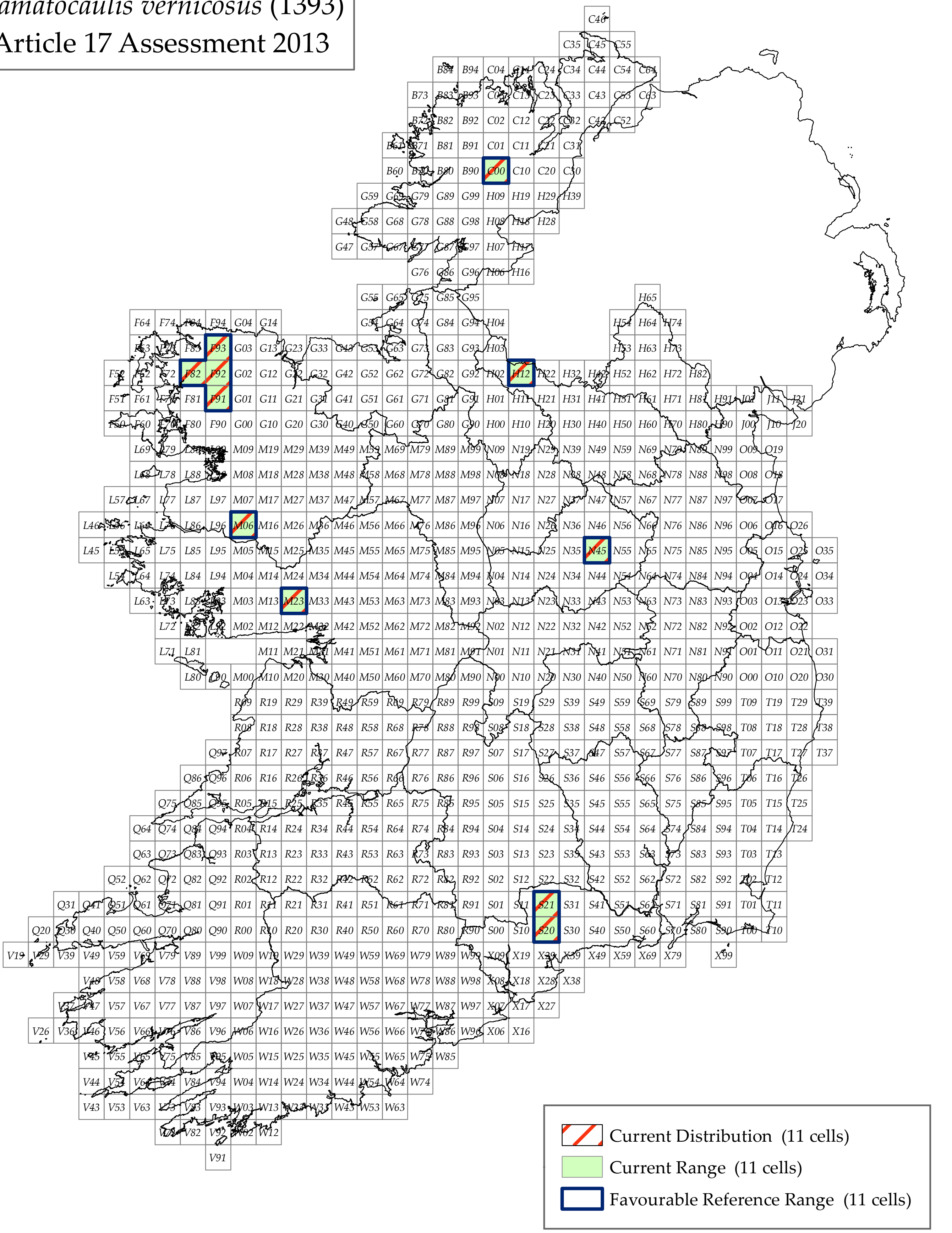
2.3.01 Surface area - Range	This figure has been derived from the range map referred to in 1.1.5
2.3.02 Method used - Surface area of Range	The explanation for this field has been covered in sections 1.1.2, 1.1.4 & 1.1.5.
2.3.04 Short term trend - Trend direction	Comparisions between detailed surveys from 1999-2012 (Campbell, 2013) and NPWS bryophyte files indicate that there have been no losses across the distribution in the recent past, therefore the short term (2001-2012) trend for range is considered to be stable.
2.3.09 a) Favourable reference range - In km2	The distribution and consequential range value derived from the 1999-2012 field survey (Campbell (2013) and additional NPWS records) is considered to be the H. vernicosus baseline. As there is no evidence of a decline since the Directive came into force the current range is set as the Favourable Reference Range. There is an assumption that the current range is large enough to encompass all of the ecological variation and ensure the long term survival of the species.
2.3.09 b) Favourable reference range - Indicate if operators were used	No symbol is utilised as the current range is considered to be the Favourable Reference Range.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Two additional populations in Cos. Cavan and Waterford have been discovered since the last reporting period (2001-2006). The measured coverage at one site (Largan More Co. Mayo) has also expanded since the last reporting period. This has resulted in a larger range, 1100 km2, than that reported in 2007, which was 900 km2. There is no reason to assume that these additional populations and coverage were not present in 2007.
2.4.01 a) Population size estimation (using individuals or agreed exceptions where possible) - Unit	Area covered by the population (m2) is the agreed exception to the use of the individual as the population size unit. The extent of 7 of the 11 populations studied by Campbell (2013) was measured by recording GPS co-ordinates along the perimeter of a polygon of the area containing H. vernicosus. The area covered by the population within the polygon was estimated from mean percentage cover within 2 x 2 m plots recorded (the number of plots depended on the size of the population) as not all micro-habitats within the areas of extent are suitable for H. vernicosus. Estimates based on expert judgement were derived for the remaining sites. The area covered by the population of each site was summed to give a national total.
2.4.01 b) Population size estimation (using individuals or agreed exceptions where possible) - Minimum	The area covered by the population of 32,500 m2 is a minimum value as 4 of the 11 populations are still to be mapped accurately.

Field label	Note
Species: 1393	**Slender green feather moss/Shining sickle moss**
2.4.01 c) Population size estimation (using individuals or agreed exceptions where possible) - Maximum	The area covered by the population of 32,500 m2 is a minimum value as 4 of the 11 populations are still to be mapped accurately.
2.4.02 a) Population size estimation (using population unit other than individuals) - Unit	Number of localities is a better measure of population size for H. vernicosus as the area covered by the population can be difficult to quantify accurately and consistently.
2.4.04 Year or period	All population values (area covered by the population (m2) and number of localities) were estimated between 1999 and 2012 (Campbell (2013) and submissions to NPWS).
2.4.05 Method used - Population size	The population size unit of area covered by the population (m2) was estimated from accurate GPS mapping at 7 of the 11 populations (Campbell, 2013) and from expert judgement for the remaining populations. The population size unit of number of localities (11) was derived from complete surveys.
2.4.06 Short-term trend - Period	Repeat visits to 7 of the 11 H. vernicosus populations between 2009 and 2011 did not suggest any changes in population size (area covered by the population (m2) or number of localities). This time frame could be extrapolated back to 2001.
2.4.07 Short-term trend - Trend direction	An estimation of the area of the population (m2) of 7 of the 11 populations was undertaken between 2009 and 2011 (Campbell, 2013). Limited data on the population size from NPWS bryophyte files suggest that there have been no losses in the size of the populations in the recent past, nor have there been losses in the number of localities. These comparisons stretch beyond the trend period, however there is no evidence to suggest losses since 2001. Therefore the short-term trend for population size is considered to be stable.
2.4.09 Short-term trend - Method used	The population size unit of area covered by the population (m2) was estimated from accurate GPS mapping at 7 of the 11 populations (Campbell, 2013) and from expert judgement for the remaining populations. The population size unit of number of localities (11) was derived from complete surveys. Limited data on area covered by the population from NPWS bryophyte files suggest that there have been no losses in the area covered by these populations, nor in the number of localities, in the recent past.
2.4.14 a) Favourable reference population - Number of individuals/agreed exceptions/other units	The area covered by the population of 32,500 m2 is taken as the Favourable Reference Population number. The area covered by the population (m2) at 11 localities recorded in the period 1999-2012 is considered to represent the population baseline. As there is no evidence of any significant decline in population number since the Directive came into force the current population number is set as the Favourable Reference Population.
2.4.14 b) Favourable reference population - Indicate if operators were used	No symbol is utilised as the current number of populations is considered equal to the Favourable Reference Population.
2.4.15 b) Reason for change - improved knowledge/more accurate data?	An additional two H. vernicosus populations were discovered in Cos. Cavan and Waterford since the last reporting period (2001-2006) and so the number of populations has increased from 9 to 11. There is no reason to suggest that these populations were not present before the last reporting period. The 2007 Conservation Status Assessment did not report on the area covered by population (m2) of H. vernicosus.
2.5.01 Area estimation	Estimates based on GPS-mapped areas of extent and subsequent estimates of habitat area covered by the populations by Campbell (2013) on 7 of the 11 populations and expert judgement estimates for the remaining populations tallied to approximately 0.032 km2. This is a minimum value as areas have not been mapped using GPS at 4 of the 11 populations.

Field label	Note
Species: 1393	**Slender green feather moss/Shining sickle moss**
2.5.02 Year or period	All habitat area values were estimated between1999 and 2012 (Campbell 2013) and submissions to NPWS).
2.5.04 a) Quality of the habitat - Good / moderate / bad / unknown	Habitat quality indicators were assessed at the 7 largest of the 11 populations (Campbell, 2013) including tree cover, shrub cover, grass cover, bryophyte cover, cover of Calliergonella cuspidata and mean vegetation height. The habitat quality at the 7 largest populations was assessed as good and as such overall habitat quality was assessed as good.
2.5.05 Short-term trend - Period	Repeat visits to the 7 largest of the 11 H. vernicosus populations between 2009 and 2011 did not suggest any changes to the habitat area for the species. This time frame could be extrapolated back to 2001.
2.5.06 Short-term trend - Trend direction	An estimation of the habitat area covered by the population and habitat quality for the 7 largest of the 11 populations was undertaken between 2009 and 2011 (Campbell, 2013). Limited data on habitat area covered by the population and habitat quality from NPWS bryophyte files suggest that there have been no losses in the habitat area or quality of these populations in the recent past. These comparisons stretch beyond the trend period, however there is no evidence to suggest losses since 2001. Therefore the short term trend for Habitat surface area and quality is considered to be stable.
2.5.09 Area of suitable habitat for the species (km2)	Although there are apparently suitable flushes and transition mires around Ireland there is no real understanding as to why this species is restricted to particular flushes and transition mires. Therefore the Area of suitable habitat is considered to be equal to the Habitat for the species.
2.5.10 b) Reason for change - improved knowledge/more accurate data?	The discovery of two additional populations and the extension of the area of occupancy at one site has occurred since the last reporting round in 2007. The actual area (3.25 hectares) is less than that reported in 2007 (257 hectares) as the latter figure included flushes/fens thought to be suitable, but without presence of H. vernicosus. Also, habitat area mapping accuracy was improved for 7 of the 11 populations using GPS technology. The final value is still approximate as 4 of the 11 populations remain to be mapped. However, expert judgement on the habitat area of the remaining four populations is also more accurate.
2.6 Main pressures - Pressure	No pressures (or impacting activities) were recorded at 7 of the 11 populations during a study by Campbell (2013) nor at the remaining 4 populations when reported (NPWS submissions).
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The range for Hamatocaulis vernicosus is scattered throughout the Republic of Ireland occurring the in the counties Donegal, Mayo, Galway, Westmeath, Waterford and Cavan. Former sites for the species in Wicklow, Meath, Wexford and Mayo were lost due to drainage and afforestation. Range is assessed as Favourable as there is no evidence of a decline in range since the Directive came into force and the restoration of historic populations is not feasible.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The size of each population in terms area covered by the population (m2) can be difficult to quantify accurately and consistently. Therefore, the number of localities is a better unit to assess population status. Four historical populations of H. vernicosus have been lost through drainge and afforestation, but the number of recently (1999-2012) discovered populations exceeds this number. Population is assessed as Favourable as there is no evidence of a decline in the number of localities nor area covered by the population (m2) since the Directive came into force. Populations lost from former localities are unlikely to be restored in the future due to irreversible habitat loss and issues surrounding the re-introduction of populations that may have a different genetic provenance. Campbell (2013) showed through genetic fingerprinting analysis that the majority of variation is between the populations as opposed to within them. Therefore conservation of all 11 populations is essential.

Field label	Note
Species: 1393	**Slender green feather moss/Shining sickle moss**
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Campbell (2013) and other recent observations have demonstrated that there is sufficient good quality habitat to support the long term survival of the species. Habitat for the species was assessed as Favourable in 2007. This assessment was based on expert judgement of field observations. The 2009-2011 field survey of 7 of the 11 populations (Campbell, 2013) also demonstrated there is no evidence to suggest that the area or quality of the habitat for the species has not changed in the recent past. Habitat for the species is therefore assessed as Favourable.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	There appear to be no pressures impacting the H. vernicosus populations at present. All populations are within the SAC network and all populations are protected by the Flora Protection Order 1999. There is no reason to believe that any threats will present themselves in the future, therefore the Future prospects are assessed as Favourable.
3.1.01 a) Population size - Unit	The population size unit of area covered by population (m2) is the agreed exception to the use of the population size unit of individual.
3.1.01 b) Population size - Minimum	This is a minimum estimation as 4 of the 11 populations have not been accurately mapped.
3.1.01 c) Population size - Maximum	This is a minimum estimation as 4 of the 11 populations have not been accurately mapped.
3.2 Conservation measures	Hamatocaulis vernicosus populations that are listed as qualifying features in SACs are protected by the Habitat Regulations (Statutory Instrument No. 477/2011), this regulates any plans or projects that may negatively impact on the species. There is also an NPWS list of Activities Requiring Consent (ARCs) that are only granted if they do not negatively impact on the Qualifying features within an SAC. Any damaging activity that impacts the conservation status of H. vernicosus populations is regulated under the Environment Liability Regulations 2008. H. vernicosus and its habitats are protected under the Flora Protection Order 1999 (Statutory Instrument No. 94).

Slender Green Feather-Moss
Hamatocaulis vernicosus (1393)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra
29-04-13

Scale - Scála
0 10 20 30 40 50 km

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Map - Léarscáil
V 1.0
Date - Dáta
29-04-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1395**
0.2.2 Species name	**Petalophyllum ralfsii**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	Petalwort

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Complete survey/Complete survey or a statistically robust estimate (3)
1.1.3 Year or period	1998-2012
1.1.4 Additional map	No
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published sources

Campbell, C. (2013). Conservation of selected legally protected and Red Listed bryophytes in Ireland. Unpublished Ph.D. thesis, Trinity College Dublin.
Hodgetts, N.G. (2003). Survey of Rare and Threatened Bryophytes in North Sligo. Unpublished report to National Parks and Wildlife Service, Dublin.
Hodgetts, N.G. (2006). Survey of Rare and Threatened Bryophytes in Mid/East Cork and Dingle Peninsula. Unpublished report to National Parks and Wildlife Service, Dublin.
Holyoak, D.T. (1999). Report on surveys of Petalophyllum ralfsii in Co. Mayo and Co. Galway, Western Ireland, 16-22 April 1999. Unpublished report to National Parks and Wildlife Service, Dublin.
Holyoak, D.T. (2002). Survey of Rare and Threatened Bryophytes in North Donegal. Unpublished report to National Parks and Wildlife Service, Dublin.
Holyoak, D.T. (2003a). Survey of Rare and Threatened Bryophytes in County Mayo. Unpublished report to National Parks and Wildlife Service, Dublin.
Holyoak, D.T. (2003b). The distribution of bryophytes in Ireland. An annotated review of the occurrence of liverworts and mosses in the Irish vice-counties based mainly on the records of the British Bryological Society. Dinas Powys, Vale of Glamorgan: Broadleaf Books.
Holyoak, D.T. (2004). Survey of Rare and Threatened Bryophytes in County Galway. Unpublished report to National Parks and Wildlife Service, Dublin.

2.3 Range

2.3.1 Surface area - Range (km²)	3200	
2.3.2 Method - Range surface area	Complete survey/Complete survey or a statistically robust estimate (3)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	3200
	operator	N/A
	unknown	No
	method	The distribution and consequential range value derived from the 1998-2012 field surveys (Campbell (2013) and additional NPWS records) is considered to be the Petalwort baseline. As there is no evidence of a decline since the Directive came into force the current range is set as the Favourable Reference Range.
2.3.10 Reason for change	Improved knowledge/more accurate data	

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	area covered by population in m2 (area)		
	min	339600	max	339600
2.4.2 Population size (other than individuals)	Unit	number of localities (localities)		
	min	30	max	30
2.4.3 Additional information	Definition of locality	A discrete location where a Petalwort population has been recorded between 1998 and 2012.		
	Conversion method			
	Problems	Large natural fluctuations in visible thalli numbers, depending on time of year and conditions, can affect the estimation of the area covered by population (m2) and the number of localities may be a better alternative population size unit.		

2.4.4 Year or period	1998-2012		
2.4.5 Method – population size	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.6 Short-term trend period	2001-2012		
2.4.7 Short term trend direction	stable (0)		
2.4.8 Short-term trend magnitude	min	max	confidence interval
2.4.9 Short-term trend method	Estimate based on partial data with some extrapolation and/or modelling (2)		
2.4.10 Long-term trend period			
2.4.11 Long term trend direction	N/A		
2.4.12 Long-term trend magnitude	min	max	confidence interval
2.4.13 Long-term trend method	N/A		
2.4.14 Favourable reference population	number	339600	
	operator	N/A	
	unknown	No	
	method	The population figure derived from the 1998-2012 field estimates (Campbell (2013) and submissions to NPWS) is considered to represent the population baseline. As there is no evidence of any	

	significant decline in population size since the Directive came into force the current population estimate is set as the Favourable Reference Population.
2.4.15 Reason for change	Improved knowledge/more accurate data

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	0.34
2.5.2 Year or period	1998-2012
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Good
2.5.4 b) Quality of habitat - method	Habitat quality indicators were derived from 13 of the 30 populations (Campbell, 2013) including hydrology, shrub cover, grass cover, cover of bare ground and mean vegetation height (cm).
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	stable (0)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	0.34
2.5.10 Reason for change	Improved knowledge/more accurate data

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
No threats or pressures (X)	()	N/A

2.6.1 Method used – pressures	based exclusively or to a larger extent on real data from sites/occurrences or other data sources (3)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
No threats or pressures (X)	()	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant Information	The 'number of localities' as an alternative population size unit may be a better alternative to use than 'area covered by population (m2)' as the area measured can depend on the number of visible thalli present which varies widely depending on conditions at time of measurement. The 30 localities is deemed adequate to ensure the species survival in Ireland. An area of coverage of ca. 44 m2, 3.9% of the population at Rosepenna in Sheephaven SAC (001190) is outside the SAC area. This area (44m2) constitutes 0.01% of the total population. The recently discovered (2012) Petalwort population at Barley Cove (109 m2) is within the Barley Cove and Ballyrisode SAC (001040) but Petalwort is not yet listed as a qualifying feature for this SAC. All populations of Petalwort are protected under the Flora Protection Order 1999 (Statutory Instrument No. 94).
2.8.3 Trans-boundary assessment	

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.9.2. Population	assessment	Favourable (FV)
	qualifiers	N/A
2.9.3. Habitat	assessment	Favourable (FV)
	qualifiers	N/A
2.9.4. Future prospects	assessment	Favourable (FV)
	qualifiers	N/A
2.9.5 Overall assessment of Conservation Status		Favourable (FV)
2.9.6 Overall trend in Conservation Status		N/A

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	area covered by population in m2 (area)		
	min	339555	max	339555
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3 Trend of population size within	stable (0)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Both	Maintain

Article 17 - SPECIES NOTES

Field label	Note
Species: 1395	**Petalwort**
0.1 Member State	Republic of Ireland
0.2.01 Species code	Petalophyllum ralfsii (Petalwort) is a small, pale green thallose liverwort with erect lamellae on its upper surface. The green part of the plant grows from a subterranean, rhizome-like axis. Sporophytes develop sheathed in a cylindrical involucre on the upper surface of the female thallus. The orange antheridia occur in clusters on the upper surface of the male plants. Petalwort may be confused with species of Fossombronia, particularly F. caespitiformis subsp. multispira, in which the rhizoids are usually colourless or pale brown (other species of Fossombronia have purple rhizoids). However, close examination will reveal the unique characteristic lamellae of Petalophyllum.
1.1.02 Method used - map	There are currently 30 extant populations, contained within in 21 sites (i.e. 21 SACs), in the Republic of Ireland, predominantly on the west coast from Donegal to Cork, with one site on the east coast, in Dublin. The 30 populations occur in 26 Irish 10 km grid squares. Mapping (using GPS) of 13 of the 30 populations, including the largest known populations and those representing the geographic distribution in Ireland, was undertaken by Campbell (2013) as part of a Ph.D. research project; the remaining populations were recorded by NPWS permanent or contract staff.
1.1.03 Year or period	1998-2012; All records have been validated in the field during these dates; 13 of the 30 populations, including the largest known populations and those representing the geographic distribution in Ireland, have been recently resurveyed by Campbell (2009-2012) as part of a Ph.D. research project (Campbell, 2013).
1.1.04 Additional distribution map	All field-verified records from 1998 to 2012 were intersected with the ING 10 km square grid.
1.1.05 Range map	The range map consists of 32 current range cells, including the 26 current distribution cells and a further 6 cells derived from the range tool that could potentially support the species due to geological and edaphic reasons.

Field label	Note
Species: 1395	**Petalwort**
2.2 Published sources	Campbell (2013) completed a Ph.D. that partly focused on the conservation biology of Petalwort. This research gathered information on population size & density, population biology, associated vegetation and pressures. Indicators and targets were derived to assess the conservation status of Population, Habitat for the Species and Future Prospects at a selected number of populations. Data from county-by-county surveys by Nick Hodgetts, Dr David Holyoak and Dr Neil Lockhart were also used. Other useful references include: Aleffi, M. 2005. New check-list of the Hepaticae and Anthocerotae of Italy. Flora Mediterranea 15: 485-566 Aleffi, M. & Schumacker, R. 1995. Check-list and red-list of the liverworts (Marchantiophyta) and hornworts (Anthocerotophyta) of Italy. Flora Mediterrenea 5: 73-161 Battandier, J.A. & Trabut, L.C. 1886. Atlas de la Flora d'Alger. Fasc. 1. A. Jourdan, Alger Bergmeier, E., Blockeel, T., Böhling, N., Fournaraki, C. Gotsiou, P., Jahn, R., Lansdown, R. & Turland, N. 2011. An inventory of the vascular plants and bryophytes of Gavdopoula Island (S. Aegean). Willdenowia 41: 179-190 Bischler, H. & Jovet-Ast, S. 1972. Les Hépatiques de Sardaigne: Énumeration, notes écologiques et biogéographiques. Revue Bryologique et Lichénologique 38: 325-419 Blockeel, T.L. 1991. The Bryophytes of Greece - New Records and Observations. Journal of Bryology 16: 629-640 Blockeel, T.L. 2003. New records of bryophytes from Cyprus. Bocconea 16: 105-11 Blockeel, T.L. & Crundwell, A.C. 1987. New bryophyte records from the Balearic Islands. Journal of Bryology 14: 519-522 Blockeel, T.L. & Long, D.G. 1998. A check-list and census catalogue of British and Irish bryophytes. British Bryological Society, Cardiff Casas, C. 1998. The Anthocerotae and Hepaticae of Spain and Balearic Islands: a preliminary checklist. Orsis 13: 17-26 Church, J.M., Hodgetts, N.G., Preston, C.D. & Stewart, N.F. 2001. British Red Data Books. Mosses and liverworts. Peterborough, Joint Nature Conservation Committee Crandall-Stotler, B.J., Stotler, R.E. & Ford, C.H. 2002. Contributions toward a Monograph of Petalophyllum (Marchantiophyta). Novon 12 (3): 334-337 Cros, R.M., Sáez, L. & Brugés, M. 2008. The bryophytes of the Balearic Islands: an annotated checklist. Journal of Bryology 30: 74-95 Dia, M.G., Miceli, G. & Not, R. 1985. Check-list delle Epatiche in Sicilia. Webbia 39: 163-177 Duckett, J.G., Pressel, S. & Ligrone, R. 2006. Cornish bryophytes in the Atlantic Arc: Cell biology, culturing, conservation and climate change. In: Leach, S.J., Page, C.N., Peytoureau, Y. & Sanford, M.N. (Eds.). Botanical Links in the Atlantic Arc: Proceedings of an Anglo-Hiberno-French Meeting Arranged by the Botanical Society of the British Isles, 8th-12th May 2003, Camborne, Cornwall. Botanical Society of the British Isles European Committee for the Conservation of Bryophytes (Ed.) 1995. Red Data Book of European bryophytes. Trondheim, European Committee for the Conservation of Bryophytes Frahm, J.-P. & Lüth, M. 2008. The bryophyte flora of the Maltese Islands. Archive for Bryology 29: 1-10 Frahm, J.-P., Lüth, M. & Van Melick, H. 2008. Kommentierte Artenliste der Moose von Sardinien. Archive for Bryology 31: 1-13 Frahm, J.-P., Lüth, M. & Van Melick, H. 2009. Die Moose Zyperns. Archive for Bryology 46: 1-8 Herzog, T. 1905. Ein Beitrag zur Kenntnis der Laub- und lebermoosflora von Sardinien. Berichte der Schweizerischen Botamischen. Gesellschaft 15: 41-67 Hill, M.O. & Preston, C.D. 1998. The geographical relationships of British and Irish bryophytes. Journal of Bryology 20: 127-226 Hill, M.O., Preston, C.D. & Smith, A.J.E. (Eds.) 1991. Atlas of the bryophytes of Britain and Ireland. Volume 1 Liverworts (Hepaticae and Anthocerotae). Colchester, Harley

Species: 1395 Petalwort

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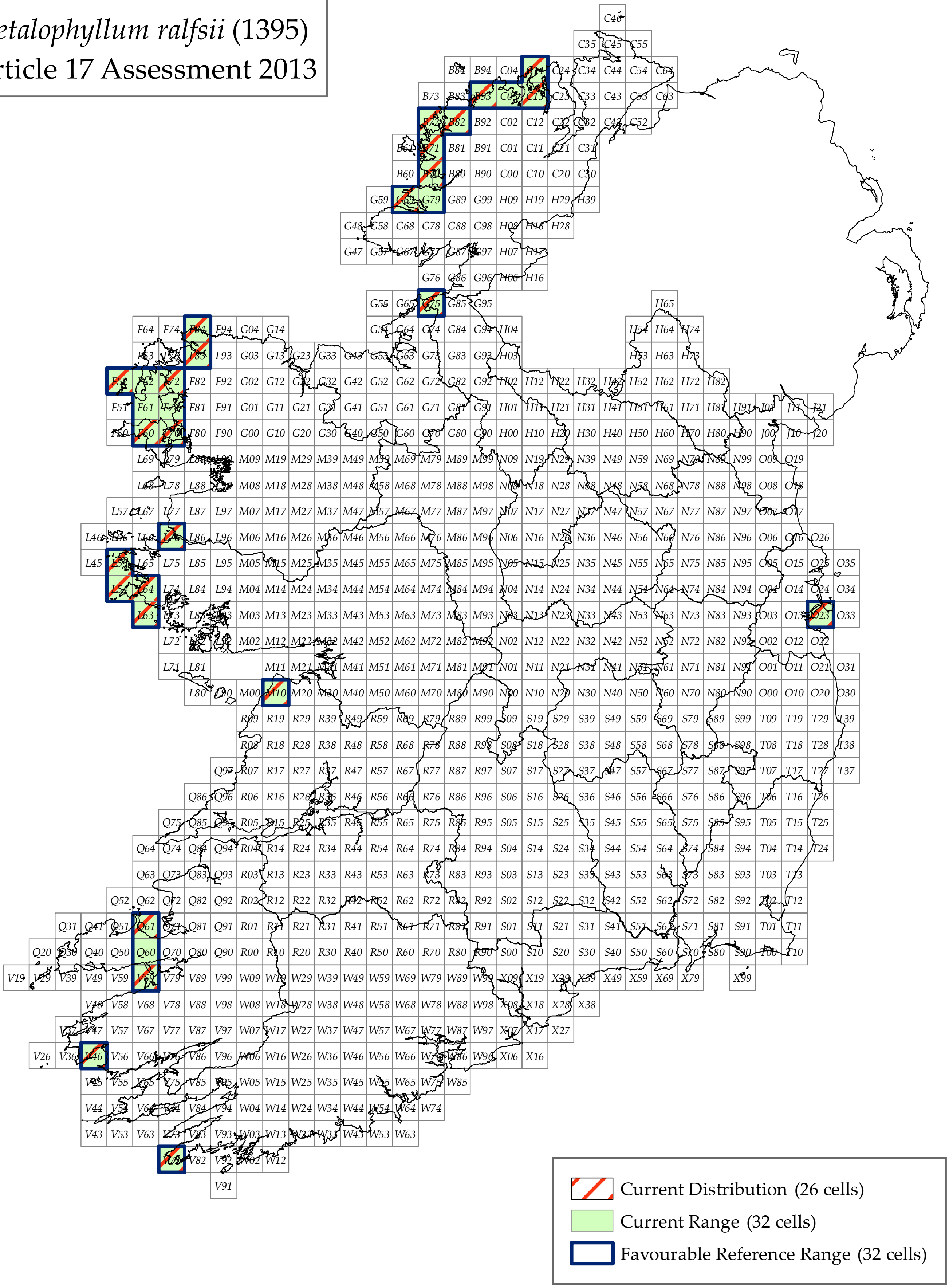
Field label	Note
Species: 1395	**Petalwort**
	Lindbergia 31: 109-125 Sérgio, C., Casas, C., Brugués, M. & Cros, R.M. 1994. Lista Vermelha dos Briófitos da Península Ibérica [Red List of Bryophytes of the Iberian Peninsula]. Lisboa, ICN Sim-Sim, M., Jones, M.P. & Sérgio, C. 2000. Petalophyllum ralfsii (Wils.) Nees & Gott., a threatened liverwort present in Portugal. Morphological and ecological data, directions for future conservation. Lindbergia 25: 101-105 Söderström, L., Urmi, E. & Váňa, J. 2002. Distribution of Hepaticae and Anthocerotae in Europe and Macaronesia. Lindbergia 27: 2-47 Stotler, R.E., Ford, C.H. & Crandall-Stotler, B.J. 2002. Typifications in the genus Petalophyllum (Marchantiophyta). The Bryologist 105 (3): 400-406 Trabut, L. 1887. Mousses et hépatiques nouvelles d'Algéria. Revue Bryologique 14: 12-13
2.3.01 Surface area - Range	This figure has been derived from the range map referred to in 1.1.5.
2.3.02 Method used - Surface area of Range	The explanation for this field has been covered in sections 1.1.2, 1.1.4 & 1.1.5.
2.3.04 Short term trend - Trend direction	Comparisons between detailed surveys from 2009-2012 (Campbell, 2013) and NPWS bryophyte files indicate that there have been no losses across the distribution in the recent past, therefore the short term trend for range is considered to be stable.
2.3.09 a) Favourable reference range - In km2	The distribution and consequential range value derived from the 1998-2012 field survey (Campbell (2013) and additional NPWS records) is considered to be the Petalwort baseline. As there is no evidence of a decline since the Directive came into force the current range is set as the Favourable Reference Range. There is an assumption that the current range is large enough to encompass all of the ecological variation and ensure the long term survival of the species.
2.3.09 b) Favourable reference range - Indicate if operators were used	No symbol is utilised as the current range is considered to be the Favourable Reference Range.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	An additional population of Petalwort was discovered in Co. Cork and the measured coverage at a site in Co. Mayo (Garter Hill) was expanded since the last reporting round, both of which increase the surface area of the range to 3200 km2. This has resulted in a larger range than that reported in 2007 of 3000 km2. There is no reason to assume that the additional population was not present in 2007 or that the range at the Mayo site has actually expanded.
2.4.01 a) Population size estimation (using individuals or agreed exceptions where possible) - Unit	Area covered by the population (m2) is the agreed exception to the use of the individual as the population size unit. The extent of 13 of the 30 populations studied by Campbell (2013) was measured by recording GPS co-ordinates along the perimeter of a polygon of the area containing Petalwort. The area of occupancy within the polygon of extent (i.e. area covered by the population) was estimated, as not all micro-habitats within the area of extent are suitable for Petalwort. Estimates of area covered by population were derived for the remaining sites based on expert judgement. The area covered by the population of each site was summed to give a national total.
2.4.01 b) Population size estimation (using individuals or agreed exceptions where possible) - Minimum	The area covered by the population of 339,600 m2 is a minumum value as many populations are still to be mapped accurately.
2.4.01 c) Population size estimation (using individuals or agreed exceptions where possible) - Maximum	The area covered by the population of 339,600 m2 is a minumum value as many populations are still to be mapped accurately.

Field label	Note
Species: 1395	**Petalwort**
2.4.02 a) Population size estimation (using population unit other than individuals) - Unit	Number of localities may be a better measure of population size as the number of thalli varies naturally and this can therefore affect the measurement of area covered by population (m2).
2.4.04 Year or period	All population values (area covered by the population (m2) and number of localities) were estimated between 1998 and 2012 (Campbell (2013) and submissions to NPWS).
2.4.05 Method used - Population size	The population size unit of area covered by the population (m2) was estimated from accurate GPS mapping at 13 of the 30 populations (Campbell, 2013) and from expert judgement for the remaining populations. The population size unit of number of localities (30) was derived from complete surveys.
2.4.06 Short-term trend - Period	Repeat visits to a selection of Petalwort populations between 2009 and 2012 did not suggest any significant changes in population size (area covered by the population (m2) or number of localities). This time frame could be extrapolated back to 2001.
2.4.07 Short-term trend - Trend direction	An estimation of the area of the population (m2) of 13 of the 30 populations was undertaken between 2009 and 2012 (Campbell, 2013). Limited data on the population size from NPWS bryophyte files suggest that there have been no losses in the size of these populations in the recent past. These comparisons stretch beyond the trend period, however there is no evidence to suggest losses since 2001. Therefore the short-term trend for population size is considered to be stable.
2.4.09 Short-term trend - Method used	The population size unit of area covered by the population (m2) was estimated from accurate GPS mapping at 13 of the 30 populations (Campbell, 2013) and from expert judgement for the remaining populations. The population size unit of number of localities (30) was derived from complete surveys. Limited data on area covered by the population from NPWS bryophyte files suggest that there have been no losses in the area covered by these populations (or the number of localities) in the recent past.
2.4.14 a) Favourable reference population - Number of individuals/agreed exceptions/other units	The area covered by the population of 339,600 m2 is taken as the Favourable Reference Population number. The area covered by the population (m2) recorded in the period 1998-2012 is considered to represent the population baseline. As there is no evidence of any significant decline in the population number since the Directive came into force the current population number is set as the Favourable Reference Population.
2.4.14 b) Favourable reference population - Indicate if operators were used	No symbol is utilised as the current number of populations is considered equal to the Favourable Reference Population.
2.4.15 b) Reason for change - improved knowledge/more accurate data?	The 2007 Conservation Status Assessment Report reported the on population size unit of number of localities, which was 29 localities (populations). An additional Petalwort population was discovered in Co. Cork since 2007 and so the number of populations has increased from 29 to 30. The 2007 Conservation Status Assessment Report reported the number of thalli as 150,252 (min.) to 7,331,682 (max.). The number of thalli of calculated for 2013 of ca. 3,609,450 (min.) to ca. 15,097,300 (max.) is greater than these numbers due to more accurate thalli counting and extrapolation at 13 of the 30 sites studied by Campbell (2013). The 2007 Conservation assessment did not make reference to the area covered by population (m2) as a population size unit.
2.5.01 Area estimation	Estimates based on GPS-mapped areas of occupancy by Campbell (2013) on 13 of the 30 populations and expert judgement estimates for the area of occupancy of the remaining populations tallied to approximately 0.34 km2. This is a minimum value as areas have not been mapped using GPS for many populations.
2.5.02 Year or period	All habitat area values were estimated between 1998 and 2012 (Campbell (2013) and submissions to NPWS).

Field label	Note
Species: 1395	**Petalwort**
2.5.04 a) Quality of the habitat - Good / moderate / bad / unknown	Habitat quality indicators were assessed at 13 of the 30 populations (Campbell, 2013) including groundwater level (hydrology), shrub cover, grass cover, cover of bare ground and mean vegetation height. One population (West of Inny Ferry) was given a poor rating mainly due to issues relating to grass cover and cover of bare ground linked to undergrazing. Overall however, the habitat quality is assessed as good.
2.5.05 Short-term trend - Period	Repeat visits to a selection of Petalwort populations between 2009 and 2012 did not suggest any changes in the area covered by the populations, however area estimates were not undertaken on every occasion. This time frame could be extrapolated back to 2001.
2.5.06 Short-term trend - Trend direction	An estimation of habitat surface area and habitat quality for 13 of the 30 populations was undertaken between 2009 and 2012 (Campbell, 2013). Limited data on habitat area and quality from NPWS bryophyte files suggest that there have been no losses in the area or quality in the recent past. These comparisons stretch beyond the trend period, however there is no evidence to suggest losses since 2001. Therefore the short term trend for Habitat for the species is considered to be stable.
2.5.09 Area of suitable habitat for the species (km2)	Although there are apparently suitable dune slack and machair habitats around the Irish coast there is no real understanding as to why this species is restricted to particular dune slacks and machair sites. Therefore the Area of suitable habitat is considered to be equal to the Habitat for the species.
2.5.10 b) Reason for change - improved knowledge/more accurate data?	An additional Petalwort population has been discovered since 2007. The actual area (34 ha) is less than that reported in 2007 (2,235 ha) as dune slacks and machair habitats without presence of Petalwort, but thought to be suitable, were included in the 2007 assessment. Also, habitat area mapping accuracy was improved for 13 of the 30 populations. However, the final value is still approximate as many populations remain to be mapped. However, expert judgement on the habitat area of the remaining populations is also more accurate.
2.6 Main pressures - Pressure	No pressures (or impacting activities) were recorded at 12 of 13 populations during the period 2009-2012 (Campbell, 2013), nor at the remaining population sites at the time of survey (NPWS submissions). Undergrazing was noted as an impacting factor at the population at West of Inny Ferry, Co. Kerry during 2009-2011, resulting in increased cover of grass and lack of bare ground impacting on the quality of the habitat for Petalwort at that particular locality. As this was an isolated occurrence it is not listed as a pressure and it is important to note that this is a localised issue and does not represent the situation across the wider landscape.
2.7 Threats - Threat	As there is no evidence to suggest a change in grazing regime at the West of Inny Ferry site, undergrazing could be considered a threat at this particular site. However, it is important to note that this is a localised issue and does not represent the situation across the wider landscape.
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The range for Petalwort is concentrated along the west coast from Donegal to Cork with one outlying population on the east coast. An old (1970) record of an inland population in Co. Sligo is thought to have been a transient occurrence. Range is assessed as Favourable as there is no evidence of a decline in the range since the Directive came into force.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The size of each population in terms of number of thalli is naturally highly variable, affecting the estimation of area covered by the populaion, and therefore the number of localities is a better unit to assess population status. Two historical Petalwort localities have been destroyed through development and eutrophication, and two others have not been refound, but the number of recently (1998-2012) discovered populations exceeds this number. Population is assessed as Favourable as there is no evidence of a decline in the number of localities since the Directive came into force.

Field label	Note
Species: 1395	**Petalwort**
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Campbell (2013) and other recent observations have demonstrated that there is sufficient good quality habitat to support the long term survival of the species. Habitat for the species was assessed as Favourable in 2007. This assessment was based on expert judgement of field observations. The 2009-2012 field survey of 13 of the 30 populations (Campbell, 2013) also demonstrated that there is no evidence to suggest that the extent or quality of the habitat for the species has changed in the recent past. Habitat for the species is therefore assessed as Favourable.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	Apart from a minor undergrazing issue at one site, there are no pressures impacting the Petalwort populations. All populations are within the SAC network (although 3.9% of Rosepenna is outside the Sheephaven SAC and Petalwort is not yet listed as a qualifying interest for Barley Cove and Ballyrisode SAC) and all populations are protected by the Flora Protection Order 1999. There is no reason to believe that any threats will present themselves in the future, therefore the Future prospects are assessed as Favourable.
3.1.01 a) Population size - Unit	The population size unit of area covered by population (m2) is the agreed exception to the population size unit of individual for bryophytes.
3.1.01 b) Population size - Minimum	The figure of 339555 m2 in less than that of 339,600 m2 given for area covered by the population in the population assessment as there is an area of circa 44 m2 occurring just outside the Sheephaven SAC. This is a minimum estimation as not all populations have been accurately mapped.
3.1.01 c) Population size - Maximum	The figure of 339555 m2 in less than that of 339600 m2 given for area covered by the population in the population assessment as there is an area of circa 44 m2 occurring just outside the Sheephaven SAC. This is a minimum estimation as not all populations have been accurately mapped.
3.2 Conservation measures	Petalwort populations that are listed as qualifying features in SACs are protected by the Habitat Regulations (Statutory Instrument No. 477/2011), this regulates any plans or projects that may negatively impact on the species. There is also an NPWS list of Activities Requiring Consent (ARCs) that are only granted if they do not negatively impact on the Qualifying features within an SAC. Any damaging activity that impacts the conservation status of Petalwort populations is regulated under the Environment Liability Regulations 2008. Petalwort and its habitats are protected under the Flora Protection Order 1999 (Statutory Instrument No. 94).

Petalwort
Petalophyllum ralfsii (1395)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 10 20 30 40 50 km

N

Map - Léarscáil
V 1.0
Date - Dáta
29-04-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1400**
0.2.2 Species name	**Leucobryum glaucum**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	White cushion moss

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	1962-2012
1.1.4 Additional map	No
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region: **Atlantic (ATL)**

2.2 Published sources:

Corine National Land Cover dataset (2000) - Environmental Protection Agency (EPA)

Corine National Land Cover dataset (2006) - Environmental Protection Agency (EPA)

Ferriss, S.E., Inskipp, T.P., Kloda, J. & Sinovas, P. 2007. Wildlife trade in Ireland – a review. Confidential report to the National Parks and Wildlife Service, Ireland. UNEP World Conservation Monitoring Centre, Cambridge. 85 pp.

2.3 Range

2.3.1 Surface area - Range (km²)	41900	
2.3.2 Method - Range surface area	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	41900
	operator	N/A
	unknown	No
	method	The distribution and consequential range value derived from the 1962-2012 records (BBS) is considered to be the Leucobryum glaucum baseline. As there is no evidence of a decline since the Directive came into force the current range is set as the Favourable Reference Range.
2.3.10 Reason for change	Improved knowledge/more accurate dataUse of different method	

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit N/A min max
2.4.2 Population size (other than individuals)	Unit number of map 10x10 km grid cells (grids10x10) min 220 max 220
2.4.3 Additional information	Definition of locality Conversion method Problems: Targeted surveys of Leucobryum glaucum have not taken place so the area covered by the population in m2 cannot be estimated with any accuracy. Therefore 10 km squares is the most appropriate unit to report for this widespread species as there is no meaningful way of converting the 10 km distribution squares to m2. However, population fluctuations of such a small plant could be masked by the scale of measurement (10km squares).
2.4.4 Year or period	1962-2012
2.4.5 Method – population size	Estimate based on expert opinion with no or minimal sampling (1)
2.4.6 Short-term trend period	2001-2012
2.4.7 Short term trend direction	stable (0)
2.4.8 Short-term trend magnitude	min max confidence interval
2.4.9 Short-term trend method	Estimate based on expert opinion with no or minimal sampling (1)
2.4.10 Long-term trend period	
2.4.11 Long term trend direction	N/A
2.4.12 Long-term trend magnitude	min max confidence interval
2.4.13 Long-term trend method	N/A
2.4.14 Favourable reference population	number 220 operator N/A unknown No method: The population distribution of 220 10km square grids derived from the 1962-2012 field records is considered to represent the population baseline. As there is no evidence of any significant decline in population size since the Directive came into force the current population estimate is set as the Favourable Reference Population.
2.4.15 Reason for change	Use of different method

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km^2)	8135
2.5.2 Year or period	2006-2006
2.5.3 Method used - habitat	Estimate based on expert opinion with no or minimal sampling (1)
2.5.4 a) Quality of habitat	Moderate
2.5.4 b) Quality of habitat - method	Based on expert opinion with no sampling. As no targeted surveys of Leucobryum glaucum have been carried out and the fact that the species is found across such a diversity of habitats, it would be difficult to report on the quality of all. However, many peatland areas have suffered from declines in both area and quality as a result of over-grazing and drainage. However, it is considered that there is enough habitat of sufficient quality to ensure the long-term survival of the species.

2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	stable (0)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km^2)	
2.5.10 Reason for change	Improved knowledge/more accurate data Use of different method

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
No threats or pressures (X)	()	N/A

2.6.1 Method used – pressures	based only on expert judgements (1)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
No threats or pressures (X)	()	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant Information	A study was commissioned in 2006 by the National Parks & Wildlife Service, Department of Environment, Heritage & Local Government, Ireland to investigate wildlife trade in Ireland. There was no evidence of exploitation of this species presented in the report (Ferriss et al., 2007).
2.8.3 Trans-boundary assessment	

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.9.2. Population	assessment	Favourable (FV)
	qualifiers	N/A
2.9.3. Habitat	assessment	Favourable (FV)
	qualifiers	N/A
2.9.4. Future prospects	assessment	Favourable (FV)
	qualifiers	N/A
2.9.5 Overall assessment of Conservation Status	Favourable (FV)	
2.9.6 Overall trend in Conservation Status	N/A	

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	N/A		
	min		max	
3.1.2 Method used	N/A			
3.1.3 Trend of population size within	N/A			

3.2 Conservation Measures

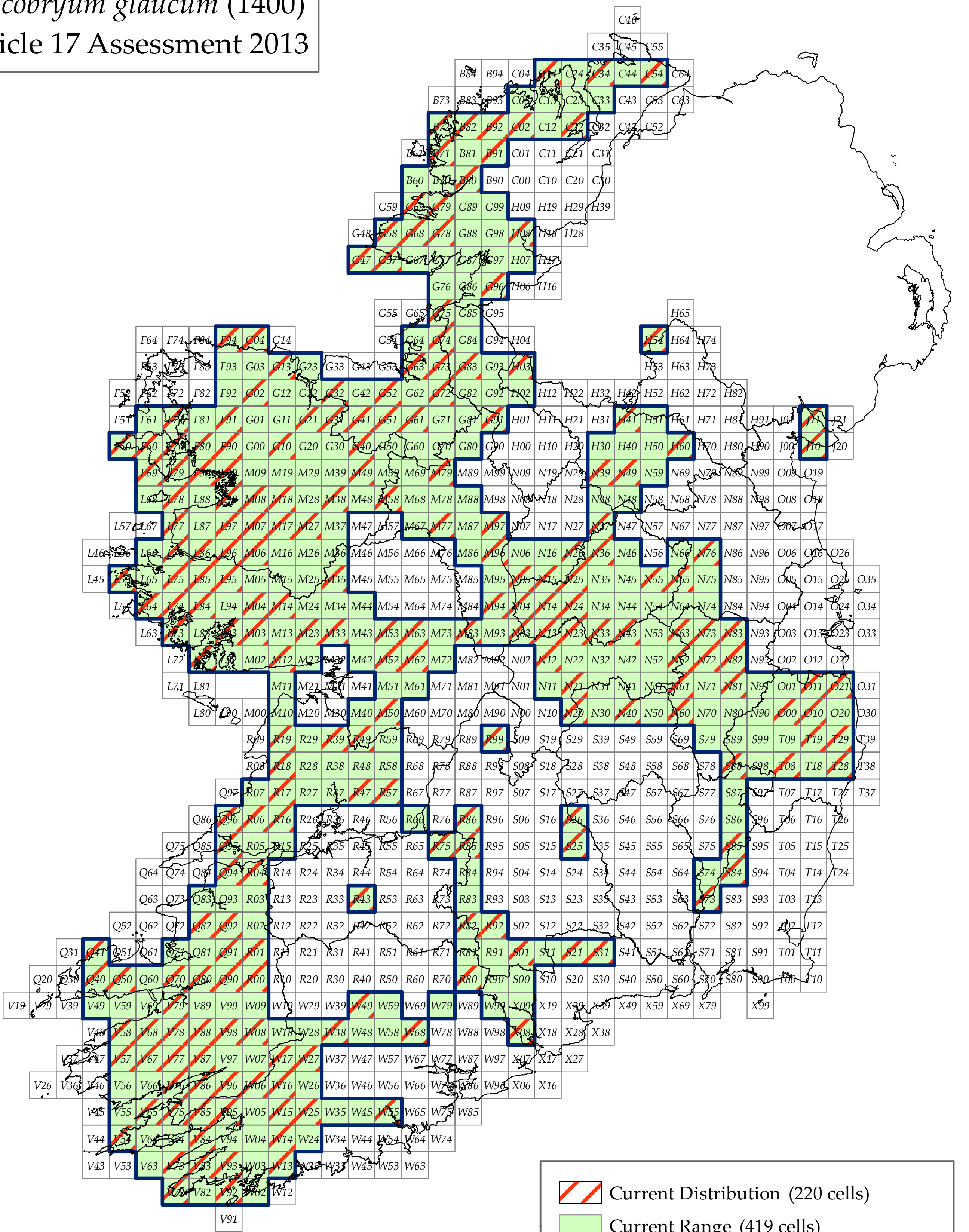
Article 17 - SPECIES NOTES

Field label	Note
Species: 1400	**White cushion moss**
0.1 Member State	Republic of Ireland
0.2.01 Species code	Leucobryum glaucum (Hedw.) Aangstr. (white cushion moss) is a densely tufted moss, forming cushions which can extend to one metre across and to 15+ cm high. The leaves are composed largely of nerve and the plant can hold water like a sponge. It is dioicous and rarely produces sporophytes, which mature in autumn. It grows commonly on rocks, tree stumps and on the ground in woodland, forest plantations, heath and bogs. The substrate is acid to strongly acid.
1.1.02 Method used - map	Records of Leucobryum glaucum in the Republic of Ireland were compiled by the British Bryological Society (BBS) for their atlas mapping scheme. All records from 1962-2012 were intersected with the Irish National Grid 10 km square grid. No targeted surveys of Leucobryum glaucum have been carried out and therefore the distribution is a minimum estimate.
1.1.03 Year or period	Records from 1962-2012 were used in the production of the range and distribution map. There is no reason to assume that older records (1962-2000) are not still present.
1.1.05 Range map	The range map consists of 419 current range cells, including the 220 current distribution cells and a further 199 cells, derived from the range tool, that could potentially support the species due to geological and edaphic reasons. As no targeted surveys of Leucobryum glaucum have taken place the range is considered a minimum estimate.
2.2 Published sources	Other useful reference: Smith, A.J.E. 1978. The Moss Flora of Britain and Ireland. Cambridge University Press.
2.3.01 Surface area - Range	This figure has been derived from the range map referred to in 1.1.5.
2.3.02 Method used - Surface area of Range	The explanation for this field has been covered in sections 1.1.2 and 1.1.5.
2.3.04 Short term trend - Trend direction	There is no evidence to suggest that there have been losses across the distribution or range in the recent past (2001-2012). Therefore the short-term trend for range is considered stable.
2.3.09 a) Favourable reference range - In km2	The distribution and consequential range value derived from the 1962-2012 records is considered to be the Leucobryum glaucum baseline. As there is no evidence of a decline since the Directive came into force the current range is set as the Favourable Reference Range. There is an assumption that the current range is large enough to encompass all of the ecological variation and ensure the long-term survival of the
2.3.09 b) Favourable reference range - Indicate if operators were used	No symbol is utilised as the current range is considered to be the Favourable Reference Range.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Despite the removal of six 10 km2 cells containing Leucobryum glaucum in Northern Ireland that were erroneously included in the 2001-2006 range assessment for the Republic of Ireland, the range is larger than reported for the 2001-2006 assessment as further additional records of Leucobryum glaucum have been compiled since then. This has resulted in a larger range than that reported in the last conservation assessment covering the period 2001-2006. There is no reason to assume that the additional records were not present in 2001-2006.
2.3.10 c) Reason for change - use of different method?	The standardised range tool was used to derive the range in this reporting round.

Field label	Note
Species: 1400	**White cushion moss**
2.4.02 a) Population size estimation (using population unit other than individuals) - Unit	The population unit of 'area covered by population in m2' is the agreed exception to the use of the individual as the population unit for bryophyte species. However, as no targeted surveys of Leucobryum glaucum have taken place it is impossible to estimate an accurate population size in m2 and so the number of 10 km square distribution grids, derived from the 1962-2012 field records, is used as the population size unit.
2.4.02 b) Population size estimation (using population unit other than individuals) - Minimum	The current number of distribution 10km square grids is 220. As no targeted surveys of Leucobryum glaucum have taken place this is a minimum estimate.
2.4.02 c) Population size estimation (using population unit other than individuals) - Maximum	The current number of distribution 10km square grids is 220. As no targeted surveys of Leucobryum glaucum have taken place this is a minimum estimate.
2.4.04 Year or period	All records were compiled between 1962-2012 (submissions to the British Bryological Society records database).
2.4.05 Method used - Population size	This has been explained in 2.4.2a.
2.4.06 Short-term trend - Period	The short-term trend period recommended is 2001-2012.
2.4.07 Short-term trend - Trend direction	The short-term trend direction is likely to be stable.
2.4.09 Short-term trend - Method used	There is no evidence to suggest a decline in the number and location of Leucobryum glaucum records in the period 2001-2012.
2.4.14 a) Favourable reference population - Number of individuals/agreed exceptions/other units	The population distribution of 220 10km square grids derived from the 1962-2012 field records is considered to represent the Favourable Reference Population.
2.4.14 b) Favourable reference population - Indicate if operators were used	No symbol is utilised as the Favourable Reference Population is unknown.
2.4.15 b) Reason for change - improved knowledge/more accurate data?	The figure reported for the last reporting round (2001-2006) of 146 10km2 was derived from records compiled from 1966-1988. The figure of 220 km2 reported in this round (2006-2012) is derived from records compiled from 1962-2012 and therefore includes the most up-to-date records.
2.5.01 Area estimation	Surface area of habitat (km2) is estimated from the cover of broad-leaved forest, coniferous forest, moors and heaths, peat bogs and transitional wetland scrub from the Corine National Land Cover dataset of 2006 within the 220 distribution cells.
2.5.02 Year or period	All records upon which the surface area of the habitat (km2) is based werederived from Corine 2006.
2.5.03 Method used Habitat for the species	As no targeted surveys of Leucobryum glaucum have taken place the surface area of the habitat (km2) is a maximum estimate.
2.5.04 a) Quality of the habitat - Good / moderate / bad / unknown	The quality of some of the habitats, i.e. peat bogs, moors and heaths within which Leucobryum glaucum occurs are under pressure from over-grazing and drainage.
2.5.05 Short-term trend - Period	While many of the older records have not been targeted for resurvey, many new records have been compiled in the period 2001-2012.

Field label	Note
Species: 1400	**White cushion moss**
2.5.06 Short-term trend - Trend direction	While many of the older records have not been targeted for resurvey, many new records have been compiled in the period 2001-2012. However, when the cover of broad-leaved forest, coniferous forest, moors and heaths, peat bogs and transitional wetland scrub from the Corine National Land Cover dataset of 2000 within the 220 range cells is compared with that of 2006, an increase of 36.9 km2 is evident. However, as this is less than a 1% (0.005%) increase, the trend is considered stable.
2.5.10 b) Reason for change - improved knowledge/more accurate data?	Additional records have been compiled since the last reporting period thus leading to a different figure for cover of habitat within the distribution grid squares.
2.5.10 c) Reason for change - use of different method (e.g. 'Range tool')?	The 2006 Corine dataset overlaid on the distribution grid squares was utilised for the current report, whereas the 2000 Corine dataset overlaid on the range grid squares was used for the last reporting period, when the habitat for the species was estimated as 11,346 km2.
2.6 Main pressures - Pressure	There are thought to be no pressures acting directly on the species at present. A study was commissioned in 2006 by the National Parks & Wildlife Service, Department of Environment, Heritage & Local Government, Ireland to investigate wildlife trade in Ireland. There was no evidence of exploitation of this species presented in the report (Ferriss et al., 2007).
2.7 Threats - Threat	No threats acting directly on the species are foreseen at present.
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The range of Leucobryum glaucum is widespread in Ireland. Range is assessed as Favourable as there is no evidence of a decline in range since the Directive came into force.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The size of the population is deemed to be sufficient to ensure the species survival into the future. There is no evidence of a decline in the population since the Directive came into force. Therefore Population is assessed as Favourable.
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The area of available habitat seems sufficiently large to ensure the long term survival of the species, and appears to be stable overall. However, habitat quality may not be sufficient in many of the peatland habitats due to over-grazing and drainage. However, there are sufficient habitats of sufficient quality to ensure the species long-term survival of the species and therefore Habitat for the Species is assessed as Favourable.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	There appear to be no pressures or threats directly impacting the Leucobryum glaucum populations and the species is expected to survive and prosper. There is no evidence that the species is being exploited in the Republic of Ireland (Ferriss et al., 2007). There is no reason to believe that any threats will present themselves in the future, therefore the Future Prospects are assessed as Favourable.
2.9.05 Overall assessment of Conservation Status	Overall, Leucobryum glaucum is widespread, occurs in many habitat types and is not under pressure or threat directly, therefore an overall conservation status assessment of Favourable is obtained for the species.

White Cushion Moss
Leucobryum glaucum (1400)
Article 17 Assessment 2013



Current Distribution (220 cells)

Current Range (419 cells)

Favourable Reference Range (419 cells)

An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 10 20 30 40 50 km

N

Map - Léarscáil
V 1.0
Date - Dáta
30-04-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1409**
0.2.2 Species name	**Sphagnum spp.**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	N/A

1. National Level

1.1 Maps

1.1.1 Distribution Map	No
1.1.1a Sensitive species	No
1.1.2 Method used - map	N/A
1.1.3 Year or period	
1.1.4 Additional map	No
1.1.5 Range map	No

2. Biogeographical Or Marine Level

2.1 Biogeographical Region	**Atlantic (ATL)**
2.2 Published sources	Ferriss, S.E., Inskipp, T.P., Kloda, J. & Sinovas, P. 2007. Wildlife trade in Ireland – a review. Confidential report to the National Parks and Wildlife Service, Ireland. UNEP World Conservation Monitoring Centre, Cambridge. 85 pp.

2.3 Range

2.3.1 Surface area - Range (km^2)		
2.3.2 Method - Range surface area	N/A	
2.3.3 Short-term trend period		
2.3.4 Short-term trend direction	N/A	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km^2)	
	operator	N/A
	unknown	No
	method	
2.3.10 Reason for change		

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	N/A	
	min		max
2.4.2 Population size (other than individuals)	Unit	N/A	
	min		max
2.4.3 Additional information	Definition of locality		
	Conversion method		
	Problems		
2.4.4 Year or period			
2.4.5 Method – population size	N/A		

2.4.6 Short-term trend period			
2.4.7 Short term trend direction	N/A		
2.4.8 Short-term trend magnitude	min	max	confidence interval
2.4.9 Short-term trend method	N/A		
2.4.10 Long-term trend period			
2.4.11 Long term trend direction	N/A		
2.4.12 Long-term trend magnitude	min	max	confidence interval
2.4.13 Long-term trend method	N/A		
2.4.14 Favourable reference population	number		
	operator N/A		
	unknown No		
	method		
2.4.15 Reason for change			

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	
2.5.2 Year or period	
2.5.3 Method used - habitat	N/A
2.5.4 a) Quality of habitat	
2.5.4 b) Quality of habitat - method	
2.5.5 Short term trend period	
2.5.6 Short term trend direction	N/A
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	
2.5.10 Reason for change	

2.6 Main Pressures

2.6.1 Method used – pressures	N/A

2.7 Main Threats

2.7.1 Method used – threats	N/A

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant Information	There are 32 Sphagnum taxa in the Republic of Ireland. The overall conservation status of this genus as a group is Inadequate. Range and population are deemed to be in Favourable status as the genus is widely distributed. However, although this genus occurs in many widespread habitats, the condition of these habitats is considered to be inadequate due to peat extraction, drainage and eutrophication, for example. The conservation assessments for blanket bog, raised bog and fen habitats were taken into consideration for this assessment and the habitat for this species group was assessed as Inadequate. A study commissioned in 2006 by the National Parks and Wildlife Service to investigate wildlife trade in Ireland noted some trade in moss species (Ferriss et al., 2007). However, it appeared to be low-level and, with one exception, did not involve plants collected in Ireland. Sphagnum was formerly collected for use in hanging baskets; however this has not been prevalent in the last 15 years or so. Collection of these species was not widespread and unlikely to pose a conservation problem. Therefore, as regards future prospects, collection is not a

	concern, but due to the poor conservation status of the peatland habitats within which the majority of Sphagnum species occur, the overall future prospects are rated as Inadequate. The overall conservation status is thus Inadequate.
2.8.3 Trans-boundary assessment	

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment	N/A
	qualifiers	N/A
2.9.2. Population	assessment	N/A
	qualifiers	N/A
2.9.3. Habitat	assessment	N/A
	qualifiers	N/A
2.9.4. Future prospects	assessment	N/A
	qualifiers	N/A
2.9.5 Overall assessment of Conservation Status	Inadequate (U1)	
2.9.6 Overall trend in Conservation Status	stable (=)	

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	N/A		
	min		max	
3.1.2 Method used	N/A			
3.1.3 Trend of population size within	N/A			

3.2 Conservation Measures

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1413**
0.2.2 Species name	**Lycopodium spp.**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	N/A

1. National Level

1.1 Maps

1.1.1 Distribution Map	No
1.1.1a Sensitive species	No
1.1.2 Method used - map	N/A
1.1.3 Year or period	
1.1.4 Additional map	No
1.1.5 Range map	No

2. Biogeographical Or Marine Level

2.1 Biogeographical Region	**Atlantic (ATL)**
2.2 Published sources	

2.3 Range

2.3.1 Surface area - Range (km²)		
2.3.2 Method - Range surface area	N/A	
2.3.3 Short-term trend period		
2.3.4 Short-term trend direction	N/A	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	
	operator	N/A
	unknown	No
	method	
2.3.10 Reason for change		

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit N/A	
	min	max
2.4.2 Population size (other than individuals)	Unit N/A	
	min	max
2.4.3 Additional information	Definition of locality	
	Conversion method	
	Problems	
2.4.4 Year or period		
2.4.5 Method – population size	N/A	
2.4.6 Short-term trend period		
2.4.7 Short term trend direction	N/A	

2.4.8 Short-term trend magnitude	min	max	confidence interval
2.4.9 Short-term trend method	N/A		
2.4.10 Long-term trend period			
2.4.11 Long term trend direction	N/A		
2.4.12 Long-term trend magnitude	min	max	confidence interval
2.4.13 Long-term trend method	N/A		
2.4.14 Favourable reference population	number		
	operator	N/A	
	unknown	No	
	method		
2.4.15 Reason for change			

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	
2.5.2 Year or period	
2.5.3 Method used - habitat	N/A
2.5.4 a) Quality of habitat	
2.5.4 b) Quality of habitat - method	
2.5.5 Short term trend period	
2.5.6 Short term trend direction	N/A
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	
2.5.10 Reason for change	

2.6 Main Pressures

2.6.1 Method used – pressures	N/A

2.7 Main Threats

2.7.1 Method used – threats	N/A

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends

2.8.2 Other relevant Information

In Ireland four species occur within the Lycopodium group; Huperzia selago (L.) Bernh. ex Schrank & Mart., Diphasiastrum alpinum (L.) Holub, Lycopodium clavatum L. and Lycopodiella inundata (L.) Holub.

H. selago, D. alpinum and L. clavatum all occur on upland heaths, bogs and rocky areas, whilst L. inundata is found on open, wet ground on lake margins, in flushed boggy areas and in wet heath. During the reporting period ecological data were collected by National Botanic Gardens, Glasnevin staff from 12 sites for H. selago (216 relevés were recorded), 4 sites for D. alpinum (30 relevés recorded), 3 sites for L. clavatum (42 relevés recorded) and 2 sites for L. inundata (14 relevés recorded). Analyses of vegetation data collected indicate that there is a high correlation between D. alpinum and L. clavatum, and the occurrence of bare ground, whilst for H. selago the opposite is true.

H. selago is the most widespread and frequently occurring of the species, with L. inundata being the rarest – the range of this species has declined over the years from one that included sites in Cos Cork, Donegal, Galway, Kerry, Mayo, Offaly and Wicklow to one in which the species has been recorded from only Cos Cork, Galway and Mayo in the last twenty years. The ranges and numbers of sites for H. selago, L. clavatum and D. alpinum have also all declined over the years, due to a variety of pressures including agricultural improvement, overgrazing, burning, habitat loss, etc. During the survey by National Botanic Gardens staff, inappropriate grazing was noted as a pressure on all species while drainage and habitat loss were also noted as problems for Lycopodiella inundata. In a recent survey of six known sites for D. alpinum this species was recorded in only four, a decline of 33%. Of note, however, was the discovery of a new site for D. alpinum in 2010 in Co. Waterford, well outside the known current range for the species (Cos Donegal, Galway, Mayo and Wicklow). This discovery lends credence to the theory that the declines shown by this and other Lycopodium group species are partly explained by under-recording rather than genuine losses.

There is no evidence of the exploitation of any of these species; however, due to ongoing pressures (particularly inappropriate grazing regimes) on the habitats in which these species occur the overall assessment for the Lycopodium group is Unfavourable inadequate.

2.8.3 Trans-boundary assessment

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment	N/A
	qualifiers	N/A
2.9.2. Population	assessment	N/A
	qualifiers	N/A
2.9.3. Habitat	assessment	N/A
	qualifiers	N/A
2.9.4. Future prospects	assessment	N/A
	qualifiers	N/A
2.9.5 Overall assessment of Conservation Status	Inadequate (U1)	
2.9.6 Overall trend in Conservation Status	stable (=)	

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	N/A		
	min		max	
3.1.2 Method used	N/A			
3.1.3 Trend of population size within	N/A			

3.2 Conservation Measures

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1421**
0.2.2 Species name	**Trichomanes speciosum**
0.2.3 Alternative species scientific name	Vandenboschia speciosa (Willd.) Kunkel, Trichomanes radicans auct.
0.2.4 Common name	Killarney Fern; Bristle Fern

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Complete survey/Complete survey or a statistically robust estimate (3)
1.1.3 Year or period	1960-2012
1.1.4 Additional map	No
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published sources

A Ph.D. research project on the conservation biology of T. speciosum is nearing completion: Ní Dhúill, E. (in prep.). Conservation Biology of the Threatened Killarney Fern (Trichomanes speciosum Willd.) in Ireland. Unpublished Ph.D. thesis, University of Dublin, Trinity College. This research has gathered information on population size and density, fertility, population genetic structure, associated vegetation and pressures at sites for the species throughout its range in the Republic of Ireland.

Other useful references containing information on the species in Ireland include:

Anonymous (2007). Draft All Ireland Species Action Plan - Killarney Fern. Department of the Environment Heritage and Local Government.
Kingston, N. & Hayes, C. (2005). The ecology and conservation of the gametophyte generation of the Killarney Fern (Trichomanes speciosum Willd.) in Ireland. Biology and Environment: Proceedings of the Royal Irish Academy 105B (2): 71-79.
Ratcliffe, D.A., Birks, H.J.B., & Birks, H.H. (1993). The ecology and conservation of the Killarney Fern Trichomanes speciosum Willd. in Britain and Ireland. Biological Conservation 66: 231-247.
Rumsey, F.J., Jermy, A.C., & Sheffield, E., (1998). The independent gametophytic stage of Trichomanes speciosum Willd. (Hymenophyllaceae), the Killarney Fern and its distribution in the British Isles. Watsonia 22: 1-19.

2.3 Range

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

2.3.1 Surface area - Range (km²)	7000	
2.3.2 Method - Range surface area	Complete survey/Complete survey or a statistically robust estimate (3)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	7000
	operator	N/A
	unknown	No
	method	The favourable reference range is 70 (10 km2) grid cells. The distribution and consequential range value derived from the 2009-2012 field surveys (Ní Dhúill in prep.) and additional NPWS records is considered to be the T. speciosum baseline. The current range is considered to encompass the ecological range of variation for the species in Ireland and to be sufficient to ensure its long term survival. It has, thus, been set as the Favourable reference range. As there is no evidence of a decline since the Directive came into force the current range is set as the Favourable reference range.
2.3.10 Reason for change	Improved knowledge/more accurate data	

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	N/A		
	min		max	
2.4.2 Population size (other than individuals)	Unit	number of colonies (colonies)		
	min	177	max	177
2.4.3 Additional information	Definition of locality			
	Conversion method			
	Problems	Although “colony” was chosen as the unit, frond counts were still carried out in order to have a baseline for future assessment of the individual colonies. Each colony was measured and where sporophytes occurred, fronds were counted. In the case of actual frond counts, this was done on easily accessible colonies that were usually <1 m2. In the case of larger colonies, estimations were carried out based on counts using 25 cm x 25 cm quadrats (between 1-6 quadrats used depending on colony size). These quadrats were placed at different sections of the colony to ensure an accurate reflection of density of a colony, and the number of fronds in each quadrat was counted. The average number of fronds per 1 m2 was then calculated and this was then extrapolated based on the colony size. In the case of the largest population in Ireland, which occurs in Co. Waterford, one colony was inaccessible. In this case frond number estimates are based on estimates from a		

	nearby colony of similar frond density.
2.4.4 Year or period	1960-2012
2.4.5 Method – population size	Estimate based on partial data with some extrapolation and/or modelling (2)
2.4.6 Short-term trend period	2001-2012
2.4.7 Short term trend direction	stable (0)
2.4.8 Short-term trend magnitude	min max confidence interval
2.4.9 Short-term trend method	Estimate based on partial data with some extrapolation and/or modelling (2)
2.4.10 Long-term trend period	
2.4.11 Long term trend direction	N/A
2.4.12 Long-term trend magnitude	min max confidence interval
2.4.13 Long-term trend method	N/A
2.4.14 Favourable reference population	number 177 operator N/A unknown No method The population figure derived from the field estimates (Ní Dhúill (in prep.) and NPWS surveys, files, correspondence and submissions) is considered to represent the population baseline. The numbers of sub-populations and colonies has increased since the last Conservation Assessment, due, it is considered, to greater recording effort rather than a genuine increase. There is an apparent reduction (by two) in the overall number of populations since the last assessment (however, see section 2.4.15b for explanation of this artefact). There has been no decline in the population size since the Directive came into force. The current population estimate is set as the Favourable reference population.
2.4.15 Reason for change	Improved knowledge/more accurate data

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km^2)	0.449
2.5.2 Year or period	1960-2012
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Good
2.5.4 b) Quality of habitat - method	T. speciosum sporophytes and gametophytes have a very restricted ecological niche. A monitoring program has been put in place since 2007 to assess habitat quality indicators such as species composition, proximity to water and a suite of environmental variables (Relative Humidity, temperature and Photosynthetic Active Radiation). Proximity to a water source, high relative humidity and adequate shade/shelter are necessary for both generations of T. speciosum. Good indicators of colony health are the presence of both generations co-existing (sporophyte and gametophyte) in the same ecological space, the presence of mature sterile and mature fertile fronds and the presence of all three generations: juvenile sporophytes, mature sporophytes and gametophytes. Colonies with all the above occurring would be considered to be the healthiest and most viable. There are currently five populations in Ireland where juvenile sporophytes have been observed in association with gametophytes (Ní Dhúill in prep.). Of the 23 populations visited by Ní Dhúill (in prep.) where sporophytes occur, 13 were fertile (56%).
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	stable (0)

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	
2.5.10 Reason for change	Improved knowledge/more accurate data

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
grazing (A04)	low importance (L)	N/A
Outdoor sports and leisure activities, recreational activities (G01)	low importance (L)	N/A
fire and fire suppression (J01)	low importance (L)	N/A
invasive non-native species (I01)	low importance (L)	N/A
problematic native species (I02)	low importance (L)	N/A

2.6.1 Method used – pressures	based exclusively or to a larger extent on real data from sites/occurrences or other data sources (3)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
grazing (A04)	low importance (L)	N/A
invasive non-native species (I01)	low importance (L)	N/A
problematic native species (I02)	low importance (L)	N/A
Outdoor sports and leisure activities, recreational activities (G01)	low importance (L)	N/A
Taking / Removal of terrestrial plants, general (F04)	low importance (L)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant Information	Of the 177 colonies where Trichomanes speciosum is known to occur, 153 (or 86.4%) are currently in SACs. Of the 24 that are not, 18 comprise gametophytes only. The remaining six colonies are of sporophytes (mixed with gametophytes in two cases), in two populations in Co. Cork and Co. Kerry. The Co. Cork population of four colonies was discovered in 2012. The Co. Kerry population is included within a proposed Natural Heritage Area and the Cork population is listed for same
2.8.3 Trans-boundary assessment	

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.9.2. Population	assessment	Favourable (FV)
	qualifiers	N/A
2.9.3. Habitat	assessment	Favourable (FV)
	qualifiers	N/A

2.9.4. Future prospects	assessment Favourable (FV) qualifiers N/A
2.9.5 Overall assessment of Conservation Status	Favourable (FV)
2.9.6 Overall trend in Conservation Status	N/A

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	number of colonies (colonies)		
	min	153	max	153
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3 Trend of population size within	N/A			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Both	Maintain

Field label	Note
Species: 1421	**Killarney Fern**
0.1 Member State	Republic of Ireland
0.2.01 Species code	1421 Trichomanes speciosum Willd. (Killarney Fern) is a large filmy fern in the family Hymenophyllaceae. It is restricted to damp, shady and humid habitats and is extremely sensitive to desiccation. The species has a typical fern 2-stage life cycle, the second “fern” like stage is known as the sporophyte and the first or haploid stage is known as the gametophyte, which in this case, consists of a filamentous structure instead of a prothallus, the more usual form of fern gametophyte. Both the sporophyte and gametophyte stages are capable of asexual reproduction by means of rhizomes (in the former) and gemmae (in the latter). Gametophyte colonies can occur and reproduce in the absence of sporophytes. In Ireland, when the sporophyte and gametophyte occur together they occupy similar habitats in dripping caves, cliffs, crevices and gullies by waterfalls, crevices in woodland, and occasionally the floor of damp woodland - all deeply shaded humid habitats. Sporophyte colonies, however, are more restricted in their distribution in Ireland than gametophyte colonies. The differences in the distribution patterns of the two generations of the species may be, in part, due to over-collecting of sporophytes during the ‘Victorian Fern Craze’, at its height in the 1830s-1890s, which would have greatly impacted the known populations. Also, loss of habitat suitable for the sporophyte has affected its distribution in Ireland. Gametophyte colonies have been found in less humid habitats and have also been found with differing associated species. Gametophytes can grow in very dark habitats where there is little competition from other species. However, niches that the gametophyte can occupy are not always suitable for the growth of sporophytes, i.e. shallow crevices in otherwise open habitats that provide adequate shade for gametophyte, but not for the larger sporophytes. T. speciosum occurs in Ireland at elevations ranging from 50m to 380m above sea level, in sites with a predominately north- or north-east-facing aspect, and on acidic substrates such as quartzite, slates and sandstones. Whilst the sporophyte has been known from Ireland since 1804 (variously cited as “before 1804” or “about 1805”), the gametophyte was first recorded here only as recently as 1992.
0.2.03 Alternative species scientific name	Trichomanes radicans auct. non Sw., Trichomanes andrewsii, Newman, Trichomanes radicans var. andrewsii (Newman) H.C. Watson & Dennes, Hymenophyllum alatum Sm., Trichomanes alatum (Sm.) Hook., Trichomanes brevisetum R. Br., Trichomanes europaeum Sm., Trichomanes hibernicum Spreng., Trichomanes pyxidiferum sensu Huds., non L., Vandenboschia speciosa (Willd.) Kunkel.

Field label	Note
Species: 1421	**Killarney Fern**
1.1.02 Method used - map	There are currently 64 extant populations in the Republic of Ireland, the majority being located in the south/south-west in Cos Kerry (almost half), Cork, Limerick, Tipperary and Waterford. The species is, however, widely distributed in the country, with extant populations also occurring in Cos Carlow, Donegal, Galway, Kilkenny, Mayo, Sligo Wexford and Wicklow. The largest known population occurs in Co. Waterford. The current 64 populations comprise 129 sub-populations, which themselves include a total of 177 colonies. These 64 populations comprise 25 co-existing sporophyte and gametophyte populations, 18 populations where sporophyte occurs alone and 21 populations where gametophyte occurs alone. Ninety of the 177 colonies, in 35 populations, were visited between 2009 and 2012 by Emer Ní Dhúill and National Parks and Wildlife Service (NPWS) permanent and/or contract staff. Records for survey were compiled from a variety of sources, the majority being obtained from NPWS digital data sources (held in Recorder 6 and MS Excel) and associated survey cards and correspondence. Historic records from the Herbarium at the National Botanic Gardens, Glasnevin, Dublin, the Botanical Society of the British Isles (BSBI) database available from the National Biodiversity Network Gateway and available academic literature were also collated and checked.
1.1.03 Year or period	Thirty-five of the 64 currently known populations have been validated in the field and recorded to be present or absent during 2009-2012. Twenty-eight of the populations visited still had T. speciosum occurring at the same historic location. Negative records were noted at two locations, in Co. Kerry and Co. Mayo. At one site in Co. Kerry, adverse weather conditions and high water levels prevented a thorough search, whilst one of the Co. Cork sites was deemed to be inaccessible and unsafe for survey. Seven new populations from Cos Cork (2012), Kerry (2008, 2009 and 2012), Kilkenny (2009), Tipperary (2009) and Wexford (2009) were discovered between 2008 and 2012 by various individuals. In addition, records for three other new populations from Co. Kerry (1996) and Co. Waterford (2006, 2006) that had not been reported upon previously came to light. Finally, a population of the species was discovered in 2010 at a site in Co. Cork from where it had been last reported in 1898. Older records not visited during 2009-2012 were not discounted unless the habitat for the species was seen to no longer be present, as at Hermitage (Altidore) Glen, Co. Wicklow and Adrigole, Co. Cork, where the habitat has been lost and the sites are no longer suitable. A number of other populations for which the most recent records are from the 19th century were searched for unsuccessfully by various individuals in recent years and are regarded as extinct. Nine historic sporophyte records were not re-found during these recent surveys. Other records from 1960 onwards were also included unless there was evidence of loss.
1.1.04 Additional distribution map	All records from 2009-2012 verified in the field as part of Ní Dhúill's research, plus older records from 1960 onwards for which there was no evidence of loss, were intersected with the Irish National Grid 10 km square grid.
1.1.05 Range map	The range map consists of the 70 (10 km2) grid cells in which the species is recorded as occurring. The range consists of 42 grid cells with 28 outlying grid cells as derived by the Range Tool.

Species: 1421 Killarney Fern

2.2 Published sources

A Ph.D. research project on the conservation biology of T. speciosum is nearing completion: Ní Dhúill, E. (in prep.). Conservation Biology of the Threatened Killarney Fern (Trichomanes speciosum Willd.) in Ireland. Unpublished Ph.D. thesis, University of Dublin, Trinity College. This research has gathered information on population size and density, fertility, population genetic structure, associated vegetation and pressures at sites for the species throughout its range in the Republic of Ireland.

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Species: 1421	**Killarney Fern**
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2.3.01 Surface area - Range	7,000 km2 (70 [10 km2] grid cells). This figure has been derived from the range map referred to in 1.1.5.
2.3.02 Method used - Surface area of Range	The range map consists of the 70 (10 km2) grid cells where the species is recorded as occurring. The range consists of 42 grid cells with 28 outlying grid cells as derived by the Range Tool.

Field label	Note
Species: 1421	**Killarney Fern**
2.3.04 Short term trend - Trend direction	Comparisons of the results of detailed surveys from 2009-2012 (Ní Dhúill in prep.) with those of earlier surveys held in NPWS files indicate that there have not been losses across the distribution in the recent past. Most of the sites with older records for T. speciosum that were revisited, were re-found, including one recorded in Co. Kerry in 1804. In fact, the range of the species has shown an apparent increase in recent years, as evidenced by the discovery of the species in 2009 in two counties from which it had not previously been reported (Co. Kilkenny and Co. Wexford, both gametophyte populations). It is considered, however, that this increase in the range is due to greater recording effort rather than a genuine expansion in range and, as such, the short-term trend for range is considered to be stable.
2.3.09 a) Favourable reference range - In km2	The favourable reference range is 70 (10 km2) grid cells. The distribution and consequential range value derived from the 2009-2012 field surveys (Ní Dhúill in prep.) and additional NPWS records is considered to be the T. speciosum baseline. The current range is considered to encompass the ecological range of variation for the species in Ireland and to be sufficient to ensure its long term survival. It has, thus, been set as the Favourable reference range. As there is no evidence of a decline since the Directive came into force the current range is set as the Favourable reference range.
2.3.09 b) Favourable reference range - Indicate if operators were used	No symbol is utilised as the current range is considered to be the Favourable reference range.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Changes to the current distribution, range and Favourable reference range for the species since the last reporting round are due to: a) The discovery of the species at seven locations from where there were no previous records, of which two were of the sporophyte generation only (Co. Kerry, 2009 and 2012), one was of co-occurring sporophyte and gametophyte (Co. Cork, 2012) and four were of the gametophyte only (Co. Kerry, 2008; Co. Kilkenny, 2009; Co. Tipperary, 2009; Co. Wexford, 2009); b) The unearthing of records for other populations from Co. Kerry (1996, sporophyte) and Co. Waterford (2006, two gametophyte populations) that had not been reported upon previously; c) The discovery of a new gametophyte population in a site from which the sporophyte had only ever been recorded, and at which it was presumed extinct (Co. Cork, 2010), resulting in the addition of grid cell V85 to the current distribution and, as a consequence, the addition of grid cell W04 to the range and Favourable reference range; d) The re-allocation, on the basis of improved knowledge, of records from grid cell V37 to the adjacent V47; e) The exclusion of one grid cell (V58) that had been included in the 2007 assessment – it was realised that the record on which this was based (Co. Kerry, 1983) has yet to be confirmed (“possible site”…. “half seen”); f) The exclusion of two grid cells considered to be erroneously listed in 2007 (O21, V76), for which no records could be traced; g) Use of the current range tool which has also added nine grid cells that were not included in the range map in the last assessment. Overall, improved knowledge has resulted in a bigger range than that reported in 2007. There is no reason to assume that recently recorded populations were not present in 2007.

Field label	Note
Species: 1421	**Killarney Fern**
2.4.01 b) Population size estimation (using individuals or agreed exceptions where possible) - Minimum	For T. speciosum the most suitable unit for measuring population size is considered to be the colony, which is simply defined by Rumsey (1997) as a discrete, i.e. unconnected, "patch" or "plant". This unit is the most useful and accurate measure of population size for the species, on account of the rhizomatous nature of the sporophyte and the filamentous nature of the gametophyte, both of which render identification in the field of what precisely constitutes an individual is difficult and liable to error. A sporophyte colony may comprise an individual or a number of individuals. A gametophyte colony may comprise an individual or thousands of individuals. Frond numbers can fluctuate on an annual basis, therefore, presence or absence of a colony is a more reliable unit than frond counts. For the purpose of this report, a colony can be one that has both sporophytes and gametophytes co-existing, or sporophytes growing alone, or gametophytes growing alone. Although "colony" was chosen as the unit, frond counts were still carried out in order to have a baseline for future assessment of the individual colonies. Each colony was measured and where sporophytes occurred, fronds were counted. In the case of actual frond counts, this was done on easily accessible colonies that were usually <1 m2. In the case of larger colonies, estimations were carried out based on counts using 25 cm x 25 cm quadrats (between 1-6 quadrats used depending on colony size). These quadrats were placed at different sections of the colony to ensure an accurate reflection of density of a colony, and the number of fronds in each quadrat was counted. The average number of fronds per 1 m2 was then calculated and this was then extrapolated based on the colony size. In the case of the largest population in Ireland, which occurs in Co. Waterford, one colony was inaccessible. In this case frond number estimates are based on estimates from a nearby colony of similar frond density. The 64 currently known populations comprise 129 sub-populations, which include a total of 177 colonies. The current 64 populations comprise 25 co-existing sporophyte and gametophyte populations, 18 populations where sporophyte occurs alone and 21 populations where gametophyte occurs alone. Of the 177 colonies, 98 are of the sporophyte (with or without the gametophyte co-occurring) and 79 comprise the gametophyte only.
2.4.04 Year or period	All population values were estimated based on surveys carried out between 1960 and 2012. (Ní Dhúill (in prep.) and NPWS surveys, files, correspondence and submissions)
2.4.07 Short-term trend - Trend direction	Colony and frond counts were undertaken between 2007 and 2012 (Ní Dhúill (in prep.) and NPWS surveys, files, correspondence and submissions) at over 35 populations. These counts were compared with such population data as were available from earlier visits (dating as far back as 1960) for a selection of these populations, the results of which did not suggest any decline in population size. It was also seen that while the colony numbers have remained stable, there is natural fluctuation in frond numbers.
2.4.14 a) Favourable reference population - Number of individuals/agreed exceptions/other units	The population figure derived from the field estimates (Ní Dhúill (in prep.) and NPWS surveys, files, correspondence and submissions) is considered to represent the population baseline. The numbers of sub-populations and colonies has increased since the last Conservation Assessment, due, it is considered, to greater recording effort rather than a genuine increase. There is an apparent reduction (by two) in the overall number of populations since the last assessment (however, see section 2.4.15b for explanation of this artefact). There has been no decline in the population size since the Directive came into force. The current population estimate is set as the Favourable reference population.

Field label	Note
Species: 1421	**Killarney Fern**
2.4.15 b) Reason for change - improved knowledge/more accurate data?	The present assessment takes a more conservative approach to the enumeration of populations and colonies in the smaller sites than was employed in the 2007 assessment. So, for example, a small site treated in 2007 as holding three populations might here be considered to comprise a single population of three sub-populations, each containing one or more colonies. This approach does not affect the larger sites, such as those in the Co. Kerry uplands, where populations are generally widely-separated (mostly more than 1 km apart) and which continue to be treated as separate populations. Merging of some of the sixty-six "2007 populations" for the present assessment has resulted in a reduction in the total number of populations for the species. However, this is merely an artefact of the amalgamation process and is not indicative of actual losses, of which there have been none since the last reporting period. Indeed, since 2007 there have been discoveries of several new populations and colonies (see sections 1.1.3, 2.3.4, 2.3.10b for details), which have helped to reverse and balance-out this apparent reduction. Currently the species is considered to comprise 64 populations, encompassing 177 colonies
2.5.02 Year or period	All habitat values were estimated between 2007 and 2012 (Ní Dhúill (in prep.) and NPWS surveys, files, correspondence and submissions).
2.5.03 Method used Habitat for the species	The area of occupancy of 79 colonies in 27 populations was recorded by Ní Dhúill (in prep.). For other recently recorded colonies not visited by her the area of occupancy is based on estimates made by the relevant recorders. Where the area was not recorded it is set a minimum value of 1 m2. For other populations not visited since 1960 the area of occupancy is taken from the 2007 assessment. A tally of all of these gives a minimum figure for area of occupancy of 280 m2 for sporophyte-only colonies, gametophyte-only colonies and the sporophyte and gametophyte elements of co-existing colonies. A maximum figure of 449 m2 is given to cover both occupied and unoccupied areas within the colony extent. This maximum figure is considered to be on the low side, as in some sites, particularly the largest one in the country, there are areas that are inaccessible to surveyors but which appear to be very suitable for the habitat and which, it is considered, are very likely to hold more colonies. In the 2007 Conservation Assessment, the maximum area for T. speciosum in Ireland was set at 1.23 km2; the current assessment sets this as 0.449 km2 – this revised figure is based on the detailed research, targeted surveys and measurements of colony sizes conducted since the 2007 assessment and, as such, is regarded as much closer to the true figure for the area of occupancy of the species, than the 2007 assessment estimate. T. speciosum sporophytes and gametophytes have a very restricted ecological niche. A monitoring program has been put in place since 2007 to assess habitat quality indicators such as species composition, proximity to water and a suite of environmental variables (Relative Humidity, temperature and Photosynthetic Active Radiation). Proximity to a water source, high relative humidity and adequate shade/shelter are necessary for both generations of T. speciosum. Good indicators of colony health are the presence of both generations co-existing (sporophyte and gametophyte) in the same ecological space, the presence of mature sterile and mature fertile fronds and the presence of all three generations: juvenile sporophytes, mature sporophytes and gametophytes. Colonies with all the above occurring would be considered to be the healthiest and most viable. There are currently five populations in Ireland where juvenile sporophytes have been observed in association with gametophytes (Ní Dhúill in prep.). Of the 23 populations visited by Ní Dhúill (in prep.) where sporophytes occur, 13 were fertile (56%).

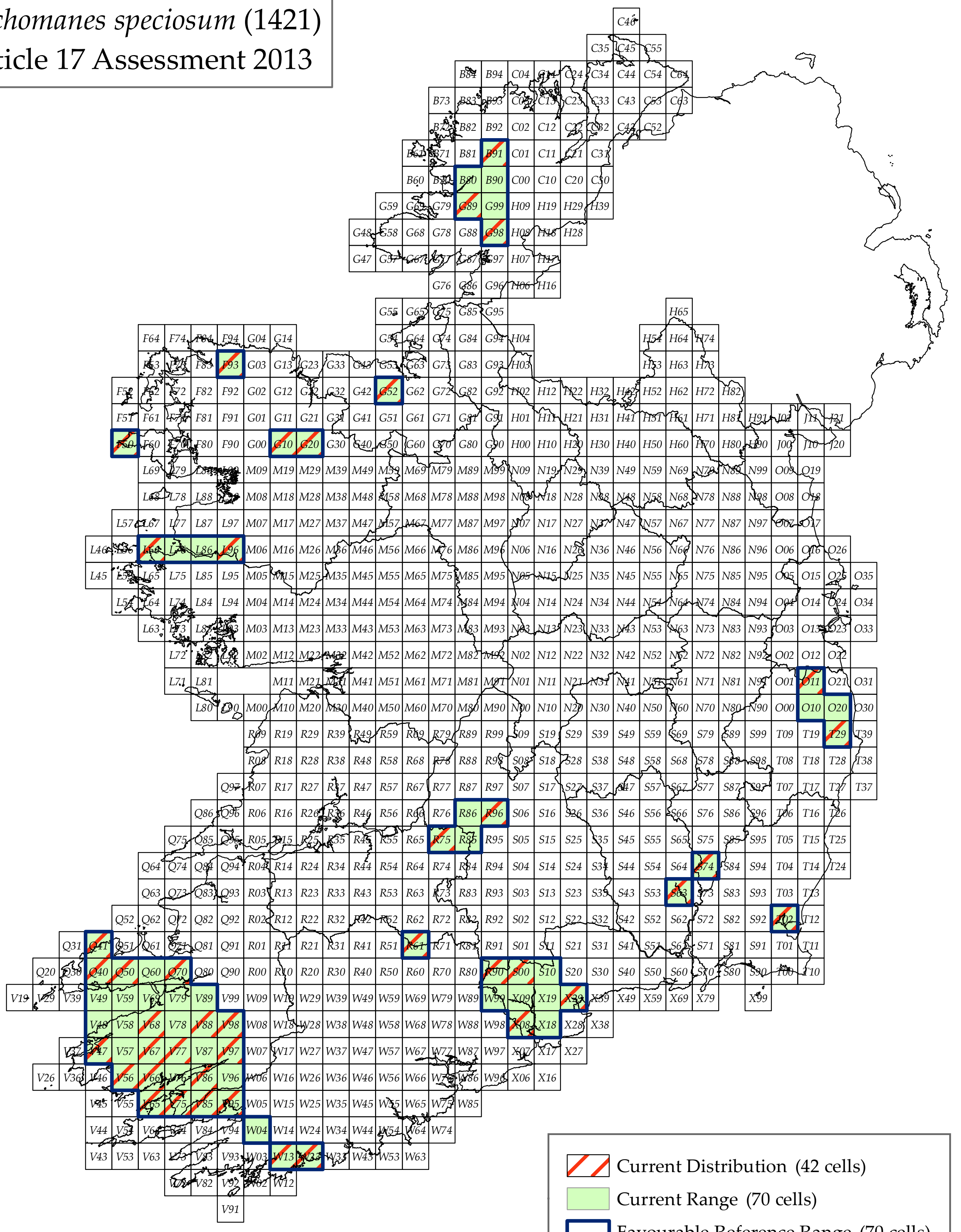
Field label	Note
Species: 1421	**Killarney Fern**
2.5.05 Short-term trend - Period	Repeat visits to a selection of T. speciosum populations between 2009 and 2012 by Ní Dhúill do not suggest any changes in the area of occupancy of the populations visited, except for a colony in Co. Tipperary which suffered a severe loss of fronds during this period (79% loss of fronds) due to exposure and severe snow over two winters. Less exposed colonies did not suffer the same extent of frond loss during this period. There was no loss of colonies during this period.
2.5.06 Short-term trend - Trend direction	For the 79 colonies visited by Ní Dhúill between 2009 and 2012 a measure of the area of occupancy of each was recorded. These data were compared with data held in NPWS files, the results of which suggested that there have been no losses in the area occupied by these populations in the recent past. Where data was available it was possible to make these comparisons beyond the trend period. Overall, there was no evidence to suggest any losses since 2000. Therefore the Short-term trend for area is considered to be stable.
2.5.09 Area of suitable habitat for the species (km2)	Although there are many apparently suitable sites around Ireland, especially in the south-west, there is no complete understanding as to why this species is restricted to particular sites. Therefore the Area of suitable habitat is considered to be equal to the Habitat for the species.
2.5.10 b) Reason for change - improved knowledge/more accurate data?	The discovery of new populations during the project period, improved knowledge and revised methods have resulted in changes in the maximum area of occupancy of T. speciosum in Ireland. These are expanded on in sections 1.1.3, 2.3.10b, 2.4.14a, 2.4.15b and 2.5.3.
2.6 Main pressures - Pressure	Pressures (or impacting activities) were recorded at nine of the populations visited (Ní Dhúill in prep.). Fire (code J01) was noted as a low impact at one Co. Kerry population. Fire also caused significant damage at a Co. Limerick population, where 2 m of visible fronds were lost to fire in 2008. This population has since recovered and fronds have re-grown, therefore the importance of fire at this site is considered to be low. Sheep grazing (code A04) was observed at two populations in Co. Cork and Co. Sligo, but was considered to be having a low impact at these populations. Outdoor sports and leisure activities (code G01) are also considered to be having a low impact at the two Co. Kerry and Co. Limerick populations where these activities occur. Invasive non-native species (code I01) were observed as currently having a low impact at three populations in Cos Cork, Limerick and Waterford. Monitoring of these populations is recommended to ensure that no loss occurs of T. speciosum colonies. Rubus fruticosus agg. (Bramble) is currently having a low impact on one Co. Cork population and future monitoring of this "problematic native species" (code I02) is recommended.

Field label	Note
Species: 1421	**Killarney Fern**
2.7 Threats - Threat	The main threats are loss of habitat, exposure and encroachment of invasive/vigorous species, (such as Rhodendron ponticum, Prunus laurocerasus and Rubus fruticosus agg). Although there was a major loss of fronds at one Co. Tipperary colony due to exposure and severe winter weather conditions (2009-2012), healthy new growth was observed and the rhizomes appeared to be undamaged. The future prospects for this colony are considered to be positive. Overgrazing is considered to be a threat to sporophyte populations that are accessible to animals, e.g. at the two populations mentioned in 2.6 above. This does not pose so much of a threat to gametophyte colonies, which are not usually within the reach of grazing animals. Changes in canopy cover or tree-felling can affect relative humidity, reduce shading and increase the amount of light reaching colonies. Such changes in canopy cover can occur through woodland management to remove invasive species (as, for example, at a site in Co. Limerick) and, unless undertaken sensitively and with the requirements of the species in mind, this activity can pose a threat. Outdoor sports and leisure activities pose a threat of damage to some populations - some sporophyte colonies are in areas that are used for recreational purposes (e.g. a colony in Co. Tipperary is at a docking area used by kayakers), while others are situated very close to popular, well-used paths. However, these are generally localised issues and overall there is no evidence to indicate that outdoor sports and leisure activities pose a significant threat to the species across the wider landscape. Although the threat of deliberate collection of the species is much reduced from levels heretofore ("Victorian Fern Craze") it is considered that there is still a low level of threat to some colonies from this activity. For this reason the precise locations of colonies of the species are not made generally available.
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The species is widely distributed in Ireland, with current populations known to occur in thirteen counties. It is of note that almost all of these counties are coastal and that all populations occur within 50 km of the coast. The reason for this is unclear but is probably attributable to a combination of various factors including suitable geology, climate, ameliorating effect of the sea, amongst others. The majority of the populations are concentrated in the south-west of the country, with Co. Kerry being a particular stronghold for the species. The number of current populations known from each of the 13 counties in which the species occurs is as follows: Carlow (1), Cork (7), Donegal (4), Galway (1), Kerry (31), Kilkenny (1), Limerick (3), Mayo (6), Sligo (1), Tipperary (2), Waterford (5), Wexford (1) and Wicklow (2). It should be noted that one population which straddles a county boundary is double-counted, suggesting that there are 65, rather than 64 populations. All west of Ireland (Connacht) populations are comprised of gametophyte colonies except for that in Co. Sligo, where both sporophyte and gametophyte colonies are found. Previously, T. speciosum sporophyte also occurred in Co. Clare and Co. Wicklow but this has not been recorded from these counties since the 19th century, probably being lost to over-collection and/or habitat change. The gametophyte is currently extant in Co. Wicklow, but there are no recent records of either generation from Co. Clare. Despite this, the geographical range of the species is still very well-represented. Range is assessed as Favourable as there is no evidence of a decline since the Directive came into force.

Field label	Note
Species: 1421	**Killarney Fern**
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Irish T. speciosum colonies range in size from the very tiny (0.0001 m2 – gametophyte colonies) to the comparatively huge (c. 60 m2 – sporophyte colony). A population (of one or more sub-populations) may comprise a single colony, or many colonies. Some populations comprise many colonies that cover large areas, such as the largest Irish population, in Co. Waterford, which has an area of occupancy of 104 m2. Populations where sporophyte and gametophyte co-exist (25) represent 39% of the known 64 populations. This figure is most likely higher as, in the recent surveys by Ní Dhúill (in prep.), the gametophyte was found to be growing with most populations for which only sporophyte was previously recorded. Of course, Irish records for the species prior to the 1990s are all of the sporophyte as the gametophyte was only discovered here in 1992. Of the 23 populations visited by Ní Dhúill (in prep.) where sporophytes occur, 13 were fertile (56%). There has been no decline in the population size since the Directive came into force. The current number of 64 populations comprising 177 colonies is considered to be sufficient to maintain viability of this species into the future.
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Ní Dhúill (in prep.) and other recent observations have demonstrated that there is sufficient good quality habitat to support the long-term survival of the T. speciosum in Ireland. Populations were assessed as favourable in 2007 - this assessment was based on expert judgement of field notes and observations as a desk study. The 2009-2012 field survey (Ní Dhúill) also demonstrated that there is no evidence to suggest that the extent or quality of the habitat for the species has changed in the recent past for colonies and populations visited. Habitat for the species is therefore assessed as Favourable. T. speciosum is a niche species and highly habitat-specific. The majority of the currently known colonies of T. speciosum and their habitats are currently protected as Special Areas of Conservation (SAC) under the E.U. Habitats Directive. The habitat of T. speciosum is largely in good condition, and most identified suitable areas still support T. speciosum. Habitat has a Favourable Conservation Status.

Field label	Note
Species: 1421	**Killarney Fern**
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	The presence of exotic invasive plant species in some sites is a threat to the survival of the species, however, this is considered to be having only a low impact at present. There are no other current pressures significantly impacting the T. speciosum populations. Most colonies are within the SAC network (153 of the 177 known colonies, or 86.4%) and the Flora (Protection) Order, 1999 protects all colonies. There is no reason to believe that any significant threats will present themselves in the future, therefore the future prospects are assessed as favourable. Historically T. speciosum sporophyte was more widespread and was collected extensively during the 'Victorian Fern Craze' (Allen 1969) and, while the overall number of Irish colonies has not declined, it is known that some colonies were lost to this activity; it may be that the number of fronds in some colonies has decreased and not recovered since these days of over-collecting. Thankfully, the threat of collection of the species no longer appears to be as significant, due, in part, to increased information and education on the importance and heritage value of the species; nevertheless, the species is slow-growing and any collecting would have negative and potentially long-term effects. For this reason the precise locations of colonies of the species are not made generally available. Considering the impacts, pressures and threats to T. speciosum in Ireland today and the measures in place that will assist its protection, it is confidentally expected that this species will survive. The overall Conservation Status for Future Prospects of T. speciosum is Favourable. Site visits to survey and monitor populations and colonies that have not been recently surveyed or recorded since 1960 are considered to be a priority. The continued presence of T. speciosum for more than a century at a significant number of its historic sites demonstrates the long-lived and site-faithful nature of the species, and it would be expected that the species is still to be found in at least some of the other historic sites that have not been subject to a recent survey. Populations lost from some of the previously recorded sites are unlikely to be restored in the future due to irreversible habitat loss. As there is no evidence of a decline in population size since the Directive came into force, population is assessed as Favourable.
3.1.02 Method used	Of the 177 colonies where Trichomanes speciosum is known to occur, 153 (or 86.4%) are currently in SACs. Of the 24 that are not, 18 comprise gametophytes only. The remaining six colonies are of sporophytes (mixed with gametophytes in two cases), in two populations in Co. Cork and Co. Kerry. The Co. Cork population of four colonies was discovered in 2012. The Co. Kerry population is included within a proposed Natural Heritage Area and the Cork population is listed for same.
3.2 Conservation measures	Trichomanes speciosum colonies that are listed as qualifying features in Special Areas of Conservation are protected by the Habitat Regulations (S.I. No. 477/2011); this regulates any plans or projects that may negatively impact on the species. There is also an NPWS list of Activities Requiring Consent (ARCs) that are only granted if they do not negatively impact on the Qualifying features within an SAC. The species is also afforded protection by the Environmental Liability Directive, which prevents and remedies environmental damage to natural habitats and protected species. T. speciosum and its habitats are protected under the Flora (Protection) Order, 1999 (S.I. No. 94 of 1999). The E.U. Habitats Directive (which specifically lists T. speciosum in Annex IIb) was transposed into Irish law in the European Communities (Natural Habitats) Regulations (S.I. 94 of 1997). For species listed, member states are required to designate SACs and, to date, Ireland has designated a total of 24 SACs which contain populations of the species, in 18 of which it is listed as a qualifying interest. Ireland is a signatory to the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention), 1982, on Annex I of which the species is also listed. There is a Species Action Plan in place for T. speciosum and part of the actions suggested in this plan have been put into place through the 2009-2012 research and survey work (Ní Dhúill in prep.).

Killarney Fern
Trichomanes speciosum (1421)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

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Scale - Scála
0 10 20 30 40 50 km

N
Map - Léarscáil
V 1.0
Date - Dáta
28-05-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1528**
0.2.2 Species name	**Saxifraga hirculus**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	Marsh Saxifrage

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Complete survey/Complete survey or a statistically robust estimate (3)
1.1.3 Year or period	2007-2012
1.1.4 Additional map	Yes
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region	**Atlantic (ATL)**
2.2 Published sources	Muldoon, C. S. (2011). Conservation Biology of Saxifraga hirculus L. in Ireland. Unpublished Ph.D. thesis, Trinity College Dublin.

2.3 Range

2.3.1 Surface area - Range (km²)	600	
2.3.2 Method - Range surface area	Complete survey/Complete survey or a statistically robust estimate (3)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	600
	operator	N/A
	unknown	No
	method	The distribution and consequential range value derived from the 2007 - 2012 records is considered to be the Marsh Saxifrage baseline. As there is no evidence of a decline since the Directive came into force the current range is set as the Favourable reference range.
2.3.10 Reason for change	Improved knowledge/more accurate data	

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	number of individuals (i)		
	min	550000	max	550000
2.4.2 Population size (other than individuals)	Unit	N/A		
	min		max	
2.4.3 Additional information	Definition of locality			
	Conversion method			
	Problems	Muldoon (2011) demonstrated high genetic diversity		

within populations. The data also showed that large clonal patches exist, therefore the counts of rosettes do not represent individuals. A loss in diversity or number of populations rather than the total number of rosettes has therefore greater conservation implications.

2.4.4 Year or period	2004-2012
2.4.5 Method – population size	Complete survey/Complete survey or a statistically robust estimate (3)
2.4.6 Short-term trend period	2001-2012
2.4.7 Short term trend direction	stable (0)
2.4.8 Short-term trend magnitude	min max confidence interval
2.4.9 Short-term trend method	Estimate based on expert opinion with no or minimal sampling (1)
2.4.10 Long-term trend period	
2.4.11 Long term trend direction	N/A
2.4.12 Long-term trend magnitude	min max confidence interval
2.4.13 Long-term trend method	N/A
2.4.14 Favourable reference population	number 550000
	operator N/A
	unknown No
	method The population figure derived from the 2004-2012 field estimates (Muldoon (2011) and submissions to NPWS) is considered to represent the population baseline. As there is no evidence of any significant decline in population size since the Directive came into force the median of the current population estimate is set as the Favourable reference population..
2.4.15 Reason for change	Improved knowledge/more accurate data

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km^2)	0.01
2.5.2 Year or period	2004-2012
2.5.3 Method used - habitat	Complete survey/Complete survey or a statistically robust estimate (3)
2.5.4 a) Quality of habitat	Good
2.5.4 b) Quality of habitat - method	Habitat quality indicators were assessed at 13 populations (Muldoon, 2011), including water level, positive & negative species, vegetation height and grazing level. 7 populations were given a poor rating and one a bad rating mainly due to issues relating to vegetation height linked with grazing level. Ongoing monitoring will determine whether this will have a knock-on effect on competition or excessive flower head removal. The overall quality is assessed as good as these issues are currently not considered to be having a major impact on the species.
2.5.5 Short term trend period	2000-2012
2.5.6 Short term trend direction	stable (0)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km^2)	0.01
2.5.10 Reason for change	Improved knowledge/more accurate data

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
grazing (A04)	low importance (L)	N/A
abandonment of pastoral systems, lack of grazing (A04.03)	low importance (L)	N/A

2.6.1 Method used – pressures	based exclusively or to a larger extent on real data from sites/occurrences or other data sources (3)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
grazing (A04)	low importance (L)	N/A
abandonment of pastoral systems, lack of grazing (A04.03)	low importance (L)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant Information	
2.8.3 Trans-boundary assessment	

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.9.2. Population	assessment	Favourable (FV)
	qualifiers	N/A
2.9.3. Habitat	assessment	Favourable (FV)
	qualifiers	N/A
2.9.4. Future prospects	assessment	Favourable (FV)
	qualifiers	N/A
2.9.5 Overall assessment of Conservation Status		Favourable (FV)
2.9.6 Overall trend in Conservation Status		N/A

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	number of individuals (i)		
	min	550000	max	550000
3.1.2 Method used	Complete survey/Complete survey or a statistically robust estimate (3)			
3.1.3 Trend of population size within	stable (0)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Both	Maintain

Article 17 - SPECIES NOTES

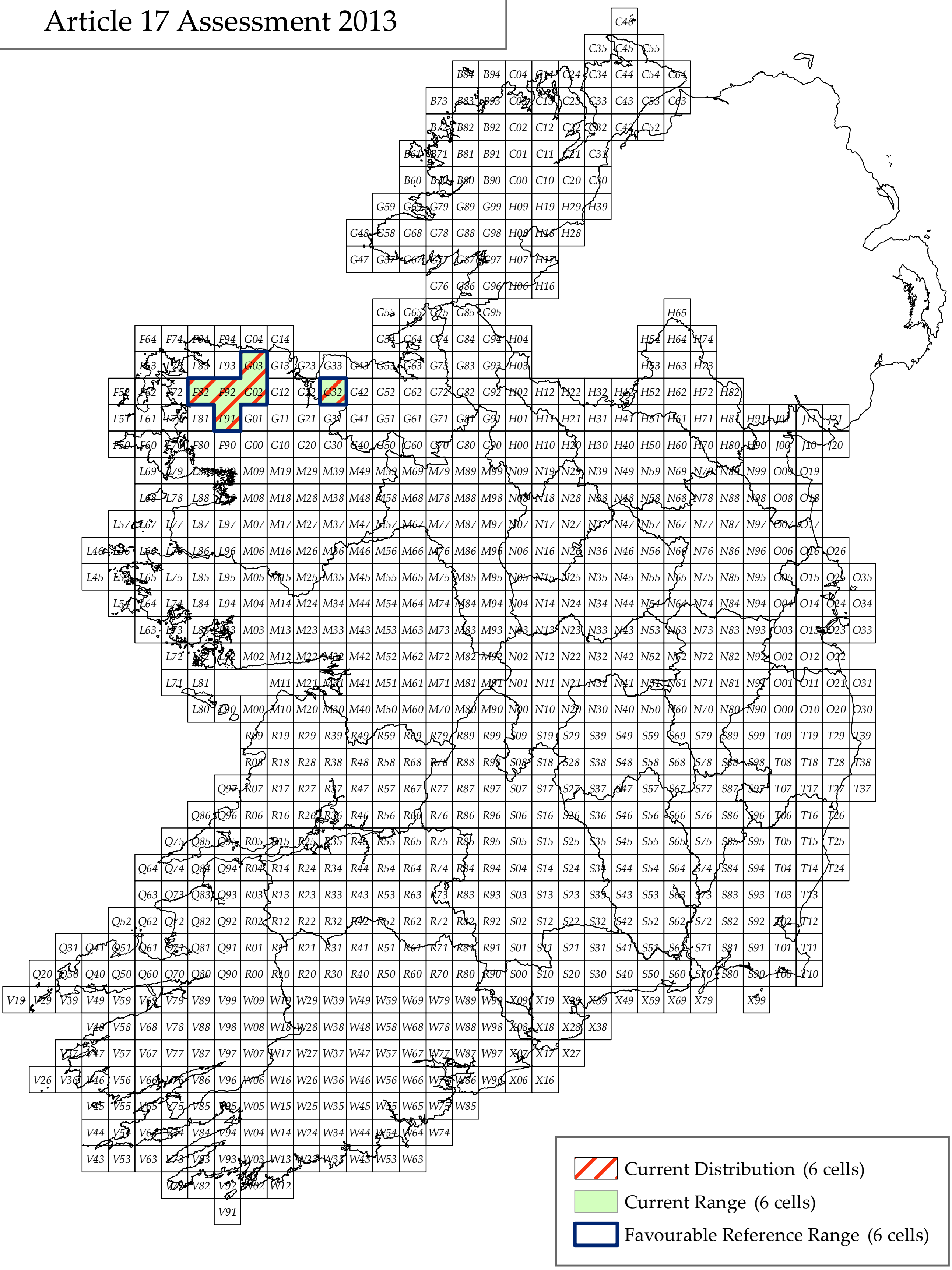
Field label	Note
Species: 1528	**Marsh Saxifrage**
0.1 Member State	Ireland
0.2.01 Species code	Saxifraga hirculus (Marsh Saxifrage) is an herbaceous perennial that is restricted to mineral flushes in blanket bog. The petals are bright yellow with orange spots near the base. The ovary is superior and sepals are turned downwards. Leaves are alternate and oblong in shape, with long stalks on the lowest leaves. The flowering stem can vary in height from 4 - 35 cm with up to 7 flowers; although 2-3 are more common. The species can reproduce sexually by insect pollination with gravity-dispersed seeds, or clonally by means of runners from the parent rhizome (normally 1-5). Moss often covers these runners which decay after one season thus separating both plants; the clone thus becomes an independent ramet forming new rhizomes.
1.1.02 Method used - map	There are currently ten extant sites in the Republic of Ireland, nine in Co. Mayo and one in Co. Sligo. These ten sites are divided for monitoring purposes into 19 populations, which themselves are comprised of some 36 sub-populations (mapped as separate GIS polygons) and an additional 38 point locations of individual plants. Mapping of most of the populations (13 of the 19) was undertaken by Muldoon (2011) as part of her Ph.D.; the remaining six populations, which mostly came to light after her studies, were recorded by NPWS permanent or contract staff.
1.1.03 Year or period	All records have been validated in the field during these dates
1.1.04 Additional distribution map	All field-verified records from 2007 to 2012 were intersected with the ING 10 square grid.
1.1.05 Range map	The range consists of a block of grid cells with one outlying grid cell. This outlier is not incorporated into a bigger range envelope as there is no suitable habitat between it and the main block.
2.2 Published sources	Muldoon (2011) completed a PhD on the conservation biology of Marsh Saxifrage. This research gathered information on population size & density, phenology, population genetic structure, associated vegetation and pressures. Indicators and targets were derived to assess the conservation status of Population, Habitat for the Species and Future Prospects at a selected number of Populations.
2.3.01 Surface area - Range	This figure has been derived from the range map referred to in 1.1.5.
2.3.02 Method used - Surface area of Range	The explanation for this field is has been covered in sections 1.1.2 & 1.1.4.
2.3.04 Short term trend - Trend direction	Comparisons between detailed surveys from 2004 – 2010 (Muldoon (2011) and NPWS Rare species files indicate that there have been no losses across the distribution in the recent past, therefore accordingly the short term trend for range is considered to be stable.
2.3.09 a) Favourable reference range - In km2	The distribution and consequential range value derived from the 2004-2012 field surveys (Muldoon (2011) and additional NPWS records) is considered to be the Marsh Saxifrage baseline. As there is no evidence of a decline since the Directive came into force the current range is set as the FRR. There is an assumption that the current range is large enough to encompass all of the ecological variation and ensure the long term survival of the species.
2.3.09 b) Favourable reference range - Indicate if operators were used	No symbol is utilised as the current range is considered to be the FRR.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Additional populations have been discovered since the last reporting round. This has resulted in a bigger range than that reported in 2007. There is no reason to assume that these populations weren't present in 2007.

Field label	Note
Species: 1528	**Marsh Saxifrage**
2.4.01 a) Population size estimation (using individuals or agreed exceptions where possible) - Unit	Population size was recorded by Muldoon (2011) using the following methodology: Rosettes were considered to represent the mature individual. In the majority of sites where rosettes carpet the ground, a polygon of the area containing Marsh Saxifrage was marked out using bamboo sticks to define the edges. The area was derived from GPS points taken at these edges. The density of rosette coverage within the polygon was then estimated in 1m2 quadrats which were subdivided into 25 x 25 cm divisions to facilitate counting of rosettes. Depending on the area of the colony five or less quadrats were randomly selected in each site. The total number of rosettes was calculated from the product of the population area and density. Estimates based on expert judgement were derived for remaining populations not covered by Muldoon (2011). In these cases the approximate value is considered a minimum value as not all populations were counted thoroughly.
2.4.04 Year or period	All population values were estimated between 2004 and 2012 (Muldoon 2011 and submissions to NPWS).
2.4.05 Method used - Population size	This has been expanded on in 2.4.1a).
2.4.06 Short-term trend - Period	Repeat visits to a selection of Marsh Saxifrage populations between 2004 and 2010 do not suggest any changes in population size, however complete counts were not undertaken on every occasion. This time frame could be extrapolated back to 2001.
2.4.07 Short-term trend - Trend direction	A rosette estimation for most populations was undertaken between 2004 and 2012 (Muldoon (2011) and submissions to NPWS). Limited data on population size from NPWS Rare species files suggest that there have been no losses in the size of these populations in the recent past. These comparisons stretch beyond the trend period, however there is no evidence to suggest losses since 2000. Therefore the short term trend for area is considered to be stable.
2.4.14 a) Favourable reference population - Number of individuals/agreed exceptions/other units	The population figure derived from the 2004-2012 field estimates (Muldoon (2011) and 2007-2012 submissions to by NPWS permanent and contract ecologists) is considered to represent the population baseline. As there is no evidence of any significant decline in population size since the Directive came into force the current population estimate is set as the Favourable reference population.
2.4.14 b) Favourable reference population - Indicate if operators were used	No symbol is utilised as the current area is considered to equal the Favourable reference population.
2.4.15 b) Reason for change - improved knowledge/more accurate data?	Additional populations have been discovered since 2007. The 2007 submission reported the number of populations and included a population estimate in “other relevant information”. The actual number of rosettes reported is less than in 2007 even though there are more populations, this is due to more refined estimates for many populations. There is no reason to assume that additional populations were not present in 2007.
2.5.01 Area estimation	Estimates based on Muldoon (2011) and expert judgement estimates for the area of occupancy of populations discovered recently tallied to approximately 0.01 km2. Note that the Sheskin B population area of occupancy was updated from Muldoon (2011).
2.5.02 Year or period	All habitat values were estimated between 2004 and 2012 (Muldoon (2011) and submissions to NPWS).

Field label	Note
Species: 1528	**Marsh Saxifrage**
2.5.04 a) Quality of the habitat - Good / moderate / bad / unknown	Habitat quality indicators were assessed at 13 populations (Muldoon, 2011), including water level, positive & negative species, vegetation height and grazing level. 7 populations were given a poor rating and one a bad rating mainly due to issues relating to vegetation height linked with grazing level. Ongoing monitoring will determine whether this will have a knock-on effect on competition or excessive flower head removal. The overall quality is assessed as good as these issues are currently not considered to be having a major impact on the species.
2.5.05 Short-term trend - Period	Repeat visits to a selection of Marsh Saxifrage populations between 2004 and 2010 do not suggest any changes in the area of occupancy of the populations, however area estimates were not undertaken on every occasion. This time frame could be extrapolated back to 2000.
2.5.06 Short-term trend - Trend direction	An area of occupancy estimation for most populations was undertaken between 2004 and 2012 (Muldoon (2011) and submissions to NPWS). Limited data on area of occupancy from NPWS Rare species files suggest that there have been no losses in the area occupied by these populations in the recent past. These comparisons stretch beyond the trend period, however there is no evidence to suggest losses since 2000. Therefore the short term trend for area is considered to be stable.
2.5.09 Area of suitable habitat for the species (km2)	Although there are many apparently suitable flushes across the north-west there is no real understanding as to why this species is restricted to particular flushes, therefore the Area of suitable habitat is considered to be equal to the Habitat for the species.
2.5.10 b) Reason for change - improved knowledge/more accurate data?	Additional populations and associated area of occupancy have been discovered since 2007. The actual area is less than that reported in 2007 even though there are more populations. More accurate boundaries have been mapped for most of the populations since 2007.
2.6 Main pressures - Pressure	Pressures (or impacting activities) were recorded at 13 populations (Muldoon, 2011). Undergrazing was noted as a low impact at several populations but was only significant at one population impacting on the quality of the habitat by resulting in the expansion of Molinia. There was also a low level impact of vehicle damage at this population but as this was an isolated occurrence it was not listed as a pressure.
2.7 Threats - Threat	As there is no evidence to suggest a change in grazing regime undergrazing is also listed at a threat. It is important to note that this is a localised issue and does not represent the situation across the wider landscape.
2.8.02 Other relevant information	All populations of Marsh Saxifrage are protected under the Flora Protection Order 1999 (S.I. No. 94 of 1999).
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The range for Marsh Saxifrage is concentrated in Mayo with an outlying area in Sligo. Previously, Marsh Saxifrage was more widespread throughout the country with sites in a number of midland counties including Tipperary, Westmeath, Offaly and Laois however these sites have been lost due to drainage and peat removal Range is assessed as Favourable as there is no evidence of a decline since the Directive came into force and the restoration of historic populations is not feasible.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The size of each population is within the range <100 to c189,000, although the definition of a population as opposed to a sub-population has not been established. Some "populations" carpet a flush while others are patchy. Research undertaken by Muldoon (2011) suggests that seed set may be pollen limited and excessive removal of flowering heads may be detrimental; however there does not seem to be reason for concern at this stage. As there is no evidence of a decline in population size since the Directive came into force population is assessed as Favourable. Populations lost from the midlands are unlikely to be restored in the future due to irreversible habitat loss and issues around the re-introduction of populations that may have a different genetic provenance.

Field label	Note
Species: 1528	**Marsh Saxifrage**
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Muldoon (2011) and other recent observations have demonstrated that there is sufficient good quality habitat to support the long term survival of the species. Populations were assessed as favourable in 2007. This assessment was based on expert judgement of field observations. The 2004-2012 field survey (Muldoon 2011) also demonstrated there is no evidence to suggest that the extent or quality of the habitat for the species has changed in the recent past. Habitat for the species is therefore assessed as Favourable.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	Apart from a minor undergrazing issue there are no pressures impacting the Marsh Saxifrage populations. All populations are within the SAC network and all are protected by the Flora (Protection) Order, 1999. There is little reason to believe that any threats will present themselves in the future, therefore the future prospects are assessed as Favourable.
2.9.05 Overall assessment of Conservation Status	The detailed research carried out by Muldoon (2011) and the recent discoveries provided new figures for Range and Population. As there is no evidence of decline, Range and Population were assessed as Favourable. Field collected ecological data were analysed to assess Population structure, Habitat for the species and future prospects. There is no evidence of any major pressures impacting the populations and therefore all attributes have been assessed as Favourable.
3.1.01 a) Population size - Unit	All Marsh Saxifrage populations occur within the SAC network, therefore the figures given in 2.4.1 are also given here.
3.1.03 Trend of population size within the network (short-term trend)	As all of the Marsh Saxifrage resource is within the SAC network the same trend is used as for Population 2.4.7.
3.2 Conservation measures	Marsh Saxifrage populations that are listed as qualifying features in SACs are protected by the Habitat Regulations (S.I. No. 477/2011), this regulates any plans or projects that may negatively impact on the species. There is also an NPWS list of Activities Requiring Consent (ARCs) that are only granted if they do not negatively impact on the Qualifying features within an SAC. Any damaging activity that impacts the conservation status of Marsh Saxifrage populations is regulated under the Environment Liability Regulations 2008. Marsh Saxifrage and its habitats are protected under the Flora (Protection) Order, 1999 (S.I. No. 94 of 1999).

Marsh Saxifrage - *Saxifraga hirculus* (1528)
Article 17 Assessment 2013



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Department of Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 10 20 30 40 50 km

N

Map - Léarscáil
V 1.0
Date - Dáta
10-05-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1833**
0.2.2 Species name	**Najas flexilis**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	Slender Naiad

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Complete survey/Complete survey or a statistically robust estimate (3)
1.1.3 Year or period	1985-2012
1.1.4 Additional map	Yes
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published sources

Allott, N., Brennan, M., Cooke, D., Reynolds, J.D. and Simon, N. (1997) A Study of the Effects of stream Hydrology and Water Quality in Forested Catchments on Fish and Invertebrates: Volume 4, Stream Chemistry, Hydrology and Biota, Galway-Mayo Region. AQUAFOR Report. COFORD, Dublin.
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2.3 Range

2.3.1 Surface area - Range (km^2)	6800	
2.3.2 Method - Range surface area	Complete survey/Complete survey or a statistically robust estimate (3)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period	1989-2012	
2.3.7 Long-term trend direction	stable (0)	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km^2)	6800
	operator	N/A
	unknown	No
	method	The range derived from the current known distribution using the Range Tool is considered to be the Favourable reference range (FRR), as there is no evidence of a decline since the Directive came into force and it is considered to encompass all ecological and geographical variation. This is larger than the FRR set in 2007 owing to the discovery of additional populations, capture of historical population records omitted in 2007, the use of lake segments (polygons) to describe the range and the new range tool. The increase in the FRR is not the result of an expansion in the species distribution or colonisation of new sites.
2.3.10 Reason for change	Improved knowledge/more accurate dataUse of different method	

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	number of individuals (i)		
	min	10000	max	50000
2.4.2 Population size (other than individuals)	Unit	N/A		
	min		max	
2.4.3 Additional information	Definition of locality			
	Conversion method			
	Problems	While it is possible to provide an estimate of the number of individuals, this estimate is not statistically robust because the species is a fragile annual that varies in density across the euphotic zone and can fluctuate significantly in numbers from year to year (see O'Connor (2013) for more detail). "Number of populations" would be a more relevant unit, particularly for the Favourable Reference Population.		

2.4.4 Year or period	1999-2005
2.4.5 Method – population size	Estimate based on partial data with some extrapolation and/or modelling (2)
2.4.6 Short-term trend period	2001-2012
2.4.7 Short term trend direction	stable (0)
2.4.8 Short-term trend magnitude	min max confidence interval
2.4.9 Short-term trend method	Estimate based on expert opinion with no or minimal sampling (1)
2.4.10 Long-term trend period	1989-2012
2.4.11 Long term trend direction	stable (0)
2.4.12 Long-term trend magnitude	min max confidence interval
2.4.13 Long-term trend method	Estimate based on expert opinion with no or minimal sampling (1)
2.4.14 Favourable reference population	number 10000 operator N/A unknown No method The current estimated minimum population size (10,000) is set as the favourable reference population (FRP). This value is considered to represent the minimum value present when the Directive came into force. The number of populations (see 2.4.3 c) is considered a more robust measure of FRP; the likelihood is that the current number of Najas flexilis populations is adequate to ensure the long term survival of the species.
2.4.15 Reason for change	Improved knowledge/more accurate data Use of different method

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	61.4
2.5.2 Year or period	2005-2012
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Moderate
2.5.4 b) Quality of habitat - method	Eutrophication and acidification are considered to have a significant negative impact on Najas flexilis (Preston and Croft, 2001, Roden, 2004, 2007, Wingfield, et al., 2004). Consequently, data on the ecological status of the Najas flexilis lakes, collected by the EPA as part of the WFD lake monitoring programme (2009-2011), were used to asses the quality of the habitat for the species. 5 monitored Najas lakes were in favourable condition, 14 in poor condition and 6 in bad condition. The approach to determining the condition of the Najas flexilis habitat used here could be considered conservative, as no statistical relationships between WFD status (for the various biological and physico-chemical elements used) and population condition have been established. It is quite possible that such a relationship will not exist, as the ecological quality of lakes forms a continuum along trophic and other gradients (FEG and CI, 2007). It is likely that Najas flexilis is tolerant of mesotrophic conditions and may even reach high abundance where chlorophyll a and Total Phosphorus are slightly above oligotrophic levels. Taking this into account the habitat quality is assessed as moderate.
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	stable (0)
2.5.7 Long-term trend period	1989-2012
2.5.8 Long term trend direction	stable (0)
2.5.9 Area of suitable habitat (km²)	61.4
2.5.10 Reason for change	Improved knowledge/more accurate data Use of different method

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
diffuse pollution to surface waters due to agricultural and forestry activities (H01.05)	high importance (H)	N/A
diffuse pollution to surface waters due to household sewage and waste waters (H01.08)	high importance (H)	N/A
diffuse pollution to surface waters due to other sources not listed (H01.09)	high importance (H)	N/A
Water abstractions from groundwater (J02.07)	high importance (H)	N/A
pollution to surface waters by industrial plants (H01.01)	medium importance (M)	N/A
other point source pollution to surface water (H01.03)	low importance (L)	N/A
invasive non-native species (I01)	low importance (L)	N/A
human induced changes in hydraulic conditions (J02)	low importance (L)	N/A
Silting up (K01.02)	low importance (L)	N/A
Drying out (K01.03)	low importance (L)	N/A
species composition change (succession) (K02.01)	low importance (L)	N/A
accumulation of organic material (K02.02)	low importance (L)	N/A

2.6.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
diffuse pollution to surface waters due to agricultural and forestry activities (H01.05)	high importance (H)	N/A
diffuse pollution to surface waters due to household sewage and waste waters (H01.08)	high importance (H)	N/A
diffuse pollution to surface waters due to other sources not listed (H01.09)	high importance (H)	N/A
Water abstractions from groundwater (J02.07)	high importance (H)	N/A
pollution to surface waters by industrial plants (H01.01)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	medium importance (M)	N/A
other point source pollution to surface water (H01.03)	low importance (L)	N/A
invasive non-native species (I01)	low importance (L)	N/A
human induced changes in hydraulic conditions (J02)	low importance (L)	N/A
Silting up (K01.02)	low importance (L)	N/A
Drying out (K01.03)	low importance (L)	N/A
species composition change (succession) (K02.01)	low importance (L)	N/A
accumulation of organic material (K02.02)	low importance (L)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	The data available for Najas flexilis did not support analyses to determine trends at a resolution as fine as 1% per annum. Available trend data were used, in so far as possible, with expert judgement.
2.8.2 Other relevant Information	The distribution includes records from 1937 to more recent times; however the Article 17 database does not allow records from this far back.

	The population estimates provided, both for the national population and the within-SAC-network population, were reported using the standard population classes. All national and within-SAC-network estimates fell within the Size Class 7. This does not mean that all Najas flexilis plants are within the SAC network. The within-SAC population estimates represented between 80% and 86% of the national estimates. 47 of the 58 extant Najas flexilis populations are within 26 SACs. 24 of these SACs are selected for the species and these contain 45 Najas flexilis populations.
2.8.3 Trans-boundary assessment	

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment Favourable (FV) qualifiers N/A
2.9.2. Population	assessment Inadequate (U1) qualifiers stable (=)
2.9.3. Habitat	assessment Inadequate (U1) qualifiers stable (=)
2.9.4. Future prospects	assessment Inadequate (U1) qualifiers stable (=)
2.9.5 Overall assessment of Conservation Status	Inadequate (U1)
2.9.6 Overall trend in Conservation Status	stable (=)

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit number of individuals (i) min 10000 max 50000
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)
3.1.3 Trend of population size within	stable (0)

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Both	Enhance
Restoring/improving water quality (4.1)	Legal Administrative	high importance (H)	Both	Long term

Article 17 - SPECIES NOTES

Field label	Note
Species: 1833	**Slender Naiad**
0.2.01 Species code	Najas flexilis is a small annual that grows permanently submerged in the lower euphotic depths of clear-water lowland lakes of the north-west and Kerry. See O 'Connor (2013) for more detail on the distribution and ecology of this species.
1.1.02 Method used - map	Historic and recent records for the species were consolidated by NPWS into a Najas flexilis database. The version of this database used to map the distribution contained a total of 346 records from 61 confirmed lakes . Figure 3 of the Najas flexilis Backing Document (O Connor, 2013) illustrates the history of the discovery of populations of Najas flexilis in Ireland.
1.1.03 Year or period	The IT tool does not allow dates before 1985, so the date provided in the reporting format of 1985-2012 is incorrect. The correct date is 1937-2012 The distribution is based on 58 populations considered to be extant. There were records for 17 of these during the reporting period (2007-2012). 47 had positive records since 1994. The remaining 11 populations have records dating from between 1937 and 1986.
1.1.05 Range map	The range map has been derived using the distribution map provided at 1.1.4 and the range tool. All unoccupied ten-km squares selected by the range tool contain at least one lake. Some hectads appear unlikely to contain potential Najas flexilis habitat as all lakes appear to be upland, base poor lakes (V77, V87 and V97) or the square is predominately coastal and marine with very limited available freshwater (B60).
2.3.03 Short-term trend - Period	The recommended short-term trend period of 2001-2012 was chosen
2.3.04 Short term trend - Trend direction	As there is no evidence of losses of populations during this trend period (See 2.4.7), the short-term trend for range is considered to be stable. 14 populations have been discovered since 2001, however, this reflects an improvement in knowledge owing to the WFD macrophyte survey efforts of the EPA, as well as a dedicated Najas flexilis survey by Cilian Roden (2002; 2003; 2004). There is no evidence to suggest that this represents an expansion in the species' range and all known Najas flexilis populations are still considered post-glacial relicts.
2.3.06 Long-term trend - Period	The recommended long-term trend period of 24 years or 1989-2012 was used.
2.3.07 Long-term trend - Trend direction	As there is no evidence of losses of populations during this trend period, the long-term trend for range is considered to be stable.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	The improved knowledge and more accurate data on the distribution of Najas flexilis have resulted in seven hectads being added to the distribution in 2013. The populations responsible for this increase were: Anure, Derg, Fern, Moher, Illauntrasna, Bofin, and Sruffauncam. With the exception of Sruffauncam, a record extracted from the literature, all of these populations were discovered since 2007 by the EPA. In order to examine the range change that resulted from this improved knowledge, a range was calculated using the 2007 distribution data. This generated a range of 5,500 km2, which suggests improved knowledge increased the range by 1,300 km2 or 26%.

Field label	Note
Species: 1833	**Slender Naiad**
2.3.10 c) Reason for change - use of different method?	Two methodological differences resulted in changes to the range between 2013 and 2007; the use of lake segments in mapping the distribution and the new range tool. As explained in 1.1.2, the distribution was generated by selecting the hectads that contain the 58 lakes with extant populations of Najas flexilis. In 2007, a similar method was used, however, only one hectad (L95) was selected for Upper Lough Corrib. For the current Range two additional hectads (L94 and M05) were selected to cover the most north-westerly basin of Upper Lough Corrib. Two other hectads have been added to cover the western edges of Lough Anaserd (L54) and Cloonee Middle Lough (V76). Consequently, four hectads were added to the distribution because they contain areas of lakes with Najas flexilis populations. The 2013 range tool differs to the method of calculating the range used in 2007. As noted in 2.3.10 b), the range tool produced a range of 5,500 km2 based on the 2007 distribution data. Those same data in 2007 yielded a range of 4,800 km2, suggesting that the range tool produces significantly greater ranges than the 2007 method (in this example, 14.6% larger).
2.4.01 a) Population size estimation (using individuals or agreed exceptions where possible) - Unit	Individual plants were considered to represent the mature individual. Population estimates were provided for 29 Najas flexilis populations by Roden (2004). Where these estimates were given as '>' or '<' an integer, that integer was used (e.g. >1,000 was called 1,000). The median and average population sizes, based on Roden's 29 estimates, were calculated as 100 and 625, respectively. Both median and average population estimates were used to estimate the population size of the other 29 extant populations, giving a national population estimate for the 58 extant populations of 21,032 and 36,257. This placed the national population in population class 7. For a more detailed discussion on deriving this population figure, please see O Connor (2013). Eight of the 58 populations have uncertain status because Dr Cilian Roden failed to find Najas flexilis despite dedicated survey between 1999 and 2005, while two had fewer than five plants when surveyed (Roden, 2007). Surveys by (Wingfield et al., 2004) and the EPA have also failed to recover the species at five lakes. Dutch surveyors have failed to re-find the species at three Connemara lakes since 1975 (van Groenendael et al., 1993, pers. comm). Three other populations have had no survey in the last 20+ years. In total, this represents 16 (or 27.5%) of the 58 presumed extant populations with some uncertainty as to their current status.
2.4.04 Year or period	Population estimates are based on the survey work of Dr Cilian Roden between 1999 and 2005. The number and distribution of populations is based on surveys from 1937-2012.
2.4.06 Short-term trend - Period	Dedicated Najas flexilis surveys were undertaken by Dr Cilian Roden funded by the Heritage Council in 1999 and on behalf of the NPWS between 2002 and 2005. Irish EPA macrophyte surveys have yielded records for the species between 2002 and 2012. The data from these surveys were used to inform an expert opinion trend for the species for the period 2001-2012. The trend was based on the number of continuing populations, rather than population size.
2.4.07 Short-term trend - Trend direction	As no populations have been documented as going extinct during the trend period, the short-term trend direction is assumed to be stable. Given the lack of dedicated population monitoring during the reporting period (2007-2012) and the unknown status of a number of populations, however, the confidence in this assessment is low.
2.4.09 Short-term trend - Method used	The trend estimate is based on expert opinion and very limited data as explained in 2.4.1a, 2.4.3c, 2.4.6 and 2.4.7.

Field label	Note
Species: 1833	**Slender Naiad**
2.4.10 Long-term trend - Period	The recommended long-term trend period is 1989-2012. As no populations have gone extinct during this period, the long-term trend is considered to be stable. Three populations are considered to have gone extinct before the Habitats Directive came into force (see O Connor, 2013). A loss of three populations from a total of 61 populations nationally, represents a decline of 5%.
2.4.15 a) Reason for change - genuine change?	It is assumed that there has been no change since the last monitoring period. See 2.4.1a for further information. As there has been no dedicated monitoring of Najas flexilis populations since the last reporting period, any genuine changes in population status have not been recorded.
2.4.15 b) Reason for change - improved knowledge/more accurate data?	As documented at 1.1.2, knowledge of the distribution and number of Najas flexilis populations has improved since 2007. While the estimates for individual lake populations and the average lake population size are derived from data from 1999-2005, the multiplier comes from the new figure of 58 presumed extant populations.
2.4.15 c) Reason for change - use of different method	No estimate of the number of individuals was given in 2007, rather the number of extant populations was provided. 46 populations were considered extant at that time, however ten of these had uncertain status and two had fewer than ten individuals. As explained in 1.1.2, knowledge of the distribution of Najas flexilis has improved since 2007 and the number of extant populations is now considered to be 58. The status of 16 of these 58 is considered to be uncertain (see 2.4.1a).
2.5.01 Area estimation	Roden (2007) noted that, in favourable conditions, large areas of a lake-bed can be colonised by a Najas flexilis monoculture. Although Najas flexilis can grow between 50 cm and ten metres below the water surface, it is generally found between 1 m and 5 m (Roden, 2002). Its vertical distribution is largely dependent on exposure to wave action at the shallow end and water clarity/light penetration at the deeper end (Roden, 2007, Wingfield et al., 2004). In 2007, as bathymetric data were unavailable, the habitat area was based on the entire lake surface area, with the exception of Lough Corrib, where only the north-western basin was included (Roden, 2007). The habitat area was given as 4,960 ha and considered to be an overestimate. For this Article 17 report, total lake surface area was again used. Firstly, the total lake surface area was summed for the 57 lakes other than Upper Lough Corrib as 5,639.6 ha or 56.3 km2. For Upper Lough Corrib, the area of the most north-westerly basin (See Figure 5 of the Najas flexilis Backing Document (O Connor, 2013)) was added. This basin had a surface area of 497.5 ha or 4.97 km2 and when added to the area for the other 57 lakes gave a total habitat surface area of 6,137.1 ha or 61.4 km2. This is clearly a significant over-estimate of the available habitat for mature plants of Najas flexilis, however, it could be claimed that the plant can use the entire lake volume during its lifecycle (pollen and seed dispersal).
2.5.02 Year or period	The habitat area was based on the “LakeSegment” feature data class from the EPA’s Water Framework Geodatabase (WFDGeodatabase.mdb Ver Oct 2011). The lake segment vectors are at 1:50,000 scale and based on the 2005 OSi Orthophotographs.
2.5.05 Short-term trend - Period	The default trend period was used.

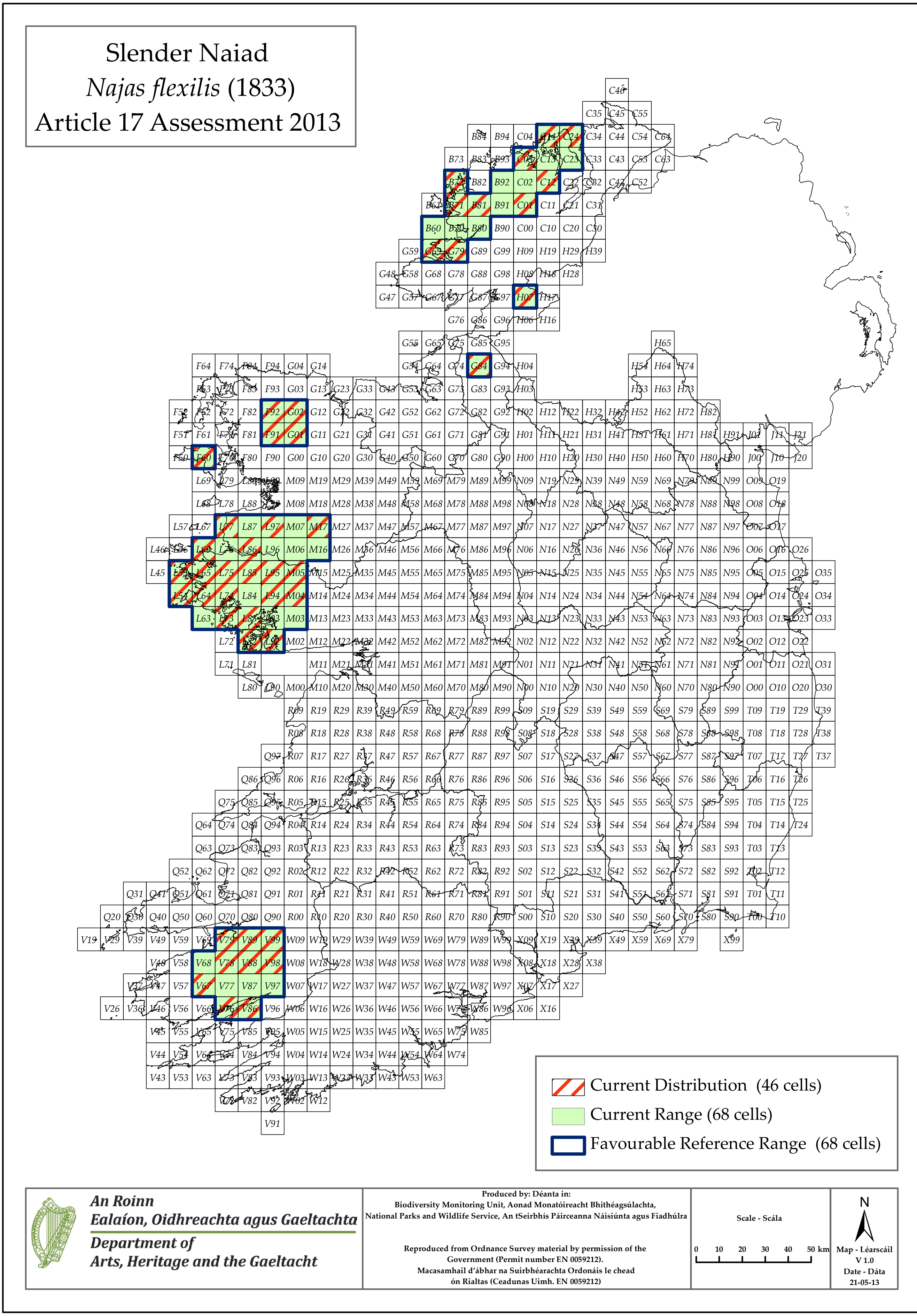
Field label	Note
Species: 1833	**Slender Naiad**
2.5.06 Short-term trend - Trend direction	There is no evidence of the destruction of any areas of the species' habitat during the trend period. As a result, the short-term trend for the area of the species' habitat is considered to be stable. In general, Najas flexilis habitat is more likely to be damaged rather than destroyed/lost. Tierney et al. (2010) illustrated the long-term trend in trophic status in Irish lakes, expressed in accordance with the areas of monitored lakes (see O Connor, 2013). The authors note that 'the percentage of lake area in each trophic category has remained relatively stable since 1998, based on the modified OECD scheme' indicating that the short-term trend in lake habitat quality generally is stable. It should be noted, however, that only 25 of the 58 Najas flexilis lakes are currently included in the EPA WFD monitoring programme (see Table 6 of O Connor, (2013) for list). It is not currently possible to determine how representative this general lake trend is of Najas flexilis lakes, or of trends within the oligotrophic and mesotrophic categories, which are combined for reporting purposes. Please see O'Connor (2013) for further analysis of WFD data.
2.5.07 Long-term trend - Period	The default trend period was used.
2.5.09 Area of suitable habitat for the species (km2)	It is likely that more populations of Najas flexilis will yet be discovered, particularly in Connemara, however there is currently no scientific basis or modelling method for identifying potentially suitable habitat. It is possible that the species could re-establish in Lough Nafeakle, one of the three lakes in which it is now extinct (See O Connor, 2013). The area of suitable habitat was, therefore, calculated to be the area of the habitat for the species (i.e. based on 58 lakes) plus the habitat in Lough Nafeakle. The surface area of Nafeakle is 0.0225 km2 and, using the method explained in 2.5.1, the area of suitable habitat for the species is 61.4 km2, or 6,139.35 ha, based on total lake area.
2.5.10 b) Reason for change - improved knowledge/more accurate data?	As explained in 1.1.2, information on the distribution of the species has improved since 2007 resulting in the inclusion of habitat in additional lakes. The inclusion of these lakes accounts for an increase of 1,512.2 ha or 15.1 km2 in the habitat area. The removal of Lough Bollard led to a decrease of 52.6 ha or 0.52 km2, giving a net increase of 1,459.6 ha or 14.5 km2.
2.5.10 c) Reason for change - use of different method (e.g. 'Range tool')?	A slight difference in surface areas of the lakes may result from the use of the updated lake segment shapefile. The north-western basin of Upper Lough Corrib was delineated differently in 2007, resulting in different surface areas. Assessment of habitat quality was completed in 2007 using (1) indicators recorded during Najas flexilis survey (e.g. water colour, epiphyton, phytoplankton) and (2) a review of planning applications for one-off houses (as an indicator of the risk of eutrophication from septic tanks/domestic wastewater systems). The former data were used here, in combination with water quality data reported by the Irish EPA. See 2.5.1, 2.5.4a and 2.5.6 for further information.

Field label	Note
Species: 1833	**Slender Naiad**
2.6 Main pressures - Pressure	The pressures impacting on Najas flexilis are indirect, arising within the catchments of the occupied lakes, and can be broadly categorised into pollution and hydrological change. Direct impacts on the species have not been documented in Ireland, however, it is possible that some invasive species are having direct impacts. Two main sources were used to document the pressures on Najas flexilis in Ireland: 1. Dr Cilian Roden recorded evident pressures during his Najas flexilis surveys between 1999 and 2005 (Roden, 2002, 2003, 2004, 2005 and 2007). Information from a 2012 survey of Lough Corrib was also used (Roden, 2012). 2. Available spatial data. An ArcGIS project was created to assess indirect, catchment scale pressures. EPA WFD spatial data were used to identify the catchments of the Najas flexilis lakes (nested lake catchments: WFD_LakeCatchmNested.shp, lake segments: WFD_LakeSegment.shp and river segments: WFD_RiverSegment.shp). The 2005 orthophotographs were examined, as well as satellite imagery by Microsoft Bing (http://www.bing.com/maps/, data from 2012) for both the catchment as a whole and the land immediately surrounding the lake itself. The standard "reference list of pressures, threats and activities" was used to categorise the identified pressures. Seven of the codes covered the majority of pressures identified across the 58 catchments (see Table 8 of the Najas flexilis Backing Document (O Connor, 2013)). Of these standard codes, two were further subdivided to identify the specific sources of pollution (agriculture and forestry, see O Connor (2013). Three different invasive non-native species were identified as pressures across three lakes. For a more detailed discussion on the impacts of these pressures on Najas see O Connor (2013).
2.7 Threats - Threat	All pressures documented at 2.6 were also listed as threats (Table 10 of the Najas flexilis Backing Document (O Connor, 2013)). In addition, climate change (M01) was identified as a threat. The potential impact of climate change is discussed in detail in the backing document.
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Najas flexilis occurs in 58 lakes in counties Donegal, Leitrim, Mayo, Galway and Kerry. Most are located near the western coast and Connemara appears to be the species' Irish stronghold. Knowledge of the species' range has improved since 2007 owing to additional survey work and collation of historical records. There has been no real expansion in the species' range and all populations are considered to be post-glacial relicts. The range was mapped using the Range Tool and a distribution based on the polygons for occupied lakes. As the current range is equal to the favourable reference range (FRR) and there is no evidence of a change in the species' range since the Directive came into force, the range for Najas flexilis is assessed as favourable.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The number of mature individuals of Najas flexilis was estimated at between Class 7 and Class 8, based on data from the period 1999-2005. 58 populations (or 58 individual lakes) are considered to be extant. This is an increase from the 46 reported in 2007. This is not the result of colonisation of new lakes, rather improved knowledge of the species' distribution. Three populations are considered to have gone extinct before the Directive came into force (most likely in the 1970s or earlier). The status of 16 of the 58 populations is uncertain. Despite dedicated Najas flexilis and/or general macrophyte surveys, the species has not been re-found in these lakes. As a result, the status of the Najas flexilis population is assessed as unfavourable inadequate.
2.9.02 b) Population - If CS is U1 or U2, use of qualifiers is recommended	The qualifier has been set as stable as there is no evidence of recent change.

Field label	Note
Species: 1833	**Slender Naiad**
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Data on biological quality and nutrient conditions were available for half or the Najas flexilis lakes from the Irish EPA's WFD lake monitoring programme. Conservative Najas flexilis targets were set for each quality element, essentially corresponding to oligotrophic conditions, and the lakes were classified as favourable, poor and bad habitat condition. 55 % of the monitored lakes were in poor condition and 24% in bad condition, however, taking into consideration that the classification may have been overly stringent and that there were no monitoring data for 29 of the lakes, the habitat for the species is assessed as unfavourable inadequate.
2.9.03 b) Habitat for the species - If CS is U1 or U2, use of qualifiers is recommended	The qualifier has been set as stable as there is no evidence of loss of any areas of the species' habitat and based on national trends in the trophic status of monitored lakes.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	Given the unfavourable inadequate status of the population and habitat of Najas flexilis, the pressures and threats identified and, in particular, the concern as to the status of 16 of the 58 extant populations, the future prospects are assessed as unfavourable inadequate.
2.9.04 b) Future prospects - If CS is U1 or U2, use of qualifiers is recommended	Pollution from once-off houses appears to be a relatively greater pressure on Najas flexilis lakes than Irish lakes generally. As a result, the National Inspection Plan for inspection of domestic wastewater treatment systems (DWWTS) should, with time, lead to reductions in losses from existing houses. Economic pressures should also reduce the number of new houses proposed, while new guidelines and risk assessment tools should ensure any new houses built will not result in additional pollution loads. It must be recognised, however, that a very large number of systems need to be inspected nationally and that this will take a significant amount of time. There is also uncertainty as to the availability of resources for the necessary system upgrades. The results of this assessment show that the catchments of Najas flexilis lakes should be highlighted as requiring inspection of DWWTS. They will, however, have to compete in the prioritisation process with other significant conservation concerns, drinking waters and health considerations. It must also be stated that agriculture is still the greatest exporter of phosphorus to surface waters in Ireland, and that current agricultural policy supports food production and land intensification. Significant national investment in municipal wastewater treatment, combined with regulation of such discharges by the EPA, has resulted in significant improvements in water quality across Ireland. Conservation actions to rehabilitate and restore blanket bogs (Reasoned opinion 2010/2161) and ongoing measures to combat overgrazing of upland and peatland resources may help reduce the pressures from peatlands in some Najas flexilis catchments. However, economic pressures are apparently increasing the reliance on relatively cheap fuels such as turf, while afforestation and agricultural reclamation of peat and peaty soils is ongoing and has increased in some parts of the west, in particular. Combined with the threats posed by climate change, therefore, it would appear overall that without dedicated conservation programmes for the species, the pressures on Najas flexilis will most likely remain stable or possibly increase in the future. Owing to the lack of information on the condition of the populations, the lack of clear evidence linking the environmental indicators used and population decline and the apparent persistence of populations in the face of significant pressures, the future prospects are assumed to be stable.
2.9.05 Overall assessment of Conservation Status	The overall conservation status of Najas flexilis is assessed as unfavourable inadequate.

Field label	Note
Species: 1833	**Slender Naiad**
2.9.06 Overall trend in Conservation Status	As there is no evidence of a decline in population or the quality of the habitat the overall trend is considered to be stable; however owing to the uncertainty on the status of 16 populations and uncertainty of the trends of the quality of the habitat there is a possibilty that this species may decline in the future.
3.1.01 a) Population size - Unit	47 Najas flexilis lakes (or 81%) are found within 26 Special Areas of Conservation (SAC) (See Table 11 of O Connor (2013)). 45 of these lakes (or 78%) are found within the 24 Special Areas of Conservation (SAC) listed for the species. Based on the population estimates of Roden (2004) and the methods detailed at 2.4.1a, the population estimate for the 47 lakes within the SAC network were 18,082, based on median population estimate, and 29,107, based on the average population estimate. These correspond to 86 % and 80 % of the total national estimates using the same methods. Using these same methods for the 45 lakes within the 24 SAC where Najas flexilis is a qualifying interest, the estimates are 17,932, or 85% of the national population, based on median population estimate,and 28,432, or 78% of the national population based on the average population estimate (Roden, 2004).
3.1.01 b) Population size - Minimum	See 3.1.1 a)
3.1.03 Trend of population size within the network (short-term trend)	The available population data do not allow comparison of trends within and outwith the SAC network. There is no apparent difference in habitat quality inside or outside the network. Therefore the same trend is used as for population and habitat generally, i.e. stable.

Species:	**1833**	**Slender Naiad**
3.2 Conservation measures		Three conservation measures were selected from the standard list (see Table 13 of the Najas flexilis Backing Document (O Connor, 2013)). Najas flexilis and its habitat are protected under the Wildlife Acts, Flora Protection Order 1999 (S.I. No. 94) (Measure 6.3). This affords protection against collection and direct damage to the species and its habitat. As detailed in 2.6, however, the pressures on Najas flexilis are primarily indirect and cannot be addressed through legal protection alone. The species is protected through the Natura 2000 network where it is listed as a qualifying interest for the SAC (Measure 6.1). Conservation objectives for Najas flexilis in these SAC afford protection against proposed developments and activities, both within the designated site and the wider catchment, through Article 6 (3). There are, however, no conservation measures currently being undertaken to restore or enhance populations of Najas flexilis within SACs. More detailed surveillance of the populations and their habitat would be required before such measures could be planned. The habitat is also afforded legal protection (6.3) under the Water Framework Directive, which prevents deterioration in status, and by the Environmental Liability Directive, which prevents and remedies environmental damage to natural habitats and protected species The Water Framework Directive provides the legal and administrative mechanism for maintaining and enhancing water quality. The measures implemented under the current and future River Basin Management Plans (RBMPs) will help improve surface waters that are in moderate, poor or bad status and help prevent deterioration in those in high or good status. The implementation of many WFD measures will take some time (e.g. inspection and upgrade of domestic on-site wastewater systems, or upgrading urban wastewater collection and treatment systems) and, as a result, water quality improvements will not become apparent in the short-term. The current RBMP measures are likely to be insufficient to protect Najas flexilis, however, for a number of reasons, most notably: 1. If, as assumed here, high status is required by Najas flexilis, then the objective of good status, which applies to all lakes not currently at high status, will not allow for restoration of the species' habitat. 2. The agricultural measures are currently restricted to implementation of the Nitrates Action Programme. It is unlikely that this programme will support the achievement of even good status in areas of Ireland with high rainfall and/or organic soils. Given that the majority of phosphorus lost to surface waters has an agricultural origin, this is a significant concern and means that the current measures may not even succeed in preventing further deterioration of lake water quality. 3. There are currently no measures to address the impacts of drainage on surface waters. It is assumed, therefore, that current and future RBMP cycles will lead to a gradual reduction in pressures from domestic on-site and municipal wastewaters. Unless an objective of high status is established for Najas flexilis lakes, the standards applied to such wastewaters may not be sufficiently stringent. It is likely that maintenance or restoration of Najas flexilis habitat quality will require dedicated Sub-basin Management Plans with more stringent objectives and specific measures to address catchment-specific pressures, particularly diffuse pollution from agriculture, forestry and peat-cutting, and hydrological and acidification pressures associated with peatland drainage.


Slender Naiad
Najas flexilis (1833)
Article 17 Assessment 2013
Current Distribution (46 cells)
Current Range (68 cells)
Favourable Reference Range (68 cells)
An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht
Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra
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Date - Dáta
21-05-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**1990**
0.2.2 Species name	**Margaritifera durrovensis**
0.2.3 Alternative species scientific name	Margaritifera margaritifera durrovensis
0.2.4 Common name	Nore Pearl Mussel

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Complete survey/Complete survey or a statistically robust estimate (3)
1.1.3 Year or period	2006-2012
1.1.4 Additional map	Yes
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

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Moorkens, E. (2006c) Preliminary assessment of River Nore tributaries for potential translocation areas for extant adult and captive bred Nore pearl mussels Margaritifera durrovensis. Unpublished report to the National Parks and Wildlife Service, Dublin.
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The European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009. (S.I. 296 of 2009).

2.3 Range

2.3.1 Surface area - Range (km²)	300			
2.3.2 Method - Range surface area	Complete survey/Complete survey or a statistically robust estimate (3)			
2.3.3 Short-term trend period	2001-2012			
2.3.4 Short-term trend direction	stable (0)			
2.3.5 Short-term trend magnitude	min		max	
2.3.6 Long-term trend period	1989-2012			
2.3.7 Long-term trend direction	decrease (-)			
2.3.8 Long-term trend magnitude	min	25	max	25
2.3.9 Favourable reference range	area (km²)		400	
	operator		N/A	
	unknown		No	
	method		The favourable reference range set in 2007 400 km2 was used. See Moorkens et al. (2007) for further information.	
2.3.10 Reason for change				

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	number of individuals (i)		
	min	531	max	585
2.4.2 Population size (other than individuals)	Unit	N/A		
	min		max	
2.4.3 Additional information	Definition of locality			
	Conversion method			
	Problems	The Nore River is well known for its high turbidity and the poor visibility of the substratum. In addition, the rapid changes in flows and levels are a significant problem. These surveying difficulties and the size of the Nore main channel, contribute to the challenge of providing accurate population estimates.		
2.4.4 Year or period	2007-2012			
2.4.5 Method – population size	Complete survey/Complete survey or a statistically robust estimate (3)			
2.4.6 Short-term trend period	2001-2012			
2.4.7 Short term trend direction	decrease (-)			
2.4.8 Short-term trend magnitude	min	max	confidence interval	
2.4.9 Short-term trend method	Complete survey/Complete survey or a statistically robust estimate (3)			
2.4.10 Long-term trend period	1989-2012			

2.4.11 Long term trend direction	decrease (-)
2.4.12 Long-term trend magnitude	min max confidence interval
2.4.13 Long-term trend method	Complete survey/Complete survey or a statistically robust estimate (3)
2.4.14 Favourable reference population	number 10000 operator N/A unknown No method The favourable reference population is the same one set in 2007 (Moorkens, et al., 2007), and is considered the minimum necessary to ensure the long-term viability of the species.
2.4.15 Reason for change	Genuine

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km^2)	0.797
2.5.2 Year or period	2011-2012
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Bad
2.5.4 b) Quality of habitat - method	The quality of the Nore pearl mussel habitat was based on data from dedicated Nore pearl mussel surveillance, which includes measurement of the condition of the species' habitat. Objectives for the condition of freshwater pearl mussel habitat were established in law through S.I. 296 of 2009. The objectives include five criteria/attributes, each with specific targets, namely macroinvertebrates, phytobenthos/diatoms (both based on Water Framework Directive (WFD) methods and having targets of WFD 'high ecological status'), macroalgae cover, macrophyte cover and siltation. All five attributes were measured and assessed during the project to produce the Nore Sub-basin Management Plan. The condition of the habitat was assessed as unfavourable in 2009. The results for the individual attributes were as follows: 1. macroinvertebrates - fail 2. phytobenthos/diatoms - fail 3. macroalgae cover – fail 4. macrophyte cover – fail 5. siltation - fail Sedimentation of the habitat is considered to be the key cause of the decline of the Nore pearl mussel. The quality of the habitat for Margaritifera durrovensis was assessed and unfavourable bad.
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	stable (0)
2.5.7 Long-term trend period	1989-2012
2.5.8 Long term trend direction	decrease (-)
2.5.9 Area of suitable habitat (km^2)	
2.5.10 Reason for change	

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
Other human induced changes in hydraulic conditions (J02.15)	high importance (H)	N/A
Modification of hydrographic functioning, general (J02.05)	high importance (H)	N/A
pollution to surface waters by industrial plants (H01.01)	high importance (H)	N/A
Water abstractions from groundwater (J02.07)	high importance (H)	N/A
diffuse pollution to surface waters due to agricultural and forestry activities (H01.05)	high importance (H)	N/A
mechanical removal of peat (C01.03.02)	medium importance (M)	Mixed pollutants (X)
sand and gravel quarries (C01.01.01)	medium importance (M)	Mixed pollutants (X)
diffuse pollution to surface waters due to household sewage and waste waters (H01.08)	low importance (L)	N/A

2.6.1 Method used – pressures	based exclusively or to a larger extent on real data from sites/occurrences or other data sources (3)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
Other human induced changes in hydraulic conditions (J02.15)	high importance (H)	N/A
Modification of hydrographic functioning, general (J02.05)	high importance (H)	N/A
pollution to surface waters by industrial plants (H01.01)	high importance (H)	N/A
Water abstractions from groundwater (J02.07)	high importance (H)	N/A
diffuse pollution to surface waters due to agricultural and forestry activities (H01.05)	high importance (H)	N/A
mechanical removal of peat (C01.03.02)	medium importance (M)	Mixed pollutants (X)
Sand and gravel extraction (C01.01)	medium importance (M)	Mixed pollutants (X)
diffuse pollution to surface waters due to household sewage and waste waters (H01.08)	low importance (L)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant Information	The standard EU codes for pressures and threats were considered particularly problematical for freshwater habitats and species, such as Margaritifera durrovensis, as many pressures act indirectly (e.g. hydrological change, nutrient pollution, sediment pollution, acidification). The pressures are frequently diffuse, and arise as a result of a number of developments and activities from a variety of sectors. Impacts are almost always the result of cumulative pressures, and interactions among pressures are frequently complex and can be difficult to predict. The standard list of codes is long, allowing multiple codes to be used to cover one pressure. The option of using a pollution qualifier further adds to the confusion and has been avoided here. By contrast, there is a need for a clear code for the pressure associated with land drainage. The absence of clear codes for drainage activities, in particular, is likely to give rise to significant inconsistencies in reporting among Member States and even within Member States.

In 2007, the viability of the Nore pearl mussel population was used as the measure of its conservation status. Specific attributes and targets for assessing the viability of Irish freshwater pearl mussel populations were established in law through S.I. 296 of 2009. The four criteria assess the numbers of live adult mussels, the number of dead mussels, the percentage of the population of approx. five years of age and under, and the percentage of the population of approx. 10-15 years of age and under. Using these and associated criteria in 2007, it was concluded that the Nore pearl mussel population was unviable. In 2007, the favourable reference population was set as two viable populations (Moorkens et al., 2007). The objective was to create at least two viable, self-sustaining populations of Margaritifera durrovensis from mussels bred in captivity, each population totalling a minimum of 5,000 mussels. A captive breeding programme has been in place since 2005. 2009 and 2010 were the most successful years of this programme and it has been estimated that there may be as many as 1,700 juvenile mussels from these years alive in captivity.

2.8.3 Trans-boundary assessment

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment	Bad (U2)
	qualifiers	stable (=)
2.9.2. Population	assessment	Bad (U2)
	qualifiers	declining (-)
2.9.3. Habitat	assessment	Bad (U2)
	qualifiers	stable (=)
2.9.4. Future prospects	assessment	Bad (U2)
	qualifiers	declining (-)
2.9.5 Overall assessment of Conservation Status		Bad (U2)
2.9.6 Overall trend in Conservation Status		declining (-)

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	number of individuals (i)		
	min	531	max	582
3.1.2 Method used	Complete survey/Complete survey or a statistically robust estimate (3)			
3.1.3 Trend of population size within	decrease (-)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Inside	Enhance
Restoring/improving water quality (4.1)	Legal Administrative	high importance (H)	Inside	Enhance Long term
Urban and industrial waste management (8.1)	Legal Administrative	high importance (H)	Inside	Enhance Long term

Specific single species or species group management measures (7.4)	Contractual	high importance (H)	Inside	Enhance Long term

Article 17 - SPECIES NOTES

Field label	Note
Species: 1990	**Nore Pearl Mussel**
0.2.01 Species code	The freshwater pearl mussel Margaritifera durrovensis known only from the lime-rich waters of the River Nore, in contrast to Margaritifera margaritifera which lives in acid waters. Margaritifera durrovensis has been known to science for less than 100 years. In 1926, B.B. Woodward found an unusual shell in the P.B. Mason collection, which was labelled from the river Nore at Durrow (Phillips 1928). He wrote to R.A. Phillips and in October 1926, Phillips, along with A.W. Stelfox, R.J. Welch and C. Oldham found the population. Five specimens from this expedition are preserved in spirit in the Dublin museum, labelled from the river Nore below Abbeyleix. Descriptions of the Nore mussels were given Bloomer (1927, 1928) and followed by Phillips naming Margaritifera durrovensis as a species new to science (Phillips 1928). The taxonomic status of Margaritifera durrovensis has been argued ever since Phillips first published his species description. Stelfox (1929) compared its thickened form with the forms of Pisidia found in hard water, and stated, in his opinion, that the Nore mussel was a variety of Margaritifera margaritifera which had become acclimatised to hard water. Haas (1948) and Chesney et al. (1993) concurred with Stelfox. Subsequently, Moorkens (1996) looked at morphometric taxonomical differences between shell sets from various rivers and different species within the Margaritifera genus. While it was evident that there were large "within species" differences between populations of Margaritifera margaritifera, it was shown in the study that there were greater morphometric differences between Margaritifera durrovensis and Margaritifera margaritifera than between the latter species and either Margaritifera falcata or Margaritifera auricularia. More recent genetic studies have also failed to reach a clear conclusion on its status (Holmes et al., 2001, Machordom et al., 2003, Geist & Kuehn, 2005). The taxonomic status of Margaritifera durrovensis remains inconclusive but is probably best described as a rare ecophenotype of Margaritifera margaritifera. The taxon that relates to Margaritifera durrovensis is considered to be restricted to the River Nore in the Republic of Ireland. See Moorkens et al. (2007) and DEHG (2010) for further information on the species. There is one Special Area of Conservation designated for the protection of the single Nore pearl mussel population. The entire population is within this SAC.
1.1.01 Distribution map	This distribution map has been transformed from the Irish Grid map referred to in 1.1.2 and 1.1.4.
1.1.02 Method used - map	The distribution was based on Margaritifera durrovensis records held in the NPWS Margaritifera_Geodatabase. Positive records of living mussels are held in the Margaritifera_Records feature class). The distribution of the Nore pearl mussel habitat in the River Barrow and River Nore Special Areas of Conservation is mapped as a polyline feature). Both of these feature classes were intersected with the Irish National 10 km Grid, producing a distribution of three 10 km squares. This matches the distribution reported in 2007. The species is found only in the River Nore main channel in counties Laois and Kilkenny.
1.1.03 Year or period	The records used in the distribution mapping dated from between 2006 and 2012.
1.1.04 Additional distribution map	The distribution map referred to in 1.1.2 was intersected with the ING 10 square grid to determine the national grid distribution.

Field label	Note
Species: 1990	**Nore Pearl Mussel**
1.1.05 Range map	Range maps were derived from the ING 10 square grid (1.1.4) and the ETRS LAEA 52 10 projection (1.1.1) distribution maps. The recommended Range Tool was not used, as the mapped distribution is considered accurate. It should be noted, however, that Margaritifera durrovensis is difficult to survey, owing to the high turbidity and rapid flow changes in the River Nore. It is possible that mussels are still found downstream (south) of the mapped distribution and survey of these stretches of the Nore is recommended.
2.2 Published sources	The publications listed contain information on the distribution of Margaritifera durrovensis, as well as information on the condition of the population and its habitat. Many of the listed sources also provided insight into pressures and threats on the species.
2.3.03 Short-term trend - Period	The recommended short-term trend period of 2001-2012 was chosen.
2.3.04 Short term trend - Trend direction	There has been no change to the range of the species since 2001.
2.3.06 Long-term trend - Period	The recommended long-term trend period of 24 years or 1989-2012 was used.
2.3.07 Long-term trend - Trend direction	Margaritifera durrovensis was once present in the Barrow and Nore main channels, but living specimens have not been found outside the Nore since 1993 (Moorkens 1996). In 1993 only living specimen was found in the River Barrow. The range of Margaritifera durrovensis in Ireland at the start of the trend period, also included one stretch within the Barrow main channel. See Moorkens et al. (2007) for further information.
2.3.10 c) Reason for change - use of different method?	The same method was used 2013 and 2007, with the range based on the current distribution.

Field label	Note
Species: 1990	**Nore Pearl Mussel**
2.4.01 a) Population size estimation (using individuals or agreed exceptions where possible) - Unit	Initial baseline SAC monitoring took place in the Nore River in 2004 (Moorkens, 2004), but detailed survey has been carried out regularly since 1990 (Moorkens, 1996, 2005), and population estimates have been made since 1988 (Moorkens, 1996; Moorkens and Costello, 1994). The 2007 estimate of the population size, based on survey work between 1991 and 2005, was 500 individuals. This represented a decline of 75% from the total of 2,000 individuals found in 1991 (DEHLG, 2010). Yearly attempts have been made to survey stretches of the Nore pearl mussel population since 2004. These have not always been successful, however, owing to the challenging conditions in the Nore. The river is well known for its high turbidity and poor visibility of the substratum. In addition, the rapid changes in flows and levels are a significant problem. The survey difficulties and the size of the Nore main channel, contribute to the difficulties of providing accurate population estimates. In the Dunmore area, a total of 167 live mussels were counted in 2009 (Moorkens, 2009). This compared with 257 in 2004 and 195 in an incomplete survey in 1999 (all areas did not have visibility for counting). Between 2004 and 2009, 39 mussels were removed from this stretch for captive breeding purposes, thus the estimated decline between 2004 and 2009 was 23% (167/218), or approximately 4.7% per year. In the stretch from Dunmore to the confluence of the Gully River, a total of 36 live mussels were counted in 2009 (Moorkens, 2009). This compares with 110 in 2004 and 142 in 1999 (complete survey). The estimated decline between 2004 and 2009 was 67%, or approximately 13.5% per year. The decline between 1999 and 2004 was 22.5% or 4.5% per year. A total of 413 dead shells were found and collected during the 2009 survey (Moorkens, 2009). The population estimate in 2009 was approximately 300 (Moorkens, 2009, DEHLG, 2020). In 2011, a survey by NPWS staff discovered new beds of mussels in a previously un-surveyed stretch downstream of the New Bridge at Durrow. There were 285 live mussels in this stretch and at least the same number of shells of dead mussels. The population estimate for this assessment is based on the 2009 estimate of 300, plus the new data from the 2011 survey (285 mussels), giving a total maximum number of adult mussels of 585. Using the 2009 findings from the Dunmore and Dunmore to Gull stretches, however, it can be assumed that these numbers of declined further, at a rate of at least 4.5% per year. Therefore, both figures were adjusted to provide a minimum population estimate. 300 minus 13.5% (covering the three years from 2009-2012), gives 259 adult mussels. 285 minus 4.5% (to cover 2012), gives 272 adult mussels. These figures sum to a minimum population estimate of 531. As the rate of decline may, based on the 2009 figures, may be as high as 13.5% per year, this figure may be an overestimate. DEHLG (2010) provided an extinction curve for Margaritifera durrovensis. The curve illustrated the predicted trends in adult mussel numbers, based on the numbers of mussels in the population, the current rate of loss compared to recruitment, and the age/size profile of the population. The full methodology is detailed in DEHLG (2010) and Moorkens (2010). This curve indicates that the population has been in rapid decline since 1991 and may become extinct before 2030. The Nore pearl mussel has not reproduced successfully in the River Nore since 1970 (DEHLG, 2010). Evidence for the decline in reproduction comes from Ross (1984) and from the detailed survey work carried out from 1991 to 2009. Ross found mussels aged from 12 to 80 years, and a wide range of age classes suggesting that mussels successfully bred almost every year between 1905 and 1971. Detailed surveys have failed to find evidence of successful recruitment thereafter. The population continues to age, and as older mussels die, they are not replaced. The timescale of recovery even if measures were implemented immediately is much longer than the estimated survival time of the current population in the wild (DELHG, 2010, DAHG, 2011).

Field label	Note
Species: 1990	**Nore Pearl Mussel**
	The key measure of the conservation condition of a freshwater pearl mussel population is, the level of recruitment to the population. In recognition of this, S.I. 296 of 2009 established two recruitment criteria/attributes and associated targets for assessing the conservation status of a freshwater pearl mussel population, namely: 1. At least 20% of population must be less than or equal to 65 mm in length 2. At least 5% of the population must be less than or equal to 30mm in length These two attributes measure the viability of a freshwater pearl mussel population, i.e. whether the species is maintaining itself on a long-term basis as a viable component of its natural habitats. It is clear that the Nore pearl mussel population fails both of these criteria. It also fails the criteria for live mussels (no recent declines) and numbers of dead shells (less than or equal to 1%). The conclusion is that the single extant Margaritifera durrovensis population in the River Nore un-viable and on the verge of extinction, and clearly in unfavourable bad condition.
2.4.06 Short-term trend - Period	The default trend period was used.
2.4.09 Short-term trend - Method used	The short term trend was based on trends calculated by Dr Evelyn Moorkens in 2009, which showed declines of 23% and 67% for the period 2004-2009 (Moorkens, 2009, DEHLG, 2010, DAHG, 2011). As this trend period did not equate to required short term trend period of 2001-2012, these percentages were not used for the trend magnitude min/max figures. See 2.4.1 a for further information.
2.4.10 Long-term trend - Period	The recommended long-term trend period is 1989-2012. As population profiles clearly show that recruitment has failed in the Nore since 1971, the trend in the numbers of mature individuals during the long-term trend period was a decline. See 2.4.1 a for further information.
2.4.14 a) Favourable reference population - Number of individuals/agreed exceptions/other units	The objective is to create at least two viable, self-sustaining populations of Margaritifera durrovensis from mussels bred in captivity, each population totalling a minimum of 5,000 mussels (Moorkens, et al., 2007, DEHLG, 2010, DAHG, 2011). This figure is considered to be approximately five times greater than the number of Nore pearl mussels when the Directive came into force.
2.4.15 a) Reason for change - genuine change?	Lack of recruitment and elevated adult mortalities have resulted in a continued decline in the number of mature individuals. See 2.4.1 a and 2.4.9 for further information.
2.4.15 b) Reason for change - improved knowledge/more accurate data?	285 mussels were found in a previously unsurveyed stretch by NPWS in 2011.
2.5.01 Area estimation	The habitat of the Nore pearl mussel was mapped and included as the polyline feature within the NPWS Margaritifera Geodatabase. In order to estimate the length of occupied channel in non-SAC populations, the individual river segments that intersect Margaritifera durrovensis habitat were selected. As the habitat for the freshwater pearl mussel can be considered to include the spawning area of the mussel's temporary salmonid host, the mapped habitat and selected river segments were compared to mapped Atlantic salmon spawning areas provided by the IFI. The selected river segments were found to extend beyond the mussel habitat and to include identified spawning areas. As a result, the length of the Nore pearl mussel habitat was based on the selected river segments and summed to 37.22 km. The width of these river segments was based on the IFI wetted are. The total habitat surface area, calculated by multiplying the length by the wetted-width of the individual channel sections and summing was 0.797 km2.

Field label	Note
Species: 1990	**Nore Pearl Mussel**
2.5.02 Year or period	The habitat area was based the “RiverSegment” feature data class from the EPA’s Water Framework Geodatabase (WFDGeodatabase.mdb Ver Oct 2011) and the Inland Fisheries Ireland (IFI) Wetted Area data. The data are at 1:50,000 scale, with the RiverSegment features based on the 2000 OSi Orthophotography and the wetted width figures based on predictive modelling completed in 2012. IFI predicted wetted width was based on the deEyto et al. method, using shreve link magnitude and catchment area.
2.5.03 Method used Habitat for the species	The method used to estimate the area of the freshwater pearl mussel habitat is detailed in 2.5.1. The length of occupied channel was based on mapped Nore pearl mussel habitat. The available salmonid spawning habitat was also considered. River segments from the WFD Geodatabase were used to estimated the length of channel. The width of each segment was available from IFI wetted width data.
2.5.06 Short-term trend - Trend direction	There is no evidence of a decrease in the area of the habitat for the species since the Directive came into force, so the surface area of the species’ habitat is assessed as stable. The quality of the species’ habitat was assessed as unfavourable bad in 2007. The Nore pearl mussel has been surveyed since 1991 and standard habitat assessment methods (Schedule Four, S.I. 296 of 2009) have been employed since 2004. The habitat has been assessed as unfavourable bad during all surveys. In addition, EPA biological quality data (macroinvertebrates, Q rating) were examined for the main channel Nore (see DEHLG, 2010). Two sites showed a decline in quality between 2001 and 2007. All other sites remained stable. Overall, therefore, the trend in biological water quality was stable. All river sites were at Q 4 or Q 3-4, or unfavourable for mussels (the EQR established in S.I. 296 of 2009 is equivalent to Q 4-5 or Q5, high WFD status). Overall, therefore, the short-term trend in habitat quality is stable (on-going bad).
2.5.08 Long-term trend - Trend direction	The recommended long-term trend period of 1989-2012 was chosen. Margaritifera durrovensis was lost from the Barrow main in or after 1993. As a result, the area of the habitat for the species is considered to have decreased during the long-term trend period. EPA biological quality data (macroinvertebrates, Q rating) were examined for the main channel Nore (see DEHLG, 2010). While some sites show a decline in quality between 1987 and 2007, overall the trend in biological water quality was stable. All river sites fail the target for mussels (Q4-5 and Q5) established in S.I. 296 of 2009. Based on loss of habitat are in the Nore, therefore, the long-term trend in habitat quality is a decrease.
2.5.10 b) Reason for change - improved knowledge/more accurate data?	No figure for habitat surface area was provided in 2007. The map of the habitat for the species (Margaritifera Geodatabase) and the IFI wetted area data were used to estimate habitat area for this report.

Field label	Note
Species: 1990	**Nore Pearl Mussel**
2.6 Main pressures - Pressure	Data on pressures on the Nore pearl mussel came from the Nore Sub-basin Management Plan (DECLG, 2010, DAHG, 2011). The standard “reference list of pressures, threats and activities” was used to categorise the identified pressures on Margaritifera durrovensis. The pressures identified, listed in approximate order of importance, were: 1. J02.15, Other human induced changes in hydraulic conditions, high importance (this code was used to cover the specific pressure of river bank erosion and slumping associated with removal of deep-rooting vegetation, including riparian trees. Such vegetation change has been caused by a number of activities in the Nore catchment, including grazing by livestock, other farming activities, and land-clearance for developments and other infrastructure). 2. J02.05, Modification of hydrographic functioning, general, high importance (This code was used to cover activities, other than land drainage, that lead to changes in the hydrological regime and morphology of the river. A key pressure in the Nore is the maintenance of drainage schemes. Bridges and culverts were also recorded as a significant hyromorphological pressure.) 3. H01.01, pollution to surface waters by industrial plants, high importance (particularly urban wastewater treatment plants) 4. J02.07, Water abstractions from groundwater, high importance (This code was used to cover land drainage. Both new drainage works and maintenance works on existing drains are significant pressures. Drainage leads to changes in the hydrological regime, resulting in modification of the bed and banks of rivers through erosion and deposition processes. Erosion in the drains themselves increases the sediment load to water. Drains also provide a shorter and more direct pathway to rivers for pollutants originating on ‘dry land’. Drains are also installed to facilitate land uses that typically increase the sources of sediment and nutrients) 5. H01.05, diffuse pollution to surface waters due to agricultural and forestry activities, high importance (there are multiple and complex agricultural and forestry activities that act as sources of sediment, nutrients and other pollutants, and that can impact on the Nore pearl mussel. Fords, drinking-water access points and other areas of soil erosion owing to livestock activity were highlighted as important sources of sediment. Agriculture is relatively intensive over large areas of the Nore catchment and, therefore, a significant and diffuse source sediment and nutrients). 6. C01.03.02 X, mechanical removal of peat, medium (Significant areas of the upper catchment are covered in raised and blanket bogs that are subject to industrial-scale peat extraction) 7. C01.01.01 X, sand and gravel quarries, medium 8. H01.08, diffuse pollution to surface waters due to household sewage and waste waters, low importance
2.7 Threats - Threat	All pressures documented at 2.6 were also listed as threats. In addition, climate change was identified as a threat, owing to its potential to exacerbate many of the current hydrological and pollutant pressures.
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Margaritifera durrovensis occurs in a single river, the Nore main channel and occupies three 10 km squares. The range is the same as that reported in 2007 and is smaller than the favourable reference range (current range is 75% of the FRR). As a result, the range is reported as unfavourable bad.

Field label	Note
Species: 1990	**Nore Pearl Mussel**
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The number of mature individuals of Margaritifera durrovensis is estimated to be 585. This is larger than the 2007 population estimate of 500, but only as a result of the discovery of new beds of mussels in 2011. There was a significant decline in adult mussels in permanent count areas monitored during the reporting period, which had declines of -23% and -67% for the period 2004-2009. The condition or viability of the Nore pearl mussel population was also assessed using four main attributes: the number of live adult mussels, the number of dead mussels, the percentage of the population of approx. five years of age and younger, and the percentage of the population of approx. 10-15 years of age and younger. It was concluded that the mussel has not successfully reproduced in the wild since the early 1970s and that the adult population continues to decline rapidly. As a result, the status of the Margaritifera durrovensis population is assessed as unfavourable bad. A captive breeding programme successfully bred Nore pearl mussels in 2009 and 2010 and it is hoped that there may be as many as 1,700 juvenile mussels held in captivity. The future of these mussels is, however, less certain than that of the adult mussels in the wild, owing to the significant challenges of captive breeding.
2.9.02 b) Population - If CS is U1 or U2, use of qualifiers is recommended	Due to the lack of recruitment and the ongoing loss to the adult population the qualifier is set as declining.
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The assessment of the quality of the Nore pearl mussel habitat was based on dedicated surveillance, which included measurement of macroinvertebrates, phytobenthos/diatoms (both are based on WFD methods and having targets of WFD 'high ecological status'), macroalgae cover, macrophyte cover and siltation. The Nore failed to reach the target fro all five ecological objectives. Sedimentation of the mussel habitat was the main cause of the decline in the quality of the species' habitat. As a result the habitat for Margaritifera durrovensis is assessed as unfavourable bad.
2.9.03 b) Habitat for the species - If CS is U1 or U2, use of qualifiers is recommended	Repeat monitoring of the condition of the species' habitat at a number of sites since 2004 and EPA biological water quality monitoring demonstrated that there has been no further declines in the area or quality of the species' habitat.

Species: 1990	Nore Pearl Mussel
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	A number of significant Margaritifera durrovensis conservation measures have been implemented during the reporting period, including: 1. Making of the Freshwater Pearl Mussel Regulations (S.I. 296 of 2009) which set environmental objectives for the population of the species, required the production of a Nore Sub-basin Management Plan (SBMP) for the species and set duties on public authorities in respect of the SBMP and its programme of measures. 2. The 'North South 2' project, which conducted all necessary survey and monitoring work and drafted the SBMP. This project ran from late 2008 to late 2010. 3. Significant progress has been made in the implementation of many important SBMP measures, notably for authorised discharges and domestic wastewater treatment systems (septic tanks). The EPA has examined IPPC and Waste licences in accordance with European Communities Environmental Objectives (Freshwater Pearl Mussel) Regulations 2009, S.I. No. 296 of 2009 and determined which licences required full reviews. The majority of these reviews have been completed and more stringent and/or additional conditions have been imposed on many licences. The EPA is examining Waste Water Discharge Licences issued prior to the introduction of S.I. 296 of 2009, to determine whether the licences require to be reviewed or technically amended. The EPA specifies the appropriate treatment on a case-by-case basis during the licensing process. The EPA has also produced a priority list of urban areas that are key pressures on the environment including the freshwater pearl mussel and that require measures to comply with the species' requirements. The EPA and NPWS continue to work with and advise Local Authorities on the integration of the freshwater pearl mussel ecological quality objectives withn the authorisation of smaller discharges under the Water Pollution Acts. The EPA has published the National Inspection Plan for inspection of domestic wastewater treatment systems (DWWTS). The EPA, GSI and external expert consultants have developed and published a scientific risk based methodology to identify the potential risk to human health, groundwater and surface water from DWWTS. The risk assessment method considers the sensitivity of the receptor and the freshwater pearl mussel is included as a key sensitive receptor. The EPA and NPWS worked together to develop a protocol for prioritising areas for inspection of DWWTS in pearl mussel catchments. Inspections are being targeted in the very high and high risk areas, which also coincide with sensitive receptors such as pearl mussel catchments. 4. A captive breeding programme was initiated in 2005, funded by the National Roads Authority and NPWS between 2005 and 2011 and is now solely funded by the NPWS. Captive breeding has been attempted at four separate locations and is now continuing at a single site in Tipperary. It has proved to be extremely challenging and success has been limited. 2009 and 2010 were the most successful years of the programme to date. While it is extremely difficult to calculate the numbers of juveniles, owing to the destructive nature of the sampling, the most recent estimate suggests there may be as many as 1,700 juvenile mussels held in captivity. The objective is to create at least two viable, self-sustaining populations of Margaritifera durrovensis from mussels bred in captivity, each population totalling a minimum of 5,000 mussels. Despite survey, however, potential receptor sites have not yet been identified. 5. New legislation has been enacted and associated guidance developed on EIA and AA of agricultural activities (under the European Communities (Environmental Impact Assessment) (Agriculture) Regulations, S.I. 456 of 2011; the Planning and Development (Amendment) (No. 2) Regulations, S.I 454 of 2011 and the European Communities (Amendment to Planning and Development Regulations) Regulations, S.I. 464 of 2011). Specific reference to the freshwater pearl mussel is made in the DAFM Guide for farmers and in the draft DECLG guidance on drainage and reclamation of wetlands. These measures should reduce the pressure from land reclamation and intensification in freshwater pearl mussel catchments. Practical measures for addressing pressures such as bank erosion and slumping,

drainage and other hydrological impacts are still under development. These are key to the full implementation of the Nore pearl mussel SBMP. Significant progress is being made in this area, however, including through an on-going INTERREG project in NI and the border counties. Donegal County Council, in partnership with the Northern Ireland Environment Agency, is responsible for this project which is trialling forestry and agricultural measures and developing a wide range of guidance that will have applicability in the Nore catchment. The draft codes-of-practice will cover the development, construction, operation and maintenance of specific activities and sectors including the following: Road, water and sewerage infrastructure, Housing and industrial development, Wind farm development, Water abstractions, physical modifications and impoundments, Agricultural and forestry planning and practices, Peat extraction & quarrying practices and General guidelines for HD Article 6 assessment for the freshwater pearl mussel. The project is scheduled for completion in March 2014. The NPWS is also proposing to undertake a demonstration project (LIFE+ Nature proposal) to demonstrate effective conservation measures for the restoration of the freshwater pearl mussel to favourable condition in two Kerry catchments. Many of the measures and guidance developed in this project would also be transferable to the Nore catchment.

NPWS has also developed, disseminated to relevant public authorities, and continues to manage a Margaritifera GeoDatabase containing both Margaritifera margaritifera and Margaritifera durrovensis data. This is an invaluable planning tool for public authorities, in particular for environmental assessment purposes (SEA, EIA and AA). The EPA intends has incorporated the NPWS Margaritifera geodatabase into their WebGIS tool for the implementation of the National Inspection Plan for Domestic Waste Water Treatment Systems.

All of these efforts represent significant positive progress, but the restoration of the habitat for the species remains challenging given its extremely poor condition and will take a significant length of time to achieve. The delay to any likely recoveries will result from:

1. The time needed to develop and test the effectiveness of measures for key diffuse pressures, particularly those arising from farming and forestry.
2. The time needed to implement measures. The development of agri-environmental or forestry schemes is one example. For DWWTS, a very large number need to be inspected nationally and that this will take a significant amount of time, as will any necessary upgrades. Similarly upgrading urban wastewater collection and treatment systems will take time.
3. Once the source of a pollutant or other pressure has been reduced or eliminated, there will be a delay before the habitat of the freshwater pearl mussel shows signs of recovery (e.g. the time to wash fines out of the river bed or use and re-cycle the available nutrients).
4. After the species' habitat has recovered, there is again likely to be a lag time before recruitment levels improve sufficiently. Owing to the 'gaps' of age classes in the population profiles, it may be decades before adult numbers recover fully.

It is unlikely, therefore, that significant recovery will occur, at a national scale, within the next 12 years.

As well as the development, implementation and recovery time-scale, there are concerns in relation to the availability of the necessary resources (e.g. to manage and fund the necessary agri-environmental measures), as well as other policy and economic drivers.

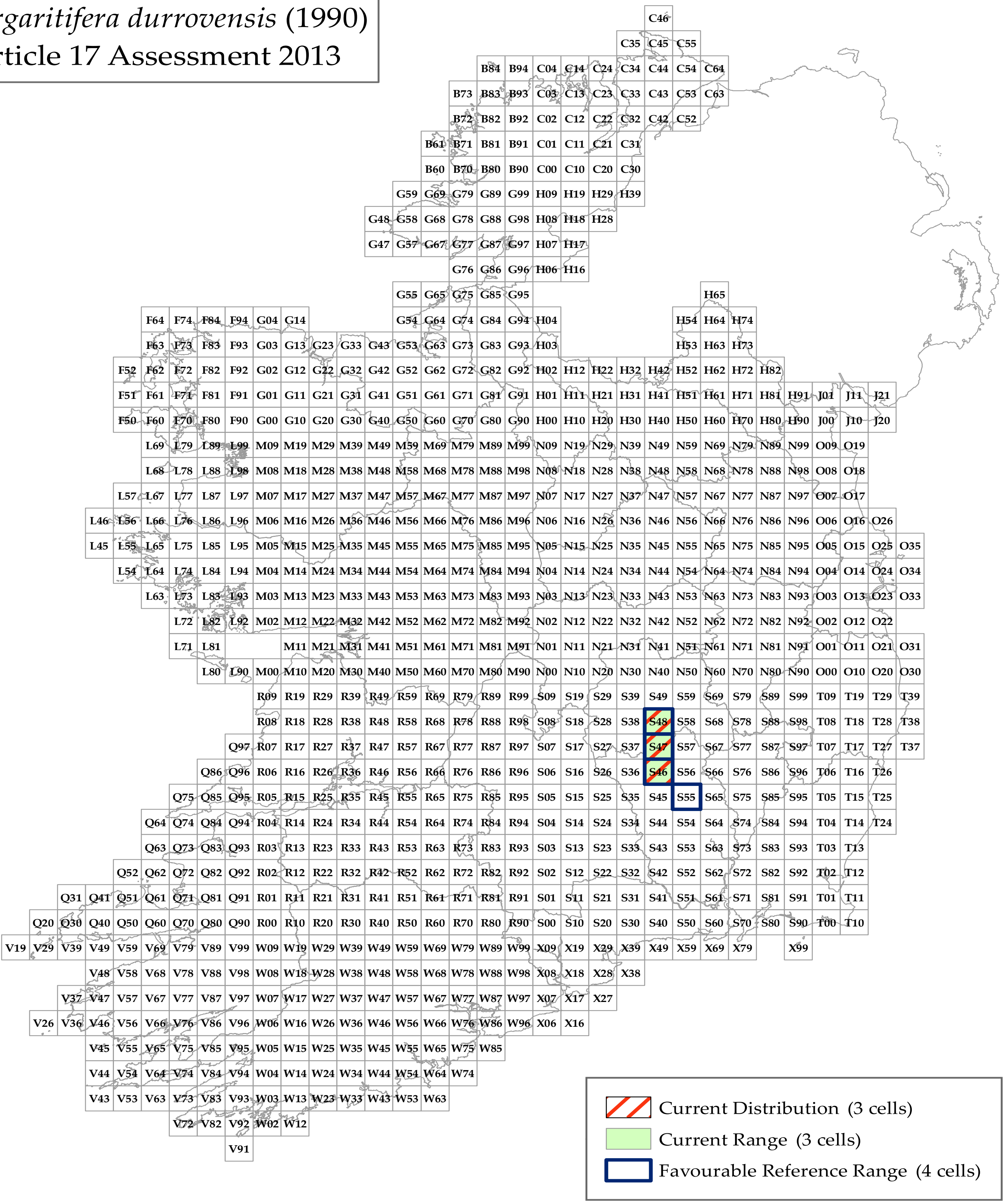
Agriculture is still the greatest exporter of phosphorus to surface waters in Ireland, and current agricultural policy supports food production and land intensification. The recent state of the Environment reports states: "The development strategy for the agriculture sector, Food Harvest 2020 (DAFF, 2010) proposes a 50% increase in milk production by 2020. While environmental sustainability is a key underlying principle of

Field label	Note
	Food Harvest 2020, the milk production targets will present a significant challenge to meeting WFD objectives." (Lehane and O'Leary, 2012). All of these considerations combined with the current bad status of the species' population and habitat quality and the on-going pressures within the catchment, mean that the future prospects are considered bad. The significant conservation measures being undertaken may, with time, lead to improvements. However, the very poor status of the species means such restoration may not occur within the life-span of the extant wild mussels.
2.9.04 b) Future prospects - If CS is U1 or U2, use of qualifiers is recommended	See 2.4.1a and 2.9.4 a. Owing to scale of the decline of the population and the predicted trends (including extinction date) it is considered likely that, despite the significant conservation measures being developed and implemented, the species will become extinct in the wild within the next 20 years. As a result, the trend is considered to be declining.
2.9.05 Overall assessment of Conservation Status	The distribution of Margaritifera durrovensis is well known and mapped in Ireland. There has been one documented population extinction (Barrow) in or after 1993, therefore the species' range is considered to be 25% smaller than the FRA and in unfavourable bad status. The population has been in decline for a very long time, and no recruitment has occurred since the early 1970s. The estimated population in the wild is 585 mature individuals and declines of 23 and 67% were reported from two survey stretches between 2004 and 2009. The population is, therefore, assessed and unfavourable bad and declining. The habitat quality continues to be in bad condition, but has shown no further decline. As a result, habitat is assessed as unfavourable bad but stable. Significant conservation efforts have been made and specific measures are being developed and implemented, however it is unlikely that these will take effect before the extinction of the wild population. Recent successes in an assisted breeding programme provide some hope, however this project has also had episodic and catastrophic losses of adult and juvenile mussels in the past. Overall, the future of the species remains very uncertain and it is assessed as unfavourable bad and declining.
2.9.06 Overall trend in Conservation Status	The overall trend is considered to be declining, owing to the documented declines in the population.
3.1.02 Method used	The entire Margaritifera durrovensis population is within the River Barrow and River Nore SAC, which is designated for its protection.
3.1.03 Trend of population size within the network (short-term trend)	See 2.4.1 a and related sections.
3.2 Conservation measures	The species is protected through the Natura 2000 network where it is listed as a qualifying interest for the SAC (Measure 6.3). Conservation objectives for the species in these SAC afford protection against proposed developments and activities, both within the designated site and the wider catchment, through Article 6 (3). The freshwater pearl mussel (including Margaritifera durrovensis) is a protected faunal species under the Wildlife Acts (1976, 2000), as it was added to the Fifth Schedule by Wildlife Act, 1976 (Protection of Wild Animals) Regulations, S.I. 112 of 1990. The species is also afforded legal protection (6.3) under the Water Framework Directive, which prevents deterioration in status, and by the Environmental Liability Directive, which prevents and remedies environmental damage to natural habitats and protected species. Significant conservation measures are being undertaken to restore Nore pearl mussel populations, notably the Nore SBMP. These conservation measures are detailed in 2.9.4 a.

Nore Pearl Mussel

Margaritifera durrovensis (1990)

Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

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Scale - Scála
0 10 20 30 40 50 km

N

Map - Léarscáil
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Date - Dáta
19-06-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**2027**
0.2.2 Species name	**Orcinus orca**
0.2.3 Alternative species scientific name	Orca
0.2.4 Common name	Killer whale

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	1995-2012
1.1.4 Additional map	No
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Marine Atlantic (MATL)

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2.3 Range

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

2.3.1 Surface area - Range (km²)	447500	
2.3.2 Method - Range surface area	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	447500
	operator	N/A
	unknown	No
	method	The range value derived from the range map referred to in 1.1.5 is considered to be the baseline for this species. As there is no evidence of a decline since the Directive came into force the current range is set as the FRR.
2.3.10 Reason for change	Improved knowledge/more accurate data	

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	number of individuals (i)		
	min	75	max	
2.4.2 Population size (other than individuals)	Unit	N/A		
	min		max	
2.4.3 Additional information	Definition of locality			
	Conversion method			
	Problems	While groups of 3-5 killer whales are most common during individual sighting encounters, most of which occur close to the coast (e.g., Berrow et al., 2010), the relative infrequency in sightings from wider Irish waters and absence of any coherent population estimate for European or northeast Atlantic waters preclude the estimation of a maximum population size. The largest group size recorded in Irish waters to date has been an estimated 75 individuals associated with a seasonal winter fishery for mackerel off the northwest of Ireland in 2011 (IWDG, 2012 - unpublished data).		
2.4.4 Year or period	2001-2012			
2.4.5 Method – population size	Estimate based on partial data with some extrapolation and/or modelling (2)			
2.4.6 Short-term trend period	2001-2012			
2.4.7 Short term trend direction	unknown (x)			
2.4.8 Short-term trend magnitude	min	max	confidence interval	
2.4.9 Short-term trend method	Estimate based on expert opinion with no or minimal sampling (1)			
2.4.10 Long-term trend period				
2.4.11 Long term trend direction	N/A			
2.4.12 Long-term trend magnitude	min	max	confidence interval	
2.4.13 Long-term trend method	N/A			
2.4.14 Favourable reference population	number			
	operator	N/A		
	unknown	Yes		

	method	Numerical data on killer whale population size and trends in Irish or European waters are not available although knowledge of the species' spatial and temporal occurrence has improved since the Directive came into force. The FRP for this species is therefore unknown.
2.4.15 Reason for change	Improved knowledge/more accurate data	

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	447500
2.5.2 Year or period	2001-2012
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Good
2.5.4 b) Quality of habitat - method	The quality of habitat for this species was determined by consideration of the relevant direct and indirect pressures thought to be acting on the species and/or its functional group, and its habitat within its natural environment. These pressures were evaluated in development of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009) using available scientific data concerning inter alia habitat use, population size, distribution and ecology, and threats to the species' protection (e.g., via natural/biological sources, human sectoral activities, management gaps, etc).
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	stable (0)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	447500
2.5.10 Reason for change	Improved knowledge/more accurate data

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	medium importance (M)	N/A
death or injury by collision (G05.11)	low importance (L)	N/A
Marine water pollution (H03)	low importance (L)	N/A
Noise nuisance, noise pollution (H06.01)	low importance (L)	N/A
Seismic exploration, explosions (H06.05)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A

2.6.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	medium importance (M)	N/A
death or injury by collision (G05.11)	low importance (L)	N/A
Marine water pollution (H03)	low importance (L)	N/A
Noise nuisance, noise pollution (H06.01)	low importance (L)	N/A
Seismic exploration, explosions (H06.05)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A

2.7.1 Method used – threats	expert opinion (1)

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2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	Research into the appropriate use of statistics and a range of data sources for population trend analysis is currently under way. Until the results of this work become available, it is not considered scientifically valid to attempt to determine population trends.
2.8.2 Other relevant Information	
2.8.3 Trans-boundary assessment	Given the mobility of this marine species, and in particular the potential for seasonal movements in response to breeding requirements, prey distribution and abundance, and other natural processes, it is now known that individuals and/or groups of this species can and do move between Irish waters and adjacent marine jurisdictions (Berrow et al., 2010; IWDG, 2012 - unpublished data). A transboundary assessment in the next reporting period would allow a fuller appreciation of the range and status of this species.

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.9.2. Population	assessment	Unknown (XX)
	qualifiers	N/A
2.9.3. Habitat	assessment	Favourable (FV)
	qualifiers	N/A
2.9.4. Future prospects	assessment	Unknown (XX)
	qualifiers	N/A
2.9.5 Overall assessment of Conservation Status	Unknown (XX)	
2.9.6 Overall trend in Conservation Status	N/A	

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	N/A		
	min		max	
3.1.2 Method used	N/A			
3.1.3 Trend of population size within	N/A			

3.2 Conservation Measures

Field label	Note
Species: 2027	**Killer whale**
0.1 Member State	Ireland
0.2.01 Species code	The killer whale is the largest member of the dolphin family occurring in Irish waters with adults reaching up to 6.5-9m in body length. Found mostly in temperate and sub-polar regions, its North Atlantic populations appear to predominantly range from the Tropic of Cancer (stretching from the Gulf of Mexico to northwest Africa) and Mediterranean Sea to Greenland, Iceland and northern Norway (Taylor et al., 2008; Ford, 2009). It is classified as a Data Deficient species due to taxonomic uncertainty as there is some evidence that more than one species may be distinguishable (Taylor et al., 2008). Killer whales are recorded annually in small numbers from Irish waters, both offshore and especially coastally (Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012). The species is readily identifiable due to its body size and predominantly black colour, its characteristic tall black dorsal fin which is particularly conspicuous and vertical in adult males, and very distinctive white/near-white patches behind the eye and dorsal fin. Although killer whales may conduct seasonal or inshore/offshore movements in some jurisdictions, breeding stocks and latitudinal patterns in movement by nomadic populations in the eastern North Atlantic have not been clearly established (DEHLG, 2009). However recent evidence suggests the presence of at least two ecological types ('ecotypes') of killer whale in the North Atlantic (Foote et al., 2009; Foote et al., 2010) reminiscent of similar divergences noted in the Pacific and Antarctic Oceans (Ford, 2009). In addition three genetically differentiated populations have been identified within this hemisphere, which appear to be linked to the distribution of particular prey resources: herring, mackerel and tuna (Foote et al., 2010). At least some of the killer whales recently recorded and photo-identified in Irish waters have been known to occur in coastal waters off Scotland (Berrow et al., 2010), underlining the species' capacity for long-distance movement (Ford, 2009).
0.2.04 Common name	Killer whale = Cráin dhubh
1.1.01 Distribution map	The distribution map presented for this species represents a significant proportion of all live sightings recorded during targeted scientific surveillance in Irish waters between 1994/95 and 2012. The surveillance programmes that contributed data to this projection are cited as follows: Pollock et al. (1997), Reid et al. (2003), Ó Cadhla et al. (2004) and Wall et al. (2013). These data and the results of other survey effort (e.g., SCANS-II, 2008; CODA, 2009; Berrow et al., 2010) were integrated into the development of the species range map presented under section 1.1.5. This distribution map for the species has been drawn in 50km x 50km resolution and is mapped in the LAEA projection.
1.1.02 Method used - map	Over the last 2-3 decades records of the occurrence of this species in Irish waters have been accumulating, providing a better insight into its population distribution. Simultaneous to more rigorous surveillance in the last 15-20 years killer whale records have continued to emerge, from deeper continental slope and shallower continental shelf and coastal waters to the north, west and southwest of Ireland as well as in the Celtic Sea and the Irish Sea (Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012). The distribution of recent sightings along with regional sighting records obtained across three preceding decades (Weir et al., 2001; Berrow et al., 2002; Reid et al., 2003) indicate a predominant distribution in waters overlying the continental shelf and continental slope off the south, west and north coasts. Irish Sea records are also well documented however. While all reliable cetacean records obtained in Irish waters were not available for use in this exercise, the map drawn for this species provides a good sample of the species' observed distribution.

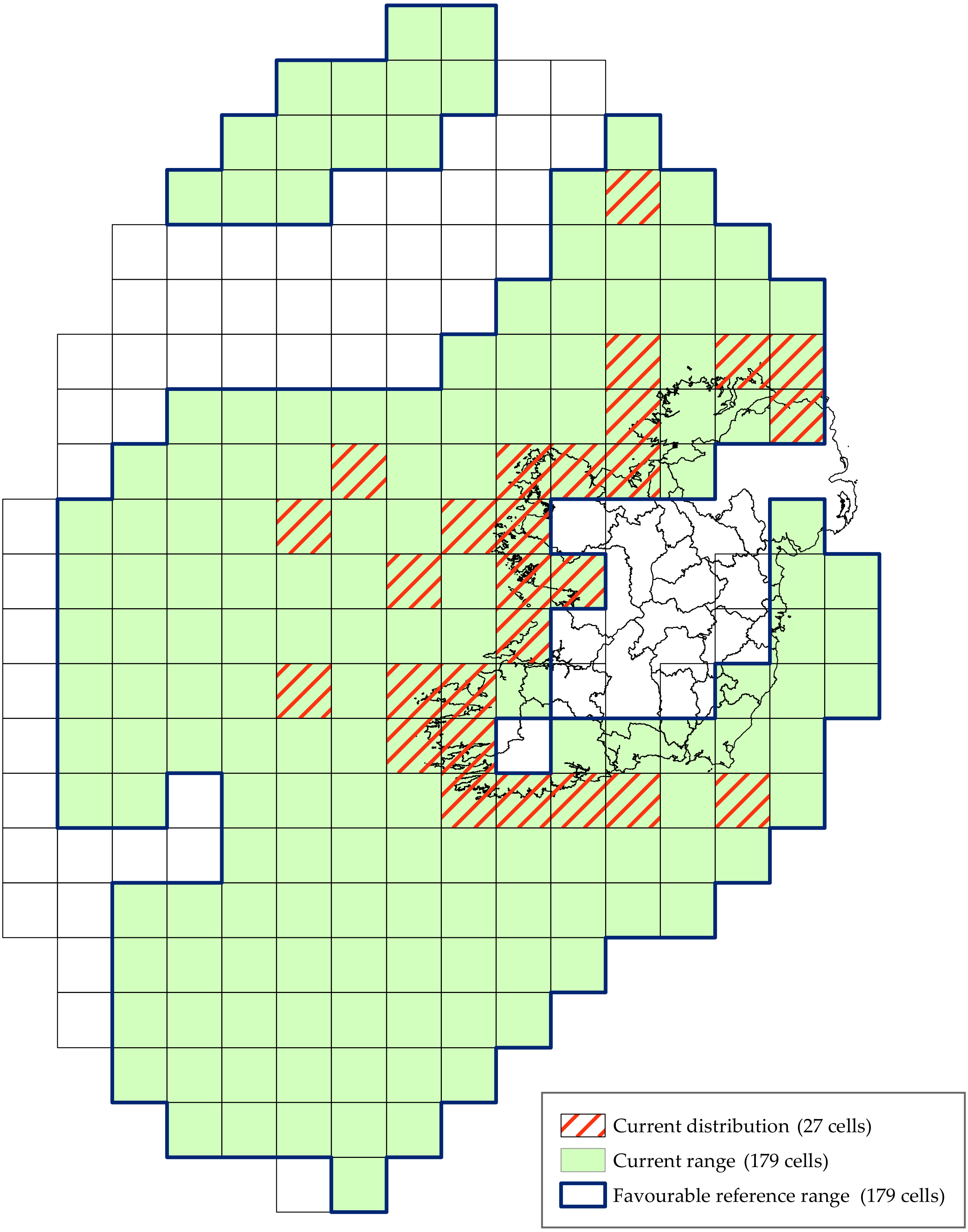
Field label	Note
Species: 2027	**Killer whale**
1.1.03 Year or period	The period selected for mapping the distribution of this species represents a period of intensive surveillance for cetaceans in Irish waters across a range of research and monitoring programmes.
1.1.05 Range map	The species' natural range in Irish waters is a believed to be small component of its wider North Atlantic range (DEHLG, 2009; Ford, 2009). The range map provided consists of its recorded and likely natural range based on recent data (2001-2012) and expert judgement, and is partly derived from 1.1.1. It consists of a block of contiguous 50km x 50km grid cells distributed in Irish marine waters up to 2,000m deep, including the eastern margin of the Rockall Bank and excluding enclosed shallow bays.
2.3.02 Method used - Surface area of Range	This figure has been derived from the range map referred to in 1.1.5.
2.3.03 Short-term trend - Period	Prior to 1999-2000, survey effort targeting cetacean species in Irish offshore waters was comparatively limited in coverage, both spatially and temporally. Since 1999-2000 a number of dedicated multi-annual surveillance programmes for cetaceans have operated in Irish waters, with survey effort extending to the limits of Ireland's EEZ and beyond. Consequently, with regard to this species it is considered that the years 2001-2012 represent an appropriate period for the evaluation of short-term trends.
2.3.04 Short term trend - Trend direction	Sighting records from dedicated surveillance effort in Irish waters (Ó Cadhla et al., 2004; Berrow et al., 2010; Ryan et al., 2010; Wall et al., 2012) provide no evidence of a decline in distribution/range in the recent past; therefore accordingly the short-term trend for range is considered to be stable.
2.3.06 Long-term trend - Period	A long-term trend period for this species is not considered appropriate, for reasons outlined in 2.3.3.
2.3.09 a) Favourable reference range - In km2	The range value derived from the range map referred to in 1.1.5 is considered to be the baseline for this species. As there is no evidence of a decline since the Directive came into force the current range is set as the FRR. [Note: (1) The species is thought to be wide-ranging with some element of seasonal variation therein while regional population components may be present year-round; Nevertheless the species' range in Irish waters is likely to represent only a component of its range in marine waters covered by the Directive and the northeast Atlantic Ocean; (2) There is an assumption that the current range in Irish waters is large enough (a) to encompass all of the ecological variation required by this species during its occurrences therein and (b) to contribute to the long-term survival of the species.]
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Additional sighting records of this commonly identified large dolphin species have been obtained since the previous reporting round (e.g., Berrow et al., 2010; Ryan et al., 2010; Wall et al., 2012). Along with previous data from a range of sources, this has resulted in an improved knowledge and ability to assess the range from that reported in 2007. There is no scientific reason to assume that the species was not similarly present in 2001-2006.
2.4.04 Year or period	The period 2001-2012 has been selected in order to represent the most current population information available for this species.
2.4.05 Method used - Population size	While groups of 3-5 killer whales are most common during individual sighting encounters, most of which occur close to the coast (e.g., Berrow et al., 2010), the relative infrequency in sightings from wider Irish waters and absence of any coherent population estimate for European or northeast Atlantic waters preclude the estimation of a maximum population size. The largest group size recorded in Irish waters to date has been an estimated 75 individuals associated with a seasonal winter fishery for mackerel off the northwest of Ireland in 2011 (IWDG, 2012 - unpublished data).

Field label	Note
Species: 2027	**Killer whale**
2.4.06 Short-term trend - Period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.4.09 Short-term trend - Method used	Given that there are no population figures in western European waters before or since the Directive came into force, the reliable determination of short-term population trend for this species is not possible.
2.4.10 Long-term trend - Period	A long-term trend period for this species is not considered appropriate for reasons outlined in 2.3.3.
2.4.14 d) Favourable reference population - Indicate method used to set reference value if other than operators	Robust data on killer whale population size or trends in Irish or European waters are not available and this is partly due to the infrequency with which the species is encountered during expansive abundance-oriented shipboard or aerial surveys of the continental shelf area (e.g., SCANS-II, 2008) or deeper oceanic waters (e.g., CODA, 2009). While estimates have historically been derived for Norwegian, Icelandic and Faroese waters (Taylor et al., 2008; Ford, 2009) which together represent an apparent stronghold for the species in the northeast Atlantic, comparable knowledge of population size, structure and movements is lacking from the waters of western Europe. Since no relevant population figures have yet been derived for the species the FRP is therefore considered to be unknown.
2.5.01 Area estimation	The surface area estimate for range (derived from the range map referred to in 1.1.5) is used as a proxy for habitat surface area.
2.5.02 Year or period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.5.03 Method used Habitat for the species	Use of the range descriptor as a proxy for habitat is judged appropriate for this wide-ranging pelagic species.
2.5.04 b) Quality of the habitat - Explain how the quality was assessed	The quality of habitat for killer whale was determined by consideration of the relevant direct and indirect pressures thought to be acting on the species and/or its functional group, and its habitat within its natural environment. These pressures were evaluated in development of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009) using available scientific data concerning inter alia habitat use, population size, distribution and ecology, and threats to the species' protection (e.g., via natural/biological sources, human sectoral activities, management gaps, etc). Killer whale may be subject to a number of local and/or regional environmental pressures throughout its range in Irish waters (see 2.3, 2.6; DEHLG, 2009). However based on current data available none are considered to be of sufficient spatial or temporal impact on the species to be causing a significant deterioration in overall habitat quality in Ireland from a "good" status.
2.5.05 Short-term trend - Period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.5.06 Short-term trend - Trend direction	The trend for range in 2.3.4 is applied as a proxy for habitat.
2.5.07 Long-term trend - Period	A long-term trend period for this species is not considered appropriate, for reasons outlined in 2.3.3.
2.5.09 Area of suitable habitat for the species (km2)	Killer whales have been steadily recorded in Irish waters both historically and to the present day. The known and repeatedly detected habitats for this species in Ireland comprise waters overlying the continental shelf and slope and also coastal waters from which a large proportion of records originate (Berrow et al., 2010). There are also limited data indicating the species' presence in waters overlying the Rockall Bank-Hatton Bank region. The Area of suitable habitat is considered to be equal to the Habitat for the species.

Species: 2027	Killer whale
2.6 Main pressures - Pressure	In the development and preparation of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009), a comprehensive review of the pressures believed and/or documented to be acting on this species and/or its functional group (i.e., threats to their protection) was undertaken. The main pressures thought to be acting on this species are considered to occur on a local or regional scale and/or on a temporary or intermittent basis (e.g., impacts arising from seasonal fisheries activity; DEHLG, 2009). Since killer whale distribution is quite broadly continental shelf and slope in nature and the available sighting information indicates comparatively low numbers in Irish waters, where a pressure may be regionally intensive the ranking given is one of medium importance. It should be noted that in relation to seismic exploration, which tends to occur on a local or occasionally regional scale in the waters of Ireland's EEZ and is comparatively low in coverage relative to several other member states, a robust regulatory and management regime applies in order to avoid potentially significant impacts on all species of marine mammal. Until the late 1980s this species was also subject to regular hunting or live captures in part of its northeast Atlantic range (i.e., Iceland and Norway), while the impact on the species of pollutant burdens in this top predator or changes in sea temperature and other abiotic factors in the marine environment cannot be discounted.
2.7 Threats - Threat	There is no evidence to suggest a change in the main pressures thought to be acting on this species in the near future. However surveillance of the species and the pressures potentially acting upon it will continue into the future, while the application of strong management measures (e.g., via the statutory/regulatory process) to avoid potentially significant impacts is also expected to continue.
2.8.01 Justification of % thresholds for trends	A detailed analysis of the statistical ability and power to robustly determine population trends for cetacean species occurring in western European waters is under way via the Joint Cetacean Protocol (JCP) project in the UK. This phased work is due for completion in 2013 and it will inform whether and for which species the measurement of population trends may be possible based on survey data from a range of sources.
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The killer whale is widely recorded in Irish waters overlying the continental shelf and slope and also occurs in coastal waters. Hence the Range is considered to be favourable.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Comparatively small numbers of killer whales are recorded close to the Irish coast on an annual basis. However the status, distribution and origin/stock identity of those whales occurring in Irish waters as a whole is not known. Considering these key data gaps and the absence of a population estimate for European waters since the Directive came into force, the population parameter is considered unknown.
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The habitat for this species in Ireland is considered favourable. Killer whales have been steadily recorded in Irish waters both historically and to the present day. The known and repeatedly detected habitats for this species comprise waters overlying the continental shelf and slope and coastal waters. There are also limited data indicating the species' presence in waters overlying the shallower Rockall-Hatton region offshore.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	A number of pressures have been identified. While the effect of these pressures may act on a temporary and/or regional scale and some are likely to continue to act as pressures into the future, the impacts on individuals or populations of killer whale in Irish waters are not well understood. This is largely due to limited data on its numbers and ecology within Ireland’s marine area. While ongoing threats as listed or identified into the future via surveillance will be managed appropriately, the future prospects for the species are therefore considered to be unknown.

Field label	Note
Species: 2027	**Killer whale**
2.9.05 Overall assessment of Conservation Status	Based on the assessments for the Range, Population, Habitat and Future Prospects parameters, the overall conclusion is that the conservation status of killer whale in Ireland is considered "Unknown". This overall result is the same as in the previous Article 17 assessment due to limited ongoing information on the species' population ecology in Irish waters. However improvements are reported in the assessments for the Range and Habitat parameters, due to improved knowledge.

Killer whale - *Orcinus orca* (2027)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

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Scale - Scála
0 25 50 75 100 km

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Map - Léarscáil
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11-06-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**2028**
0.2.2 Species name	**Pseudorca crassidens**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	False killer whale

1. National Level

1.1 Maps

1.1.1 Distribution Map	No
1.1.1a Sensitive species	No
1.1.2 Method used - map	N/A
1.1.3 Year or period	
1.1.4 Additional map	No
1.1.5 Range map	No

2. Biogeographical Or Marine Level

2.1 Biogeographical Region	**Marine Atlantic (MATL)**
2.2 Published sources	

2.3 Range

2.3.1 Surface area - Range (km²)		
2.3.2 Method - Range surface area	N/A	
2.3.3 Short-term trend period		
2.3.4 Short-term trend direction	N/A	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	
	operator	N/A
	unknown	No
	method	
2.3.10 Reason for change		

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	N/A	
	min		max
2.4.2 Population size (other than individuals)	Unit	N/A	
	min		max
2.4.3 Additional information	Definition of locality		
	Conversion method		
	Problems		
2.4.4 Year or period			
2.4.5 Method – population size	N/A		
2.4.6 Short-term trend period			
2.4.7 Short term trend direction	N/A		

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2.4.8 Short-term trend magnitude	min	max	confidence interval
2.4.9 Short-term trend method	N/A		
2.4.10 Long-term trend period			
2.4.11 Long term trend direction	N/A		
2.4.12 Long-term trend magnitude	min	max	confidence interval
2.4.13 Long-term trend method	N/A		
2.4.14 Favourable reference population	number		
	operator	N/A	
	unknown	No	
	method		
2.4.15 Reason for change			

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	
2.5.2 Year or period	
2.5.3 Method used - habitat	N/A
2.5.4 a) Quality of habitat	
2.5.4 b) Quality of habitat - method	
2.5.5 Short term trend period	
2.5.6 Short term trend direction	N/A
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	
2.5.10 Reason for change	

2.6 Main Pressures

2.6.1 Method used – pressures	N/A

2.7 Main Threats

2.7.1 Method used – threats	N/A

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant Information	
2.8.3 Trans-boundary assessment	

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment	Unknown (XX)
	qualifiers	N/A
2.9.2. Population	assessment	Unknown (XX)
	qualifiers	N/A
2.9.3. Habitat	assessment	Unknown (XX)
	qualifiers	N/A
2.9.4. Future prospects	assessment	Unknown (XX)
	qualifiers	N/A
2.9.5 Overall assessment of Conservation Status	Unknown (XX)	
2.9.6 Overall trend in Conservation Status	N/A	

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	N/A	
	min		max
3.1.2 Method used	N/A		
3.1.3 Trend of population size within	N/A		

3.2 Conservation Measures

Article 17 - SPECIES NOTES

Field label	Note
Species: 2028	**False killer whale**
0.1 Member State	Ireland
0.2.04 Common name	False killer whale = Cráin dhubh bhréige
1.1.02 Method used - map	No live records of this species have been obtained from Ireland within the current reporting round. Several records exist up to 2001.
2.9.05 Overall assessment of Conservation Status	Since no live records of this species have been obtained from Ireland within the current reporting round the conservation status of this vagrant species is assessed as unknown.

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**2029**
0.2.2 Species name	**Globicephala melas**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	Long-finned pilot whale

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	1995-2012
1.1.4 Additional map	No
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Marine Atlantic (MATL)

2.2 Published sources

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Reid, J.B., Evans, P.G.H. & Northridge, S.P. (2003). Atlas of Cetacean Distribution in North-west European Waters. Joint Nature Conservation Committee, Peterborough, 76pp.

Aguilar de Soto, N., Rogan, E., O Cadhla, O., Gordon, J.C.D., Mackey, M., and Connolly, N. (2004) Cetaceans and Seabirds of Ireland's Atlantic Margin. Volume III-Acoustic Surveys for Cetaceans. Report on research carried out under the Irish Infrastructure Programme (PIP): Rockall Studies Group (RSG) projects 98/6 and 00/13, Porcupine Studies Group project P00/15 and Offshore Support Group (OSG) project 99/38. 51pp.

SCANS-II (2008). Small Cetaceans in the European Atlantic and North Sea. Final Report to the European Commission under project LIFE04NAT/GB/000245. Sea Mammal Research Unit, Gatty Marine Laboratory, University of St Andrews, St Andrews, Fife, KY16 8LB.

Wall, D., Murray, C., O'Brien, J., Kavanagh, L., Wilson, C., Ryan, C., Glanville, B., Williams, D., Enlander, I., O'Connor, I., McGrath, D., Whooley, P. & Berrow, S. (2013). Atlas of the distribution and relative abundance of marine mammals in Irish offshore waters 2005 - 2011. Irish Whale and Dolphin Group, Kilrush, Co. Clare. 62pp.

Pollock, C.M., Reid, J.R., Webb, A. & Tasker, M.L. (1997). The distribution of seabirds and cetaceans in the waters around Ireland. JNCC Report No. 267. Joint Nature Conservation Committee, Peterborough. 167pp.

2.3 Range

2.3.1 Surface area - Range (km²)	572500	
2.3.2 Method - Range surface area	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	572500
	operator	N/A
	unknown	No
	method	The range value derived from the range map referred to in 1.1.5 is considered to be the baseline for this species. As there is no evidence of a decline since the Directive came into force the current range is set as the FRR.
2.3.10 Reason for change	Improved knowledge/more accurate data	

2.4 Population

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

2.4.1 Population size (individuals or agreed exception)	Unit: number of individuals (i) min: 13251 max: 47550
2.4.2 Population size (other than individuals)	Unit: N/A min: max:
2.4.3 Additional information	Definition of locality: Conversion method: Problems: Evidence from multi-annual surveillance programmes (Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012) indicate that long-finned pilot whales occur widely in Irish waters and do so throughout the year. Recent estimates of total abundance in waters overlying the western European continental slope and deeper oceanic waters numbered approximately 25,100 animals (95%CL 13,251-47,550; CODA, 2009) with the majority of sightings occurring in waters off northern Scotland to western Ireland and the Rockall Trough. Previously, abundance in the central and northeastern Atlantic was estimated at 750,000 in the late 1980s (Reilly et al., 2008). In seeking to approximate population size range for Irish waters from these broad-scale datasets, there are significant difficulties due (i) to the species' wide pelagic distribution throughout Atlantic and western European waters making jurisdictional separation somewhat arbitrary, (ii) to problems associated with the narrow temporal focus of such surveys (e.g., one month in one season in one year, or separate years for coverage of shelf and deeper oceanic waters), and (iii) to high CVs (i.e., estimation uncertainty) particularly from regions where recorded numbers of sightings have been low. The population estimates given for this species are based on the summation of regional estimates presented in CODA (2009) and they assume the free ranging of animals across and within the regions concerned (e.g., from the Bay of Biscay to the Rockall Trough).
2.4.4 Year or period	2001-2012
2.4.5 Method – population size	Estimate based on partial data with some extrapolation and/or modelling (2)
2.4.6 Short-term trend period	2001-2012
2.4.7 Short term trend direction	unknown (x)
2.4.8 Short-term trend magnitude	min max confidence interval
2.4.9 Short-term trend method	Estimate based on expert opinion with no or minimal sampling (1)
2.4.10 Long-term trend period	
2.4.11 Long term trend direction	N/A
2.4.12 Long-term trend magnitude	min max confidence interval
2.4.13 Long-term trend method	N/A
2.4.14 Favourable reference population	number: operator: N/A unknown: Yes

	method	Robust data on long-finned pilot whale population trends in Irish waters are not available although knowledge of the species' distribution and summer abundance has improved since the Directive came into force. Nevertheless the use of current population figures as descriptors for FRP require further work. The FRP for this species is therefore considered to be unknown.
2.4.15 Reason for change	Improved knowledge/more accurate data	

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	572500
2.5.2 Year or period	2001-2012
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Good
2.5.4 b) Quality of habitat - method	The quality of habitat for this species was determined by consideration of the relevant direct and indirect pressures thought to be acting on the species and/or its functional group, and its habitat within its natural environment. These pressures were evaluated in development of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009) using available scientific data concerning inter alia habitat use, population size, distribution and ecology, and threats to the species' protection (e.g., via natural/biological sources, human sectoral activities, management gaps, etc).
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	stable (0)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	572500
2.5.10 Reason for change	Improved knowledge/more accurate data

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	low importance (L)	N/A
death or injury by collision (G05.11)	low importance (L)	N/A
Marine water pollution (H03)	low importance (L)	N/A
Noise nuisance, noise pollution (H06.01)	low importance (L)	N/A
Seismic exploration, explosions (H06.05)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A
Threats and pressures from outside the EU territory (XE)	low importance (L)	N/A
Threats and pressures from outside the Member State (XO)	low importance (L)	N/A

2.6.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	low importance (L)	N/A
death or injury by collision (G05.11)	low importance (L)	N/A
Marine water pollution (H03)	low importance (L)	N/A
Noise nuisance, noise pollution (H06.01)	low importance (L)	N/A
Seismic exploration, explosions (H06.05)	medium importance (M)	N/A

Changes in abiotic conditions (M01)	low importance (L)	N/A
Threats and pressures from outside the EU territory (XE)	low importance (L)	N/A
Threats and pressures from outside the Member State (XO)	low importance (L)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	Research into the appropriate use of statistics and a range of data sources for population trend analysis is currently under way. Until the results of this work become available, it is not considered scientifically valid to attempt to determine population trends.
2.8.2 Other relevant Information	
2.8.3 Trans-boundary assessment	Given the mobility of this marine species, and in particular the potential for seasonal movements in response to breeding requirements, prey distribution and abundance, and other natural processes, it is likely that individuals and/or groups of this species move between Irish waters and adjacent marine jurisdictions. A transboundary assessment in the next reporting period would allow a fuller appreciation of the range and status of this species.

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment Favourable (FV) qualifiers N/A
2.9.2. Population	assessment Favourable (FV) qualifiers N/A
2.9.3. Habitat	assessment Favourable (FV) qualifiers N/A
2.9.4. Future prospects	assessment Favourable (FV) qualifiers N/A
2.9.5 Overall assessment of Conservation Status	Favourable (FV)
2.9.6 Overall trend in Conservation Status	N/A

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit N/A min max
3.1.2 Method used	N/A
3.1.3 Trend of population size within	N/A

3.2 Conservation Measures

Field label	Note
Species: 2029	**Long-finned pilot whale**
0.1 Member State	Ireland
0.2.01 Species code	The long-finned pilot whale is one of the largest members of the dolphin family occurring in Irish waters with adults averaging to 6m in body length. Found mostly in temperate and sub-polar regions, its North Atlantic populations range from Greenland, Iceland and the Barents Sea to the Tropic of Cancer and also inhabit the western Mediterranean Sea (Olson, 2009). It is classified as a Data Deficient species due to taxonomic uncertainty as there is some evidence that more than one species may be distinguishable (Taylor et al., 2008). Long-finned pilot whales are frequently recorded in Irish Atlantic waters but less so coastally (Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012). The species is quite readily identifiable due to its body size and predominantly black/dark grey colour, its characteristic broad-based low dorsal fin and its bulbous melon (forehead) lacking an obvious beak. Although the species may conduct seasonal inshore movements in some jurisdictions (DEHLG, 2009; Olson, 2009), separate breeding stocks and clear latitudinal patterns in movement by nomadic populations in the eastern North Atlantic are not apparent (Olson, 2009).
0.2.04 Common name	Long-finned pilot whale = Píolótach fadeiteach
1.1.01 Distribution map	The distribution map presented for this species represents a significant proportion of all live sightings recorded during targeted scientific surveillance in Irish waters between 1994/95 and 2012. The surveillance programmes that contributed data to this projection are cited as follows: Pollock et al. (1997), Reid et al. (2003), Ó Cadhla et al. (2004) and Wall et al. (2013). These data and the results of other survey effort (e.g., SCANS-II, 2008; CODA, 2009; Berrow et al., 2010) were integrated into the development of the species range map presented under section 1.1.5. This distribution map for the species has been drawn in 50km x 50km resolution and is mapped in the LAEA projection.
1.1.02 Method used - map	Over the last 2-3 decades records of the occurrence of this species in Irish waters have been far more numerous than records of other large dolphin species. Simultaneous to more rigorous surveillance in the last 15-20 years numerous pilot whale records have continued to emerge, from deep oceanic and continental shelf waters to the west and southwest of Ireland as well as in the Celtic Sea (Ó Cadhla et al., 2004; CODA, 2009; Berrow et al., 2010; Wall et al., 2012). The distribution of recent sightings along with regional sighting records obtained across three preceding decades (Berrow et al., 2002; Reid et al., 2003) indicate a predominant distribution in deeper Atlantic waters overlying the continental slope and in the Rockall Trough and Porcupine Seabight. Records in the Irish Sea are comparatively rare. While all reliable cetacean records obtained in Irish waters were not available for use in this exercise, the map drawn for this species provides a good sample of the species' observed distribution.
1.1.03 Year or period	The period selected for mapping the distribution of this species represents a period of intensive surveillance for cetaceans in Irish waters across a range of research and monitoring programmes.
1.1.05 Range map	The species' natural range in Irish waters is believed to be a small component of its wider North Atlantic range (DEHLG, 2009; Olson, 2009). The range map provided consists of its recorded and likely natural range based on recent data (2001-2012) and expert judgement, and is partly derived from 1.1.1. It consists of a block of contiguous 50km x 50km grid cells distributed in Irish marine waters, excluding enclosed shallow bays.
2.3.02 Method used - Surface area of Range	This figure has been derived from the range map referred to in 1.1.5.

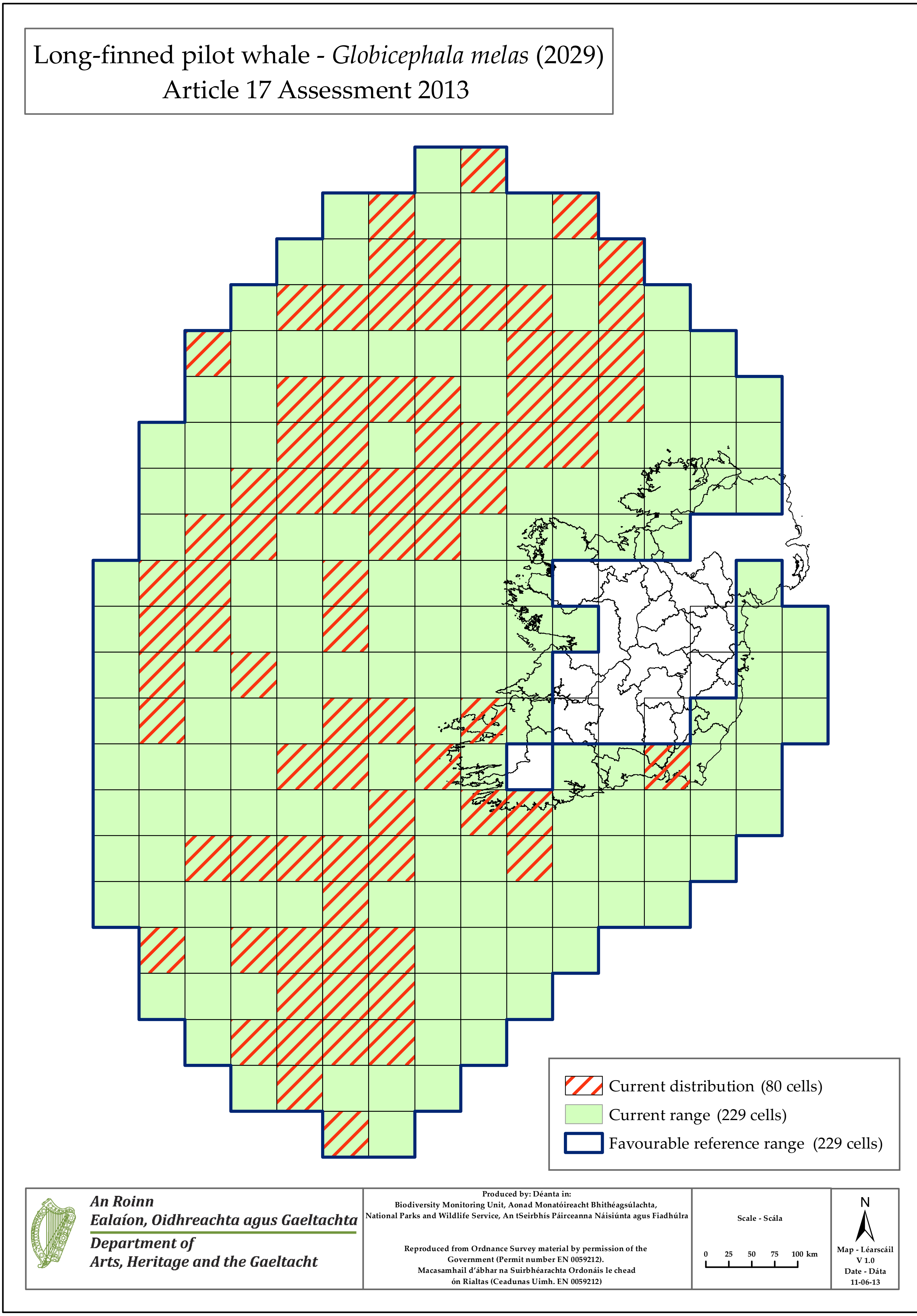
Field label	Note
Species: 2029	**Long-finned pilot whale**
2.3.03 Short-term trend - Period	Prior to 1999-2000, survey effort targeting cetacean species in Irish offshore waters was comparatively limited in coverage, both spatially and temporally. Since 1999-2000 a number of dedicated multi-annual surveillance programmes for cetaceans have operated in Irish waters, with survey effort extending to the limits of Ireland's EEZ and beyond. Consequently, with regard to this species it is considered that the years 2001-2012 represent an appropriate period for the evaluation of short-term trends.
2.3.04 Short term trend - Trend direction	Sighting and acoustic records from dedicated surveillance effort in Irish waters (Aguilar de Soto et al., 2004; Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012) provide no evidence of a decline in distribution/range in the recent past; therefore accordingly the short-term trend for range is considered to be stable.
2.3.06 Long-term trend - Period	A long-term trend period for this species is not considered appropriate, for reasons outlined in 2.3.3.
2.3.09 a) Favourable reference range - In km2	The range value derived from the range map referred to in 1.1.5 is considered to be the baseline for this species. As there is no evidence of a decline since the Directive came into force the current range is set as the FRR. Note: (1) The species is thought to be wide-ranging with some element of seasonal variation therein while regional population components may be present year-round; Nevertheless the species' range in Irish waters is likely to represent only a component of its range in marine waters covered by the Directive and the northeast Atlantic Ocean. (2) There is an assumption that the current range in Irish waters is large enough (a) to encompass all of the ecological variation required by this species during its occurrences therein and (b) to contribute to the long-term survival of the species.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Additional sighting records of this commonly identified large dolphin species (e.g., CODA, 2009; DEHLG, 2009; Berrow et al., 2010; Wall et al., 2012) have been obtained since the previous reporting round. Along with previous data from a range of sources, this has resulted in an improved knowledge and ability to assess the range from that reported in 2007. There is no scientific reason to assume that the species was not similarly present in 2001-2006.
2.4.04 Year or period	The period 2001-2012 has been selected in order to represent the most current population information available for this species.
2.4.05 Method used - Population size	Evidence from multi-annual surveillance programmes (Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012) indicate that long-finned pilot whales occur widely in Irish waters and do so throughout the year. Recent estimates of total abundance in waters overlying the western European continental slope and deeper oceanic waters numbered approximately 25,100 animals (95%CL 13,251-47,550; CODA, 2009) with the majority of sightings occurring in waters off northern Scotland to western Ireland and the Rockall Trough. Previously, abundance in the central and northeastern Atlantic was estimated at 750,000 in the late 1980s (Taylor et al., 2008). In seeking to approximate population size range for Irish waters from these broad-scale datasets, there are significant difficulties due (i) to the species' wide pelagic distribution throughout Atlantic and western European waters making jurisdictional separation somewhat arbitrary, (ii) to problems associated with the narrow temporal focus of such surveys (e.g., one month in one season in one year, or separate years for coverage of shelf and deeper oceanic waters), and (iii) to high CVs (i.e., estimation uncertainty) particularly from regions where recorded numbers of sightings have been low. The population estimates given for this species are based on the summation of regional estimates presented in CODA (2009) and they assume the free ranging of animals across and within the regions concerned (e.g., from the Bay of Biscay to the Rockall Trough).
2.4.06 Short-term trend - Period	The period 2001-2012 has been selected, consistent with 2.3.3.

Field label	Note
Species: 2029	**Long-finned pilot whale**
2.4.09 Short-term trend - Method used	There is little evidence of growth in the northeast Atlantic population(s) of long-finned pilot whale, although assessments of overall population size in the northeast and North Atlantic indicate that the species is in a healthy state (Taylor et al., 2008). However, given that recent population estimates for the species (CODA, 2009) are the only figures for western European waters since the Directive came into force, the reliable determination of short-term population trend for this species is not possible.
2.4.10 Long-term trend - Period	A long-term trend period for this species is not considered appropriate for reasons outlined in 2.3.3.
2.4.14 d) Favourable reference population - Indicate method used to set reference value if other than operators	Robust data on long-finned pilot whale population trends in Irish waters are not available. However broad-scale population estimates have been obtained for the European Atlantic based on comparable surveys of the continental shelf area (SCANS-II, 2008) and deeper oceanic waters (CODA, 2009). While the population figures derived represent the first comparatively robust estimates since the Directive came into force, they are all captured from a short snapshot in time, the associated Lower and Upper 95% Confidence Limits are significantly different, and their use as descriptors for FRP require further work. The FRP for this species is therefore considered to be unknown.
2.5.01 Area estimation	The surface area estimate for range (derived from the range map referred to in 1.1.5) is used as a proxy for habitat surface area.
2.5.02 Year or period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.5.03 Method used Habitat for the species	Use of the range descriptor as a proxy for habitat is judged appropriate for this wide-ranging pelagic species.
2.5.04 b) Quality of the habitat - Explain how the quality was assessed	The quality of habitat for long-finned pilot whale was determined by consideration of the relevant direct and indirect pressures thought to be acting on the species and/or its functional group, and its habitat within its natural environment. These pressures were evaluated in development of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009) using available scientific data concerning inter alia habitat use, population size, distribution and ecology, and threats to the species' protection (e.g., via natural/biological sources, human sectoral activities, management gaps, etc). Long-finned pilot whale may be subject to a number of local and/or regional environmental pressures throughout its range in Irish waters (see 2.3, 2.6; DEHLG, 2009). However based on current data available none are considered to be of sufficient spatial or temporal impact on the species to be causing a significant deterioration in overall habitat quality in Ireland from a "good" status.
2.5.05 Short-term trend - Period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.5.06 Short-term trend - Trend direction	The trend for range in 2.3.4 is applied as a proxy for habitat.
2.5.07 Long-term trend - Period	A long-term trend period for this species is not considered appropriate, for reasons outlined in 2.3.3.
2.5.09 Area of suitable habitat for the species (km2)	Long-finned pilot whales have been widely recorded in Irish waters both historically and to the present day and the known habitats for this predominantly deep water species include waters overlying the continental shelf and occasionally even coastal waters. The Area of suitable habitat is therefore considered to be equal to the Habitat for the species.

Field label	Note
Species: 2029	**Long-finned pilot whale**
2.6 Main pressures - Pressure	In the development and preparation of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009), a comprehensive review of the pressures believed and/or documented to be acting on this species and/or its functional group (i.e., threats to their protection) was undertaken. The main pressures thought to be acting on this species are considered to occur primarily on a local or regional scale and/or on a temporary or intermittent basis (e.g., impacts arising from seasonal fisheries activity or seismic exploration; DEHLG, 2009). Since long-finned pilot whale distribution is likely to be predominantly offshore Atlantic in nature, the ranking given in most cases is one of low importance. Nevertheless where a pressure may be regionally intensive the ranking given is one of medium importance due to the species' common occurrence in deep water habitats, conferring greater physiological constraints on individual animals, and potential sensitivity to underwater noise in such circumstances. It should be noted that in relation to seismic exploration, which tends to occur on a local or occasionally regional scale in the waters of Ireland's EEZ and is comparatively low in coverage relative to several other member states, a robust regulatory and management regime applies in order to avoid potentially significant impacts on all species of marine mammal. This species is also still subject to hunting in part of its northeast Atlantic range (i.e., Faroe Islands) while the impact on the species of pollutant burdens or changes in sea temperature and other abiotic factors in the marine environment cannot be discounted.
2.7 Threats - Threat	There is no evidence to suggest a change in the main pressures thought to be acting on this species in the near future. However surveillance of the species and the pressures potentially acting upon it will continue into the future, while the application of strong management measures (e.g., via the statutory/regulatory process) to avoid potentially significant impacts is also expected to continue.
2.8.01 Justification of % thresholds for trends	A detailed analysis of the statistical ability and power to robustly determine population trends for cetacean species occurring in western European waters is under way via the Joint Cetacean Protocol (JCP) project in the UK. This phased work is due for completion in 2013 and it will inform whether and for which species the measurement of population trends may be possible based on survey data from a range of sources.
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The long-finned pilot whale is widely recorded in Irish waters from deep oceanic areas and those overlying the continental shelf and slope to coastal waters on occasion. Hence the Range is considered to be favourable.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	While robust data on long-finned pilot whale population size and trends in Irish waters as a whole are not available, knowledge of the species' seasonal distribution and summer abundance in western European waters has improved significantly since the Directive came into force. This indicates that long-finned pilot whales number in the tens of thousands regionally (see 2.4). Given the available estimates and the species' wide occurrence in Irish offshore waters, the population parameter is considered favourable.
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The habitat for this species in Ireland is considered favourable, as it supports a favourable population across a very large marine area.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	A number of pressures have been identified. While the effect of these pressures may act on a temporary and/or regional scale and some are likely to continue to act as pressures into the future, none is considered to be of sufficient magnitude to be causing an adverse impact on populations of long-finned pilot whale in Irish waters. Ongoing threats as listed or identified into the future via surveillance will be managed appropriately. Hence the future prospects for the species are considered favourable.

Field label	Note
Species: 2029	**Long-finned pilot whale**
2.9.05 Overall assessment of Conservation Status	Based on the assessments for Range, Population, Habitat and Future Prospects parameters, the overall conclusion is that the conservation status of long-finned pilot whale in Ireland is considered "Favourable". This overall result is an improvement on the previous Article 17 assessment and also across all four assessment parameters, due to improved knowledge.

Long-finned pilot whale - *Globicephala melas* (2029)
Article 17 Assessment 2013



Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**2030**
0.2.2 Species name	**Grampus griseus**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	Risso's dolphin

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	1995-2012
1.1.4 Additional map	No
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Marine Atlantic (MATL)

2.2 Published sources

Taylor, B.L., Baird, R., Barlow, J., Dawson, S.M., Ford, J.K.B., Mead, J.G., Notarbartolo di Sciara, G., Wade, P. & Pitman, R.L. (2012). Grampus griseus. In IUCN 2012. IUCN Red List of Threatened Species. Version 2012.2. http://www.iucnredlist.org.

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Berrow, S.D., Whooley, P., O'Connell, M. & Wall, D. (2010). Irish Cetacean Review (2000-2009). Irish Whale and Dolphin Group, Kilrush, Co. Clare. 60pp.

Wall, D., O'Brien, J., Kavanagh, L., Ryan, C., Hunt, L. & Fennelly, S. (2012). Monitoring of spatial and temporal habitat use and abundance of cetaceans. In S.D. Berrow, J.O'Brien, I. O'Connor, D. McGrath & D. Wall. Marine Mammals and Megafauna in Irish Waters – behaviour, distribution and habitat use. Final project report for Grant-Aid Agreement No. PBA/ME/07/005(02) under the Sea Change Strategy with the support of the Marine Institute, the Marine Research Sub-Programme of the National Development Plan 2007–2013 and the Department of Arts, Heritage and the Gaeltacht. Galway-Mayo Institute of Technology, Galway. p.1-187.

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2.3 Range

2.3.1 Surface area - Range (km²)	367500	
2.3.2 Method - Range surface area	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	367500
	operator	N/A
	unknown	No
	method	The range value derived from the range map referred to in 1.1.5 is considered to be the baseline for this species. As there is no evidence of a decline since the Directive came into force the current range is set as the FRR.
2.3.10 Reason for change	Improved knowledge/more accurate data	

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2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit: number of individuals (i) min: 19 max:
2.4.2 Population size (other than individuals)	Unit: N/A min: max:
2.4.3 Additional information	Definition of locality: Conversion method: Problems: While groups of up to 10 Risso's dolphins are not uncommon during individual sighting encounters and occasionally upwards of 19-20 individuals may be recorded (IWDG, 2012 - unpublished data), the relative infrequency in sightings from Irish waters and absence of any coherent population estimate for European or northeast Atlantic waters preclude the estimation of a maximum population size.
2.4.4 Year or period	2001-2012
2.4.5 Method – population size	Estimate based on partial data with some extrapolation and/or modelling (2)
2.4.6 Short-term trend period	2001-2012
2.4.7 Short term trend direction	unknown (x)
2.4.8 Short-term trend magnitude	min: max: confidence interval:
2.4.9 Short-term trend method	Estimate based on expert opinion with no or minimal sampling (1)
2.4.10 Long-term trend period	
2.4.11 Long term trend direction	N/A
2.4.12 Long-term trend magnitude	min: max: confidence interval:
2.4.13 Long-term trend method	N/A
2.4.14 Favourable reference population	number: operator: N/A unknown: Yes method: Numerical data on Risso's dolphin population size and trends in Irish or European waters are not available although knowledge of the species' spatial and temporal occurrence has improved since the Directive came into force. The FRP for this species is therefore unknown.
2.4.15 Reason for change	Improved knowledge/more accurate data

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km^2)	367500
2.5.2 Year or period	2001-2012
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Good
2.5.4 b) Quality of habitat - method	The quality of habitat for this species was determined by consideration of the relevant direct and indirect pressures thought to be acting on the species and/or its functional group, and its habitat within its natural environment. These pressures were evaluated in development of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009) using available scientific data concerning inter alia habitat use, population size, distribution and ecology, and threats to the species' protection (e.g., via natural/biological sources, human sectoral activities, management gaps, etc).

2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	stable (0)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	367500
2.5.10 Reason for change	Improved knowledge/more accurate data

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	medium importance (M)	N/A
death or injury by collision (G05.11)	low importance (L)	N/A
Marine water pollution (H03)	low importance (L)	N/A
Noise nuisance, noise pollution (H06.01)	low importance (L)	N/A
Seismic exploration, explosions (H06.05)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A
Threats and pressures from outside the EU territory (XE)	low importance (L)	N/A
Threats and pressures from outside the Member State (XO)	low importance (L)	N/A

2.6.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	medium importance (M)	N/A
death or injury by collision (G05.11)	low importance (L)	N/A
Marine water pollution (H03)	low importance (L)	N/A
Noise nuisance, noise pollution (H06.01)	low importance (L)	N/A
Seismic exploration, explosions (H06.05)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A
Threats and pressures from outside the EU territory (XE)	low importance (L)	N/A
Threats and pressures from outside the Member State (XO)	low importance (L)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	Research into the appropriate use of statistics and a range of data sources for population trend analysis is currently under way. Until the results of this work become available, it is not considered scientifically valid to attempt to determine population trends.
2.8.2 Other relevant Information	
2.8.3 Trans-boundary assessment	Given the mobility of this marine species, and in particular the potential for seasonal movements in response to breeding requirements, prey distribution and abundance, and other natural processes, it is likely that individuals and/or groups of this species move between Irish waters and adjacent marine jurisdictions. A transboundary assessment in the next reporting period would allow a fuller appreciation of the range and status of this species.

2.9 Conclusions (assessment of conservation status at end of reporting period)

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

2.9.1 Range	assessment Favourable (FV) qualifiers N/A
2.9.2. Population	assessment Unknown (XX) qualifiers N/A
2.9.3. Habitat	assessment Favourable (FV) qualifiers N/A
2.9.4. Future prospects	assessment Unknown (XX) qualifiers N/A
2.9.5 Overall assessment of Conservation Status	Unknown (XX)
2.9.6 Overall trend in Conservation Status	N/A

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit N/A min max
3.1.2 Method used	N/A
3.1.3 Trend of population size within	N/A

3.2 Conservation Measures

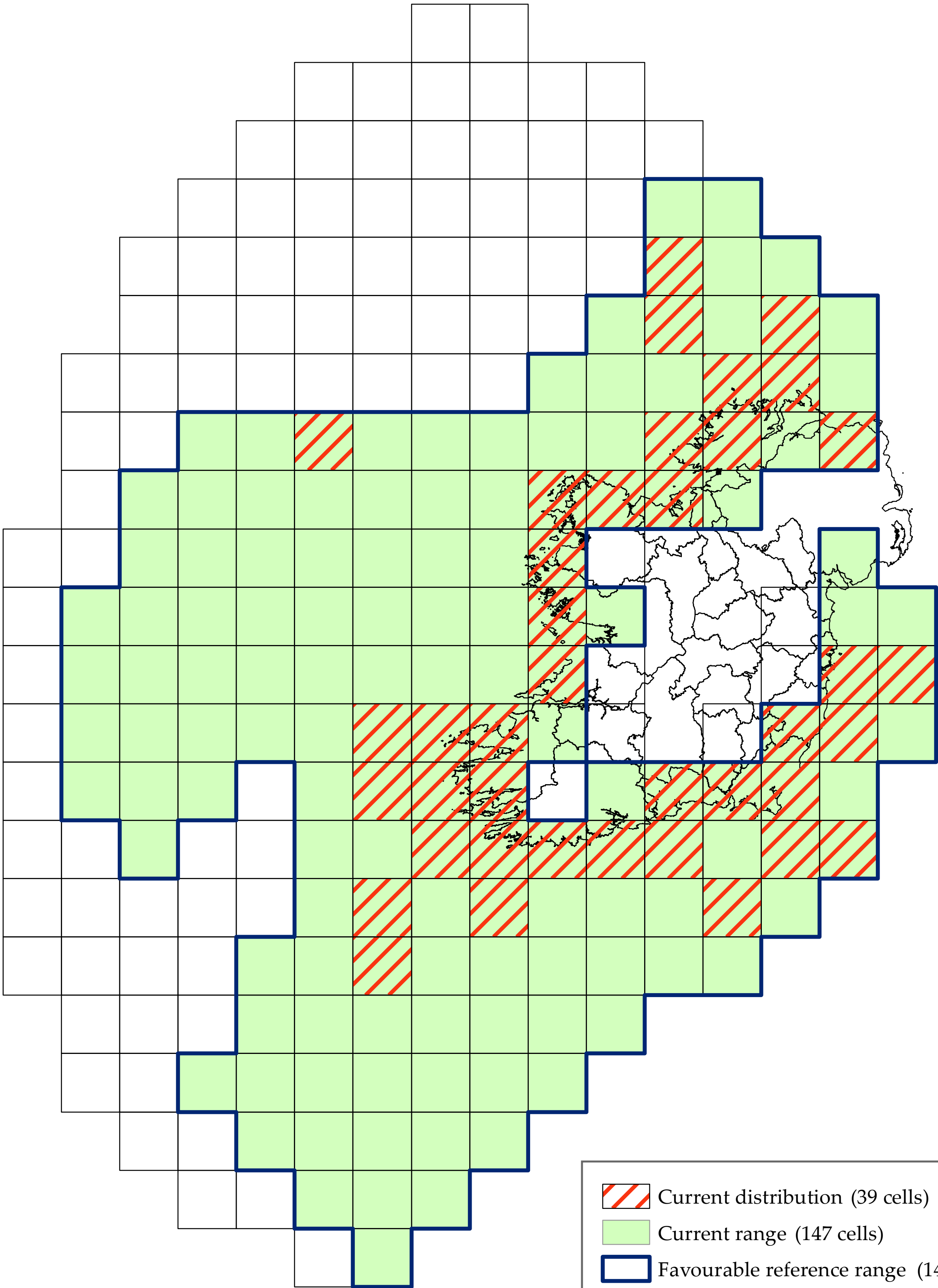
Field label	Note
Species: 2030	**Risso's dolphin**
0.1 Member State	Ireland
0.2.01 Species code	The Risso's dolphin is one of the larger dolphin species occurring in Irish waters with adults averaging up to 4.0m in body length. Found throughout the world's oceans and in the eastern Atlantic from Norway to South Africa (Taylor et al., 2012), it is classified as a species of Least Concern since its global range and abundance indicate that the species is well above the thresholds for a threatened category. Risso's dolphins are one of the least frequently recorded dolphin species in Irish waters however (Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012) although they are quite readily identifiable, bearing an unusually tall grey dorsal fin, no noticeable beak and with many individuals showing heavily scarred whitened dorsal surfaces, particularly in front of the dorsal fin. Although the species may conduct seasonal movements in some jurisdictions (DEHLG, 2009; Baird, 2009), separate breeding stocks and clear latitudinal patterns in movement by populations in the North Atlantic are not apparent (Baird, 2009). There is some evidence that western UK and Mediterranean populations may be genetically differentiated (Gaspari et al., 2007), with those sampled in the UK being less diverse genetically.
0.2.04 Common name	Risso's dolphin = Deilf liath
1.1.01 Distribution map	The distribution map presented for this species represents a significant proportion of all live sightings recorded during targeted scientific surveillance in Irish waters between 1994/95 and 2012. The surveillance programmes that contributed data to this projection are cited as follows: Pollock et al. (1997), Reid et al. (2003), Ó Cadhla et al. (2004) and Wall et al. (2013). These data and the results of other survey effort (e.g., SCANS-II, 2008; CODA, 2009; Berrow et al., 2010) were integrated into the development of the species range map presented under section 1.1.5. This distribution map for the species has been drawn in 50km x 50km resolution and is mapped in the LAEA projection.
1.1.02 Method used - map	Over the last 2-3 decades records of the occurrence of this species in Irish waters have been accumulating, providing a better insight into its population distribution. Simultaneous to more rigorous surveillance in the last 15-20 years Risso's dolphin records have continued to emerge, from deeper continental slope and continental shelf waters to the west and southwest of Ireland as well as in the Celtic Sea and the Irish Sea (Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012). The distribution of recent sightings along with regional sighting records obtained across three preceding decades (Berrow et al., 2002; Reid et al., 2003) indicate a predominant distribution in waters overlying the continental shelf and continental slope off the south, west and north coasts. Irish Sea records are also well documented however. While all reliable cetacean records obtained in Irish waters were not available for use in this exercise, the map drawn for this species provides a good sample of the species' observed distribution.
1.1.03 Year or period	The period selected for mapping the distribution of this species represents a period of intensive surveillance for cetaceans in Irish waters across a range of research and monitoring programmes.
1.1.05 Range map	The species' natural range in Irish waters is believed to be a small component of its wider North Atlantic range (DEHLG, 2009; Baird, 2009; Taylor et al., 2012). The range map provided consists of its recorded and likely natural range based on recent data (2001-2012) and expert judgement, and is partly derived from 1.1.1. It consists of a block of contiguous 50km x 50km grid cells distributed in Irish marine waters up to 1,000m deep and excluding enclosed shallow bays.
2.3.02 Method used - Surface area of Range	This figure has been derived from the range map referred to in 1.1.5.

Field label	Note
Species: 2030	**Risso's dolphin**
2.3.03 Short-term trend - Period	Prior to 1999-2000, survey effort targeting cetacean species in Irish offshore waters was comparatively limited in coverage, both spatially and temporally. Since 1999-2000 a number of dedicated multi-annual surveillance programmes for cetaceans have operated in Irish waters, with survey effort extending to the limits of Ireland's EEZ and beyond. Consequently, with regard to this species it is considered that the years 2001-2012 represent an appropriate period for the evaluation of short-term trends.
2.3.04 Short term trend - Trend direction	Sighting records from dedicated surveillance effort in Irish waters (Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012) provide no evidence of a decline in distribution/range in the recent past; therefore accordingly the short-term trend for range is considered to be stable.
2.3.06 Long-term trend - Period	A long-term trend period for this species is not considered appropriate, for reasons outlined in 2.3.3.
2.3.09 a) Favourable reference range - In km2	The range value derived from the range map referred to in 1.1.5 is considered to be the baseline for this species. As there is no evidence of a decline since the Directive came into force the current range is set as the FRR. [Note: (1) The species is thought to be wide-ranging with some element of seasonal variation therein while regional population components may be present year-round;nNevertheless the species' range in Irish waters is likely to represent only a component of its range in marine waters covered by the Directive and the northeast Atlantic Ocean; (2) There is an assumption that the current range in Irish waters is large enough (a) to encompass all of the ecological variation required by this species during its occurrences therein and (b) to contribute to the long-term survival of the species.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Additional sighting records of this readily identified dolphin species (e.g., DEHLG, 2009; Berrow et al., 2010; Wall et al., 2012) have been obtained since the previous reporting round. Along with previous data from a range of sources, this has resulted in an improved knowledge and ability to assess the range from that reported in 2007. There is no scientific reason to assume that the species was not similarly present in 2001-2006.
2.4.04 Year or period	The period 2001-2012 has been selected in order to represent the most current population information available for this species.
2.4.05 Method used - Population size	While groups of up to 10 Risso's dolphins are not uncommon during individual sighting encounters and occasionally upwards of 19-20 individuals may be recorded (IWDG, 2012 - unpublished data), the relative infrequency in sightings from Irish waters and absence of any coherent population estimate for European or northeast Atlantic waters preclude the estimation of a maximum population size.
2.4.06 Short-term trend - Period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.4.09 Short-term trend - Method used	Given that there are no population figures for western European waters before or since the Directive came into force, the reliable determination of short term population trend for this species is not possible.
2.4.10 Long-term trend - Period	A long-term trend period for this species is not considered appropriate for reasons outlined in 2.3.3.
2.4.14 d) Favourable reference population - Indicate method used to set reference value if other than operators	Robust data on Risso's dolphin population size or trends in Irish or European waters are not available. No broad-scale population estimates have yet been obtained for the northeast Atlantic based on either surveys of the continental shelf area (e.g., SCANS-II, 2008) or deeper oceanic waters (e.g., CODA, 2009). Since no relevant population figures have yet been derived for the species the FRP is therefore considered to be unknown.
2.5.01 Area estimation	The surface area estimate for range (derived from the range map referred to in 1.1.5) is used as a proxy for habitat surface area.
2.5.02 Year or period	The period 2001-2012 has been selected, consistent with 2.3.3.

Field label	Note
Species: 2030	**Risso's dolphin**
2.5.03 Method used Habitat for the species	Use of the range descriptor as a proxy for habitat is judged appropriate for this wide-ranging pelagic species.
2.5.04 b) Quality of the habitat - Explain how the quality was assessed	The quality of habitat for Risso's dolphin was determined by consideration of the relevant direct and indirect pressures thought to be acting on the species and/or its functional group, and its habitat within its natural environment. These pressures were evaluated in development of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009) using available scientific data concerning inter alia habitat use, population size, distribution and ecology, and threats to the species' protection (e.g., via natural/biological sources, human sectoral activities, management gaps, etc). Risso's dolphin may be subject to a number of local and/or regional environmental pressures throughout its range in Irish waters (see 2.3, 2.6; DEHLG, 2009). However based on current data available none are considered to be of sufficient spatial or temporal impact on the species to be causing a significant deterioration in overall habitat quality in Ireland from a "good" status.
2.5.05 Short-term trend - Period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.5.06 Short-term trend - Trend direction	The trend for range in 2.3.4 is applied as a proxy for habitat.
2.5.07 Long-term trend - Period	A long-term trend period for this species is not considered appropriate, for reasons outlined in 2.3.3.
2.5.09 Area of suitable habitat for the species (km2)	Risso's dolphins have been steadily recorded in Irish waters both historically and to the present day. While the species may indicate a preference for continental slope and deep water habitats elsewhere within its global range (Baird, 2009), the known and repeatedly detected habitats for this species in Ireland comprise waters overlying the continental shelf and slope and even coastal waters. The Area of suitable habitat is therefore considered to be equal to the Habitat for the species.
2.6 Main pressures - Pressure	In the development and preparation of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009), a comprehensive review of the pressures believed and/or documented to be acting on this species and/or its functional group (i.e., threats to their protection) was undertaken. The main pressures thought to be acting on this species are considered to occur primarily on a local or regional scale and/or on a temporary or intermittent basis (e.g., impacts arising from seasonal fisheries activity or seismic exploration; DEHLG, 2009). Since Risso's dolphin distribution is quite broadly continental shelf and slope in nature and the available sighting information indicates comparatively low numbers in Irish waters, where a pressure may be regionally intensive the ranking given is one of medium importance. This is also due to the species' common occurrence in continental slope habitats, conferring greater physiological constraints on individual animals, and potential sensitivity to underwater noise in such circumstances. It should be noted that in relation to seismic exploration, which tends to occur on a local or occasionally regional scale in the waters of Ireland's EEZ and is comparatively low in coverage relative to several other member states, a robust regulatory and management regime applies in order to avoid potentially significant impacts on all species of marine mammal. This species is also subject to occasional hunting in part of its northeast Atlantic range (i.e., Faroe Islands) while the impact on the species of pollutant burdens or changes in sea temperature and other abiotic factors in the marine environment cannot be discounted.
2.7 Threats - Threat	There is no evidence to suggest a change in the main pressures thought to be acting on this species in the near future. However surveillance of the species and the pressures potentially acting upon it will continue into the future, while the application of strong management measures (e.g., via the statutory/regulatory process) to avoid potentially significant impacts is also expected to continue.

Field label	Note
Species: 2030	**Risso's dolphin**
2.8.01 Justification of % thresholds for trends	A detailed analysis of the statistical ability and power to robustly determine population trends for cetacean species occurring in western European waters is under way via the Joint Cetacean Protocol (JCP) project in the UK. This phased work is due for completion in 2013 and it will inform whether and for which species the measurement of population trends may be possible based on survey data from a range of sources.
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The Risso's dolphin is widely recorded in Irish waters overlying the continental shelf and slope and also occurs in coastal waters. Hence the Range is considered to be favourable.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Data on Risso's dolphin population size or trends in Irish or European waters are not available. No broad-scale population estimates have yet been obtained for the northeast Atlantic based on either surveys of the continental shelf area or deeper oceanic waters. Since no relevant population figures have yet been derived for the species before or since the Directive came into force, the population parameter is considered unknown.
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The habitat for this species in Ireland is considered favourable. Risso's dolphins have been steadily recorded in Irish waters both historically and to the present day. While the species may indicate a preference for continental slope and deep water habitats elsewhere within its global range, the known and repeatedly detected habitats for this species in Ireland comprise waters overlying the continental shelf and slope and even coastal waters.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	A number of pressures have been identified. While the effect of these pressures may act on a temporary and/or regional scale and some are likely to continue to act as pressures into the future, the impacts on individuals or populations of Risso's dolphin in Irish waters are not well understood. This is largely due to limited data on its numbers and ecology within Ireland's marine area. While ongoing threats as listed or identified into the future via surveillance will be managed appropriately, the future prospects for the species are therefore considered to be unknown.
2.9.05 Overall assessment of Conservation Status	Based on the assessments for the Range, Population, Habitat and Future Prospects parameters, the overall conclusion is that the conservation status of Risso's dolphin in Ireland is considered "Unknown". This overall result is the same as in the previous Article 17 assessment due to limited ongoing information on the species' population ecology in Irish waters. However improvements are reported in the assessments for the Range and Habitat parameters, due to improved knowledge.

Risso's dolphin - *Grampus griseus* (2030)
Article 17 Assessment 2013



Current distribution (39 cells)
Current range (147 cells)
Favourable reference range (147 cells)

An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 25 50 75 100 km

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Map - Léarscáil
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Date - Dáta
11-06-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**2031**
0.2.2 Species name	**Lagenorhynchus acutus**
0.2.3 Alternative species scientific name	White-sided dolphin
0.2.4 Common name	Atlantic white-sided dolphin

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	1995-2012
1.1.4 Additional map	No
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Marine Atlantic (MATL)

2.2 Published sources

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Pollock, C.M., Reid, J.R., Webb, A. & Tasker, M.L. (1997). The distribution of seabirds and cetaceans in the waters around Ireland. JNCC Report No. 267. Joint Nature Conservation Committee, Peterborough. 167pp.

2.3 Range

2.3.1 Surface area - Range (km²)	545000	
2.3.2 Method - Range surface area	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	545000
	operator	N/A
	unknown	No
	method	The range value derived from the range map referred to in 1.1.5 is considered to be the baseline for this species. As there is no evidence of a decline since the Directive came into force the current range is set as the FRR.
2.3.10 Reason for change	Improved knowledge/more accurate data	

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2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit: number of individuals (i) min: 1134 max: 10015
2.4.2 Population size (other than individuals)	Unit: N/A min: max:
2.4.3 Additional information	Definition of locality: Conversion method: Problems: Evidence from multi-annual surveillance programmes (Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012) indicate that Atlantic white-sided dolphins occur widely in Irish waters and may do so throughout the year. However, recent estimates of cetacean species abundance in the waters overlying the western European continental slope and deeper oceanic waters (CODA, 2009) did not include measures for Atlantic white-sided dolphin, due to low sighting records. There were also insufficient numbers of sightings during the SCANS-II continental shelf survey (SCANS-II, 2008) to enable abundance estimation. Rough estimates for the entire range number 150,000-300,000 individuals, ca. 50,000 of which could be attributed to the western Atlantic and the remainder to the central and eastern North Atlantic (Hammond et al., 2008; Cipriano, 2009). Since the only previous population estimates for this species in Irish waters (Ó Cadhla et al., 2001; Ó Cadhla et al., 2004) were generated for a regional area of 120,000 sq.km within Ireland's EEZ (ca. 426,000 sq.km), it is considered that its minimum and maximum estimates of population size (i.e., lower and upper 95% CL) in Irish waters can be provided here but only as indicative and transient measures.
2.4.4 Year or period	2001-2012
2.4.5 Method – population size	Estimate based on partial data with some extrapolation and/or modelling (2)
2.4.6 Short-term trend period	2001-2012
2.4.7 Short term trend direction	unknown (x)
2.4.8 Short-term trend magnitude	min: max: confidence interval:
2.4.9 Short-term trend method	Estimate based on expert opinion with no or minimal sampling (1)
2.4.10 Long-term trend period	
2.4.11 Long term trend direction	N/A
2.4.12 Long-term trend magnitude	min: max: confidence interval:
2.4.13 Long-term trend method	N/A
2.4.14 Favourable reference population	number: operator: N/A unknown: Yes method: Robust data on Atlantic white-sided dolphin population trends in Irish waters are not available although knowledge of the species' wider distribution and summer abundance have improved since the Directive came into force. Nevertheless the use of any population figures as descriptors for FRP require further work. The FRP for this

species is therefore considered to be unknown.

2.4.15 Reason for change	Improved knowledge/more accurate data

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	545000
2.5.2 Year or period	2001-2012
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Good
2.5.4 b) Quality of habitat - method	The quality of habitat for this species was determined by consideration of the relevant direct and indirect pressures thought to be acting on the species and/or its functional group, and its habitat within its natural environment. These pressures were evaluated in development of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009) using available scientific data concerning inter alia habitat use, population size, distribution and ecology, and threats to the species' protection (e.g., via natural/biological sources, human sectoral activities, management gaps, etc).
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	stable (0)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	545000
2.5.10 Reason for change	Improved knowledge/more accurate data

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	medium importance (M)	N/A
death or injury by collision (G05.11)	low importance (L)	N/A
Marine water pollution (H03)	low importance (L)	N/A
Noise nuisance, noise pollution (H06.01)	low importance (L)	N/A
Seismic exploration, explosions (H06.05)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A
Threats and pressures from outside the EU territory (XE)	low importance (L)	N/A

2.6.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	medium importance (M)	N/A
death or injury by collision (G05.11)	low importance (L)	N/A
Marine water pollution (H03)	low importance (L)	N/A
Noise nuisance, noise pollution (H06.01)	low importance (L)	N/A
Seismic exploration, explosions (H06.05)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A
Threats and pressures from outside the EU territory (XE)	low importance (L)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	Research into the appropriate use of statistics and a range of data sources for population trend analysis is currently under way. Until the results of this work become available, it is not considered scientifically valid to attempt to determine population trends.
2.8.2 Other relevant Information	
2.8.3 Trans-boundary assessment	Given the mobility of this marine species, and in particular the potential for seasonal movements in response to breeding requirements, prey distribution and abundance, and other natural processes, it is likely that individuals and/or groups of this species move between Irish waters and adjacent marine jurisdictions. A transboundary assessment in the next reporting period would allow a fuller appreciation of the range and status of this species.

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.9.2. Population	assessment	Favourable (FV)
	qualifiers	N/A
2.9.3. Habitat	assessment	Favourable (FV)
	qualifiers	N/A
2.9.4. Future prospects	assessment	Favourable (FV)
	qualifiers	N/A
2.9.5 Overall assessment of Conservation Status	Favourable (FV)	
2.9.6 Overall trend in Conservation Status	N/A	

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	N/A		
	min		max	
3.1.2 Method used	N/A			
3.1.3 Trend of population size within	N/A			

3.2 Conservation Measures

Article 17 - SPECIES NOTES

Field label	Note
Species: **2031**	**Atlantic white-sided dolphin**
0.1 Member State	Ireland
0.2.01 Species code	The Atlantic white-sided dolphin is one of several medium-sized dolphin species occurring in Irish waters with adults averaging ca. 2.2-2.7m in body length. Confined to the North Atlantic Ocean, the species is predominantly found in cold temperate and sub-polar waters, in the northeastern Atlantic from Iceland and northern Norway south to the Bay of Biscay/west of the Iberian peninsula (Hammond et al., 2008; Cipriano, 2009). It is classified as a species of Least Concern since its broad North Atlantic range and abundance indicate that the species is well above the thresholds for a threatened category and no major threats have been identified. White-sided dolphins are frequently recorded in Irish Atlantic waters but less so coastally (Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012). The species can be difficult to identify at sea due to its body size, inconspicuous dorsal fin and a predominantly black/dark grey dorsal colouration that is a feature common to several dolphin species. However white-sided dolphins are quite readily identifiable when they break clear of the water surface showing their characteristic short stub-like beak, thick tail stock and horizontal bright white into sandy colour bands on the rear flanks of the body. Little is known of the species' population structure; separate breeding stocks, sub-populations or clear latitudinal patterns in movement by populations in the eastern North Atlantic are not apparent (Hammond et al., 2008; DEHLG, 2009).
0.2.04 Common name	Atlantic white-sided dolphin = Deilf bhánchliathánach Atlantach
1.1.01 Distribution map	The distribution map presented for this species represents a significant proportion of al live sightings recorded during targeted scientific surveillance in Irish waters between 1994/95 and 2012. The surveillance programmes that contributed data to this projection are cited as follows: Pollock et al. (1997), Reid et al. (2003), Ó Cadhla et al. (2004) and Wall et al. (2013). These data and the results of other survey effort (e.g., SCANS-II, 2008; CODA, 2009; Berrow et al., 2010) were integrated into the development of the species range map presented under section 1.1.5. This distribution map for the species has been drawn in 50km x 50km resolution and is mapped in the LAEA projection.
1.1.02 Method used - map	Over the last 2-3 decades records of the occurrence of this species in Irish waters have been accumulating, providing a better insight into its population distribution. Simultaneous to more rigorous surveillance in the last 15-20 years numerous Atlantic white-sided dolphin records have continued to emerge, predominantly from deep oceanic and continental shelf waters to the west and southwest of Ireland and occasionally in the Celtic Sea (Ó Cadhla et al., 2004; SCANS-II, 2008; CODA, 2009; Berrow et al., 2010; Wall et al., 2012). The distribution of recent sightings along with regional records obtained across three preceding decades (Weir et al., 2001; Berrow et al., 2002; Reid et al., 2003) indicate a predominant distribution in Atlantic waters >100m deep overlying the continental shelf, the continental slope and deep ocean basins (e.g., Rockall Trough, Porcupine Seabight). While all reliable cetacean records obtained in Irish waters were not available for use in this exercise, the map drawn for this species provides a good sample of the species' observed distribution.
1.1.03 Year or period	The period selected for mapping the distribution of this species represents a period of intensive surveillance for cetaceans in Irish waters across a range of research and monitoring programmes.

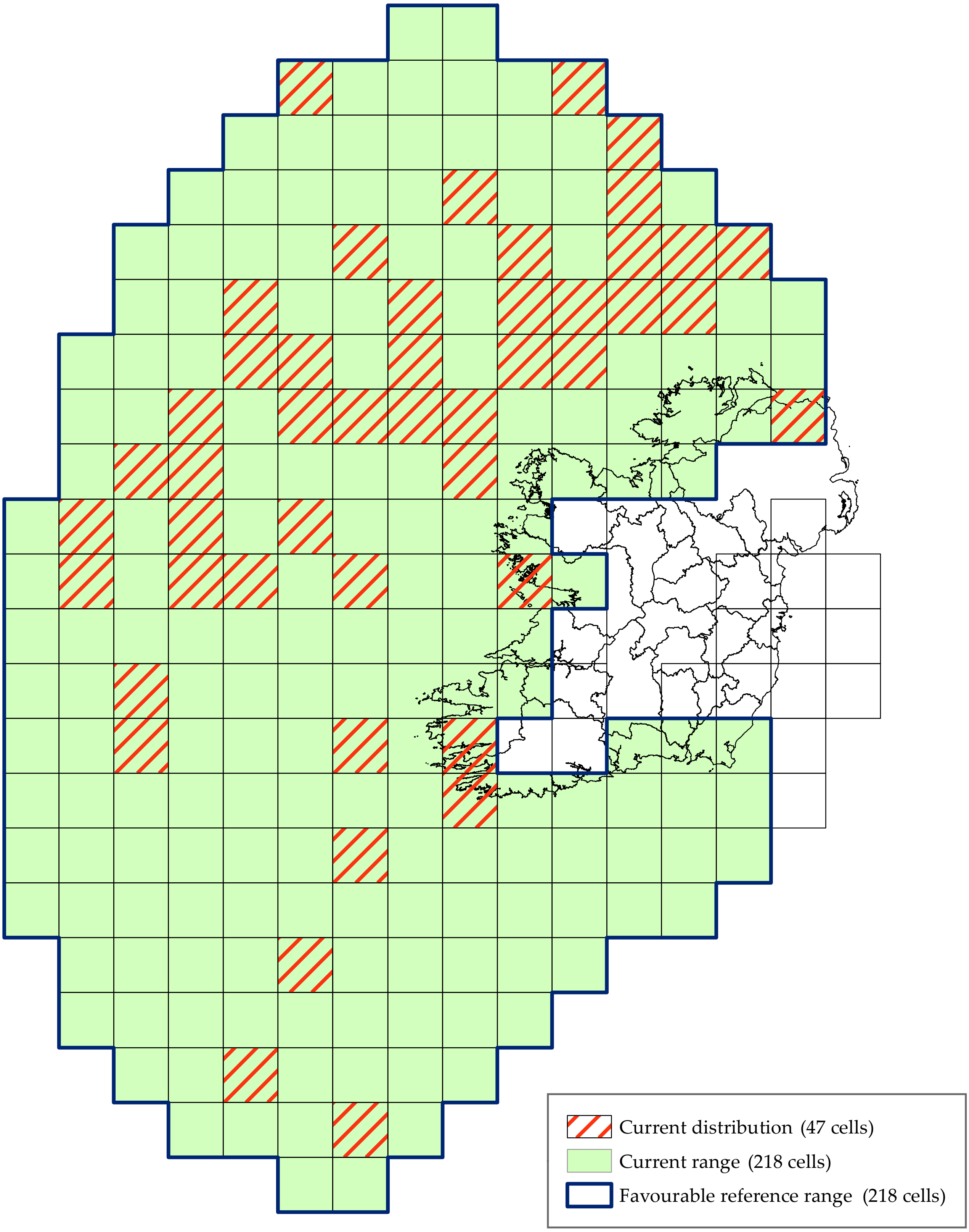
Field label	Note
Species: 2031	**Atlantic white-sided dolphin**
1.1.05 Range map	The species' natural range in Irish waters is a small component of its wider North Atlantic range (DEHLG, 2009). The range map provided consists of its recorded and likely natural range based on recent data (2001-2012) and expert judgement, and is partly derived from 1.1.1. It consists of a block of contiguous 50km x 50km grid cells distributed in Irish marine waters, excluding enclosed shallow bays and the Irish Sea (omitted due to an absence of records).
2.3.02 Method used - Surface area of Range	This figure has been derived from the range map referred to in 1.1.5.
2.3.03 Short-term trend - Period	Prior to 1999-2000, survey effort targeting cetacean species in Irish offshore waters was comparatively limited in coverage, both spatially and temporally. Since 1999-2000 a number of dedicated multi-annual surveillance programmes for cetaceans have operated in Irish waters, with survey effort extending to the limits of Ireland's EEZ and beyond. Consequently, with regard to this species it is considered that the years 2001-2012 represent an appropriate period for the evaluation of short-term trends.
2.3.04 Short term trend - Trend direction	Sighting records from dedicated surveillance effort in Irish waters (Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012) provide no evidence of a decline in distribution/range in the recent past; therefore accordingly the short- term trend for range is considered to be stable.
2.3.06 Long-term trend - Period	A long-term trend period for this species is not considered appropriate, for reasons outlined in 2.3.3.
2.3.09 a) Favourable reference range - In km2	The range value derived from the range map referred to in 1.1.5 is considered to be the baseline for this species. As there is no evidence of a decline since the Directive came into force the current range is set as the FRR. [Note: (1) The species is thought to be wide-ranging with some element of seasonal variation therein while regional population components may be present year-round; nevertheless the species' range in Irish waters is likely to represent only a component of its range in marine waters covered by the Directive and the northeast Atlantic Ocean; (2) There is an assumption that the current range in Irish waters is large enough (a) to encompass all of the ecological variation required by this species during its occurrences therein and (b) to contribute to the long-term survival of the species.]
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Additional sighting records of this predominantly Atlantic dolphin species (e.g., Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012) have been obtained since the previous reporting round. Along with previous data from a range of sources, this has resulted in an improved knowledge and ability to assess the range from that reported in 2007. There is no scientific reason to assume that the species was not similarly present in 2001-2006.
2.4.04 Year or period	The period 2001-2012 has been selected in order to represent the most current population information available for this species.

Field label	Note
Species: 2031	**Atlantic white-sided dolphin**
2.4.05 Method used - Population size	Evidence from multi-annual surveillance programmes (Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012) indicate that Atlantic white-sided dolphins occur widely in Irish waters and may do so throughout the year. However, recent estimates of cetacean species abundance in the waters overlying the western European continental slope and deeper oceanic waters (CODA, 2009) did not include figures for Atlantic white-sided dolphin, due to low sighting records. There were also insufficient numbers of sightings during the SCANS-II continental shelf survey (SCANS-II, 2008) to enable abundance estimation. Rough estimates for the entire range number 150,000-300,000 individuals, ca. 50,000 of which could be attributed to the western Atlantic and the remainder to the central and eastern North Atlantic (Hammond et al., 2008; Cipriano, 2009). Since the only previous population estimates for this species in Irish waters (Ó Cadhla et al., 2001; Ó Cadhla et al., 2004) were generated for a regional area of 120,000 sq.km within Ireland's EEZ (ca. 426,000 sq.km), it is considered that its minimum and maximum estimates of population size (i.e., lower and upper 95% CL) in Irish waters can be provided here but only as indicative and transient figures.
2.4.06 Short-term trend - Period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.4.09 Short-term trend - Method used	There is little evidence of growth or decline in the northeast Atlantic population(s) of Atlantic white-sided dolphin, although general assessments of overall population size in the northeast and North Atlantic indicate that the species is in a healthy state (Hammond et al., 2008; Cipriano, 2009; DEHLG, 2009). Given that there are no comprehensive robust figures for western European waters since the Directive came into force and only a single summer estimate for a portion of Irish waters, the reliable determination of short-term population trend for this species is not possible.
2.4.10 Long-term trend - Period	A long-term trend period for this species is not considered appropriate for reasons outlined in 2.3.3.
2.4.14 d) Favourable reference population - Indicate method used to set reference value if other than operators	Robust data on Atlantic white-sided dolphin population trends in Irish waters are not available. However a regional abundance estimate was previously derived for a 120,000 sq.km area of Irish Atlantic waters in mid-summer (Ó Cadhla et al., 2001; Ó Cadhla et al., 2004). While the population figures derived represent the first geographically relevant estimates since the Directive came into force, they did not cover the full known range of the species in Irish waters, they were also captured from a short snapshot in time, and the associated Lower and Upper 95% Confidence Limits are significantly different. Consequently the development of descriptors for FRP require considerably further work and the FRP for this species is considered to be unknown.
2.5.01 Area estimation	The surface area estimate for range (derived from the range map referred to in 1.1.5) is used as a proxy for habitat surface area.
2.5.02 Year or period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.5.03 Method used Habitat for the species	Use of the range descriptor as a proxy for habitat is judged appropriate for this wide-ranging pelagic species.

Species:	2031	Atlantic white-sided dolphin
2.5.04 b) Quality of the habitat - Explain how the quality was assessed		The quality of habitat for Atlantic white-sided dolphin was determined by consideration of the relevant direct and indirect pressures thought to be acting on the species and/or its functional group, and its habitat within its natural environment. These pressures were evaluated in development of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009) using available scientific data concerning inter alia habitat use, population size, distribution and ecology, and threats to the species' protection (e.g., via natural/biological sources, human sectoral activities, management gaps, etc). Atlantic white-sided dolphin may be subject to a number of local and/or regional environmental pressures throughout its range in Irish waters (see 2.3, 2.6; DEHLG, 2009). However based on current data available none are considered to be of sufficient spatial or temporal impact on the species to be causing a significant deterioration in overall habitat quality in Ireland from a "good" status.
2.5.05 Short-term trend - Period		The period 2001-2012 has been selected, consistent with 2.3.3.
2.5.06 Short-term trend - Trend direction		The trend for range in 2.3.4 is applied as a proxy for habitat.
2.5.07 Long-term trend - Period		A long-term trend period for this species is not considered appropriate, for reasons outlined in 2.3.3.
2.5.09 Area of suitable habitat for the species (km2)		Atlantic white-sided dolphins have been widely recorded in Irish waters both historically and to the present day and the known habitats for this predominantly Atlantic species include waters overlying the deeper ocean basins, the continental slope, continental shelf and occasionally even coastal waters. The Area of suitable habitat is therefore considered to be equal to the Habitat for the species.
2.6 Main pressures - Pressure		In the development and preparation of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009), a comprehensive review of the pressures believed and/or documented to be acting on this species and/or its functional group (i.e., threats to their protection) was undertaken. The main pressures thought to be acting on this species are considered to occur primarily on a local or regional scale and/or on a temporary or intermittent basis (e.g., impacts arising from seasonal fisheries activity or seismic exploration; DEHLG, 2009). Since Atlantic white-sided dolphin distribution is very broad in nature, where a pressure may be regionally intensive the ranking given is one of medium importance. It should be noted that in relation to seismic exploration, which tends to occur on a local or occasionally regional scale in the waters of Ireland's EEZ and is comparatively low in coverage relative to several other member states, a robust regulatory and management regime applies in order to avoid potentially significant impacts on all species of marine mammal. This species is also subject to occasional hunting in part of its northeast Atlantic range (i.e., Faroe Islands) while the impact on the species of pollutant burdens or changes in sea temperature and other abiotic factors in the marine environment cannot be discounted.
2.7 Threats - Threat		There is no evidence to suggest a change in the main pressures thought to be acting on this species in the near future. However surveillance of the species and the pressures potentially acting upon it will continue into the future, while the application of strong management measures (e.g., via the statutory/regulatory process) to avoid potentially significant impacts is also expected to continue.
2.8.01 Justification of % thresholds for trends		A detailed analysis of the statistical ability and power to robustly determine population trends for cetacean species occurring in western European waters is under way via the Joint Cetacean Protocol (JCP) project in the UK. This phased work is due for completion in 2013 and it will inform whether and for which species the measurement of population trends may be possible based on survey data from a range of sources.

Field label	Note
Species: 2031	**Atlantic white-sided dolphin**
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The Atlantic white-sided dolphin is widely recorded in Irish waters from deep oceanic areas to coastal waters. Hence the Range is considered to be favourable.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	There is little evidence of growth or decline in the northeast Atlantic population(s) of Atlantic white-sided dolphin, although general assessments of overall population size in the northeast and North Atlantic indicate that the species is in a healthy state. While the status, distribution and origin/stock identity of those dolphins occurring in Irish waters is poorly understood it is considered likely that they are part of the larger wide-ranging stocks distributed off western Europe. Therefore the population parameter is considered favourable.
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The habitat for this species in Ireland is considered favourable, as it supports a favourable population across a very large marine area.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	A number of pressures have been identified. While the effect of these pressures may act on a temporary and/or regional scale and some are likely to continue to act as pressures into the future, none is considered to be of sufficient magnitude to be causing an adverse impact on populations of Atlantic white-sided dolphin in Irish waters. Ongoing threats as listed or identified into the future via surveillance will be managed appropriately. Hence the future prospects for the species are considered
2.9.05 Overall assessment of Conservation Status	Based on the assessments for Range, Population, Habitat and Future Prospects parameters, the overall conclusion is that the conservation status of Atlantic white-sided dolphin in Ireland is considered "Favourable". This overall result is the same as in the previous Article 17 assessment while an improvement was noted in the population parameter (from "Unknown" to "Favourable") given information that overall regional populations are in a healthy state.

White-sided dolphin - *Lagenorhynchus acutus* (2031)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 25 50 75 100 km

N
Map - Léarscáil
V 1.0
Date - Dáta
11-06-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**2032**
0.2.2 Species name	**Lagenorhynchus albirostris**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	White-beaked dolphin

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	1995-2012
1.1.4 Additional map	No
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region: **Marine Atlantic (MATL)**

2.2 Published sources:

Kinze, C.C. (2009). White-beaked dolphin. Lagenorhynchus albirostris. In W.F. Perrin, B. Würsig, J.G.M. Thewissen (eds.). Encyclopedia of Marine Mammals – 2nd edition. Academic Press, Elsevier Inc. p.1255-1258.

Hammond, P.S., Bearzi, G., Bjørge, A., Forney, K.A., Karczmarski, L., Kasuya, T., Perrin, W.F., Scott, M.D., Wang, J.Y., Wells, R.S. & Wilson, B. (2012). Lagenorhynchus albirostris. In IUCN 2012. IUCN Red List of Threatened Species. Version 2012.2. http://www.iucnredlist.org.

Ó Cadhla, O., Mackey, M., Aguilar de Soto, N., Rogan, E. & Connolly, N. (2004). Cetaceans and Seabirds of Ireland's Atlantic Margin. Volume II - Cetacean distribution and abundance. Report on research carried out under the Irish Petroleum Infrastructure Programme (PIP): Rockall Studies Group (RSG) projects 98/6 and 00/13, Porcupine Studies Group project P00/15 and Offshore Support Group (OSG) project 99/38. 82pp.

DEHLG. (2009). Conservation Plan for Cetaceans in Irish Waters. Department of the Environment, Heritage and Local Government, 7 Ely Place, Dublin. 97pp.

Berrow, S.D., Whooley, P., O'Connell, M. & Wall, D. (2010). Irish Cetacean Review (2000-2009). Irish Whale and Dolphin Group, Kilrush, Co. Clare. 60pp.

Wall, D., O'Brien, J., Kavanagh, L., Ryan, C., Hunt, L. & Fennelly, S. (2012). Monitoring of spatial and temporal habitat use and abundance of cetaceans. In S.D. Berrow, J.O'Brien, I. O'Connor, D. McGrath & D. Wall. Marine Mammals and Megafauna in Irish Waters – behaviour, distribution and habitat use. Final project report for Grant-Aid Agreement No. PBA/ME/07/005(02) under the Sea Change Strategy with the support of the Marine Institute, the Marine Research Sub-Programme of the National Development Plan 2007–2013 and the Department of Arts, Heritage and the Gaeltacht. Galway-Mayo Institute of Technology, Galway. p.1-187.

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Weir, C.R., Pollock, C., Cronin, C. & Taylor, S. (2001). Cetaceans of the Atlantic frontier, north and west of Scotland. Continental Shelf Research 21, 1047-1071.

Berrow, S.D., Whooley, P. & Ferriss, S. (2002). Irish Whale and Dolphin Group Cetacean Sighting Review (1991-2001). Irish Whale and Dolphin Group, Kilrush, Co. Clare. 34 pp.

Reid, J.B., Evans, P.G.H. & Northridge, S.P. (2003). Atlas of Cetacean Distribution in North-west European Waters. Joint Nature Conservation Committee, Peterborough, 76pp.

CODA (2009). Cetacean offshore distribution and abundance in the European Atlantic (CODA). Sea Mammal Research Unit, Gatty Marine Laboratory, University of St Andrews, St Andrews, Fife, KY16 8LB. 43pp.

Wall, D., Murray, C., O'Brien, J., Kavanagh, L., Wilson, C., Ryan, C., Glanville, B., Williams, D., Enlander, I., O'Connor, I., McGrath, D., Whooley, P. & Berrow, S. (2013). Atlas of the distribution and relative abundance of marine mammals in Irish offshore waters 2005 - 2011. Irish Whale and Dolphin Group, Kilrush, Co. Clare. 62pp.

Pollock, C.M., Reid, J.R., Webb, A. & Tasker, M.L. (1997). The distribution of seabirds and cetaceans in the waters around Ireland. JNCC Report No. 267. Joint Nature Conservation Committee, Peterborough. 167pp.

2.3 Range

2.3.1 Surface area - Range (km²)	450000	
2.3.2 Method - Range surface area	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	450000
	operator	N/A
	unknown	No
	method	The range value derived from the range map referred to in 1.1.5 is considered to be the baseline for this species. As there is no evidence of a decline since the Directive came into force the current range is set as the FRR.
2.3.10 Reason for change	Improved knowledge/more accurate data	

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	number of individuals (i)		
	min	1192	max	44589

2.4.2 Population size (other than individuals)	Unit	N/A
	min	max
2.4.3 Additional information	Definition of locality	
	Conversion method	
	Problems	Evidence from multi-annual surveillance programmes (Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012) indicate that white-beaked dolphins can occur widely in Irish waters, although recorded distribution is predominantly Atlantic in nature. Wider-scale abundance in the northeast Atlantic may exceed 100,000 individuals (Hammond et al., 2012). Recent estimates of total abundance in waters overlying the western European continental shelf numbered approximately 22,700 animals (95%CL = 10,341 - 49,670; SCANS-II, 2008) with the majority of sightings occurring in the North Sea and in regional survey blocks off northern/western Scotland to western Ireland. In seeking to approximate population size range for Irish waters from these broad-scale datasets, there are significant difficulties due (i) to the species' wide pelagic distribution throughout Atlantic and western European waters making jurisdictional separation somewhat arbitrary, (ii) to problems associated with the narrow temporal focus of the limited abundance estimation surveys undertaken (e.g., one month in one season in one year, or separate years for coverage of shelf and deeper oceanic waters), and (iii) to high CVs (i.e., estimation uncertainty) particularly from regions where recorded numbers of sightings have been low. The minimum and maximum population estimates presented for this species are based on the summation of regional estimates presented in SCANS-II (2008) and they assume the free ranging of animals across and within the regions concerned (i.e., from western Ireland and the Irish Sea extending to northern/western Scotland, but excluding the North Sea). In the case of this species, summer abundance in Irish waters is likely to be better represented by the lower end of the population size range given.
2.4.4 Year or period	2001-2012	
2.4.5 Method – population size	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.4.6 Short-term trend period	2001-2012	
2.4.7 Short term trend direction	unknown (x)	
2.4.8 Short-term trend magnitude	min	max / confidence interval
2.4.9 Short-term trend method	Estimate based on expert opinion with no or minimal sampling (1)	
2.4.10 Long-term trend period		

2.4.11 Long term trend direction	N/A		
2.4.12 Long-term trend magnitude	min	max	confidence interval
2.4.13 Long-term trend method	N/A		
2.4.14 Favourable reference population	number		
	operator	N/A	
	unknown	Yes	
	method	Robust data on white-beaked dolphin population trends in Irish waters are not available although knowledge of the species' wider distribution and summer abundance have improved since the Directive came into force. Nevertheless the use of any population figures as descriptors for FRP require further work. The FRP for this species is therefore considered to be unknown.	
2.4.15 Reason for change	Improved knowledge/more accurate data		

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	450000
2.5.2 Year or period	2001-2012
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Good
2.5.4 b) Quality of habitat - method	The quality of habitat for this species was determined by consideration of the relevant direct and indirect pressures thought to be acting on the species and/or its functional group, and its habitat within its natural environment. These pressures were evaluated in development of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009) using available scientific data concerning inter alia habitat use, population size, distribution and ecology, and threats to the species' protection (e.g., via natural/biological sources, human sectoral activities, management gaps, etc).
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	stable (0)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	450000
2.5.10 Reason for change	Improved knowledge/more accurate data

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	low importance (L)	N/A
death or injury by collision (G05.11)	low importance (L)	N/A
Marine water pollution (H03)	low importance (L)	N/A
Noise nuisance, noise pollution (H06.01)	low importance (L)	N/A
Seismic exploration, explosions (H06.05)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A
Threats and pressures from outside the EU territory (XE)	low importance (L)	N/A

2.6.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	low importance (L)	N/A
death or injury by collision (G05.11)	low importance (L)	N/A
Marine water pollution (H03)	low importance (L)	N/A
Noise nuisance, noise pollution (H06.01)	low importance (L)	N/A
Seismic exploration, explosions (H06.05)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A
Threats and pressures from outside the EU territory (XE)	low importance (L)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	Research into the appropriate use of statistics and a range of data sources for population trend analysis is currently under way. Until the results of this work become available, it is not considered scientifically valid to attempt to determine population trends.
2.8.2 Other relevant Information	
2.8.3 Trans-boundary assessment	Given the mobility of this marine species, and in particular the potential for seasonal movements in response to breeding requirements, prey distribution and abundance, and other natural processes, it is likely that individuals and/or groups of this species move between Irish waters and adjacent marine jurisdictions. A transboundary assessment in the next reporting period would allow a fuller appreciation of the range and status of this species.

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.9.2. Population	assessment	Favourable (FV)
	qualifiers	N/A
2.9.3. Habitat	assessment	Favourable (FV)
	qualifiers	N/A
2.9.4. Future prospects	assessment	Favourable (FV)
	qualifiers	N/A
2.9.5 Overall assessment of Conservation Status	Favourable (FV)	
2.9.6 Overall trend in Conservation Status	N/A	

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	N/A	
	min		max
3.1.2 Method used	N/A		
3.1.3 Trend of population size within	N/A		

3.2 Conservation Measures

Field label	Note
Species: 2032	**White-beaked dolphin**
0.1 Member State	Ireland
0.2.01 Species code	The white-beaked dolphin is one of several medium-sized dolphin species occurring in Irish waters with adults averaging between 2.5-3.1m in body length. Confined to the North Atlantic Ocean, the species is predominantly found in cold temperate and sub-polar waters, in the northeastern Atlantic from Iceland and northern Norway south to the Bay of Biscay (Kinze, 2009; Hammond et al., 2012). It is classified as a species of Least Concern since its broad North Atlantic range and abundance indicate that the species is well above the thresholds for a threatened category and no major threats have been identified. White-beaked dolphins are regularly recorded in Irish Atlantic waters and may be also observed coastally (Ó Cadhla et al., 2004; DEHLG, 2009; Berrow et al., 2010; Wall et al., 2012). The species can be difficult to identify at sea due to its body size and a predominantly black/dark grey dorsal colouration that is a feature common to several dolphin species. However white-beaked dolphins are quite readily identifiable at close range or when they break clear of the water surface showing their characteristic short stub-like white/grey beak, conspicuously tall dorsal fin relative to body size, a stocky appearance and large pale white-coloured bands or patches on the flanks of the body and behind the dorsal fin. Little is known of the species' population structure although morphological differences have been described between individuals sampled from the eastern and western Atlantic (Kinze, 2009; Hammond et al., 2012); separate breeding stocks, sub-populations or clear latitudinal patterns in movement by populations in the eastern North Atlantic are not apparent (DEHLG, 2009; Kinze, 2009).
0.2.04 Common name	White-beaked dolphin = Deilf shocbhán
1.1.01 Distribution map	The distribution map presented for this species represents a significant proportion of all live sightings recorded during targeted scientific surveillance in Irish waters between 1994/95 and 2012. The surveillance programmes that contributed data to this projection are cited as follows: Pollock et al. (1997), Reid et al. (2003), Ó Cadhla et al. (2004) and Wall et al. (2013). These data and the results of other survey effort (e.g., SCANS-II, 2008; CODA, 2009; Berrow et al., 2010) were integrated into the development of the species range map presented under section 1.1.5. This distribution map for the species has been drawn in 50km x 50km resolution and is mapped in the LAEA projection.
1.1.02 Method used - map	Over the last 2-3 decades records of the occurrence of this species in Irish waters have been accumulating, providing a better insight into its population distribution. Simultaneous to more rigorous surveillance in the last 15-20 years white-beaked dolphin records have continued to emerge, predominantly from continental shelf and continental slope waters to the north, west and southwest of Ireland and occasionally in the Celtic Sea (Ó Cadhla et al., 2004; SCANS-II, 2008; Berrow et al., 2010; Wall et al., 2012). The distribution of recent sightings along with regional records obtained across three preceding decades (Weir et al., 2001; Berrow et al., 2002; Reid et al., 2003) indicate a predominant distribution in Atlantic waters overlying the continental shelf and continental slope, particularly those <1,000m in depth. There are few sighting records from the Irish Sea. While all reliable cetacean records obtained in Irish waters were not available for use in this exercise, the map drawn for this species provides a good sample of the species' observed distribution.
1.1.03 Year or period	The period selected for mapping the distribution of this species represents a period of intensive surveillance for cetaceans in Irish waters across a range of research and monitoring programmes.

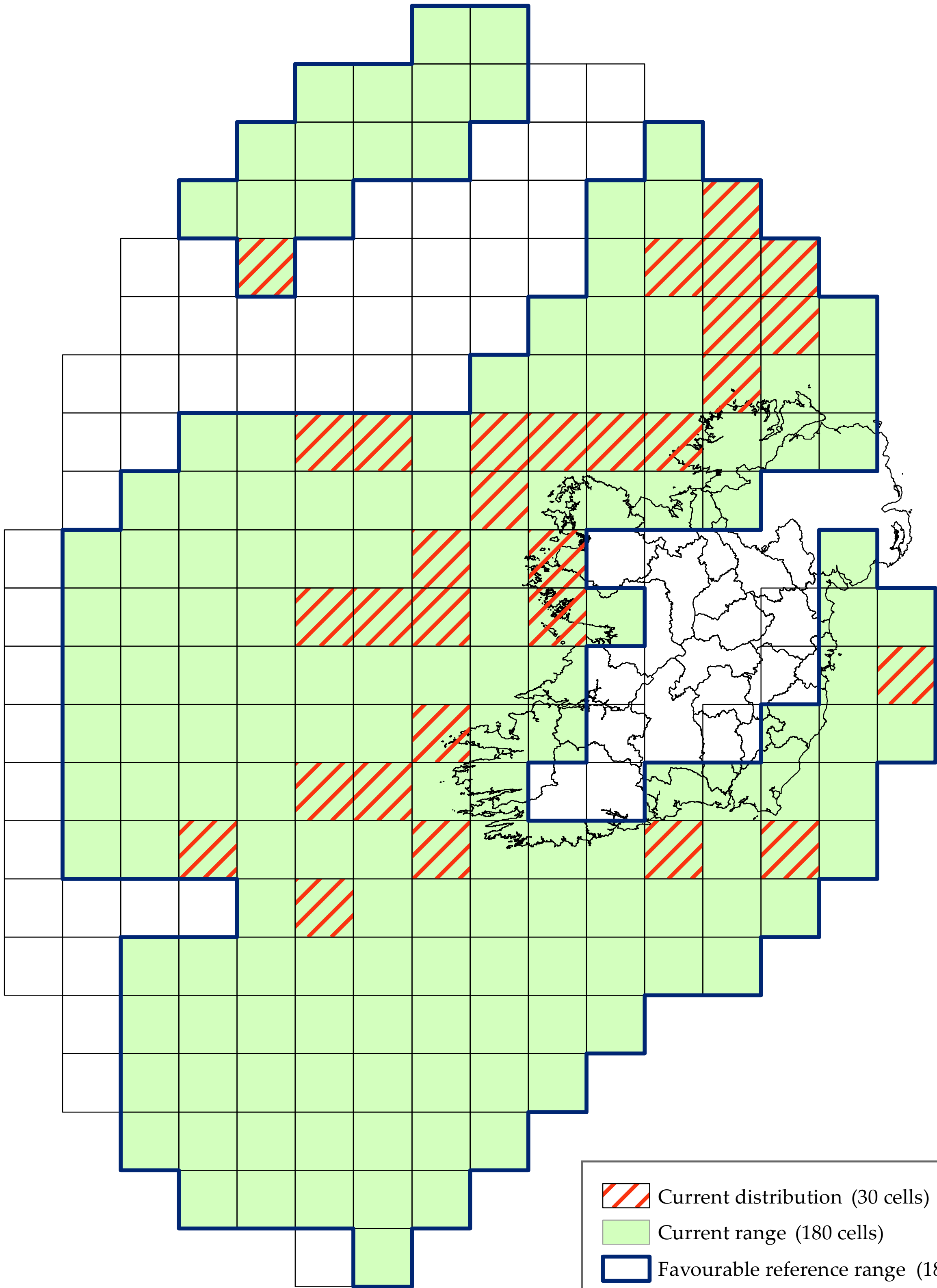
Field label	Note
Species: 2032	**White-beaked dolphin**
1.1.05 Range map	The species' natural range in Irish waters is a small component of its wider North Atlantic range (DEHLG, 2009; Kinze, 2009). The range map provided consists of its recorded and likely natural range based on recent data (2001-2012) and expert judgement, and is partly derived from 1.1.1. It consists of a block of contiguous 50km x 50km grid cells distributed in Irish marine waters up to 2,000m deep, including the eastern margin of the Rockall Bank and excluding enclosed shallow bays.
2.3.02 Method used - Surface area of Range	This figure has been derived from the range map referred to in 1.1.5.
2.3.03 Short-term trend - Period	Prior to 1999-2000, survey effort targeting cetacean species in Irish offshore waters was comparatively limited in coverage, both spatially and temporally. Since 1999-2000 a number of dedicated multi-annual surveillance programmes for cetaceans have operated in Irish waters, with survey effort extending to the limits of Ireland's EEZ and beyond. Consequently, with regard to this species it is considered that the years 2001-2012 represent an appropriate period for the evaluation of short-term trends.
2.3.04 Short term trend - Trend direction	Sighting records from dedicated surveillance effort in Irish waters (Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012) provide no evidence of a decline in distribution/range in the recent past; therefore accordingly the short-term trend for range is considered to be stable.
2.3.06 Long-term trend - Period	A long-term trend period for this species is not considered appropriate, for reasons outlined in 2.3.3.
2.3.09 a) Favourable reference range - In km2	The range value derived from the range map referred to in 1.1.5 is considered to be the baseline for this species. As there is no evidence of a decline since the Directive came into force the current range is set as the FRR. [Note: (1) The species is thought to be wide-ranging with some element of seasonal variation therein while regional population components could be present year-round; nevertheless the species' range in Irish waters is likely to represent only a component of its range in marine waters covered by the Directive and the northeast Atlantic Ocean. (2) There is an assumption that the current range in Irish waters is large enough (a) to encompass all of the ecological variation required by this species during its occurrences therein and (b) to contribute to the long-term survival of the species.]
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Additional sighting records of this predominantly Atlantic dolphin species (e.g., Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012) have been obtained since the previous reporting round. Along with previous data from a range of sources, this has resulted in an improved knowledge and ability to assess the range from that reported in 2007. There is no scientific reason to assume that the species was not similarly present in 2001-2006.
2.4.04 Year or period	The period 2001-2012 has been selected in order to represent the most current population information available for this species.

Field label	Note
Species: 2032	**White-beaked dolphin**
2.4.05 Method used - Population size	Evidence from multi-annual surveillance programmes (Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012) indicate that white-beaked dolphins can occur widely in Irish waters, although recorded distribution is predominantly Atlantic in nature. Wider-scale abundance in the northeast Atlantic may exceed 100,000 individuals (Hammond et al., 2012). Recent estimates of total abundance in waters overlying the western European continental shelf numbered approximately 22,700 animals (95%CL = 10,341 - 49,670; SCANS-II, 2008) with the majority of sightings occurring in the North Sea and in regional survey blocks off northern/western Scotland to western Ireland. In seeking to approximate population size range for Irish waters from these broad-scale datasets, there are significant difficulties due (i) to the species' wide pelagic distribution throughout Atlantic and western European waters making jurisdictional separation somewhat arbitrary, (ii) to problems associated with the narrow temporal focus of the limited abundance estimation surveys undertaken (e.g., one month in one season in one year, or separate years for coverage of shelf and deeper oceanic waters), and (iii) to high CVs (i.e., estimation uncertainty) particularly from regions where recorded numbers of sightings have been low. The minimum and maximum population estimates presented for this species are based on the summation of regional estimates presented in SCANS-II (2008) and they assume the free ranging of animals across and within the regions concerned (i.e., from western Ireland and the Irish Sea extending to northern/western Scotland, but excluding the North Sea). In the case of this species, summer abundance in Irish waters is likely to be better represented by the lower end of the population size range given.
2.4.06 Short-term trend - Period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.4.09 Short-term trend - Method used	There is little evidence of growth in the northeast Atlantic population(s) of white-beaked dolphin, although assessments of overall population size in the northeast and North Atlantic (Hammond et al., 2012) indicate that the species is likely to be in a healthy state. However, given that recent population estimates for the species (SCANS-II, 2008) are the only comprehensive figures for west European shelf waters since the Directive came into force, the reliable determination of short-term population trend for this species is not possible.
2.4.10 Long-term trend - Period	A long-term trend period for this species is not considered appropriate for reasons outlined in 2.3.3.
2.4.14 d) Favourable reference population - Indicate method used to set reference value if other than operators	Robust data on white-beaked dolphin population trends in Irish waters are not available. However broad-scale population estimates have been obtained for the waters of western Europe based on comparable surveys of the continental shelf area (SCANS-II, 2008) and deeper oceanic waters (CODA, 2009). While the population figures derived represent the first comparatively robust and comprehensive estimates since the Directive came into force, they are all captured from a short snapshot in time, the associated Lower and Upper 95% Confidence Limits are significantly different, and their use as descriptors for FRP require further work. The FRP for this species is therefore considered to be unknown.
2.5.01 Area estimation	The surface area estimate for range (derived from the range map referred to in 1.1.5) is used as a proxy for habitat surface area.
2.5.02 Year or period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.5.03 Method used Habitat for the species	Use of the range descriptor as a proxy for habitat is judged appropriate for this wide-ranging pelagic species.

Field label	Note
Species: 2032	**White-beaked dolphin**
2.5.04 b) Quality of the habitat - Explain how the quality was assessed	The quality of habitat for white-beaked dolphin was determined by consideration of the relevant direct and indirect pressures thought to be acting on the species and/or its functional group, and its habitat within its natural environment. These pressures were evaluated in development of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009) using available scientific data concerning inter alia habitat use, population size, distribution and ecology, and threats to the species' protection (e.g., via natural/biological sources, human sectoral activities, management gaps, etc). White beaked dolphin may be subject to a number of local and/or regional environmental pressures throughout its range in Irish waters (see 2.3, 2.6; DEHLG, 2009). However based on current data available none are considered to be of sufficient spatial or temporal impact on the species to be causing a significant deterioration in overall habitat quality in Ireland from a "good" status.
2.5.05 Short-term trend - Period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.5.06 Short-term trend - Trend direction	The trend for range in 2.3.4 is applied as a proxy for habitat.
2.5.07 Long-term trend - Period	A long-term trend period for this species is not considered appropriate, for reasons outlined in 2.3.3.
2.5.09 Area of suitable habitat for the species (km2)	White-beaked dolphins have been steadily recorded in Irish waters both historically and to the present day. The known and repeatedly detected habitats for this species in Ireland comprise waters overlying the continental shelf and slope and occasionally coastal waters. There are also limited data indicating the species' presence in shallow waters overlying the Rockall Bank. The Area of suitable habitat is considered to be equal to the Habitat for the species.
2.6 Main pressures - Pressure	In the development and preparation of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009), a comprehensive review of the pressures believed and/or documented to be acting on this species and/or its functional group (i.e., threats to their protection) was undertaken. The main pressures thought to be acting on this species are considered to occur primarily on a local or regional scale and/or on a temporary or intermittent basis (e.g., impacts arising from seasonal fisheries activity or seismic exploration; DEHLG, 2009). Since white-beaked dolphin distribution is quite broadly continental shelf and slope in nature, where a pressure may be regionally intensive the ranking given is one of medium importance. It should be noted that in relation to seismic exploration, which tends to occur on a local or occasionally regional scale in the waters of Ireland's EEZ and is comparatively low in coverage relative to several other member states, a robust regulatory and management regime applies in order to avoid potentially significant impacts on all species of marine mammal. This species is also subject to occasional hunting in part of its northeast Atlantic range (i.e., Faroe Islands) while the impact on the species of pollutant burdens or changes in sea temperature and other abiotic factors in the marine environment cannot be discounted
2.7 Threats - Threat	There is no evidence to suggest a change in the main pressures thought to be acting on this species in the near future. However surveillance of the species and the pressures potentially acting upon it will continue into the future, while the application of strong management measures (e.g., via the statutory/regulatory process) to avoid potentially significant impacts is also expected to continue.
2.8.01 Justification of % thresholds for trends	A detailed analysis of the statistical ability and power to robustly determine population trends for cetacean species occurring in western European waters is under way via the Joint Cetacean Protocol (JCP) project in the UK. This phased work is due for completion in 2013 and it will inform whether and for which species the measurement of population trends may be possible based on survey data from a range of sources.

Field label	Note
Species: 2032	**White-beaked dolphin**
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The white-beaked dolphin is widely recorded in Irish waters overlying the continental shelf and slope and also occurs in coastal waters. Hence the Range is considered to be favourable.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Robust data on white-beaked dolphin population size and trends in Irish waters as a whole are not available, though knowledge of the species' seasonal distribution and summer abundance in western European waters has improved significantly since the Directive came into force. This indicates that white-beaked dolphins number in the tens of thousands regionally (see 2.4). While the status, distribution and origin/stock identity of those dolphins occurring in Irish waters is poorly understood it is considered likely that they are part of the larger wide-ranging stocks distributed off western Europe. Therefore the population parameter is considered favourable.
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The habitat for this species in Ireland is considered favourable, as it supports a favourable population across a very large marine area.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	A number of pressures have been identified. While the effect of these pressures may act on a temporary and/or regional scale and some are likely to continue to act as pressures into the future, none is considered to be of sufficient magnitude to be causing an adverse impact on populations of white-beaked dolphin in Irish waters. Ongoing threats as listed or identified into the future via surveillance will be managed appropriately. Hence the future prospects for the species are considered favourable.
2.9.05 Overall assessment of Conservation Status	Based on the assessments for Range, Population, Habitat and Future Prospects parameters, the overall conclusion is that the conservation status of white-beaked dolphin in Ireland is considered "Favourable". This overall result is an improvement on the previous Article 17 assessment across all four assessment parameters, due to improved knowledge.

White-beaked dolphin - *Lagenorhynchus albirostris* (2032)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
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Scale - Scála
0 25 50 75 100 km

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Map - Léarscáil
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Date - Dáta
11-06-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**2034**
0.2.2 Species name	**Stenella coeruleoalba**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	Striped dolphin

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	1995-2012
1.1.4 Additional map	No
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Marine Atlantic (MATL)

2.2 Published sources

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Archer, II, F.I. (2009). Striped dolphin. Stenella coeruleoalba. In W.F. Perrin, B. Würsig, J.G.M. Thewissen (eds.). Encyclopedia of Marine Mammals – 2nd edition. Academic Press, Elsevier Inc. p.1127-1129.

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Berrow, S.D., Whooley, P., O'Connell, M. & Wall, D. (2010). Irish Cetacean Review (2000-2009). Irish Whale and Dolphin Group, Kilrush, Co. Clare. 60pp.

Wall, D., O'Brien, J., Kavanagh, L., Ryan, C., Hunt, L. & Fennelly, S. (2012). Monitoring of spatial and temporal habitat use and abundance of cetaceans. In S.D. Berrow, J.O'Brien, I. O'Connor, D. McGrath & D. Wall. Marine Mammals and Megafauna in Irish Waters – behaviour, distribution and habitat use. Final project report for Grant-Aid Agreement No. PBA/ME/07/005(02) under the Sea Change Strategy with the support of the Marine Institute, the Marine Research Sub-Programme of the National Development Plan 2007–2013 and the Department of Arts, Heritage and the Gaeltacht. Galway-Mayo Institute of Technology, Galway. p.1-187.

DEHLG. (2009). Conservation Plan for Cetaceans in Irish Waters. Department of the Environment, Heritage and Local Government, 7 Ely Place, Dublin. 97pp.

CODA (2009). Cetacean offshore distribution and abundance in the European Atlantic (CODA). Sea Mammal Research Unit, Gatty Marine Laboratory, University of St Andrews, St Andrews, Fife, KY16 8LB. 43pp.

Berrow, S.D., Whooley, P. & Ferriss, S. (2002). Irish Whale and Dolphin Group Cetacean Sighting Review (1991-2001). Irish Whale and Dolphin Group, Kilrush, Co. Clare. 34 pp.

Reid, J.B., Evans, P.G.H. & Northridge, S.P. (2003). Atlas of Cetacean Distribution in North-west European Waters. Joint Nature Conservation Committee, Peterborough, 76pp.

Wall, D., Murray, C., O'Brien, J., Kavanagh, L., Wilson, C., Ryan, C., Glanville, B., Williams, D., Enlander, I., O'Connor, I., McGrath, D., Whooley, P. & Berrow, S. (2013). Atlas of the distribution and relative abundance of marine mammals in Irish offshore waters 2005 - 2011. Irish Whale and Dolphin Group, Kilrush, Co. Clare. 62pp.

Pollock, C.M., Reid, J.R., Webb, A. & Tasker, M.L. (1997). The distribution of seabirds and cetaceans in the waters around Ireland. JNCC Report No. 267. Joint Nature Conservation Committee, Peterborough. 167pp.

2.3 Range

2.3.1 Surface area - Range (km²)	570000	
2.3.2 Method - Range surface area	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	570000
	operator	N/A
	unknown	No
	method	The range value derived from the range map referred to in 1.1.5 is considered to be the baseline for this species. As there is no evidence of a decline since the Directive came into force the current range is set as the FRR.
2.3.10 Reason for change	Improved knowledge/more accurate data	

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	number of individuals (i)		
	min	32543	max	139653
2.4.2 Population size (other than individuals)	Unit	N/A		
	min		max	
2.4.3 Additional information	Definition of locality			
	Conversion method			
	Problems	Evidence from multi-annual surveillance programmes (Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012) indicate that striped dolphins can occur widely in		

Irish waters, although recorded distribution is predominantly Atlantic in nature. Recent estimates of total abundance in the deeper oceanic waters of western Europe, including those overlying the continental slope, numbered approximately 67,400 animals (95%CL 32,543-139,653; CODA, 2009) with the majority of sightings occurring in the Bay of Biscay and northwest of the Iberian peninsula. In seeking to approximate population size range for Irish waters from these broad scale datasets, there are significant difficulties due (i) to the species' wide pelagic distribution throughout western European waters making jurisdictional separation somewhat arbitrary, (ii) to problems associated with the narrow temporal focus of the limited abundance estimation surveys undertaken (e.g., one month in one season in one year, or separate years for coverage of shelf and deeper oceanic waters), and (iii) to high CVs (i.e., estimation uncertainty) particularly from regions where recorded numbers of sightings have been low. The population estimates given for this species are based on the summation of regional estimates presented in CODA (2009) and they assume the free ranging of animals across and within the regions concerned (e.g., from the Iberian peninsula and Bay of Biscay to the Rockall Trough). In the case of this species, summer abundance in Irish waters is likely to be better represented by the lower end of the population size range given.

2.4.4 Year or period	2001-2012		
2.4.5 Method – population size	Estimate based on expert opinion with no or minimal sampling (1)		
2.4.6 Short-term trend period	2001-2012		
2.4.7 Short term trend direction	unknown (x)		
2.4.8 Short-term trend magnitude	min	max	confidence interval
2.4.9 Short-term trend method	Estimate based on expert opinion with no or minimal sampling (1)		
2.4.10 Long-term trend period			
2.4.11 Long term trend direction	N/A		
2.4.12 Long-term trend magnitude	min	max	confidence interval
2.4.13 Long-term trend method	N/A		
2.4.14 Favourable reference population	number		
	operator	N/A	
	unknown	Yes	
	method	Robust data on striped dolphin population trends in Irish waters are not available although knowledge of the species' distribution and summer abundance has improved since the Directive came into force. Nevertheless the use of current population figures as descriptors for FRP require further work. The FRP for this species is therefore considered to be unknown.	
2.4.15 Reason for change	Improved knowledge/more accurate data		

2.5 Habitat for the Species

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

2.5.1 Surface area - Habitat (km²)	570000
2.5.2 Year or period	2001-2012
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Good
2.5.4 b) Quality of habitat - method	The quality of habitat for this species was determined by consideration of the relevant direct and indirect pressures thought to be acting on the species and/or its functional group, and its habitat within its natural environment. These pressures were evaluated in development of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009) using available scientific data concerning inter alia habitat use, population size, distribution and ecology, and threats to the species' protection (e.g., via natural/biological sources, human sectoral activities, management gaps, etc).
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	stable (0)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	570000
2.5.10 Reason for change	Improved knowledge/more accurate data

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	medium importance (M)	N/A
death or injury by collision (G05.11)	low importance (L)	N/A
Marine water pollution (H03)	low importance (L)	N/A
Noise nuisance, noise pollution (H06.01)	low importance (L)	N/A
Seismic exploration, explosions (H06.05)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A

2.6.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	medium importance (M)	N/A
death or injury by collision (G05.11)	low importance (L)	N/A
Marine water pollution (H03)	low importance (L)	N/A
Noise nuisance, noise pollution (H06.01)	low importance (L)	N/A
Seismic exploration, explosions (H06.05)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	Research into the appropriate use of statistics and a range of data sources for population trend analysis is currently under way. Until the results of this work become available, it is not considered scientifically valid to attempt to determine population trends.
2.8.2 Other relevant Information	
2.8.3 Trans-boundary assessment	Given the mobility of this marine species, and in particular the potential for

seasonal movements in response to breeding requirements, prey distribution and abundance, and other natural processes, it is likely that individuals and/or groups of this species move between Irish waters and adjacent marine jurisdictions. A transboundary assessment in the next reporting period would allow a fuller appreciation of the range and status of this species.

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.9.2. Population	assessment	Favourable (FV)
	qualifiers	N/A
2.9.3. Habitat	assessment	Favourable (FV)
	qualifiers	N/A
2.9.4. Future prospects	assessment	Favourable (FV)
	qualifiers	N/A
2.9.5 Overall assessment of Conservation Status	Favourable (FV)	
2.9.6 Overall trend in Conservation Status	N/A	

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	N/A		
	min		max	
3.1.2 Method used	N/A			
3.1.3 Trend of population size within	N/A			

3.2 Conservation Measures

Article 17 - SPECIES NOTES

Field label	Note
Species: 2034	**Striped dolphin**
0.1 Member State	Ireland
0.2.01 Species code	The striped dolphin is one of the smallest dolphin species occurring in Irish waters with adults averaging just 1.8-2.5m in body length. Found throughout the world's tropical and warm temperate waters, in the northeast Atlantic it is mainly recorded from the Faroe Islands and northern UK waters to South Africa with a noteworthy prevalence in the Mediterranean Sea (Hammond et al., 2008; Archer, 2009). It is classified as a species of Least Concern due to its broad global distribution and abundance estimates exceeding two million individuals (Hammond et al., 2008), while no major threats to the species are currently identified. Striped dolphins are occasionally recorded in Irish Atlantic waters and less so coastally (Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012). This species can be difficult to identify at sea due to its small body size, inconspicuous dorsal fin and a predominantly black/dark grey dorsal colouration that is a feature common to several dolphin species. Its similarity in body shape and behaviour to the short-beaked common dolphin, and tendency to form mixed groups with this species, may also obscure its field identification. Striped dolphins are better identified at close range when individuals break clear of the water surface showing their characteristic prominent beak, a predominantly pale or white ventral surface and distinct narrow grey/black stripes extending (i) diagonally from the eye to pectoral fin and (ii) from the eye to the underside of the tail stock. Little is known of the species' population structure in the North Atlantic; separate breeding stocks, sub-populations or clear latitudinal patterns in movement by eastern Atlantic populations are not apparent (DEHLG, 2009) but there are indications that Mediterranean populations may be comparatively isolated genetically from those in the open Atlantic (Hammond et al., 2008).
0.2.04 Common name	Striped dolphin = Deilf stríocach
1.1.01 Distribution map	The distribution map presented for this species represents a significant proportion of all live sightings recorded during targeted scientific surveillance in Irish waters between 1994/95 and 2012. The surveillance programmes that contributed data to this projection are cited as follows: Pollock et al. (1997), Reid et al. (2003), Ó Cadhla et al. (2004) and Wall et al. (2013). These data and the results of other survey effort (e.g., SCANS-II, 2008; CODA, 2009; Berrow et al., 2010) were integrated into the development of the species range map presented under section 1.1.5. This distribution map for the species has been drawn in 50km x 50km resolution and is mapped in the LAEA projection.
1.1.02 Method used - map	Over the last 2-3 decades records of the occurrence of this species in Irish waters have been accumulating, providing a better insight into its population distribution. Simultaneous to more rigorous surveillance in the last 15-20 years striped dolphin records have continued to emerge, predominantly from deep oceanic, continental slope and shelf waters to the west and southwest of Ireland and occasionally in the Celtic Sea (Ó Cadhla et al., 2004; CODA, 2009; Berrow et al., 2010; Wall et al., 2012). The distribution of recent sightings along with regional records obtained across three preceding decades (Berrow et al., 2002; Reid et al., 2003) indicate a predominant distribution in Atlantic waters >100m deep overlying the continental shelf, the continental slope and deep ocean basins (e.g., Rockall Trough, Porcupine Seabight). Sighting records from the Irish Sea are infrequent. While all reliable cetacean records obtained in Irish waters were not available for use in this exercise, the map drawn for this species provides a good sample of the species' observed distribution.
1.1.03 Year or period	The period selected for mapping the distribution of this species represents a period of intensive surveillance for cetaceans in Irish waters across a range of research and monitoring programmes.

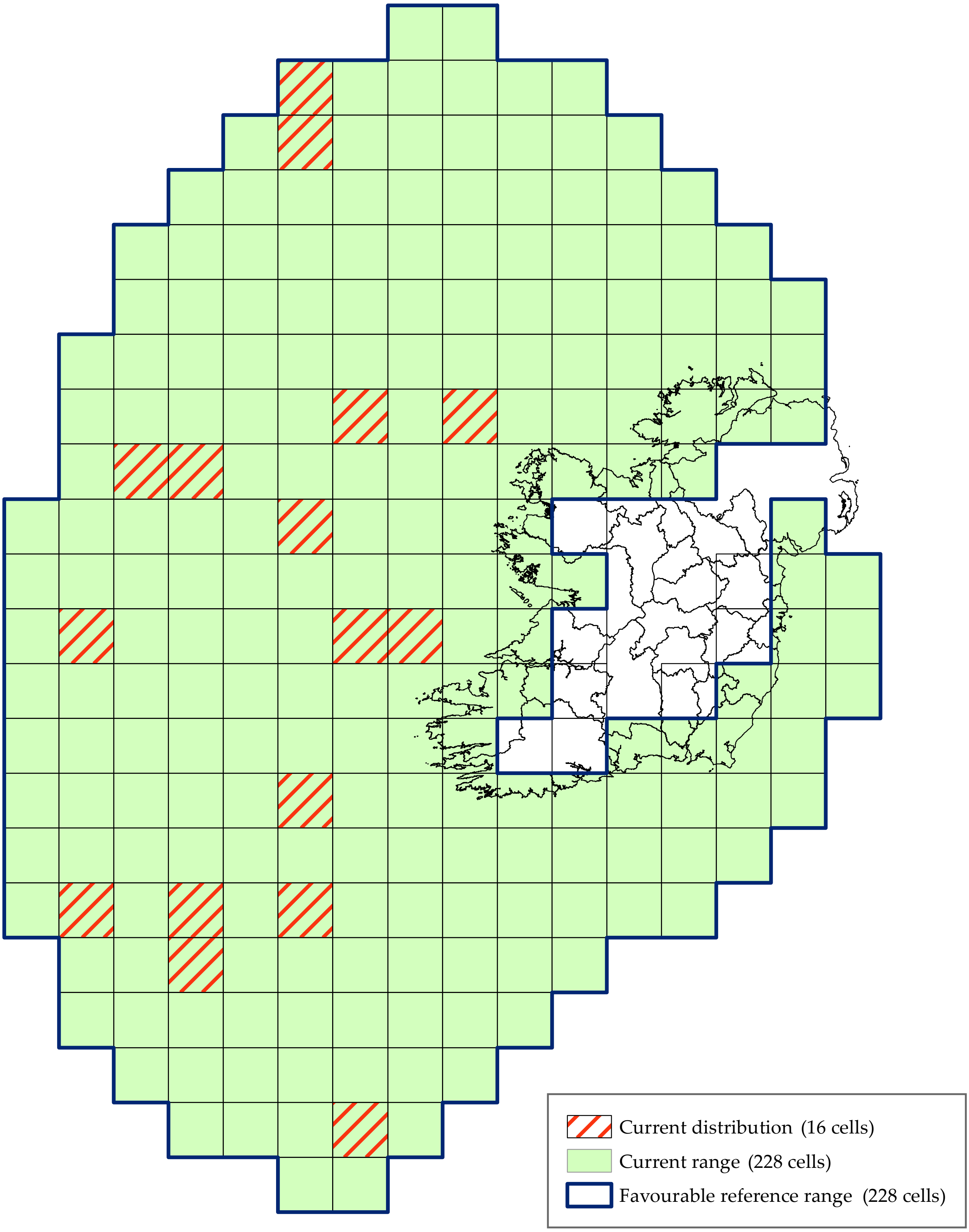
Field label	Note
Species: 2034	**Striped dolphin**
1.1.05 Range map	The species' natural range in Irish waters is a small component of its wider North Atlantic range (Hammond et al., 2008; DEHLG, 2009; Archer, 2009). The range map provided consists of its recorded and likely natural range based on recent data (2001-2012) and expert judgement, and is partly derived from 1.1.1. It consists of a block of contiguous 50km x 50km grid cells distributed in Irish marine waters, excluding enclosed shallow bays.
2.3.02 Method used - Surface area of Range	This figure has been derived from the range map referred to in 1.1.5.
2.3.03 Short-term trend - Period	Prior to 1999-2000, survey effort targeting cetacean species in Irish offshore waters was comparatively limited in coverage, both spatially and temporally. Since 1999-2000 a number of dedicated multi-annual surveillance programmes for cetaceans have operated in Irish waters, with survey effort extending to the limits of Ireland's EEZ and beyond. Consequently, with regard to this species it is considered that the years 2001-2012 represent an appropriate period for the evaluation of short-term trends.
2.3.04 Short term trend - Trend direction	Sighting records from dedicated surveillance effort in Irish waters (Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012) provide no evidence of a decline in distribution/range in the recent past; therefore accordingly the short-term trend for range is considered to be stable.
2.3.06 Long-term trend - Period	A long-term trend period for this species is not considered appropriate, for reasons outlined in 2.3.3.
2.3.09 a) Favourable reference range - In km2	The range value derived from the range map referred to in 1.1.5 is considered to be the baseline for this species. As there is no evidence of a decline since the Directive came into force the current range is set as the FRR. [Note: (1) The species is thought to be wide-ranging with some element of seasonal variation therein although it is not known whether population components may be present year-round; Nevertheless the species' range in Irish waters is likely to represent only a component of its range in marine waters covered by the Directive and the northeast Atlantic Ocean; (2) There is an assumption that the current range in Irish waters is large enough (a) to encompass all of the ecological variation required by this species during its occurrences therein and (b) to contribute to the long-term survival of the species.]
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Additional sighting records of this irregularly observed Atlantic dolphin species have been obtained since the previous reporting round (Ó Cadhla et al., 2004; CODA, 2009; Berrow et al., 2010; Wall et al., 2012). Along with previous data from a range of sources, this has resulted in an improved knowledge and ability to assess the range from that reported in 2007. There is no scientific reason to assume that the species was not similarly present in 2001-2006.
2.4.04 Year or period	The period 2001-2012 has been selected in order to represent the most current population information available for this species.

Field label	Note
Species: 2034	**Striped dolphin**
2.4.05 Method used - Population size	Evidence from multi-annual surveillance programmes (Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012) indicate that striped dolphins can occur widely in Irish waters, although recorded distribution is predominantly Atlantic in nature. Recent estimates of total abundance in the deeper oceanic waters of western Europe, including those overlying the continental slope, numbered approximately 67,400 animals (95%CL 32,543-139,653; CODA, 2009) with the majority of sightings occurring in the Bay of Biscay and northwest of the Iberian peninsula. In seeking to approximate population size range for Irish waters from these broad scale datasets, there are significant difficulties due (i) to the species' wide pelagic distribution throughout western European waters making jurisdictional separation somewhat arbitrary, (ii) to problems associated with the narrow temporal focus of the limited abundance estimation surveys undertaken (e.g., one month in one season in one year, or separate years for coverage of shelf and deeper oceanic waters), and (iii) to high CVs (i.e., estimation uncertainty) particularly from regions where recorded numbers of sightings have been low. The population estimates given for this species are based on the summation of regional estimates presented in CODA (2009) and they assume the free ranging of animals across and within the regions concerned (e.g., from the Iberian peninsula and Bay of Biscay to the Rockall Trough). In the case of this species, summer abundance in Irish waters is likely to be better represented by the lower end of the population size range given.
2.4.06 Short-term trend - Period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.4.09 Short-term trend - Method used	There is little evidence of growth or decline in the northeast Atlantic population(s) of striped dolphin, although general assessments of overall population size in the North Atlantic indicate that the species is in a healthy state (Hammond et al., 2008; Archer, 2009; DEHLG, 2009). Given that there is only a single summer estimate for the offshore Atlantic portion of western European waters (CODA, 2009) since the Directive came into force, the reliable determination of short-term population trend for this species is not possible.
2.4.10 Long-term trend - Period	A long-term trend period for this species is not considered appropriate, for reasons outlined in 2.3.3.
2.4.14 d) Favourable reference population - Indicate method used to set reference value if other than operators	Robust data on striped dolphin population trends in Irish waters are not available. However regional abundance estimates in mid-summer were previously derived for deeper oceanic waters stretching from the northwest UK through Irish Atlantic waters to the Bay of Biscay (CODA, 2009). While the population figures derived represent the first geographically relevant estimates since the Directive came into force, they did not cover the full known range of the species in Irish waters, they were also captured from a short snapshot in time, and the associated Lower and Upper 95% Confidence Limits are significantly different; Consequently the development of descriptors for FRP require considerably further work and the FRP for this species is considered to be unknown.
2.5.01 Area estimation	The surface area estimate for range (derived from the range map referred to in 1.1.5) is used as a proxy for habitat surface area.
2.5.02 Year or period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.5.03 Method used Habitat for the species	Use of the range descriptor as a proxy for habitat is judged appropriate for this wide-ranging pelagic species.

Field label	Note
Species: 2034	**Striped dolphin**
2.5.04 b) Quality of the habitat - Explain how the quality was assessed	The quality of habitat for striped dolphin was determined by consideration of the relevant direct and indirect pressures thought to be acting on the species and/or its functional group, and its habitat within its natural environment. These pressures were evaluated in development of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009) using available scientific data concerning inter alia habitat use, population size, distribution and ecology, and threats to the species' protection (e.g., via natural/biological sources, human sectoral activities, management gaps, etc). Striped dolphin may be subject to a number of local and/or regional environmental pressures throughout its range in Irish waters (see 2.3, 2.6; DEHLG, 2009). However based on current data available none are considered to be of sufficient spatial or temporal impact on the species to be causing a significant deterioration in overall habitat quality in Ireland from a "good" status.
2.5.05 Short-term trend - Period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.5.06 Short-term trend - Trend direction	The trend for range in 2.3.4 is applied as a proxy for habitat.
2.5.07 Long-term trend - Period	A long-term trend period for this species is not considered appropriate, for reasons outlined in 2.3.3.
2.5.09 Area of suitable habitat for the species (km2)	Striped dolphins have been widely recorded in Irish waters both historically and to the present day and the known habitats for this predominantly Atlantic species include waters overlying the deeper ocean basins, the continental slope, continental shelf and occasionally even coastal waters. The Area of suitable habitat is therefore considered to be equal to the Habitat for the species.
2.6 Main pressures - Pressure	In the development and preparation of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009), a comprehensive review of the pressures believed and/or documented to be acting on this species and/or its functional group (i.e., threats to their protection) was undertaken. With the exception of pressures arising from some commercial fishing activity, most of the main pressures thought to be acting on this species are not considered to occur over large regional areas but may be more local in scale and/or on a temporary or intermittent basis (e.g., seismic exploration; DEHLG, 2009). Since striped dolphin distribution is likely to be broadly and predominantly Atlantic in nature, where a pressure may be regionally intensive the ranking given is one of medium importance. It should be noted that in relation to seismic exploration, which tends to occur on a local or occasionally regional scale in the waters of Ireland's EEZ and is comparatively low in coverage relative to several other member states, a robust regulatory and management regime applies in order to avoid potentially significant impacts on all species of marine mammal. The impact on this species of pollutant burdens or changes in sea temperature and other abiotic factors in the marine environment can also not be discounted.
2.7 Threats - Threat	There is no evidence to suggest a change in the main pressures thought to be acting on this species in the near future. However surveillance of the species and the pressures potentially acting upon it will continue into the future, while the application of strong management measures (e.g., via the statutory/regulatory process) to avoid potentially significant impacts is also expected to continue.
2.8.01 Justification of % thresholds for trends	A detailed analysis of the statistical ability and power to robustly determine population trends for cetacean species occurring in western European waters is under way via the Joint Cetacean Protocol (JCP) project in the UK. This phased work is due for completion in 2013 and it will inform whether and for which species the measurement of population trends may be possible based on survey data from a range of sources.

Field label	Note
Species: 2034	**Striped dolphin**
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	While the species is recorded less commonly than other dolphins, observations of striped dolphins in Irish waters have been very wide ranging, from deep oceanic areas and those overlying the continental shelf and slope to coastal waters on occasion. Hence the Range is considered to be favourable.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	While robust data on striped dolphin population size and trends in Irish waters as a whole are not available, knowledge of the species' seasonal distribution and summer abundance in western European waters has improved significantly since the Directive came into force. This indicates that striped dolphins number in the tens of thousands regionally (see 2.4). While the status, distribution and origin/stock identity of those dolphins occurring in Irish waters is poorly understood it is considered likely that they are part of the larger wide-ranging stocks distributed off western Europe. Therefore the population parameter is considered favourable.
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The habitat for this species in Ireland is considered favourable, as it supports a favourable population across a very large marine area.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	A number of pressures have been identified. While the effect of these pressures may act on a temporary and/or regional scale and some are likely to continue to act as pressures into the future, none is considered to be of sufficient magnitude to be causing an adverse impact on populations of striped dolphin in Irish waters. Ongoing threats as listed or identified into the future via surveillance will be managed appropriately. Hence the future prospects for the species are considered favourable.
2.9.05 Overall assessment of Conservation Status	Based on the assessments for Range, Population, Habitat and Future Prospects parameters, the overall conclusion is that the conservation status of striped dolphin in Ireland is considered "Favourable". This overall result is an improvement on the previous Article 17 assessment across all four assessment parameters, due to improved knowledge.

Striped dolphin - *Stenella coeruleoalba* (2034)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 25 50 75 100 km

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Map - Léarscáil
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11-06-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**2035**
0.2.2 Species name	**Ziphius cavirostris**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	Cuvier's beaked whale

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	1995-2012
1.1.4 Additional map	No
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Marine Atlantic (MATL)

2.2 Published sources

DEHLG. (2009). Conservation Plan for Cetaceans in Irish Waters. Department of the Environment, Heritage and Local Government, 7 Ely Place, Dublin. 97pp.

Berrow, S.D., Whooley, P., O'Connell, M. & Wall, D. (2010). Irish Cetacean Review (2000-2009). Irish Whale and Dolphin Group, Kilrush, Co. Clare. 60pp.

Taylor, B.L., Baird, R., Barlow, J., Dawson, S.M., Ford, J., Mead, J.G., Notarbartolo di Sciara, G., Wade, P. & Pitman, R.L. (2008). Ziphius cavirostris. In IUCN 2012. IUCN Red List of Threatened Species. Version 2012.2. http://www.iucnredlist.org.

Heyning, J.E. & Mead, J.G. (2009). Cuvier's beaked whale. Ziphius cavirostris. In W.F. Perrin, B. Würsig, J.G.M. Thewissen (eds.). Encyclopedia of Marine Mammals – 2nd edition. Academic Press, Elsevier Inc. p.294-295.

Ó Cadhla, O., Mackey, M., Aguilar de Soto, N., Rogan, E. & Connolly, N. (2004). Cetaceans and Seabirds of Ireland's Atlantic Margin. Volume II - Cetacean distribution and abundance. Report on research carried out under the Irish Petroleum Infrastructure Programme (PIP): Rockall Studies Group (RSG) projects 98/6 and 00/13, Porcupine Studies Group project P00/15 and Offshore Support Group (OSG) project 99/38. 82pp.

Wall, D., O'Brien, J., Kavanagh, L., Ryan, C., Hunt, L. & Fennelly, S. (2012). Monitoring of spatial and temporal habitat use and abundance of cetaceans. In S.D. Berrow, J.O'Brien, I. O'Connor, D. McGrath & D. Wall. Marine Mammals and Megafauna in Irish Waters – behaviour, distribution and habitat use. Final project report for Grant-Aid Agreement No. PBA/ME/07/005(02) under the Sea Change Strategy with the support of the Marine Institute, the Marine Research Sub-Programme of the National Development Plan 2007–2013 and the Department of Arts, Heritage and the Gaeltacht. Galway-Mayo Institute of Technology, Galway. p.1-187.

CODA (2009). Cetacean offshore distribution and abundance in the European

Atlantic (CODA). Sea Mammal Research Unit, Gatty Marine Laboratory, University of St Andrews, St Andrews, Fife, KY16 8LB. 43pp.

Reid, J.B., Evans, P.G.H. & Northridge, S.P. (2003). Atlas of Cetacean Distribution in North-west European Waters. Joint Nature Conservation Committee, Peterborough, 76pp.

SCANS-II (2008). Small Cetaceans in the European Atlantic and North Sea. Final Report to the European Commission under project LIFE04NAT/GB/000245. Sea Mammal Research Unit, Gatty Marine Laboratory, University of St Andrews, St Andrews, Fife, KY16 8LB.

Cañadas, A., Macleod, K., Mikkelsen, B., Rogan, E., Uriarte, A., Antonio Vázquez, J., Van Canneyt, O. & Hammond, P.S. (2011). Abundance and distribution of beaked whales in the European Atlantic. Report to the Scientific Committee of the International Whaling Commission, Cambridge. SC/63/SM13. 16pp.

Wall, D., Murray, C., O'Brien, J., Kavanagh, L., Wilson, C., Ryan, C., Glanville, B., Williams, D., Enlander, I., O'Connor, I., McGrath, D., Whooley, P. & Berrow, S. (2013). Atlas of the distribution and relative abundance of marine mammals in Irish offshore waters 2005 - 2011. Irish Whale and Dolphin Group, Kilrush, Co. Clare. 62pp.

Pollock, C.M., Reid, J.R., Webb, A. & Tasker, M.L. (1997). The distribution of seabirds and cetaceans in the waters around Ireland. JNCC Report No. 267. Joint Nature Conservation Committee, Peterborough. 167pp.

2.3 Range

2.3.1 Surface area - Range (km²)	355000	
2.3.2 Method - Range surface area	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	unknown (x)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	355000
	operator	N/A
	unknown	No
	method	The range value derived from the range map referred to in 1.1.5 is considered to be the baseline for this species. As there is no evidence of a decline since the Directive came into force the current range is set as the FRR.
2.3.10 Reason for change	Improved knowledge/more accurate data	

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	number of individuals (i)		
	min	1735	max	11519
2.4.2 Population size (other than individuals)	Unit	N/A		
	min		max	
2.4.3 Additional information	Definition of locality			

	Conversion method	
	Problems	Evidence from multi-annual surveillance programmes (Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012) indicate that Cuvier's beaked whales occur predominantly in deep Atlantic waters although it remains unclear whether the species is present year-round. Recent estimates of total abundance in waters overlying the western European continental slope and deeper oceanic waters numbered approximately 2,300-4,500 animals (95%CL = 1,735-11,519; Cañadas et al., 2011), more than 60% of which was attributed to the southern Gulf of Gascogne in the Bay of Biscay. However the species' abundance in its wider northeast or North Atlantic range is unknown (Taylor et al., 2008). In seeking to approximate population size range for Irish waters from these limited datasets, there are significant difficulties due (i) to the species' apparently wide pelagic distribution throughout northeast Atlantic and European offshore waters making jurisdictional separation somewhat arbitrary, (ii) to problems associated with the narrow temporal focus of such surveys (e.g., one month in one season in one year, or separate years for coverage of shelf and deeper oceanic waters), and (iii) to high CVs (i.e., estimation uncertainty) particularly from regions where recorded numbers of sightings have been low. The minimum and maximum population estimates given for this species are based on the summation of regional estimates derived by Cañadas et al. (2011) and driven by data gathered in the 2007 CODA survey (CODA, 2009) and 2005 SCANS-II survey (SCANS-II, 2008). They assume the free ranging of animals across and within the regions concerned (e.g., from deep oceanic waters in the Bay of Biscay and off the Iberian peninsula to the Rockall Trough and northern UK waters). In the case of this species, summer abundance is likely to be better represented by the lower end of the population size range given.

2.4.4 Year or period	2001-2012		
2.4.5 Method – population size	Estimate based on expert opinion with no or minimal sampling (1)		
2.4.6 Short-term trend period	2001-2012		
2.4.7 Short term trend direction	unknown (x)		
2.4.8 Short-term trend magnitude	min	max	confidence interval
2.4.9 Short-term trend method	Estimate based on expert opinion with no or minimal sampling (1)		
2.4.10 Long-term trend period			
2.4.11 Long term trend direction	N/A		
2.4.12 Long-term trend magnitude	min	max	confidence interval
2.4.13 Long-term trend method	N/A		
2.4.14 Favourable reference population	number		
	operator	N/A	
	unknown	Yes	

method	Robust data on Cuvier's beaked whale population trends in Irish waters are not available although knowledge of the species' distribution and occurrence has improved since the Directive came into force. Nevertheless the use of current population figures as descriptors for FRP require further work. The FRP for this species is therefore considered to be unknown.
2.4.15 Reason for change	Improved knowledge/more accurate data

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	355000
2.5.2 Year or period	2001-2012
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Good
2.5.4 b) Quality of habitat - method	The quality of habitat for this species was determined by consideration of the relevant direct and indirect pressures thought to be acting on the species and/or its functional group, and its habitat within its natural environment. These pressures were evaluated in development of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009) using available scientific data concerning inter alia habitat use, population size, distribution and ecology, and threats to the species' protection (e.g., via natural/biological sources, human sectoral activities, management gaps, etc).
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	unknown (x)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	355000
2.5.10 Reason for change	Improved knowledge/more accurate data

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	low importance (L)	N/A
death or injury by collision (G05.11)	low importance (L)	N/A
Noise nuisance, noise pollution (H06.01)	low importance (L)	N/A
Seismic exploration, explosions (H06.05)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A
Threats and pressures from outside the Member State (XO)	low importance (L)	N/A

2.6.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	low importance (L)	N/A
death or injury by collision (G05.11)	low importance (L)	N/A
Noise nuisance, noise pollution (H06.01)	low importance (L)	N/A
Seismic exploration, explosions (H06.05)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A
Threats and pressures from outside the Member State (XO)	low importance (L)	N/A

2.7.1 Method used – threats	expert opinion (1)

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	Research into the appropriate use of statistics and a range of data sources for population trend analysis is currently under way. Until the results of this work become available, it is not considered scientifically valid to attempt to determine population trends.
2.8.2 Other relevant Information	
2.8.3 Trans-boundary assessment	Given the mobility of this marine species, and in particular the potential for seasonal movements in response to breeding requirements, prey distribution and abundance, and other natural processes, it is possible or likely that individuals and/or groups of this species move between Irish waters and adjacent marine jurisdictions. A transboundary assessment in the next reporting period would allow a fuller appreciation of the range and status of this species.

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment Favourable (FV) qualifiers N/A
2.9.2. Population	assessment Unknown (XX) qualifiers N/A
2.9.3. Habitat	assessment Favourable (FV) qualifiers N/A
2.9.4. Future prospects	assessment Unknown (XX) qualifiers N/A
2.9.5 Overall assessment of Conservation Status	Unknown (XX)
2.9.6 Overall trend in Conservation Status	N/A

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	N/A		
	min		max	
3.1.2 Method used	N/A			
3.1.3 Trend of population size within	N/A			

3.2 Conservation Measures

Field label	Note
Species: 2035	**Cuvier's beaked whale**
0.1 Member State	Ireland
0.2.01 Species code	The Cuvier's beaked whale is the most common member of the beaked whale family (Ziphiidae) to be found stranded on the Irish coast (DEHLG, 2009; Berrow et al., 2010). A distinctive 'goose-beaked' toothed whale with adults averaging up to 5.5-6.5m in body length, it is also one of the most widely distributed beaked whales, being found in all oceans and most seas except in polar regions (Taylor et al., 2008; Heyning & Mead, 2009). Its principal range in the eastern Atlantic is believed to extend from Iceland and Norway to cold temperate waters off southern Africa, and it is the only beaked whale species commonly occurring in the Mediterranean Sea (Taylor et al., 2008). Cuvier's beaked whale is classified as a species of Least Concern whose extensive offshore range and abundance numbering at least 100,000 (Taylor et al., 2008) contribute to its position above the threshold for a threatened category. However sightings in Irish waters have been infrequent and sporadic (e.g., Ó Cadhla et al., 2004; Wall et al., 2012) which may be partly due to the species' exclusive occurrence in deeper oceanic waters and its ability to undertake extremely long dives (DEHLG, 2009; Heyning & Mead, 2009). Cuvier's beaked whales can be very difficult to identify at sea (e.g., Wall et al., 2012) due, for example, to elusive behaviour in the presence of vessels, their low body profile and the absence of diagnostic features that can be observed at long range. Individuals may be identified more readily at close range due to their body colouration, a short but prominent blunt beak, their moderate body length for a toothed cetacean, the position of a small curved dorsal fin about two-thirds of the way along the back, and the absence of a central notch in the tail flukes. Skin colouration can assist in the identification of this beaked whale species in particular: adult males bear a distinctively white/cream-coloured head and this brighter dorsal surface can extend 1-2m rearwards. Mature individuals may also range in skin colour from dark grey to mid-brown or reddish-brown while lighter oval patches and linear scarring along the flanks are common (Heyning & Mead, 2009). Little is known about the species' natural history or ecology in the waters of western Europe and wider northeast Atlantic; separate populations or breeding stocks and clear patterns in latitudinal/longitudinal movement are not apparent at present, although some seasonality in population distribution within Irish/UK waters may occur (DEHLG, 2009).
0.2.04 Common name	Cuvier's beaked whale = Míol mór socach Cuvier / Míol mór Cuvier
1.1.01 Distribution map	The distribution map presented for this species represents a significant proportion of all live sightings recorded during targeted scientific surveillance in Irish waters between 1994/95 and 2012. The surveillance programmes that contributed data to this projection are cited as follows: Pollock et al. (1997), Reid et al. (2003), Ó Cadhla et al. (2004) and Wall et al. (2013). These data and the results of other survey effort (e.g., SCANS-II, 2008; CODA, 2009; Berrow et al., 2010) were integrated into the development of the species range map presented under section 1.1.5. This distribution map for the species has been drawn in 50km x 50km resolution and is mapped in the LAEA projection.

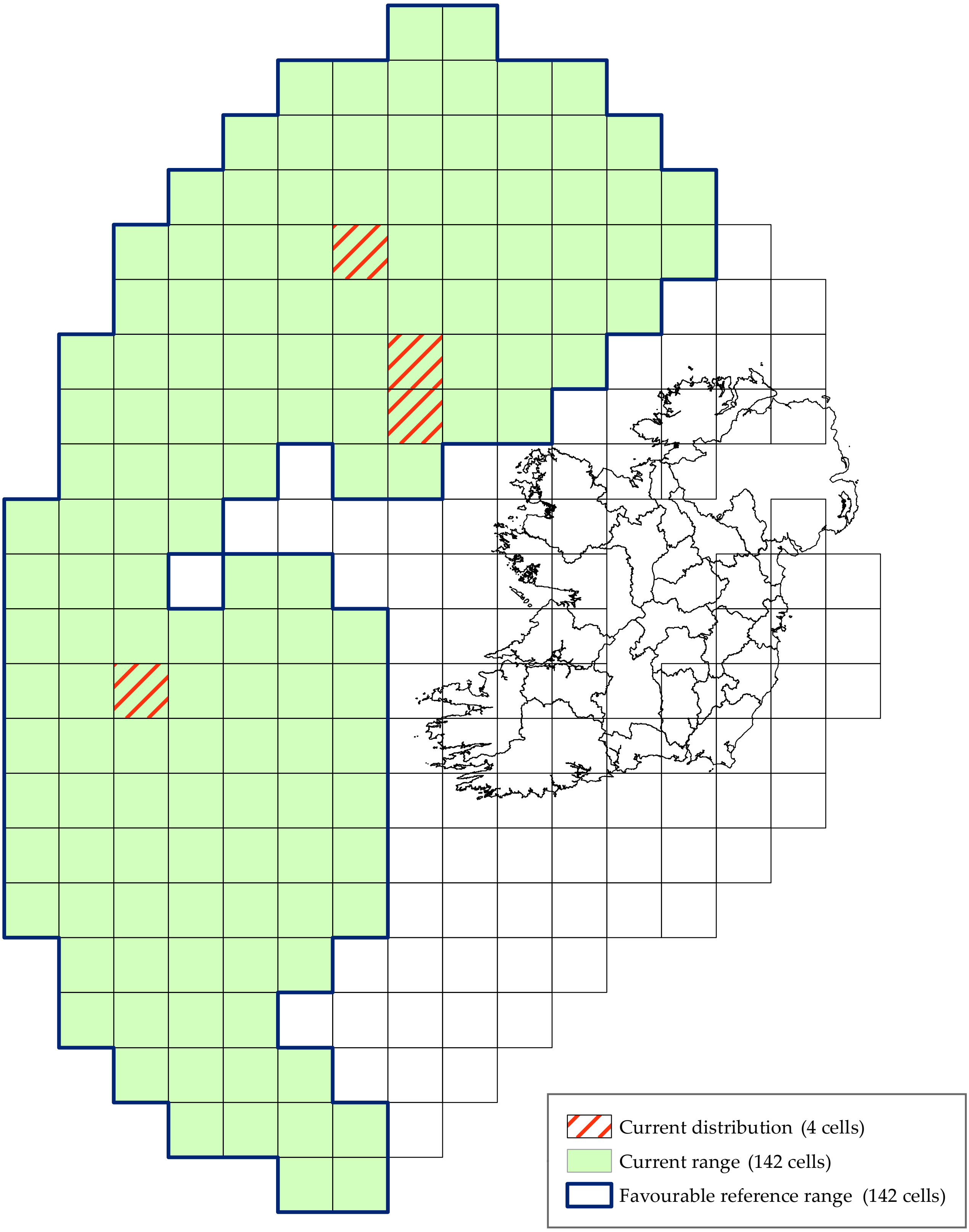
Field label	Note
Species: 2035	**Cuvier's beaked whale**
1.1.02 Method used - map	Over the last 2-3 decades definitive records of the occurrence of this species in Irish waters have been elusive. Simultaneous to more rigorous surveillance in the last 15-20 years occasional Cuvier's beaked whale records have emerged however, mainly from deeper oceanic and continental slope waters to the north, west and southwest of Ireland (Ó Cadhla et al., 2004; CODA, 2009; Wall et al., 2012). The distribution of recent sightings along with regional sighting records obtained across three preceding decades (Reid et al., 2003) indicate a predominant distribution in deeper Atlantic waters overlying the continental slope of Ireland and in the Rockall Trough and Porcupine Seabight. The species may also occur in deep waters overlying the Porcupine Abyssal Plain and Goban Spur at the southern limits of Irish jurisdiction. While all reliable cetacean records obtained in Irish waters were not available for use in this exercise, the map drawn for this species provides a good sample of the species' observed distribution.
1.1.03 Year or period	The period selected for mapping the distribution of this species represents a period of intensive surveillance for cetaceans in Irish waters across a range of research and monitoring programmes.
1.1.05 Range map	The species' natural range in Irish waters is believed to be a small component of its wider North Atlantic range (Taylor et al., 2008; DEHLG, 2009). However, a degree of seasonal/interannual association with or residency within particular preferred deep-water habitats cannot be discounted at this stage. The range map provided consists of its recorded and likely natural range based on recent data (2001-2012) and expert judgement, and is partly derived from 1.1.1. It consists of a block of contiguous 50km x 50km grid cells distributed in Irish marine waters of 500m depth or greater.
2.3.02 Method used - Surface area of Range	This figure has been derived from the range map referred to in 1.1.5.
2.3.03 Short-term trend - Period	Prior to 1999-2000, survey effort targeting cetacean species in Irish offshore waters was comparatively limited in coverage, both spatially and temporally. Since 1999-2000 a number of dedicated multi-annual surveillance programmes for cetaceans have operated in Irish waters, with survey effort extending to the limits of Ireland's EEZ and beyond. Consequently, with regard to this species it is considered that the years 2001-2012 represent an appropriate period for the evaluation of short-term trends.
2.3.04 Short term trend - Trend direction	Sighting records from dedicated surveillance effort in Irish waters (Ó Cadhla et al., 2004; CODA, 2009; Wall et al., 2012) have been occasional and sporadic, and they do not provide a sufficient basis for the evaluation of trends in distribution/range in the recent past; therefore accordingly the short-term trend for range is considered to be unknown.
2.3.06 Long-term trend - Period	A long-term trend period for this species is not considered appropriate, for reasons outlined in 2.3.3.
2.3.09 a) Favourable reference range - In km2	The range value derived from the range map referred to in 1.1.5 is considered to be the baseline for this species. As there is no evidence of a decline since the Directive came into force the current range is set as the FRR. [Note: (1) The species may undertake seasonal movements although regional population components may also be present year-round; Nevertheless the species' range in Irish waters is likely to represent only a component of its range in marine waters covered by the Directive and the northeast Atlantic Ocean; (2) There is an assumption that the current range in Irish waters is large enough (a) to encompass all of the ecological variation required by this species during its occurrences therein and (b) to contribute to the long-term survival of the species.]

Field label	Note
Species: 2035	**Cuvier's beaked whale**
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Additional but infrequent sighting records of this distinctive beaked whale species have been obtained since the previous reporting round (e.g., CODA, 2009; Wall et al., 2012). Along with previous data from a range of sources, this has resulted in an improved knowledge and ability to assess the range from that reported in 2007. There is no scientific reason to assume that the species was not similarly present in 2001-2006.
2.4.04 Year or period	The period 2001-2012 has been selected in order to represent the most current population information available for this species.
2.4.05 Method used - Population size	Evidence from multi-annual surveillance programmes (Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012) indicate that Cuvier's beaked whales occur predominantly in deep Atlantic waters although it remains unclear whether the species is present year-round. Recent estimates of total abundance in waters overlying the western European continental slope and deeper oceanic waters numbered approximately 2,300-4,500 animals (95%CL = 1,735-11,519; Cañadas et al., 2011), more than 60% of which was attributed to the southern Gulf of Gascogne in the Bay of Biscay. However the species' abundance in its wider northeast or North Atlantic range is unknown (Taylor et al., 2008). In seeking to approximate population size range for Irish waters from these limited datasets, there are significant difficulties due (i) to the species' apparently wide pelagic distribution throughout northeast Atlantic and European offshore waters making jurisdictional separation somewhat arbitrary, (ii) to problems associated with the narrow temporal focus of such surveys (e.g., one month in one season in one year, or separate years for coverage of shelf and deeper oceanic waters), and (iii) to high CVs (i.e., estimation uncertainty) particularly from regions where recorded numbers of sightings have been low. The minimum and maximum population estimates given for this species are based on the summation of regional estimates derived by Cañadas et al. (2011) and driven by data gathered in the 2007 CODA survey (CODA, 2009) and 2005 SCANS-II survey (SCANS-II, 2008). They assume the free ranging of animals across and within the regions concerned (e.g., from deep oceanic waters in the Bay of Biscay and off the Iberian peninsula to the Rockall Trough and northern UK waters). In the case of this species, summer abundance is likely to be better represented by the lower end of the population size range given.
2.4.06 Short-term trend - Period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.4.09 Short-term trend - Method used	There is no evidence of growth or decline in the northeast Atlantic population(s) of Cuvier's beaked whale, although a recent assessment of overall population size in the offshore waters of western Europe (Cañadas et al., 2011) indicates that in regional terms the species could be in a healthy state. However, given that these estimates for the species are the only figures for western European waters since the Directive came into force, the reliable determination of short-term population trend for this species is not possible.
2.4.10 Long-term trend - Period	A long-term trend period for this species is not considered appropriate, for reasons outlined in 2.3.3.
2.4.14 d) Favourable reference population - Indicate method used to set reference value if other than operators	Robust data on Cuvier's beaked whale population trends in Irish waters are not available. However broad-scale population estimates have recently been derived for the European Atlantic based on comparable surveys of the continental shelf area (SCANS-II, 2008) and deeper oceanic waters (Cañadas et al., 2011). While these population figures represent the first comparatively robust estimates since the Directive came into force, they are captured from a short snapshot in time, the associated Lower and Upper 95% Confidence Limits are significantly different, and their use as descriptors for FRP require further work. The FRP for this species is therefore considered to be unknown.
2.5.01 Area estimation	The surface area estimate for range (derived from the range map referred to in 1.1.5) is used as a proxy for habitat surface area.

Field label	Note
Species: 2035	**Cuvier's beaked whale**
2.5.02 Year or period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.5.03 Method used Habitat for the species	Use of the range descriptor as a proxy for habitat is judged appropriate for this pelagic species.
2.5.04 b) Quality of the habitat - Explain how the quality was assessed	The quality of habitat for Cuvier's beaked whale was determined by consideration of the relevant direct and indirect pressures thought to be acting on the species and/or its functional group, and its habitat within its natural environment. These pressures were evaluated in development of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009) using available scientific data concerning inter alia habitat use, population size, distribution and ecology, and threats to the species' protection (e.g., via natural/biological sources, human sectoral activities, management gaps, etc). Cuvier's beaked whale may be subject to a number of local and/or regional environmental pressures throughout its range in Irish waters (see 2.3, 2.6; DEHLG, 2009). However based on current data available none are considered to be of sufficient spatial or temporal impact on the species to be causing a significant deterioration in overall habitat quality in Ireland from a "good" status.
2.5.05 Short-term trend - Period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.5.06 Short-term trend - Trend direction	The trend for range in 2.3.4 is applied as a proxy for habitat.
2.5.07 Long-term trend - Period	A long-term trend period for this species is not considered appropriate, for reasons outlined in 2.3.3.
2.5.09 Area of suitable habitat for the species (km2)	Cuvier's beaked whales have occasionally been recorded in Irish and neighbouring waters both historically and to the present day and the known habitats for this predominantly deep water species include waters overlying the continental slope, the Rockall Trough and the Porcupine Seabight. The Area of suitable habitat is considered to be equal to the Habitat for the species.
2.6 Main pressures - Pressure	In the development and preparation of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009), a comprehensive review of the pressures believed and/or documented to be acting on this species and/or its functional group (i.e., threats to their protection) was undertaken. The main pressures thought to be acting on this species are considered to occur primarily on a local or regional scale and/or on a temporary or intermittent basis (e.g., impacts arising from shipping movements or seismic exploration; DEHLG, 2009). Since Cuvier's beaked whale distribution is likely to be exclusively offshore Atlantic in nature, the ranking given in most cases is one of low importance. Nevertheless where a pressure may be regionally intensive the ranking given is one of medium importance due to the species' potential preference for specific deep canyon habitats, conferring greater physiological constraints on individual animals, and apparent sensitivity to underwater noise in such circumstances. It should be noted that in relation to seismic exploration, which tends to occur on a local or occasionally regional scale in the waters of Ireland's EEZ and is comparatively low in coverage relative to several other member states, a robust regulatory and management regime applies in order to avoid potentially significant impacts on all species of marine mammal. The impact on this species of changes in sea temperature and other abiotic factors in the marine environment can also not be discounted.
2.7 Threats - Threat	There is no evidence to suggest a change in the main pressures thought to be acting on this species in the near future. However surveillance of the species and the pressures potentially acting upon it will continue into the future, while the application of strong management measures (e.g., via the statutory/regulatory process) to avoid potentially significant impacts is also expected to continue.

Field label	Note
Species: **2035**	**Cuvier's beaked whale**
2.8.01 Justification of % thresholds for trends	A detailed analysis of the statistical ability and power to robustly determine population trends for cetacean species occurring in western European waters is under way via the Joint Cetacean Protocol (JCP) project in the UK. This phased work is due for completion in 2013 and it will inform whether and for which species the measurement of population trends may be possible based on survey data from a range of sources.
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	While records of Cuvier's beaked whale in Irish waters have been comparatively infrequent, sightings data indicate a wide occurrence in deep oceanic waters and those overlying the continental slope. Hence the Range is considered to be favourable.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	There is no evidence of a growth or decline in the northeast Atlantic population(s) of Cuvier's beaked whale, although a recent assessment of overall population size in the offshore waters of western Europe indicate that in regional terms the species could be in a healthy state. However the status, distribution and origin/stock identity of those whales occurring in Irish waters is not known. Considering these key data gaps and the infrequency of positive sighting records from Irish waters the population parameter is considered unknown.
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	While Cuvier's beaked whales have been recorded comparatively infrequently in Irish waters both historically and to the present day, the known habitats for this predominantly deep water species include extensive waters overlying the continental slope and its canyonated margins, the Porcupine Seabight and the Rockall Trough. Hence the habitat for this species in Ireland is considered favourable.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	A number of pressures have been identified. While the effect of these pressures may act on a temporary and/or regional scale and some are likely to continue to act as pressures into the future, the impacts on individuals or populations of Cuvier's beaked whale in Irish waters are not well understood. This is largely due to the species' occurrence far offshore and to limited data on its numbers and ecology within Ireland's marine area. While ongoing threats as listed or identified into the future via surveillance will be managed appropriately, the future prospects for the species are therefore considered to be unknown.
2.9.05 Overall assessment of Conservation Status	Based on the assessments for the Range, Population, Habitat and Future Prospects parameters, the overall conclusion is that the conservation status of Cuvier's beaked whale in Ireland is considered "Unknown". This overall result is the same as in the previous Article 17 assessment due to limited ongoing information on the species' population ecology in Irish waters. However improvements are reported in the assessments for the Range and Habitat parameters, due to improved knowledge.

Cuvier's beaked whale - *Ziphius cavirostris* (2035)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

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Scale - Scála
0 25 50 75 100 km

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11-06-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**2037**
0.2.2 Species name	**Mesoplodon mirus**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	True's beaked whale

1. National Level

1.1 Maps

1.1.1 Distribution Map	No
1.1.1a Sensitive species	No
1.1.2 Method used - map	N/A
1.1.3 Year or period	
1.1.4 Additional map	No
1.1.5 Range map	No

2. Biogeographical Or Marine Level

2.1 Biogeographical Region	**Marine Atlantic (MATL)**
2.2 Published sources	

2.3 Range

2.3.1 Surface area - Range (km²)		
2.3.2 Method - Range surface area	N/A	
2.3.3 Short-term trend period		
2.3.4 Short-term trend direction	N/A	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	
	operator	N/A
	unknown	No
	method	
2.3.10 Reason for change		

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	N/A
	min	max
2.4.2 Population size (other than individuals)	Unit	N/A
	min	max
2.4.3 Additional information	Definition of locality	
	Conversion method	
	Problems	
2.4.4 Year or period		
2.4.5 Method – population size	N/A	
2.4.6 Short-term trend period		
2.4.7 Short term trend direction	N/A	

2.4.8 Short-term trend magnitude	min	max	confidence interval
2.4.9 Short-term trend method	N/A		
2.4.10 Long-term trend period			
2.4.11 Long term trend direction	N/A		
2.4.12 Long-term trend magnitude	min	max	confidence interval
2.4.13 Long-term trend method	N/A		
2.4.14 Favourable reference population	number		
	operator N/A		
	unknown No		
	method		
2.4.15 Reason for change			

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	
2.5.2 Year or period	
2.5.3 Method used - habitat	N/A
2.5.4 a) Quality of habitat	
2.5.4 b) Quality of habitat - method	
2.5.5 Short term trend period	
2.5.6 Short term trend direction	N/A
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	
2.5.10 Reason for change	

2.6 Main Pressures

2.6.1 Method used – pressures	N/A

2.7 Main Threats

2.7.1 Method used – threats	N/A

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant Information	
2.8.3 Trans-boundary assessment	

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment	Unknown (XX)
	qualifiers	N/A
2.9.2. Population	assessment	Unknown (XX)
	qualifiers	N/A
2.9.3. Habitat	assessment	Unknown (XX)
	qualifiers	N/A
2.9.4. Future prospects	assessment	Unknown (XX)
	qualifiers	N/A
2.9.5 Overall assessment of Conservation Status	Unknown (XX)	
2.9.6 Overall trend in Conservation Status	N/A	

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	N/A		
	min		max	
3.1.2 Method used	N/A			
3.1.3 Trend of population size within	N/A			

3.2 Conservation Measures

Field label	Note
Species: 2037	**True's beaked whale**
0.1 Member State	Ireland
0.2.04 Common name	True's beaked whale = Míol mór socach breá
1.1.02 Method used - map	No live records of this species have been obtained from Ireland within the current reporting round. A sighting record in Irish offshore waters in 2001 was concluded to be of this species.
2.9.05 Overall assessment of Conservation Status	Since no live records of this species have been obtained from Ireland within the current reporting round the conservation status of this vagrant species is assessed as unknown.

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**2038**
0.2.2 Species name	**Mesoplodon bidens**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	Sowerby's beaked whale

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	1995-2012
1.1.4 Additional map	No
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region: **Marine Atlantic (MATL)**

2.2 Published sources:

Taylor, B.L., Baird, R., Barlow, J., Dawson, S.M., Ford, J., Mead, J.G., Notarbartolo di Sciara, G., Wade, P. & Pitman, R.L. (2008). Mesoplodon bidens. In IUCN 2012. IUCN Red List of Threatened Species. Version 2012.2. http://www.iucnredlist.org.

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Wall, D., O'Brien, J., Kavanagh, L., Ryan, C., Hunt, L. & Fennelly, S. (2012). Monitoring of spatial and temporal habitat use and abundance of cetaceans. In S.D. Berrow, J.O'Brien, I. O'Connor, D. McGrath & D. Wall. Marine Mammals and Megafauna in Irish Waters – behaviour, distribution and habitat use. Final project report for Grant-Aid Agreement No. PBA/ME/07/005(02) under the Sea Change Strategy with the support of the Marine Institute, the Marine Research Sub-Programme of the National Development Plan 2007–2013 and the Department of Arts, Heritage and the Gaeltacht. Galway-Mayo Institute of Technology, Galway. p.1-187.

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Weir, C.R., Pollock, C., Cronin, C. & Taylor, S. (2001). Cetaceans of the Atlantic frontier, north and west of Scotland. Continental Shelf Research 21, 1047-1071.

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SCANS-II (2008). Small Cetaceans in the European Atlantic and North Sea. Final Report to the European Commission under project LIFE04NAT/GB/000245. Sea Mammal Research Unit, Gatty Marine Laboratory, University of St Andrews, St Andrews, Fife, KY16 8LB.

Cañadas, A., Macleod, K., Mikkelsen, B., Rogan, E., Uriarte, A., Antonio Vázquez, J., Van Canneyt, O. & Hammond, P.S. (2011). Abundance and distribution of beaked whales in the European Atlantic. Report to the Scientific Committee of the International Whaling Commission, Cambridge. SC/63/SM13. 16pp.

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Pollock, C.M., Reid, J.R., Webb, A. & Tasker, M.L. (1997). The distribution of seabirds and cetaceans in the waters around Ireland. JNCC Report No. 267. Joint Nature Conservation Committee, Peterborough. 167pp.

2.3 Range

2.3.1 Surface area - Range (km²)	355000	
2.3.2 Method - Range surface area	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	unknown (x)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	355000
	operator	N/A
	unknown	No
	method	The range value derived from the range map referred to in 1.1.5 is considered to be the baseline for this species. As there is no evidence of a decline since the Directive came into force the current range is set as the FRR.
2.3.10 Reason for change	Improved knowledge/more accurate data	

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	number of individuals (i)		
	min	1725	max	10356
2.4.2 Population size (other than individuals)	Unit	N/A		
	min		max	
2.4.3 Additional information	Definition of locality			

	Conversion method	
	Problems	Evidence from multi-annual surveillance programmes (Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012) indicate that Sowerby's beaked whales occur predominantly in deep Atlantic waters although it remains unclear whether the species is present year-round. Recent estimates of total abundance in waters overlying the western European continental slope and deeper oceanic waters numbered approximately 3,500-4,200 animals (95%CL = 1,725-10,356; Cañadas et al., 2011). However the species' abundance in its wider northeast or North Atlantic range is unknown (Taylor et al., 2008). In seeking to approximate population size range for Irish waters from these limited datasets, there are significant difficulties due (i) to the species' apparently wide pelagic distribution throughout northeast Atlantic and European offshore waters making jurisdictional separation somewhat arbitrary, (ii) to problems associated with the narrow temporal focus of such surveys (e.g., one month in one season in one year, or separate years for coverage of shelf and deeper oceanic waters), and (iii) to high CVs (i.e., estimation uncertainty) particularly from regions where recorded numbers of sightings have been low. The minimum and maximum population estimates given for this species are based on the summation of regional estimates derived by Cañadas et al. (2011) and driven by data gathered in the 2007 CODA survey (CODA, 2009). They assume the free ranging of animals across and within the regions concerned (e.g., from deep oceanic waters west of the Bay of Biscay and Iberian peninsula to the Rockall Trough and northern UK waters).

2.4.4 Year or period	2001-2012		
2.4.5 Method – population size	Estimate based on expert opinion with no or minimal sampling (1)		
2.4.6 Short-term trend period	2001-2012		
2.4.7 Short term trend direction	unknown (x)		
2.4.8 Short-term trend magnitude	min	max	confidence interval
2.4.9 Short-term trend method	Estimate based on expert opinion with no or minimal sampling (1)		
2.4.10 Long-term trend period			
2.4.11 Long term trend direction	N/A		
2.4.12 Long-term trend magnitude	min	max	confidence interval
2.4.13 Long-term trend method	N/A		

2.4.14 Favourable reference population	number	
	operator	N/A
	unknown	Yes
	method	Robust data on Sowerby's beaked whale population trends in Irish waters are not available although knowledge of the species' distribution and occurrence has improved since the Directive came into force. Nevertheless the use of current population figures as descriptors for FRP require further work. The FRP for this species is

therefore considered to be unknown.

2.4.15 Reason for change	Improved knowledge/more accurate data

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	355000
2.5.2 Year or period	2001-2012
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Good
2.5.4 b) Quality of habitat - method	The quality of habitat for this species was determined by consideration of the relevant direct and indirect pressures thought to be acting on the species and/or its functional group, and its habitat within its natural environment. These pressures were evaluated in development of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009) using available scientific data concerning inter alia habitat use, population size, distribution and ecology, and threats to the species' protection (e.g., via natural/biological sources, human sectoral activities, management gaps, etc).
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	unknown (x)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	355000
2.5.10 Reason for change	Improved knowledge/more accurate data

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	low importance (L)	N/A
death or injury by collision (G05.11)	low importance (L)	N/A
Noise nuisance, noise pollution (H06.01)	low importance (L)	N/A
Seismic exploration, explosions (H06.05)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A
Threats and pressures from outside the Member State (XO)	low importance (L)	N/A

2.6.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	low importance (L)	N/A
death or injury by collision (G05.11)	low importance (L)	N/A
Noise nuisance, noise pollution (H06.01)	low importance (L)	N/A
Seismic exploration, explosions (H06.05)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A
Threats and pressures from outside the Member State (XO)	low importance (L)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	Research into the appropriate use of statistics and a range of data sources for population trend analysis is currently under way. Until the results of this work become available, it is not considered scientifically valid to attempt to determine

	population trends.
2.8.2 Other relevant Information	
2.8.3 Trans-boundary assessment	Given the mobility of this marine species, and in particular the potential for seasonal movements in response to breeding requirements, prey distribution and abundance, and other natural processes, it is possible or likely that individuals and/or groups of this species move between Irish waters and adjacent marine jurisdictions. A transboundary assessment in the next reporting period would allow a fuller appreciation of the range and status of this species.

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.9.2. Population	assessment	Unknown (XX)
	qualifiers	N/A
2.9.3. Habitat	assessment	Favourable (FV)
	qualifiers	N/A
2.9.4. Future prospects	assessment	Unknown (XX)
	qualifiers	N/A
2.9.5 Overall assessment of Conservation Status	Unknown (XX)	
2.9.6 Overall trend in Conservation Status	N/A	

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	N/A		
	min		max	
3.1.2 Method used	N/A			
3.1.3 Trend of population size within	N/A			

3.2 Conservation Measures

Article 17 - SPECIES NOTES

Field label	Note
Species: 2038	**Sowerby's beaked whale**
0.1 Member State	Ireland
0.2.01 Species code	The Sowerby's beaked whale is one of three members of the Genus Mesoplodon that have been recorded historically in Ireland and it has been the most common of the three. A smaller member of the beaked whale family (Ziphiidae) with adults averaging up to 5-6m in body length, the species is found only in the North Atlantic where it occurs mostly in temperate and sub-polar regions. Its range in the eastern Atlantic is believed to stretch from Iceland and northern Norway to the Azores and Canary Islands off northwest Africa, and it excludes the Mediterranean and Baltic Seas (Taylor et al., 2008). It is classified as a Data Deficient species whose population status and trends remain uncertain yet it is not believed to be uncommon (Taylor et al., 2008). Sightings in Irish waters have been infrequent and sporadic (e.g., Ó Cadhla et al., 2004; Wall et al., 2012) which may be partly due to its exclusive occurrence in deeper oceanic waters. Sowerby's beaked whales are quite readily identifiable due to their long slender beak which may be clearly visible when the animal surfaces (e.g., Wall et al., 2012), their moderate body length for a toothed cetacean, the position of a small curved dorsal fin about two-thirds of the way along the back, and the absence of a central notch in the tail flukes. Skin colouration tends to be uniformly dark grey with a paler ventral surface but individuals may show distinct elongated scarring along the flanks. Very little is known about the species' natural history or ecology in the waters of western Europe and wider northeast Atlantic; separate populations or breeding stocks and clear patterns in latitudinal/longitudinal movement are not apparent at present (DEHLG, 2009).
0.2.04 Common name	Sowerby's beaked whale = Míol mór socach na Mara Thuaidh
1.1.01 Distribution map	The distribution map presented for this species represents a significant proportion of al live sightings recorded during targeted scientific surveillance in Irish waters between 1994/95 and 2012. The surveillance programmes that contributed data to this projection are cited as follows: Pollock et al. (1997), Reid et al. (2003), Ó Cadhla et al. (2004) and Wall et al. (2013). These data and the results of other survey effort (e.g., SCANS-II, 2008; CODA, 2009; Berrow et al., 2010) were integrated into the developmen of the species range map presented under section 1.1.5. This distribution map for the species has been drawn in 50km x 50km resolution and is mapped in the LAEA projection.
1.1.02 Method used - map	Over the last 2-3 decades definitive records of the occurrence of this species in Irish waters have been elusive. Simultaneous to more rigorous surveillance in the last 15-20 years occasional Sowerby's beaked whale records have emerged however, mainly from deeper oceanic and continental slope waters to the north and west of Ireland (Ó Cadhla et al., 2004; CODA, 2009; Wall et al., 2012). The distribution of recent sightings along with regional sighting records obtained across three preceding decades (Weir et al., 2001; Reid et al., 2003) indicate a predominant distribution in deeper Atlantic waters overlying the continental slope of Ireland and in the Rockall Trough. It is also likely that the species occurs in the Porcupine Seabight and in deep waters overlying the Porcupine Abyssal Plain and Goban Spur at the southern limits of Irish jurisdiction. While all reliable cetacean records obtained in Irish waters were not available for use in this exercise, the map drawn for this species provides a good sample of the species' observed distribution.
1.1.03 Year or period	The period selected for mapping the distribution of this species represents a period of intensive surveillance for cetaceans in Irish waters across a range of research and monitoring programmes.

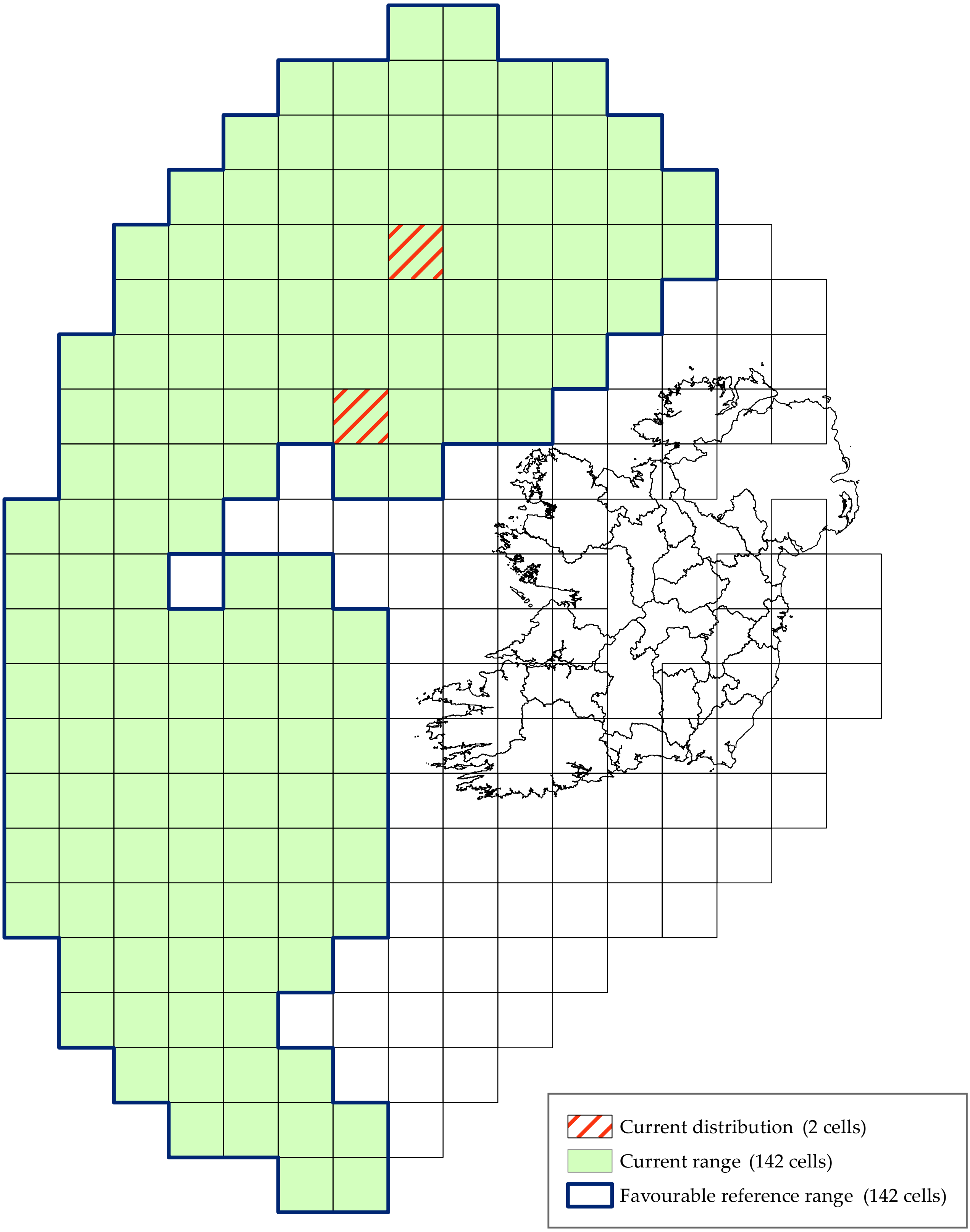
Field label	Note
Species: 2038	**Sowerby's beaked whale**
1.1.05 Range map	The species' natural range in Irish waters is believed to be a small component of its wider North Atlantic range (Taylor et al., 2008; DEHLG, 2009). However, a degree of seasonal/interannual association with or residency within particular preferred deep-water habitats cannot be discounted at this stage. The range map provided consists of its recorded and likely natural range based on recent data (2001-2012) and expert judgement, and is partly derived from 1.1.1. It consists of a block of contiguous 50km x 50km grid cells distributed in Irish marine waters of 500m depth or greater.
2.3.02 Method used - Surface area of Range	This figure has been derived from the range map referred to in 1.1.5.
2.3.03 Short-term trend - Period	Prior to 1999-2000, survey effort targeting cetacean species in Irish offshore waters was comparatively limited in coverage, both spatially and temporally. Since 1999-2000 a number of dedicated multi-annual surveillance programmes for cetaceans have operated in Irish waters, with survey effort extending to the limits of Ireland's EEZ and beyond. Consequently, with regard to this species it is considered that the years 2001-2012 represent an appropriate period for the evaluation of short-term trends.
2.3.04 Short term trend - Trend direction	Sighting records from dedicated surveillance effort in Irish waters (Ó Cadhla et al., 2004; CODA, 2009; Wall et al., 2012) have been occasional and sporadic, and they do not provide a sufficient basis for the evaluation of trends in distribution/range in the recent past; therefore accordingly the short-term trend for range is considered to be unknown.
2.3.06 Long-term trend - Period	A long-term trend period for this species is not considered appropriate, for reasons outlined in 2.3.3.
2.3.09 a) Favourable reference range - In km2	The range value derived from the range map referred to in 1.1.5 is considered to be the baseline for this species. As there is no evidence of a decline since the Directive came into force the current range is set as the FRR. [Note: (1) The species may undertake seasonal movements although regional population components may also be present year-round; nevertheless the species' range in Irish waters is likely to represent only a component of its range in marine waters covered by the Directive and the northeast Atlantic Ocean; (2) There is an assumption that the current range in Irish waters is large enough (a) to encompass all of the ecological variation required by this species during its occurrences therein and (b) to contribute to the long-term survival of the species.]
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Additional but infrequent sighting records of this small distinctive beaked whale species have been obtained since the previous reporting round (e.g., CODA, 2009; Wall et al., 2012). Along with previous data from a range of sources, this has resulted in an improved knowledge and ability to assess the range from that reported in 2007. There is no scientific reason to assume that the species was not similarly present in 2001-2006
2.4.04 Year or period	The period 2001-2012 has been selected in order to represent the most current population information available for this species.

Field label	Note
Species: 2038	**Sowerby's beaked whale**
2.4.05 Method used - Population size	Evidence from multi-annual surveillance programmes (Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012) indicate that Sowerby's beaked whales occur predominantly in deep Atlantic waters although it remains unclear whether the species is present year round. Recent estimates of total abundance in waters overlying the western European continental slope and deeper oceanic waters numbered approximately 3,500-4,200 animals (95%CL = 1,725-10,356; Cañadas et al., 2011). However the species' abundance in its wider northeast or North Atlantic range is unknown (Taylor et al., 2008). In seeking to approximate population size range for Irish waters from these limited datasets, there are significant difficulties due (i) to the species' apparently wide pelagic distribution throughout northeast Atlantic and European offshore waters making jurisdictional separation somewhat arbitrary, (ii) to problems associated with the narrow temporal focus of such surveys (e.g., one month in one season in one year, or separate years for coverage of shelf and deeper oceanic waters), and (iii) to high CVs (i.e., estimation uncertainty) particularly from regions where recorded numbers of sightings have been low. The minimum and maximum population estimates given for this species are based on the summation of regional estimates derived by Cañadas et al. (2011) and driven by data gathered in the 2007 CODA survey (CODA, 2009). They assume the free ranging of animals across and within the regions concerned (e.g., from deep oceanic waters west of the Bay of Biscay and Iberian peninsula to the Rockall Trough and northern UK waters).
2.4.06 Short-term trend - Period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.4.09 Short-term trend - Method used	There is no evidence of growth or decline in the northeast Atlantic population(s) of Sowerby's beaked whale, although a recent assessment of overall population size in the offshore waters of western Europe (Cañadas et al., 2011) indicates that in regional terms the species could be in a healthy state. However, given that these estimates for the species are the only figures for western European waters since the Directive came into force, the reliable determination of short-term population trend for this species is not possible.
2.4.10 Long-term trend - Period	A long-term trend period for this species is not considered appropriate, for reasons outlined in 2.3.3.
2.4.14 d) Favourable reference population - Indicate method used to set reference value if other than operators	Robust data on Sowerby's beaked whale population trends in Irish waters are not available. However broad-scale population estimates have recently been derived for the European Atlantic based on comparable surveys of the continental shelf area (SCANS-II, 2008) and deeper oceanic waters (Cañadas et al., 2011). While these population figures represent the first comparatively robust estimates since the Directive came into force, they are captured from a short snapshot in time, the associated Lower and Upper 95% Confidence Limits are significantly different, and their use as descriptors for FRP require further work. The FRP for this species is therefore considered to be unknown.
2.5.01 Area estimation	The surface area estimate for range (derived from the range map referred to in 1.1.5) is used as a proxy for habitat surface area.
2.5.02 Year or period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.5.03 Method used Habitat for the species	Use of the range descriptor as a proxy for habitat is judged appropriate for this pelagic species.

Field label	Note
Species: 2038	**Sowerby's beaked whale**
2.5.04 b) Quality of the habitat - Explain how the quality was assessed	The quality of habitat for Sowerby's beaked whale was determined by consideration of the relevant direct and indirect pressures thought to be acting on the species and/or its functional group, and its habitat within its natural environment. These pressures were evaluated in development of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009) using available scientific data concerning inter alia habitat use, population size, distribution and ecology, and threats to the species' protection (e.g., via natural/biological sources, human sectoral activities, management gaps, etc). Sowerby's beaked whale may be subject to a number of local and/or regional environmental pressures throughout its range in Irish waters (see 2.3, 2.6; DEHLG, 2009). However based on current data available none are considered to be of sufficient spatial or temporal impact on the species to be causing a significant deterioration in overall habitat quality in Ireland from a "good" status.
2.5.05 Short-term trend - Period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.5.06 Short-term trend - Trend direction	The trend for range in 2.3.4 is applied as a proxy for habitat.
2.5.07 Long-term trend - Period	A long-term trend period for this species is not considered appropriate, for reasons outlined in 2.3.3.
2.5.09 Area of suitable habitat for the species (km2)	Sowerby's beaked whales have occasionally been recorded in Irish and neighbouring waters both historically and to the present day and the known habitats for this predominantly deep water species include waters overlying the continental slope and the Rockall Trough. The Area of suitable habitat is considered to be equal to the Habitat for the species.
2.6 Main pressures - Pressure	In the development and preparation of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009), a comprehensive review of the pressures believed and/or documented to be acting on this species and/or its functional group (i.e., threats to their protection) was undertaken. The main pressures thought to be acting on this species are considered to occur primarily on a local or regional scale and/or on a temporary or intermittent basis (e.g., impacts arising from shipping movements or seismic exploration; DEHLG, 2009). Since Sowerby's beaked whale distribution is likely to be exclusively offshore Atlantic in nature, the ranking given in most cases is one of low importance. Nevertheless where a pressure may be regionally intensive the ranking given is one of medium importance due to the species' potential preference for specific deep canyon habitats, conferring greater physiological constraints on individual animals, and apparent sensitivity to underwater noise in such circumstances. It should be noted that in relation to seismic exploration, which tends to occur on a local or occasionally regional scale in the waters of Ireland's EEZ and is comparatively low in coverage relative to several other member states, a robust regulatory and management regime applies in order to avoid potentially significant impacts on all species of marine mammal. The impact on this species of changes in sea temperature and other abiotic factors in the marine environment can also not be discounted.
2.7 Threats - Threat	There is no evidence to suggest a change in the main pressures thought to be acting on this species in the near future. However surveillance of the species and the pressures potentially acting upon it will continue into the future, while the application of strong management measures (e.g., via the statutory/regulatory process) to avoid potentially significant impacts is also expected to continue.
2.8.01 Justification of % thresholds for trends	A detailed analysis of the statistical ability and power to robustly determine population trends for cetacean species occurring in western European waters is under way via the Joint Cetacean Protocol (JCP) project in the UK. This phased work is due for completion in 2013 and it will inform whether and for which species the measurement of population trends may be possible based on survey data from a range of sources.

Field label	Note
Species: 2038	**Sowerby's beaked whale**
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	While records of Sowerby's beaked whale in Irish waters have been comparatively infrequent, sightings data indicate a wide occurrence in deep oceanic waters and those overlying the continental slope. Hence the Range is considered to be favourable.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	There is no evidence of a growth or decline in the northeast Atlantic population(s) of Sowerby's beaked whale, although a recent assessment of overall population size in the offshore waters of western Europe indicate that in regional terms the species could be in a healthy state. However the status, distribution and origin/stock identity of those whales occurring in Irish waters is not known. Considering these key data gaps and the infrequency of positive sighting records from Irish waters the population parameter is considered unknown.
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	While Sowerby's beaked whales have been recorded comparatively infrequently in Irish waters both historically and to the present day, the known habitats for this predominantly deep water species include extensive waters overlying the continental slope and its canyonated margins, and the Rockall Trough. Hence the habitat for this species in Ireland is considered favourable.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	A number of pressures have been identified. While the effect of these pressures may act on a temporary and/or regional scale and some are likely to continue to act as pressures into the future, the impacts on individuals or populations of Sowerby's beaked whale in Irish waters are not well understood. This is largely due to the species' occurrence far offshore and to limited data on its numbers and ecology within Ireland's marine area. While ongoing threats as listed or identified into the future via surveillance will be managed appropriately, the future prospects for the species are therefore considered to be unknown.
2.9.05 Overall assessment of Conservation Status	Based on the assessments for the Range, Population, Habitat and Future Prospects parameters, the overall conclusion is that the conservation status of Sowerby's beaked whale in Ireland is considered "Unknown". This overall result is the same as in the previous Article 17 assessment due to limited ongoing information on the species' population ecology in Irish waters. However improvements are reported in the assessments for the Range and Habitat parameters, due to improved knowledge.

Sowerby's beaked whale - *Mesoplodon bidens* (2038)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
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Map - Léarscáil
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11-06-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**2618**
0.2.2 Species name	**Balaenoptera acutorostrata**
0.2.3 Alternative species scientific name	Common minke whale
0.2.4 Common name	Minke whale

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	1995-2012
1.1.4 Additional map	No
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Marine Atlantic (MATL)

2.2 Published sources

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2.3 Range

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

2.3.1 Surface area - Range (km²)	455000
2.3.2 Method - Range surface area	Estimate based on partial data with some extrapolation and/or modelling (2)
2.3.3 Short-term trend period	2001-2012
2.3.4 Short-term trend direction	stable (0)
2.3.5 Short-term trend magnitude	min max
2.3.6 Long-term trend period	
2.3.7 Long-term trend direction	N/A
2.3.8 Long-term trend magnitude	min max
2.3.9 Favourable reference range	area (km²) 455000 operator N/A unknown No method The range value derived from the range map referred to in 1.1.5 is considered to be the baseline for this species. As there is no evidence of a decline since the Directive came into force the current range is set as the FRR.
2.3.10 Reason for change	Improved knowledge/more accurate data

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit number of individuals (i) min 3161 max 42101
2.4.2 Population size (other than individuals)	Unit N/A min max
2.4.3 Additional information	Definition of locality Conversion method Problems Evidence from multi-annual surveillance programmes (Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012) indicate that minke whales occur widely in Irish continental shelf and slope waters and may do so throughout the year. The most recent estimate of total abundance in the North Atlantic numbers approximately 182,000 whales (Reilly et al., 2008), approximately 80,000 of which may occur in the northeast Atlantic (DEHLG, 2009). Estimates for the population(s) inhabiting European Atlantic waters have been lacking until recently when comparable data from the SCANS-II (2005) and CODA (2007) summer surveys were combined to deliver an estimate of 30,410 minke whales (95% CL=15,961-57,940; Hammond et al., 2011). In seeking to approximate population size range for Irish waters from these broad-scale datasets, there are significant difficulties due (i) to the species' wide distribution throughout European shelf waters making jurisdictional separation somewhat arbitrary, (ii) to problems associated with the narrow temporal focus of such surveys (e.g., one month in one season in one year, and separate years for coverage of shelf and oceanic waters), and (iii) to high CVs (i.e., estimation uncertainty) particularly from regions where recorded numbers of sightings have been low. The population estimates given are based on the 95% CL derived from

	the CODA survey (CODA, 2009; Hammond et al., 2011) which comprise all sightings within the UK/IRL/NW Iberia offshore survey blocks. Measures obtained via the earlier SCANS-II survey (SCANS-II, 2008) fall within these population size estimates.
2.4.4 Year or period	2001-2012
2.4.5 Method – population size	Estimate based on partial data with some extrapolation and/or modelling (2)
2.4.6 Short-term trend period	2001-2012
2.4.7 Short term trend direction	unknown (x)
2.4.8 Short-term trend magnitude	min max confidence interval
2.4.9 Short-term trend method	Estimate based on expert opinion with no or minimal sampling (1)
2.4.10 Long-term trend period	
2.4.11 Long term trend direction	N/A
2.4.12 Long-term trend magnitude	min max confidence interval
2.4.13 Long-term trend method	N/A
2.4.14 Favourable reference population	number operator N/A unknown Yes method Robust data on minke whale population size and trends in Irish waters are not available although knowledge of the species' distribution and summer abundance has improved since the Directive came into force. Nevertheless the use of current population figures as descriptors for FRP require further work. The FRP for this species is therefore considered to be unknown.
2.4.15 Reason for change	Improved knowledge/more accurate data

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	455000
2.5.2 Year or period	2001-2012
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Good
2.5.4 b) Quality of habitat - method	The quality of habitat for this species was determined by consideration of the relevant direct and indirect pressures thought to be acting on the species and/or its functional group, and its habitat within its natural environment. These pressures were evaluated in development of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009) using available scientific data concerning inter alia habitat use, population size, distribution and ecology, and threats to the species' protection (e.g., via natural/biological sources, human sectoral activities, management gaps, etc).
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	stable (0)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	455000
2.5.10 Reason for change	Improved knowledge/more accurate data

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	medium importance (M)	N/A
death or injury by collision (G05.11)	low importance (L)	N/A
Noise nuisance, noise pollution (H06.01)	low importance (L)	N/A
Seismic exploration, explosions (H06.05)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A
Threats and pressures from outside the EU territory (XE)	medium importance (M)	N/A

2.6.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	medium importance (M)	N/A
death or injury by collision (G05.11)	low importance (L)	N/A
Noise nuisance, noise pollution (H06.01)	low importance (L)	N/A
Seismic exploration, explosions (H06.05)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A
Threats and pressures from outside the EU territory (XE)	medium importance (M)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	Research into the appropriate use of statistics and a range of data sources for population trend analysis is currently under way. Until the results of this work become available, it is not considered scientifically valid to attempt to determine population trends.
2.8.2 Other relevant Information	
2.8.3 Trans-boundary assessment	Given the mobility of this marine species, and in particular the potential for seasonal movements in response to breeding requirements, prey distribution and abundance, and other natural processes, it is likely that individuals and/or groups of this species move between Irish waters and adjacent marine jurisdictions. A transboundary assessment in the next reporting period would allow a fuller appreciation of the range and status of this species.

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment Favourable (FV) qualifiers N/A
2.9.2. Population	assessment Favourable (FV) qualifiers N/A
2.9.3. Habitat	assessment Favourable (FV) qualifiers N/A
2.9.4. Future prospects	assessment Favourable (FV) qualifiers N/A
2.9.5 Overall assessment of Conservation Status	Favourable (FV)
2.9.6 Overall trend in Conservation Status	N/A

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	N/A	
	min		max
3.1.2 Method used	N/A		
3.1.3 Trend of population size within	N/A		

3.2 Conservation Measures

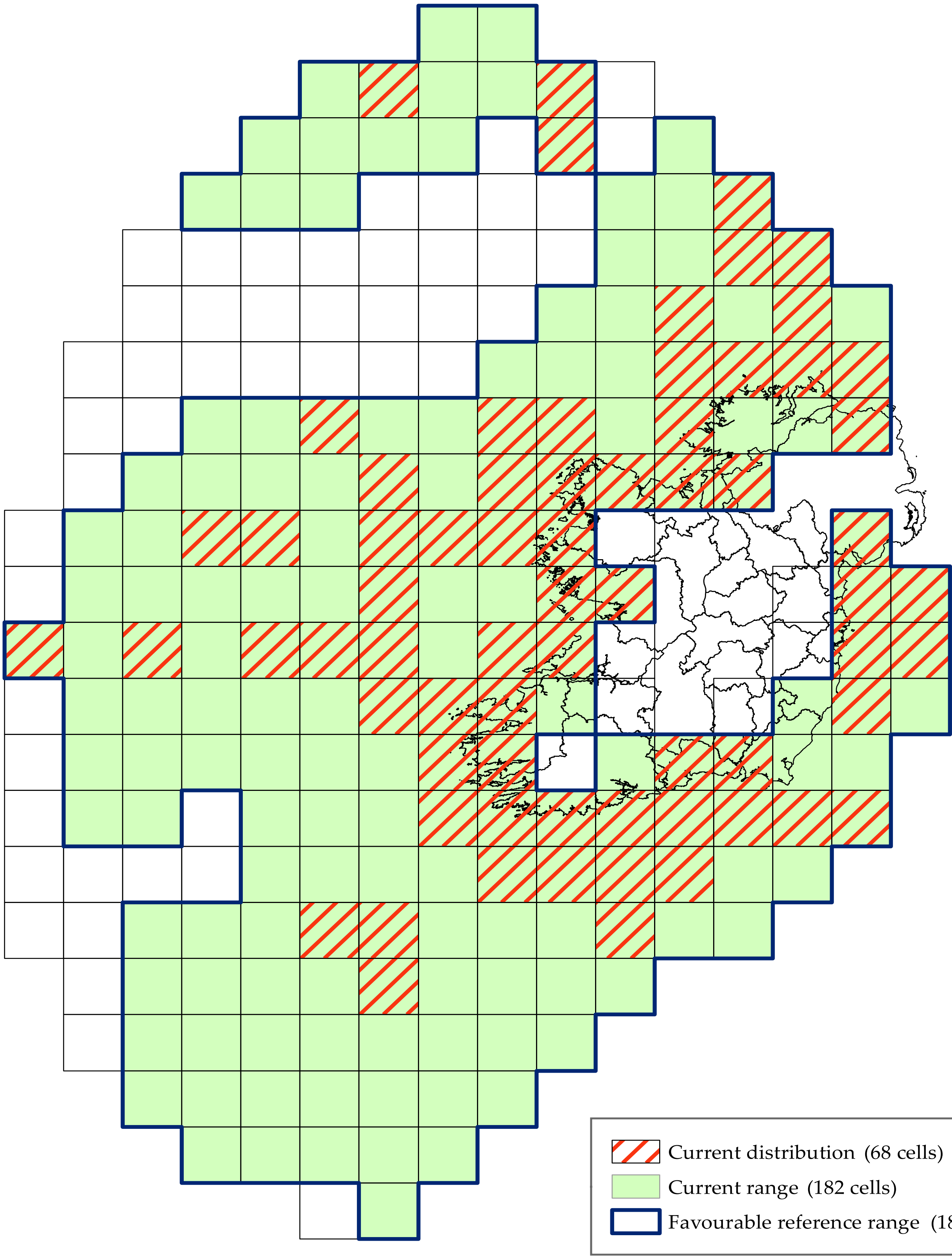
Field label	Note
Species: 2618	**Minke whale**
0.1 Member State	Ireland
0.2.01 Species code	The minke whale is the smallest baleen whale species occurring in Irish waters, with adults averaging to just 8.0-8.5m in body length. Found only in the Northern Hemisphere, it is classified as a species of Least Concern due to its extensive distribution and abundance estimates indicating that the species is well above the thresholds for a threatened category (Reilly et al., 2008; Perrin & Brownell Jr., 2009). Minke whales are recorded more frequently in Irish waters than their larger relatives the blue whale, fin whale and the sei whale (Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012). In addition to their significant size difference and the absence of a distinct tall exhalation blow when the animal surfaces, the species' characteristic pointed rostrum and diagnostic broad white or pale patches on the pectoral fins are striking and useful in field identification. Although the species may be considered a seasonal migrant in some jurisdictions (DEHLG, 2009), separate breeding stocks and clear latitudinal patterns in movement by populations in the eastern North Atlantic are not apparent (Perrin & Brownell Jr., 2009) and it is considered that many minke whales may occupy temperate waters all year round.
0.2.04 Common name	Minke whale = Droimeiteach beag
1.1.01 Distribution map	The distribution map presented for this species represents a significant proportion of al live sightings recorded during targeted scientific surveillance in Irish waters between 1994/95 and 2012. The surveillance programmes that contributed data to this projection are cited as follows: Pollock et al. (1997), Reid et al. (2003), Ó Cadhla et al. (2004) and Wall et al. (2013). These data and the results of other survey effort (e.g., SCANS-II, 2008; CODA, 2009; Berrow et al., 2010) were integrated into the developmen of the species range map presented under section 1.1.5. This distribution map for the species has been drawn in 50km x 50km resolution and is mapped in the LAEA projection.
1.1.02 Method used - map	Over the last 2-3 decades records of the occurrence of this species in Irish waters have been common in comparison to other baleen whales. Simultaneous to more rigorous surveillance in the last 15-20 years numerous minke whale records have continued to emerge, from continental shelf waters to the west and southwest of Ireland as well as in the Celtic Sea and the Irish Sea (Ó Cadhla et al., 2004; SCANS-II, 2008; CODA, 2009; Berrow et al., 2010; Wall et al., 2012). The distribution of recent sightings along with regional sighting records obtained across three preceding decades (Berrow et al., 2002; Reid et al., 2003) indicate a predominant distribution in waters overlying the continental shelf and continental slope. While all reliable cetacean records obtained in Irish waters were not available for use in this exercise, the map drawn for this species provides a good sample of the species' observed distribution.
1.1.03 Year or period	The period selected for mapping the distribution of this species represents a period of intensive surveillance for cetaceans in Irish waters across a range of research and monitoring programmes.
1.1.05 Range map	The species' natural range in Irish waters is believed to be a small component of its wider North Atlantic range (DEHLG, 2009; Perrin & Brownell Jr., 2009). The range map provided consists of its recorded and likely natural range based on recent data (2001-2012) and expert judgement, and is partly derived from 1.1.1. It consists of a block of contiguous 50km x 50km grid cells distributed in Irish marine waters up to 2,000m deep and eastern margins of the Rockall Bank of similar depth. Coastally the range excludes smaller enclosed shallow bays.
2.3.02 Method used - Surface area of Range	This figure has been derived from the range map referred to in 1.1.5.

Field label	Note
Species: 2618	**Minke whale**
2.3.03 Short-term trend - Period	Prior to 1999-2000, survey effort targeting cetacean species in Irish offshore waters was comparatively limited in coverage, both spatially and temporally. Since 1999-2000 a number of dedicated multi-annual surveillance programmes for cetaceans have operated in Irish waters, with survey effort extending to the limits of Ireland's EEZ and beyond. Consequently, with regard to this species it is considered that the years 2001-2012 represent an appropriate period for the evaluation of short-term trends.
2.3.04 Short term trend - Trend direction	Sighting records from dedicated surveillance effort in Irish waters (Ó Cadhla et al., 2004; Berrow et al., 2010; Hammond et al., 2011; Wall et al., 2012) provide no evidence of a decline in distribution/range in the recent past; therefore accordingly the short-term trend for range is considered to be stable.
2.3.06 Long-term trend - Period	A long-term trend period for this species is not considered appropriate, for reasons outlined in 2.3.3.
2.3.09 a) Favourable reference range - In km2	The range value derived from the range map referred to in 1.1.5 is considered to be the baseline for this species. As there is no evidence of a decline since the Directive came into force the current range is set as the FRR. [Note: (1) The species is thought to be migratory although regional population components may be present year-round; nevertheless the species' range in Irish waters is likely to represent only a component of its range in marine waters covered by the Directive and the northeast Atlantic Ocean; (2) There is an assumption that the current range in Irish waters is large enough (a) to encompass all of the ecological variation required by this species during its occurrences therein and (b) to contribute to the long-term survival of the species.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Additional sighting records of this commonly identified baleen whale species (e.g., DEHLG, 2009; Berrow et al., 2010; Hammond et al., 2011; Wall et al., 2012) have been obtained since the previous reporting round. Along with previous data from a range of sources, this has resulted in an improved knowledge and ability to assess the range from that reported in 2007. There is no scientific reason to assume that the species was not similarly present in 2001-2006.
2.4.04 Year or period	The period 2001-2012 has been selected in order to represent the most current population information available for this species.
2.4.05 Method used - Population size	Evidence from multi-annual surveillance programmes (Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012) indicate that minke whales occur widely in Irish continental shelf and slope waters and may do so throughout the year. The most recent estimate of total abundance in the North Atlantic numbers approximately 182,000 whales (Reilly et al., 2008), approximately 80,000 of which may occur in the northeast Atlantic (DEHLG, 2009). Estimates for the population(s) inhabiting European Atlantic waters have been lacking until recently when comparable data from the SCANS-II (2005) and CODA (2007) summer surveys were combined to deliver an estimate of 30,410 minke whales (95% CL=15,961-57,940; Hammond et al., 2011). In seeking to approximate population size range for Irish waters from these broad-scale datasets, there are significant difficulties due (i) to the species' wide distribution throughout European shelf waters making jurisdictional separation somewhat arbitrary, (ii) to problems associated with the narrow temporal focus of such surveys (e.g., one month in one season in one year, and separate years for coverage of shelf and oceanic waters), and (iii) to high CVs (i.e., estimation uncertainty) particularly from regions where recorded numbers of sightings have been low. The population estimates given are based on the 95% CL derived from the CODA survey (CODA, 2009; Hammond et al., 2011) which comprise all sightings within the UK/IRL/NW Iberia offshore survey blocks. Measures obtained via the earlier SCANS-II survey (SCANS-II, 2008) fall within these population size estimates.
2.4.06 Short-term trend - Period	The period 2001-2012 has been selected, consistent with 2.3.3.

Field label	Note
Species: 2618	**Minke whale**
2.4.09 Short-term trend - Method used	There is little evidence of growth in the northeast Atlantic population(s) of minke whale, although assessments of overall population status in the North Atlantic indicate that the species is in a healthy state (Reilly et al., 2008; IWC, 2012 - unpublished data). However, given that recent population estimates for the species (Hammond et al., 2011) are the only figures for western European waters since the Directive came into force, the reliable determination of short-term population trend for this species is not possible.
2.4.10 Long-term trend - Period	A long-term trend period for this species is not considered appropriate for reasons outlined in 2.3.3.
2.4.14 d) Favourable reference population - Indicate method used to set reference value if other than operators	Robust data on minke whale population size and trends in Irish waters are not available, although broader-scale abundance estimates have been derived for the European Atlantic (Hammond et al., 2011) based on comparable surveys of the continental shelf area (Hammond et al., 2002; SCANS-II, 2008) and deeper oceanic waters (CODA, 2009). While the population figures derived represent the first comparatively robust estimates since the Directive came into force, they are transboundary figures captured from a short snapshot in time, the associated Lower and Upper 95% Confidence Limits are significantly different, and their use as descriptors for FRP require further work. The FRP for this species is therefore considered to be unknown.
2.5.01 Area estimation	The surface area estimate for range (derived from the range map referred to in 1.1.5) is used as a proxy for habitat surface area.
2.5.02 Year or period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.5.03 Method used Habitat for the species	Use of the range descriptor as a proxy for habitat is judged appropriate for this wide-ranging pelagic species.
2.5.04 b) Quality of the habitat - Explain how the quality was assessed	The quality of habitat for minke whale was determined by consideration of the relevant direct and indirect pressures thought to be acting on the species and/or its functional group, and its habitat within its natural environment. These pressures were evaluated in development of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009) using available scientific data concerning inter alia habitat use, population size, distribution and ecology, and threats to the species' protection (e.g., via natural/biological sources, human sectoral activities, management gaps, etc). Minke whale may be subject to a number of local and/or regional environmental pressures throughout its range in Irish waters (see 2.3, 2.6; DEHLG, 2009). However based on current data available none are considered to be of sufficient spatial or temporal impact on the species to be causing a significant deterioration in overall habitat quality in Ireland from a "good" status.
2.5.05 Short-term trend - Period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.5.06 Short-term trend - Trend direction	The trend for range in 2.3.4 is applied as a proxy for habitat.
2.5.07 Long-term trend - Period	A long-term trend period for this species is not considered appropriate, for reasons outlined in 2.3.3.
2.5.09 Area of suitable habitat for the species (km2)	Minke whales have been widely recorded in Irish waters both historically and to the present day and the predominant known habitats for this cosmopolitan species include waters overlying the continental slope, continental shelf and coastal waters. The Area of suitable habitat is therefore considered to be equal to the Habitat for the species.

Field label	Note
Species: 2618	**Minke whale**
2.6 Main pressures - Pressure	In the development and preparation of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009), a comprehensive review of the pressures believed and/or documented to be acting on this species and/or its functional group (i.e., threats to their protection) was undertaken. The main pressures thought to be acting on this species are considered to occur primarily on a regional or local scale and/or on a temporary or intermittent basis (e.g., impacts arising from seasonal commercial fisheries or seismic exploration; DEHLG, 2009). Consequently the ranking given in all cases is one of low to medium importance. It should be noted that in relation to seismic exploration, which tends to occur on a local or occasionally regional scale in the waters of Ireland's EEZ and is comparatively low in coverage relative to several other member states, a robust regulatory and management regime applies in order to avoid potentially significant impacts on all species of marine mammal. This species is still subject to hunting in the northern part of its Atlantic range while the impact on the species of changes in sea temperature and other abiotic factors in the marine environment cannot be discounted.
2.7 Threats - Threat	There is no evidence to suggest a change in the main pressures thought to be acting on this species in the near future. However surveillance of the species and the pressures potentially acting upon it will continue into the future, while the application of strong management measures (e.g., via the statutory/regulatory process) to avoid potentially significant impacts is also expected to continue.
2.8.01 Justification of % thresholds for trends	A detailed analysis of the statistical ability and power to robustly determine population trends for cetacean species occurring in western European waters is under way via the Joint Cetacean Protocol (JCP) project in the UK. This phased work is due for completion in 2013 and it will inform whether and for which species the measurement of population trends may be possible based on survey data from a range of sources.
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The minke whale is widely recorded in Irish waters overlying the continental shelf and slope and also occurs in coastal waters. Hence the Range is considered to be favourable.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	While robust data on minke whale population size and trends in Irish waters as a whole are not available, knowledge of the species' seasonal distribution and summer abundance in western European waters has improved significantly since the Directive came into force. This indicates that minke whales continue to number in the tens of thousands regionally (see 2.4). Given the available estimates and the species' wide occurrence in Irish waters, the population parameter is considered favourable.
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The habitat for this species in Ireland is considered favourable, as it supports a favourable population across a very large marine area.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	A number of pressures have been identified. While the effect of these pressures may act on a temporary and/or regional scale and some are likely to continue to act as pressures into the future, none is considered to be of sufficient magnitude to be causing an adverse impact on populations of minke whale in Irish waters. Ongoing threats as listed or identified into the future via surveillance will be managed appropriately. Hence the future prospects for the species are considered favourable.
2.9.05 Overall assessment of Conservation Status	Based on the assessments for Range, Population, Habitat and Future Prospects parameters, the overall conclusion is that the conservation status of minke whale in Ireland is considered "Favourable". This overall result is the same as in the previous Article 17 assessment while an improvement is reported in the assessment for the Population parameter, due to improved knowledge.

Minke whale - *Balaenoptera acutorostrata* (2618)
Article 17 Assessment 2013



Current distribution (68 cells)
Current range (182 cells)
Favourable reference range (182 cells)

An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 25 50 75 100 km

N
Map - Léarscáil
V 1.0
Date - Dáta
11-06-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**2619**
0.2.2 Species name	**Balaenoptera borealis**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	Sei whale

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	1995-2012
1.1.4 Additional map	No
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Marine Atlantic (MATL)

2.2 Published sources

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Hammond, P.S., Macleod, K., Burt, L., Cañadas, A., Lens, S., Mikkelsen, B., Rogan, E., Santos, B., Uriarte, A., Van Canneyt, O., & Antonio Vázquez, J. (2011). Abundance of baleen whales in the European Atlantic. Report to the Scientific Committee of the International Whaling Commission, Cambridge. SC/63/RMP24. 22pp.

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Reid, J.B., Evans, P.G.H. & Northridge, S.P. (2003). Atlas of Cetacean Distribution in North-west European Waters. Joint Nature Conservation Committee, Peterborough, 76pp.

CODA (2009). Cetacean offshore distribution and abundance in the European Atlantic (CODA). Sea Mammal Research Unit, Gatty Marine Laboratory, University of St Andrews, St Andrews, Fife, KY16 8LB. 43pp.

IWC. (2012). International Whaling Commission species status and population estimates. International Whaling Commission, Cambridge. http://iwc.int/home .

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Pollock, C.M., Reid, J.R., Webb, A. & Tasker, M.L. (1997). The distribution of seabirds and cetaceans in the waters around Ireland. JNCC Report No. 267. Joint Nature Conservation Committee, Peterborough. 167pp.

2.3 Range

2.3.1 Surface area - Range (km²)	545000	
2.3.2 Method - Range surface area	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	545000
	operator	N/A
	unknown	No
	method	The range value derived from the range map referred to in

	1.1.5 is considered to be the baseline for this species. As there is no evidence of a decline since the Directive came into force the current range is set as the FRR.
2.3.10 Reason for change	Improved knowledge/more accurate data

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit: number of individuals (i) min: 6 max: 1164
2.4.2 Population size (other than individuals)	Unit: N/A min: max:
2.4.3 Additional information	Definition of locality: Conversion method: Problems: While sightings have been infrequent in Irish waters, where they have occurred the number of sei whales recorded has commonly been 1-3 animals with up to five individuals on occasions (Ó Cadhla et al., 2004; Berrow et al., 2010). Hammond et al. (2011) recently estimated sei whale abundance in the SCANS-II (SCANS-II, 2008) continental shelf and CODA (CODA, 2009) oceanic survey areas at 29 whales (95%CL = 6-152) and 590 whales (95%CL = 299-1164), respectively. It is noteworthy that all sightings confirmed during the CODA survey were located in the NW Iberia survey block while significant numbers of 'large whales' could not be identified to species level (CODA, 2009; Hammond et al., 2011). While precise figures for sei whale population size in Irish waters cannot be provided due to ongoing data limitations, including the inconsistency of positive records from Irish waters, provisional minimum and maximum figures are given. These are based on the lower and upper 95%CL generated by Hammond et al. (2011) and they assume the free ranging of animals across and within the regions concerned (e.g., from NW Iberian waters to the Porcupine Seabight, Porcupine shelf and the Rockall Trough).
2.4.4 Year or period	2001-2012
2.4.5 Method – population size	Estimate based on expert opinion with no or minimal sampling (1)
2.4.6 Short-term trend period	2001-2012
2.4.7 Short term trend direction	unknown (x)
2.4.8 Short-term trend magnitude	min: max: confidence interval:
2.4.9 Short-term trend method	Estimate based on expert opinion with no or minimal sampling (1)
2.4.10 Long-term trend period	
2.4.11 Long term trend direction	N/A
2.4.12 Long-term trend magnitude	min: max: confidence interval:
2.4.13 Long-term trend method	N/A
2.4.14 Favourable reference population	number: operator: N/A unknown: Yes

	method	Robust data on sei whale population size and trends in Irish waters are not available, mirroring continued uncertainty regarding this depleted species throughout its North Atlantic range (also uncertain). Since it has not been possible to determine a realistic baseline value since the Directive came into force the FRP is unknown.
2.4.15 Reason for change		Improved knowledge/more accurate data

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	545000
2.5.2 Year or period	2001-2012
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Good
2.5.4 b) Quality of habitat - method	The quality of habitat for this species was determined by consideration of the relevant direct and indirect pressures thought to be acting on the species and/or its functional group, and its habitat within its natural environment. These pressures were evaluated in development of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009) using available scientific data concerning inter alia habitat use, population size, distribution and ecology, and threats to the species' protection (e.g., via natural/biological sources, human sectoral activities, management gaps, etc).
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	stable (0)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	545000
2.5.10 Reason for change	Improved knowledge/more accurate data

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	low importance (L)	N/A
death or injury by collision (G05.11)	low importance (L)	N/A
Noise nuisance, noise pollution (H06.01)	low importance (L)	N/A
Seismic exploration, explosions (H06.05)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A

2.6.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	low importance (L)	N/A
death or injury by collision (G05.11)	low importance (L)	N/A
Noise nuisance, noise pollution (H06.01)	low importance (L)	N/A
Seismic exploration, explosions (H06.05)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	Research into the appropriate use of statistics and a range of data sources for population trend analysis is currently under way. Until the results of this work become available, it is not considered scientifically valid to attempt to determine population trends.
2.8.2 Other relevant Information	
2.8.3 Trans-boundary assessment	Given the mobility of this marine species, and in particular the potential for seasonal movements in response to breeding requirements, prey distribution and abundance, and other natural processes, it is likely that individuals and/or groups of this species move between Irish waters and adjacent marine jurisdictions. A transboundary assessment in the next reporting period would allow a fuller appreciation of the range and status of this species.

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.9.2. Population	assessment	Unknown (XX)
	qualifiers	N/A
2.9.3. Habitat	assessment	Favourable (FV)
	qualifiers	N/A
2.9.4. Future prospects	assessment	Unknown (XX)
	qualifiers	N/A
2.9.5 Overall assessment of Conservation Status	Unknown (XX)	
2.9.6 Overall trend in Conservation Status	N/A	

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	N/A		
	min		max	
3.1.2 Method used	N/A			
3.1.3 Trend of population size within	N/A			

3.2 Conservation Measures

Article 17 - SPECIES NOTES

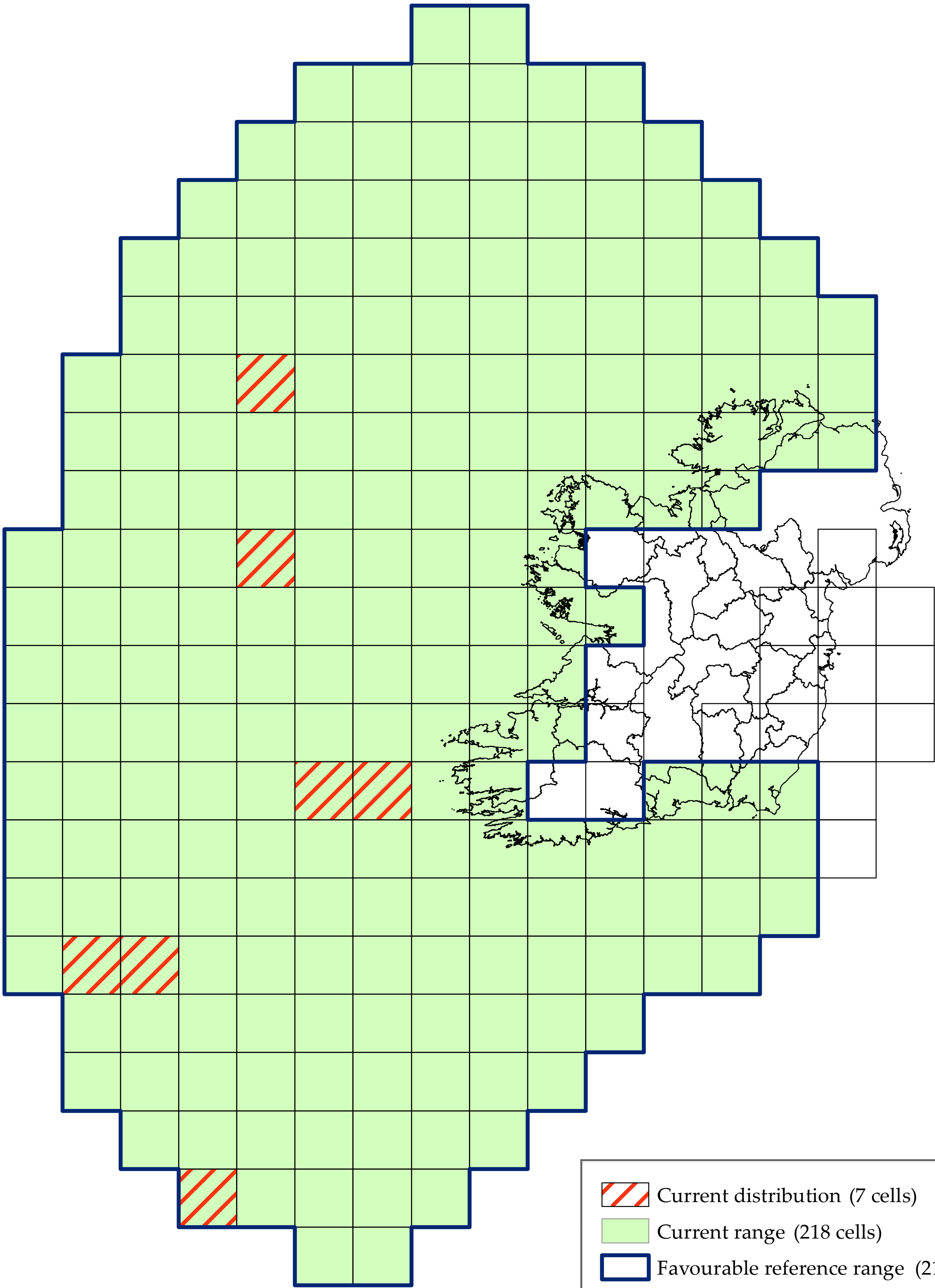
Field label	Note
Species: 2619	**Sei whale**
0.1 Member State	Ireland
0.2.01 Species code	The sei whale is the third largest whale species and one of four members of the family Balaenopteridae that are found in Irish waters. Classified as an Endangered species (Reilly et al., 2008) having been the subject of intense pressure from commercial whaling until the 1970s, this migratory baleen whale is recorded infrequently in Ireland. While it is possible that the species is persistently under-recorded due to difficulties in distinguishing individual whales from other large Balaenopterids in the open sea (i.e., fin whale, blue whale)(Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012), its predominantly oceanic occurrence (Horwood, 2009) may also explain why records remain low compared to more ubiquitous whale species.
0.2.04 Common name	Sei whale = Droimeiteach na Saíán
1.1.01 Distribution map	The distribution map presented for this species represents a significant proportion of all live sightings recorded during targeted scientific surveillance in Irish waters between 1994/95 and 2012. The surveillance programmes that contributed data to this projection are cited as follows: Pollock et al. (1997), Reid et al. (2003), Ó Cadhla et al. (2004) and Wall et al. (2013). These data and the results of other survey effort (e.g., SCANS-II, 2008; CODA, 2009; Berrow et al., 2010) were integrated into the development of the species range map presented under section 1.1.5. This distribution map for the species has been drawn in 50km x 50km resolution and is mapped in the LAEA projection.
1.1.02 Method used - map	Sightings of this depleted and somewhat elusive migratory species in Irish waters have been relatively infrequent and patchy over the last century. Some relevant regional data have emerged however, simultaneous to more rigorous surveillance in the last 15-20 years. These include multiple records in oceanic waters off the southwest of Ireland in 1999-2001 (Ó Cadhla et al., 2004), a single record in the western Celtic Sea during the 2005 SCANS-II survey (SCANS-II, 2008; Hammond et al., 2011) and records of at least one individual in coastal waters of western Ireland in 2009 (Berrow et al., 2010). The distribution of recent sightings along with regional sighting records obtained across three preceding decades (Weir et al., 2001; Berrow et al., 2002; Reid et al., 2003) indicate a predominant distribution in deeper Atlantic waters including waters overlying the continental slope, although the species' occurrence in continental shelf waters <200m deep cannot be discounted. While all reliable cetacean records obtained in Irish waters were not available for use in this exercise, the map drawn for this species provides a good sample of the species' observed distribution.
1.1.03 Year or period	The period selected for mapping the distribution of this species represents a period of intensive surveillance for cetaceans in Irish waters across a range of research and monitoring programmes.
1.1.05 Range map	The species' natural range in Irish waters is a small component of its wider North Atlantic migratory range (DEHLG, 2009; Horwood, 2009). The range map provided consists of its recorded and likely natural range based on recent data (2001-2012) and expert judgement, and is partly derived from 1.1.1. It consists of a block of contiguous 50km x 50km grid cells distributed in Irish marine waters, excluding enclosed shallow bays and the Irish Sea (omitted due to an absence of records).
2.3.02 Method used - Surface area of Range	This figure has been derived from the range map referred to in 1.1.5.

Field label	Note
Species: 2619	**Sei whale**
2.3.03 Short-term trend - Period	Prior to 1999-2000, survey effort targeting cetacean species in Irish offshore waters was comparatively limited in coverage, both spatially and temporally. Since 1999-2000 a number of dedicated multi-annual surveillance programmes for cetaceans have operated in Irish waters, with survey effort extending to the limits of Ireland's EEZ and beyond. Consequently, with regard to this species it is considered that the years 2001-2012 represent an appropriate period for the evaluation of short-term trends.
2.3.04 Short term trend - Trend direction	Sighting records from dedicated surveillance effort in Irish waters (Ó Cadhla et al., 2004; Berrow et al., 2010; Hammond et al., 2011) provide no evidence of a decline in distribution/range in the recent past; therefore accordingly the short-term trend for range is considered to be stable.
2.3.06 Long-term trend - Period	A long-term trend period for this species is not considered appropriate, for reasons outlined in 2.3.3.
2.3.09 a) Favourable reference range - In km2	The range value derived from the range map referred to in 1.1.5 is considered to be the baseline for this species. As there is no evidence of a decline since the Directive came into force the current range is set as the FRR. [Note: (1) The species is known to be migratory; thus its range in Irish waters is likely to represent only a small component of its range in marine waters covered by the Directive and the wider North Atlantic Ocean; (2) There is an assumption that the current range in Irish waters is large enough (a) to encompass all of the ecological variation required by this species during its occurrences therein and (b) to contribute to the long-term survival of the species.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Additional sighting records of this infrequently observed species have been obtained since the previous reporting round. Along with previous data from a range of sources, this has resulted in an improved knowledge and ability to assess the range from that reported in 2007. There is no scientific reason to assume that the species was not similarly present in 2001-2006.
2.4.04 Year or period	The period 2001-2012 has been selected in order to represent the most current population information available for this species.
2.4.05 Method used - Population size	While sightings have been infrequent in Irish waters, where they have occurred the number of sei whales recorded has commonly been 1-3 animals with up to five individuals on occasions (Ó Cadhla et al., 2004; Berrow et al., 2010). Hammond et al. (2011) recently estimated sei whale abundance in the SCANS-II (SCANS-II, 2008) continental shelf and CODA (CODA, 2009) oceanic survey areas at 29 whales (95%CL = 6-152) and 590 whales (95%CL = 299-1164), respectively. It is noteworthy that all sightings confirmed during the CODA survey were located in the NW Iberia survey block while significant numbers of 'large whales' could not be identified to species level (CODA, 2009; Hammond et al., 2011). While precise figures for sei whale population size in Irish waters cannot be provided due to ongoing data limitations, including the inconsistency of positive records from Irish waters, provisional minimum and maximum figures are given. These are based on the lower and upper 95%CL generated by Hammond et al. (2011) and they assume the free ranging of animals across and within the regions concerned (e.g., from NW Iberian waters to the Porcupine Seabight, Porcupine shelf and the Rockall Trough).
2.4.06 Short-term trend - Period	The period 2001-2012 has been selected, consistent with 2.3.3.

Field label	Note
Species: 2619	**Sei whale**
2.4.09 Short-term trend - Method used	There is little sign of any recovery in northeast Atlantic populations of sei whale since the cessation of whaling just 3-4 decades ago (IWC, 2012 - unpublished data), while the origin/stock identity of those whales occurring in Irish waters and neighbouring waters off the Iberian peninsula is not known (Reilly et al., 2008). Considering these key data gaps and the infrequency and inconsistency of positive sighting records from Irish waters, there is insufficient evidence to reliably determine the short-term population trend for this species.
2.4.10 Long-term trend - Period	A long-term trend period for this species is not considered appropriate, for reasons outlined in 2.3.3.
2.4.14 d) Favourable reference population - Indicate method used to set reference value if other than operators	Robust data on population size and trends for this species in Irish waters are not available, mirroring continued uncertainty regarding this depleted species throughout its North Atlantic range (also uncertain). Since it has not been possible to determine a realistic baseline value since the Directive came into force the FRP is unknown.
2.5.01 Area estimation	The surface area estimate for range (derived from the range map referred to in 1.1.5) is used as a proxy for habitat surface area.
2.5.02 Year or period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.5.03 Method used Habitat for the species	Use of the range descriptor as a proxy for habitat is judged appropriate for this wide-ranging pelagic species.
2.5.04 b) Quality of the habitat - Explain how the quality was assessed	The quality of habitat for sei whale was determined by consideration of the relevant direct and indirect pressures thought to be acting on the species and/or its functional group, and its habitat within its natural environment. These pressures were evaluated in development of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009) using available scientific data concerning inter alia habitat use, population size, distribution and ecology, and threats to the species' protection (e.g., via natural/biological sources, human sectoral activities, management gaps, etc). Sei whale may be subject to a number of local and/or regional environmental pressures throughout its range in Irish waters (see 2.3, 2.6; DEHLG, 2009). However based on current data available none are considered to be of sufficient spatial or temporal impact on the species to be causing a significant deterioration in overall habitat quality in Ireland from a "good" status.
2.5.05 Short-term trend - Period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.5.06 Short-term trend - Trend direction	The trend for range in 2.3.4 is applied as a proxy for habitat.
2.5.07 Long-term trend - Period	A long-term trend period for this species is not considered appropriate, for reasons outlined in 2.3.3.
2.5.09 Area of suitable habitat for the species (km2)	While sei whales have been recorded in Irish waters overlying the continental shelf including Atlantic coastal waters, the extent to which such waters represent a regular habitat is unclear for this species. Given the uncertainty and limited data as outlined, the Area of suitable habitat is considered to be equal to the Habitat for the species.

Field label	Note
Species: 2619	**Sei whale**
2.6 Main pressures - Pressure	In the development and preparation of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009), a comprehensive review of the pressures believed and/or documented to be acting on this species and/or its functional group (i.e., threats to their protection) was undertaken. The main pressures thought to be acting on this species are considered to occur primarily on a local or regional scale and/or on a temporary or intermittent basis (e.g., impacts arising from seasonal commercial fisheries or seismic exploration; DEHLG, 2009). Since sei whale distribution is thought to be predominantly offshore Atlantic in nature, the ranking given in most cases is one of low importance. Nevertheless where a pressure may be regionally intensive the ranking given is one of medium importance due also to the species' depleted status. It should be noted that in relation to seismic exploration, which tends to occur on a local or occasionally regional scale in the waters of Ireland's EEZ and is comparatively low in coverage relative to several other member states, a robust regulatory and management regime applies in order to avoid potentially significant impacts on all species of marine mammal. The impact on this species of changes in sea temperature and other abiotic factors in the marine environment can also not be discounted.
2.7 Threats - Threat	There is no evidence to suggest a change in the main pressures thought to be acting on this species in the near future. However surveillance of the species and the pressures potentially acting upon it will continue into the future, while the application of strong management measures (e.g., via the statutory/regulatory process) to avoid potentially significant impacts is also expected to continue.
2.8.01 Justification of % thresholds for trends	A detailed analysis of the statistical ability and power to robustly determine population trends for cetacean species occurring in western European waters is under way via the Joint Cetacean Protocol (JCP) project in the UK. This phased work is due for completion in 2013 and it will inform whether and for which species the measurement of population trends may be possible based on survey data from a range of sources.
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	While records of sei whale in Irish waters are not very common, sightings data indicate the species' occurrence in deep oceanic waters and those overlying the continental shelf and slope. Hence the Range is considered to be favourable.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	There is little sign of any recovery in northeast Atlantic populations of sei whale since the cessation of whaling while the origin/stock identity of those whales occurring in Irish waters is also not known. Considering these key data gaps and the infrequency and inconsistency of positive sighting records from Irish waters the population parameter is considered unknown.
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The habitat for this species in Ireland is considered favourable given the broad distribution of records from deeper oceanic waters, which may represent the species' predominant habitat, to those overlying the continental shelf.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	A number of pressures have been identified. While the effect of these pressures may act on a temporary and/or regional scale and some are likely to continue to act as pressures into the future, the impacts on individuals or populations of sei whale in Irish waters are not well understood. This is largely due to the species’ occurrence far offshore and to limited data on its numbers and ecology within Ireland’s marine area. While ongoing threats as listed or identified into the future via surveillance will be managed appropriately, the future prospects for the species are therefore considered to be unknown.
2.9.05 Overall assessment of Conservation Status	Based on the assessments for the Range, Population, Habitat and Future Prospects parameters, the overall conclusion is that the conservation status of sei whale in Ireland is considered "Unknown". This overall result is the same as in the previous Article 17 assessment due to limited ongoing information on this depleted species' occurrence and population ecology in Irish waters. However improvements are reported in the assessments for the Range and Habitat parameters, due to improved knowledge.

Sei whale - *Balaenoptera borealis* (2619)
Article 17 Assessment 2013



Current distribution (7 cells)
Current range (218 cells)
Favourable reference range (218 cells)

An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 25 50 75 100 km

N
Map - Léarscáil
V 1.0
Date - Dáta
11-06-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**2621**
0.2.2 Species name	**Balaenoptera physalus**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	Fin whale

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	1995-2012
1.1.4 Additional map	No
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Marine Atlantic (MATL)

2.2 Published sources

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2.3 Range

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

2.3.1 Surface area - Range (km²)	570000	
2.3.2 Method - Range surface area	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	570000
	operator	N/A
	unknown	No
	method	The range value derived from the range map referred to in 1.1.5 is considered to be the baseline for this species. As there is no evidence of a decline since the Directive came into force the current range is set as the FRR.
2.3.10 Reason for change	Improved knowledge/more accurate data	

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	number of individuals (i)		
	min	477	max	22151
2.4.2 Population size (other than individuals)	Unit	N/A		
	min		max	
2.4.3 Additional information	Definition of locality			
	Conversion method			
	Problems	Evidence from deep water acoustic monitoring (Charif & Clark, 2009) and multi-annual surveillance programmes (Ó Cadhla et al., 2004; Berrow et al.,2010; Wall et al., 2012) indicate that fin whales occur widely in Irish waters and may do so throughout the year. The most recent estimate of total abundance in the North Atlantic numbered approximately 53,000 whales around the year 2000 (Reilly et al., 2008), some 17,000-17,500 of which could be attributed to deeper oceanic waters off western Europe including those shared by Spain, Portugal, Ireland and Britain (Buckland et al., 1992: N=17,355, CV=0.27). Updated estimates for the population(s) inhabiting European Atlantic waters have been lacking until recently when comparable data from the SCANS-II (2005) and CODA (2007) summer surveys were combined to deliver an estimate of 19,354 fin whales (95% CL=12,217-30,659; Hammond et al., 2011). In seeking to approximate population size range for Irish waters from these datasets, the minimum and maximum 95% CL figures for CODA Blocks 1 and 2 respectively were used since together they represent the Irish Atlantic area best and also capture the full range of estimates within the survey region (CODA, 2009). SCANS-II data for the species were very limited. Although this method is somewhat crude, it cannot be assumed that all whales recorded in the SCANS-		

	II/CODA dataset would occur in Irish waters during a given year. In addition to some uncertainty introduced by separating the sighting data into member state jurisdictions, problems associated with such estimation include (i) the narrow temporal focus of such surveys (e.g., one month in one season in one year, and separate years for coverage of shelf and oceanic waters), (ii) high CVs (i.e., estimation uncertainty) particularly where recorded numbers of sightings have been low, and (iii) exclusion of sighting data for whales that could not be positively identified to species level (Hammond et al., 2011: n=102 sightings).
2.4.4 Year or period	2001-2012
2.4.5 Method – population size	Estimate based on partial data with some extrapolation and/or modelling (2)
2.4.6 Short-term trend period	2001-2012
2.4.7 Short term trend direction	unknown (x)
2.4.8 Short-term trend magnitude	min max confidence interval
2.4.9 Short-term trend method	Estimate based on expert opinion with no or minimal sampling (1)
2.4.10 Long-term trend period	
2.4.11 Long term trend direction	N/A
2.4.12 Long-term trend magnitude	min max confidence interval
2.4.13 Long-term trend method	N/A
2.4.14 Favourable reference population	number operator N/A unknown Yes method Robust data on fin whale population size and trends in Irish waters are not available, although broader-scale abundance estimates have been derived for the European Atlantic based on comparable surveys of the continental shelf area and deeper oceanic waters. While the population figures derived represent the first comparatively robust estimates since the Directive came into force, their use as descriptors for FRP require further work. The FRP for this species is therefore considered to be unknown.
2.4.15 Reason for change	Improved knowledge/more accurate data

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	570000
2.5.2 Year or period	2001-2012
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Good
2.5.4 b) Quality of habitat - method	The quality of habitat for this species was determined by consideration of the relevant direct and indirect pressures thought to be acting on the species and/or its functional group, and its habitat within its natural environment. These pressures were evaluated in development of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009) using available scientific data concerning inter alia habitat use, population size, distribution and ecology, and threats to the species' protection (e.g., via natural/biological sources, human sectoral activities, management gaps, etc).
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	stable (0)

2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	570000
2.5.10 Reason for change	Improved knowledge/more accurate data

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	medium importance (M)	N/A
death or injury by collision (G05.11)	low importance (L)	N/A
Noise nuisance, noise pollution (H06.01)	low importance (L)	N/A
Seismic exploration, explosions (H06.05)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A
Threats and pressures from outside the EU territory (XE)	low importance (L)	N/A

2.6.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	medium importance (M)	N/A
death or injury by collision (G05.11)	low importance (L)	N/A
Noise nuisance, noise pollution (H06.01)	low importance (L)	N/A
Seismic exploration, explosions (H06.05)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A
Threats and pressures from outside the EU territory (XE)	low importance (L)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	Research into the appropriate use of statistics and a range of data sources for population trend analysis is currently under way. Until the results of this work become available, it is not considered scientifically valid to attempt to determine population trends.
2.8.2 Other relevant Information	
2.8.3 Trans-boundary assessment	Given the mobility of this marine species, and in particular the potential for seasonal movements in response to breeding requirements, prey distribution and abundance, and other natural processes, it is likely that individuals and/or groups of this species move between Irish waters and adjacent marine jurisdictions. A transboundary assessment in the next reporting period would allow a fuller appreciation of the range and status of this species.

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.9.2. Population	assessment	Favourable (FV)
	qualifiers	N/A
2.9.3. Habitat	assessment	Favourable (FV)
	qualifiers	N/A

2.9.4. Future prospects	assessment Favourable (FV) qualifiers N/A
2.9.5 Overall assessment of Conservation Status	Favourable (FV)
2.9.6 Overall trend in Conservation Status	N/A

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	N/A		
	min		max	
3.1.2 Method used	N/A			
3.1.3 Trend of population size within	N/A			

3.2 Conservation Measures

Field label	Note
Species: 2621	**Fin whale**
0.1 Member State	Ireland
0.2.01 Species code	The fin whale is the second largest whale species in the world, with adults in the Northern Hemisphere averaging up to 22m in body length. It is classified as an Endangered species (Reilly et al., 2008) having been intensively exploited in the late 19th and early 20th centuries by industrial whaling throughout the North Atlantic (Reilly et al., 2008; Aguilar 2009), including off the Atlantic seaboard of Ireland. Nevertheless the species has been recorded more frequently in Irish waters than either of its close relatives the blue whale and the sei whale. While fin whales can be difficult to distinguish from other large Balaenopterids in the open sea (Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012), its characteristic asymmetrical skin pigmentation in the head region is striking and useful in field identification. Although it is considered a seasonal migrant, separate breeding stocks and clear latitudinal patterns in movement by populations in the eastern North Atlantic are not apparent (Aguilar, 2009) and it is considered that many fin whales may occupy temperate waters all year round.
0.2.04 Common name	Fin whale = Droimeiteach
1.1.01 Distribution map	The distribution map presented for this species represents a significant proportion of all live sightings recorded during targeted scientific surveillance in Irish waters between 1994/95 and 2012. The surveillance programmes that contributed data to this projection are cited as follows: Pollock et al. (1997), Reid et al. (2003), Ó Cadhla et al. (2004) and Wall et al. (2013). These data and the results of other survey effort (e.g., SCANS-II, 2008; CODA, 2009; Berrow et al., 2010) were integrated into the development of the species range map presented under section 1.1.5. This distribution map for the species has been drawn in 50km x 50km resolution and is mapped in the LAEA projection.
1.1.02 Method used - map	Over the last 2-3 decades records of the occurrence of this depleted species in Irish waters have been relatively frequent in comparison to other large baleen whales. Simultaneous to more rigorous surveillance in the last 15-20 years numerous fin whale records have continued to emerge, from deep oceanic waters to the west and southwest of Ireland (Ó Cadhla et al., 2004; Charif & Clark, 2009; CODA, 2009; Berrow et al., 2010; Wall et al., 2012) to continental shelf and even coastal waters (SCANS-II, 2008; Berrow et al., 2010; Wall et al., 2012). A growing concentration of seasonal records off the south and southeast coasts, to which individual whales may return in successive years (Whooley et al., 2011), highlights the cosmopolitan nature of this species. The distribution of recent sightings along with regional sighting and acoustic records obtained across three preceding decades (Berrow et al., 2002; Reid et al., 2003; Charif & Clark, 2009) indicate a predominant distribution in deeper Atlantic waters including those overlying the continental slope, although the species' occurrence in the Celtic Sea and occasionally the Irish Sea are well documented. While all reliable cetacean records obtained in Irish waters were not available for use in this exercise, the map drawn for this species provides a good sample of the species' observed
1.1.03 Year or period	The period selected for mapping the distribution of this species represents a period of intensive surveillance for cetaceans in Irish waters across a range of research and monitoring programmes.

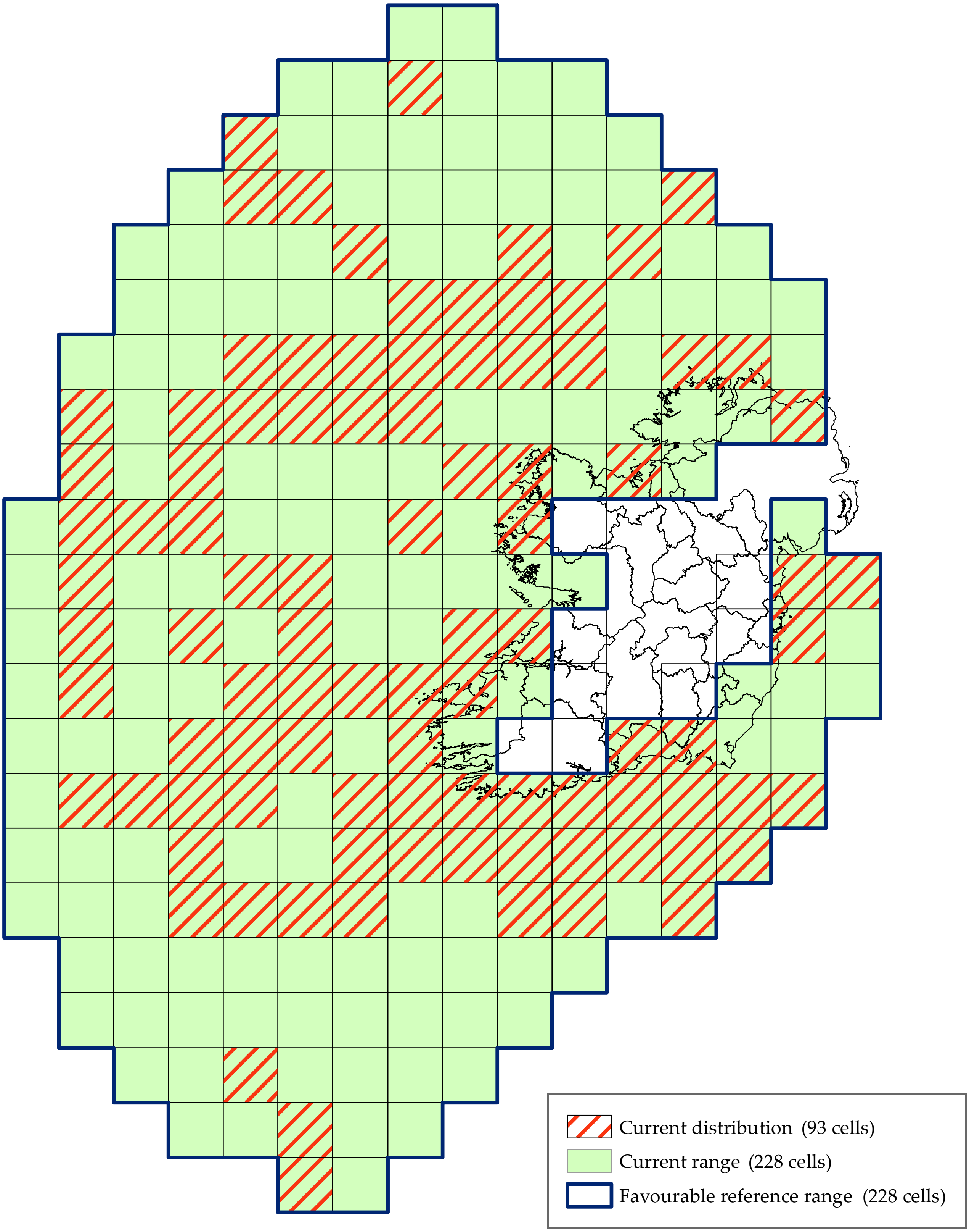
Field label	Note
Species: 2621	**Fin whale**
1.1.05 Range map	The species' natural range in Irish waters is believed to be a small component of its wider North Atlantic migratory range (DEHLG, 2009; Aguilar, 2009). The range map provided consists of its recorded and likely natural range based on recent data (2001-2012) and expert judgement, and is partly derived from 1.1.1. It consists of a block of contiguous 50km x 50km grid cells distributed in Irish marine waters, excluding enclosed shallow bays.
2.3.02 Method used - Surface area of Range	This figure has been derived from the range map referred to in 1.1.5.
2.3.03 Short-term trend - Period	Prior to 1999-2000, survey effort targeting cetacean species in Irish offshore waters was comparatively limited in coverage, both spatially and temporally. Since 1999-2000 a number of dedicated multi-annual surveillance programmes for cetaceans have operated in Irish waters, with survey effort extending to the limits of Ireland's EEZ and beyond. Consequently, with regard to this species it is considered that the years 2001-2012 represent an appropriate period for the evaluation of short-term trends.
2.3.04 Short term trend - Trend direction	Sighting and acoustic records from dedicated surveillance effort in Irish waters (Ó Cadhla et al., 2004; Charif & Clark, 2009; Berrow et al., 2010; Hammond et al., 2011; Wall et al., 2012) provide no evidence of a decline in distribution/range in the recent past; therefore accordingly the short-term trend for range is considered to be stable.
2.3.06 Long-term trend - Period	A long-term trend period for this species is not considered appropriate, for reasons outlined in 2.3.3.
2.3.09 a) Favourable reference range - In km2	The range value derived from the range map referred to in 1.1.5 is considered to be the baseline for this species. As there is no evidence of a decline since the Directive came into force the current range is set as the FRR. [Note: (1) The species is thought to be migratory although regional population components may be present year-round; nevertheless the species' range in Irish waters is likely to represent only a component of its range in marine waters covered by the Directive and the northeast Atlantic Ocean; (2) There is an assumption that the current range in Irish waters is large enough (a) to encompass all of the ecological variation required by this species during its occurrences therein and (b) to contribute to the long-term survival of the species.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Additional sighting records of this more commonly identified large whale species (e.g., DEHLG, 2009; Berrow et al., 2010; Hammond et al., 2011) have been obtained since the previous reporting round. Along with previous data from a range of sources, this has resulted in an improved knowledge and ability to assess the range from that reported in 2007. There is no scientific reason to assume that the species was not similarly present in 2001-2006.
2.4.04 Year or period	The period 2001-2012 has been selected in order to represent the most current population information available for this species.

Field label	Note
Species: 2621	**Fin whale**
2.4.05 Method used - Population size	Evidence from deep water acoustic monitoring (Charif & Clark, 2009) and multi-annual surveillance programmes (Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012) indicate that fin whales occur widely in Irish waters and may do so throughout the year. The most recent estimate of total abundance in the North Atlantic numbered approximately 53,000 whales around the year 2000 (Reilly et al., 2008), some 17,000-17,500 of which could be attributed to deeper oceanic waters off western Europe including those shared by Spain, Portugal, Ireland and Britain (Buckland et al., 1992: N=17,355, CV=0.27). Updated estimates for the population(s) inhabiting European Atlantic waters have been lacking until recently when comparable data from the SCANS-II (2005) and CODA (2007) summer surveys were combined to deliver an estimate of 19,354 fin whales (95% CL=12,217-30,659; Hammond et al., 2011). In seeking to approximate population size range for Irish waters from these datasets, the minimum and maximum 95% CL figures for CODA Blocks 1 and 2 respectively were used since together they represent the Irish Atlantic area best and also capture the full range of estimates within the survey region (CODA, 2009). SCANS-II data for the species were very limited. Although this method is somewhat crude, it cannot be assumed that all whales recorded in the SCANS-II/CODA dataset would occur in Irish waters during a given year. In addition to some uncertainty introduced by separating the sighting data into member state jurisdictions, problems associated with such estimation include (i) the narrow temporal focus of such surveys (e.g., one month in one season in one year, and separate years for coverage of shelf and oceanic waters), (ii) high CVs (i.e., estimation uncertainty) particularly where recorded numbers of sightings have been low, and (iii) exclusion of sighting data for whales that could not be positively identified to species level (Hammond et al., 2011: n=102 sightings).
2.4.06 Short-term trend - Period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.4.09 Short-term trend - Method used	There is little concrete evidence of growth in the northeast Atlantic population(s) of fin whale since the cessation of whaling almost three decades ago, although assessments of population status in the central North Atlantic, off western Iceland and Greenland indicate a level of recovery (Reilly et al., 2008; IWC, 2012 - unpublished data). However, given that recent population estimates for the species (Hammond et al., 2011) are the only figures for western European waters since the Directive came into force, the reliable determination of short-term population trend for this species is not possible.
2.4.10 Long-term trend - Period	A long-term trend period for this species is not considered appropriate for reasons outlined in 2.3.3.
2.4.14 d) Favourable reference population - Indicate method used to set reference value if other than operators	Robust data on fin whale population size and trends in Irish waters are not available, although broader-scale abundance estimates have been derived for the European Atlantic (Hammond et al., 2011) based on comparable surveys of the continental shelf area (SCANS-II, 2008) and deeper oceanic waters (CODA, 2009). While the population figures derived represent the first comparatively robust estimates since the Directive came into force, they are transboundary figures captured from a short snapshot in time, the associated Lower and Upper 95% Confidence Limits are significantly different, and their use as descriptors for FRP require further work. The FRP for this species is therefore considered to be unknown.
2.5.01 Area estimation	The surface area estimate for range (derived from the range map referred to in 1.1.5) is used as a proxy for habitat surface area.
2.5.02 Year or period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.5.03 Method used Habitat for the species	Use of the range descriptor as a proxy for habitat is judged appropriate for this wide-ranging pelagic species.

Field label	Note
Species: 2621	**Fin whale**
2.5.04 b) Quality of the habitat - Explain how the quality was assessed	The quality of habitat for fin whale was determined by consideration of the relevant direct and indirect pressures thought to be acting on the species and/or its functional group, and its habitat within its natural environment. These pressures were evaluated in development of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009) using available scientific data concerning inter alia habitat use, population size, distribution and ecology, and threats to the species' protection (e.g., via natural/biological sources, human sectoral activities, management gaps, etc). Fin whale may be subject to a number of local and/or regional environmental pressures throughout its range in Irish waters (see 2.3, 2.6; DEHLG, 2009). However based on current data available none are considered to be of sufficient spatial or temporal impact on the species to be causing a significant deterioration in overall habitat quality in Ireland from a "good" status.
2.5.05 Short-term trend - Period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.5.06 Short-term trend - Trend direction	The trend for range in 2.3.4 is applied as a proxy for habitat.
2.5.07 Long-term trend - Period	A long-term trend period for this species is not considered appropriate, for reasons outlined in 2.3.3.
2.5.09 Area of suitable habitat for the species (km2)	Fin whales have been widely recorded in Irish waters both historically and to the present day and the known habitats for this predominantly deep water species include waters overlying the continental shelf and coastal waters. The Area of suitable habitat is therefore considered to be equal to the Habitat for the species.
2.6 Main pressures - Pressure	In the development and preparation of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009), a comprehensive review of the pressures believed and/or documented to be acting on this species and/or its functional group (i.e., threats to their protection) was undertaken. The main pressures thought to be acting on this species are considered to occur primarily on a local or regional scale and/or on a temporary or intermittent basis (e.g., impacts arising from shipping movements; DEHLG, 2009). Since fin whale distribution is likely to be broadly offshore in nature, the ranking given in most cases is one of low importance; but where a pressure may be regionally intensive (e.g., seasonal fisheries for shared target species or seismic exploration) the ranking given is one of medium importance. It should be noted that in relation to seismic exploration, which tends to occur on a local or occasionally regional scale in the waters of Ireland's EEZ and is comparatively low in coverage relative to several other member states, a robust regulatory and management regime applies in order to avoid potentially significant impacts on all species of marine mammal. This species is still subject to some limited hunting in the northern part of its Atlantic range while the impact on the species of changes in sea temperature and other abiotic factors in the marine environment cannot be discounted.
2.7 Threats - Threat	There is no evidence to suggest a change in the main pressures thought to be acting on this species in the near future. However surveillance of the species and the pressures potentially acting upon it will continue into the future, while the application of strong management measures (e.g., via the statutory/regulatory process) to avoid potentially significant impacts is also expected to continue.
2.8.01 Justification of % thresholds for trends	A detailed analysis of the statistical ability and power to robustly determine population trends for cetacean species occurring in western European waters is under way via the Joint Cetacean Protocol (JCP) project in the UK. This phased work is due for completion in 2013 and it will inform whether and for which species the measurement of population trends may be possible based on survey data from a range of sources.

Field label	Note
Species: 2621	**Fin whale**
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The fin whale is widely recorded in Irish waters from deep oceanic areas to coastal waters. Hence the Range is considered to be favourable.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	While robust data on fin whale population size and trends in Irish waters as a whole are not available, knowledge of the species' seasonal distribution and summer abundance in western European waters has improved significantly since the Directive came into force. Broad-scale abundance estimates have been derived for the European Atlantic based on comparable surveys of the continental shelf area and deeper oceanic waters. This indicates that fin whales number in the high thousands regionally (see 2.4). While there is some uncertainty in the trajectory of northeast Atlantic populations since the cessation of whaling, given the available regional estimates and the species' wide and common occurrence in Irish waters the population parameter is considered favourable.
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The habitat for this species in Ireland is considered favourable, as it supports a favourable population across a very large marine area.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	A number of pressures have been identified. While the effect of these pressures may act on a temporary and/or regional scale and some are likely to continue to act as pressures into the future, none is considered to be of sufficient magnitude to be causing an adverse impact on populations of fin whale in Irish waters. Ongoing threats as listed or identified into the future via surveillance will be managed appropriately. Hence the future prospects for the species are considered favourable.
2.9.05 Overall assessment of Conservation Status	Based on the assessments for Range, Population, Habitat and Future Prospects parameters, the overall conclusion is that the conservation status of fin whale in Ireland is considered "Favourable". This overall result is the same as in the previous Article 17 assessment while an improvement is reported in the assessment for the Population parameter, due to improved knowledge.

Fin whale - *Balaenoptera physalus* (2621)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

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Scale - Scála
0 25 50 75 100 km

N
Map - Léarscáil
V 1.0
Date - Dáta
11-06-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**2622**
0.2.2 Species name	**Kogia breviceps**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	Pygmy sperm whale

1. National Level

1.1 Maps

1.1.1 Distribution Map	No
1.1.1a Sensitive species	No
1.1.2 Method used - map	N/A
1.1.3 Year or period	
1.1.4 Additional map	No
1.1.5 Range map	No

2. Biogeographical Or Marine Level

2.1 Biogeographical Region	**Marine Atlantic (MATL)**
2.2 Published sources	

2.3 Range

2.3.1 Surface area - Range (km²)		
2.3.2 Method - Range surface area	N/A	
2.3.3 Short-term trend period		
2.3.4 Short-term trend direction	N/A	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	
	operator	N/A
	unknown	No
	method	
2.3.10 Reason for change		

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit N/A	
	min	max
2.4.2 Population size (other than individuals)	Unit N/A	
	min	max
2.4.3 Additional information	Definition of locality	
	Conversion method	
	Problems	
2.4.4 Year or period		
2.4.5 Method – population size	N/A	
2.4.6 Short-term trend period		
2.4.7 Short term trend direction	N/A	

2.4.8 Short-term trend magnitude	min	max	confidence interval
2.4.9 Short-term trend method	N/A		
2.4.10 Long-term trend period			
2.4.11 Long term trend direction	N/A		
2.4.12 Long-term trend magnitude	min	max	confidence interval
2.4.13 Long-term trend method	N/A		
2.4.14 Favourable reference population	number		
	operator	N/A	
	unknown	No	
	method		
2.4.15 Reason for change			

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	
2.5.2 Year or period	
2.5.3 Method used - habitat	N/A
2.5.4 a) Quality of habitat	
2.5.4 b) Quality of habitat - method	
2.5.5 Short term trend period	
2.5.6 Short term trend direction	N/A
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	
2.5.10 Reason for change	

2.6 Main Pressures

2.6.1 Method used – pressures	N/A

2.7 Main Threats

2.7.1 Method used – threats	N/A

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant Information	
2.8.3 Trans-boundary assessment	

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment	Unknown (XX)
	qualifiers	N/A
2.9.2. Population	assessment	Unknown (XX)
	qualifiers	N/A
2.9.3. Habitat	assessment	Unknown (XX)
	qualifiers	N/A
2.9.4. Future prospects	assessment	Unknown (XX)
	qualifiers	N/A
2.9.5 Overall assessment of Conservation Status	Unknown (XX)	
2.9.6 Overall trend in Conservation Status	N/A	

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	N/A		
	min		max	
3.1.2 Method used	N/A			
3.1.3 Trend of population size within	N/A			

3.2 Conservation Measures

Article 17 - SPECIES NOTES

Field label	Note
Species: 2622	**Pygmy sperm whale**
0.1 Member State	Ireland
0.2.04 Common name	Pygmy sperm whale = Caisealóid bheag
1.1.02 Method used - map	No live records of this species have been obtained from Ireland within the current reporting round or since the Directive came into force.
2.9.05 Overall assessment of Conservation Status	Since no live records of this species have been obtained from Ireland within the current reporting round or since the Directive came into force, the conservation status of this vagrant species is assessed as unknown.

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**5009**
0.2.2 Species name	**Pipistrellus pygmaeus**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	Soprano pipistrelle (Ialtóg fheascrach sopránach)

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	2007-2012
1.1.4 Additional map	Yes
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published sources

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2.3 Range

2.3.1 Surface area - Range (km²)	74100	
2.3.2 Method - Range surface area	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	74100
	operator	N/A
	unknown	No
	method	The soprano pipistrelle is widespread across the country, indicating sufficient availability of roosts and adaptability to foraging in a range of habitats. The Favourable Reference Range has been set as the current range which, at 74,100km2, is the largest range of any of our bat species. This area is considered to be large enough to allow the long term survival of the species.
2.3.10 Reason for change	Improved knowledge/more accurate data	

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	number of individuals (i)		
	min	502000	max	1129000
2.4.2 Population size (other than individuals)	Unit	N/A		
	min		max	
2.4.3 Additional information	Definition of locality			

	Conversion method	
	Problems	Since all soprano pipistrelle bat roosts are not known it is not possible to count the population based on a complete census. Therefore, the population of mature (volant) individuals has been estimated using data from the Car-based Bat Monitoring Scheme. This population estimate is calculated based on the detection range for echolocating soprano pipistrelle bats (20-30m) and the approximate area that is detectable. The area of Ireland is divided by the approximate detectable area and multiplied by the probability of detecting a soprano pipistrelle bat along any given roadside (2007-2012) on any given evening, from Car-based Bat Monitoring data. The minimum end of the range is based on the wider detection range (30m) while the maximum end is based on the closer detection range (20m). This population estimate uses a number of assumptions which may be only approximately correct and it could be improved with more detailed information on size and shape of detectable areas, greater knowledge of soprano pipistrelle habitat use around roadsides and other factors. However, it may be considered a starting point from which to refine future estimates. See Roche et al. (2013) for further details.

2.4.4 Year or period	2007-2012
2.4.5 Method – population size	Estimate based on partial data with some extrapolation and/or modelling (2)
2.4.6 Short-term trend period	2001-2012
2.4.7 Short term trend direction	increase (+)
2.4.8 Short-term trend magnitude	min 99.2 max 187 confidence interval 95
2.4.9 Short-term trend method	Estimate based on partial data with some extrapolation and/or modelling (2)
2.4.10 Long-term trend period	
2.4.11 Long term trend direction	N/A
2.4.12 Long-term trend magnitude	min max confidence interval
2.4.13 Long-term trend method	N/A
2.4.14 Favourable reference population	number 1000000 operator N/A unknown No method The Favourable Reference Population for the species is set to 1 million for the current reporting period, which is at the higher end of the estimate range completed for this assessment. The reason why a higher number has been chosen is because the soprano pipistrelle echolocates at a higher frequency, and is therefore less detectable, than the common pipistrelle. Therefore, the detection radius for this species is likely to be smaller and the higher end of the estimate range is considered to be more accurate [see 2.4.3c and Roche et al 2013 for details]
2.4.15 Reason for change	Improved knowledge/more accurate data Use of different method

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	57452
2.5.2 Year or period	2000-2009
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Good
2.5.4 b) Quality of habitat - method	Habitat and roosting associations of all Irish bat species including the soprano pipistrelle, were modelled using a Maximum Entropy model by Lundy et al. (2011) to determine likelihood of occurrence in specific habitats in the Irish landscape and maternity roost preferences. This modelling was carried out using roost and bat detector location data from 2000-2009 which is stored on the Bat Conservation Ireland bat database and includes records from monitoring schemes, BATLAS 2010 and records contributed by ecologists, academics and volunteers, among others. CORINE landcover, altitude, climate data, soil pH and human bias layers were included in the model. Soprano pipistrelle bat records were found to be associated broadly with broadleaved woodland, riparian habitats and small amounts of urbanisation (Lundy et al. 2011). Since these habitat types are currently stable or increasing the habitat quality for the species is considered good.
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	stable (0)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	
2.5.10 Reason for change	Improved knowledge/more accurate data Use of different method

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
removal of hedges and copses or scrub (A10.01)	medium importance (M)	N/A
use of biocides, hormones and chemicals (A07)	medium importance (M)	toxic inorganic chemicals (T)
		Mixed pollutants (X)
forestry clearance (B02.02)	medium importance (M)	N/A
removal of dead and dying trees (B02.04)	low importance (L)	N/A
use of biocides, hormones and chemicals (forestry) (B04)	low importance (L)	toxic inorganic chemicals (T)
		Mixed pollutants (X)
wind energy production (C03.03)	medium importance (M)	N/A
roads, motorways (D01.02)	medium importance (M)	N/A
continuous urbanisation (E01.01)	medium importance (M)	N/A
demolishment of buildings & human structures (E06.01)	low importance (L)	N/A
reconstruction, renovation of buildings (E06.02)	medium importance (M)	N/A
tree surgery, felling for public safety, removal of roadside trees (G05.06)	low importance (L)	N/A
anthropogenic reduction of habitat connectivity (J03.02)	medium importance (M)	N/A
death or injury by collision (G05.11)	low importance (L)	N/A
Other human intrusions and disturbances (G05)	medium importance (M)	N/A

2.6.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
use of biocides, hormones and chemicals (A07)	medium importance (M)	toxic inorganic chemicals (T)
		Mixed pollutants (X)
removal of hedges and copses or scrub (A10.01)	medium importance (M)	N/A
forestry clearance (B02.02)	medium importance (M)	N/A
removal of dead and dying trees (B02.04)	low importance (L)	N/A
use of biocides, hormones and chemicals (forestry) (B04)	low importance (L)	toxic inorganic chemicals (T)
		Mixed pollutants (X)
wind energy production (C03.03)	medium importance (M)	N/A
roads, motorways (D01.02)	medium importance (M)	N/A
continuous urbanisation (E01.01)	medium importance (M)	N/A
demolishment of buildings & human structures (E06.01)	low importance (L)	N/A
reconstruction, renovation of buildings (E06.02)	medium importance (M)	N/A
tree surgery, felling for public safety, removal of roadside trees (G05.06)	low importance (L)	N/A
death or injury by collision (G05.11)	low importance (L)	N/A
anthropogenic reduction of habitat connectivity (J03.02)	medium importance (M)	N/A
Other human intrusions and disturbances (G05)	medium importance (M)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant Information	
2.8.3 Trans-boundary assessment	Given the mobility of this species, and in particular the tendency for seasonal movements between roosts, it is likely that bats regularly cross the border from the Republic of Ireland into Northern Ireland and vice versa. A transboundary assessment in the next reporting period would allow a fuller appreciation of the range and status of this species.

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment Favourable (FV) qualifiers N/A
2.9.2. Population	assessment Favourable (FV) qualifiers N/A
2.9.3. Habitat	assessment Favourable (FV) qualifiers N/A
2.9.4. Future prospects	assessment Favourable (FV) qualifiers N/A
2.9.5 Overall assessment of Conservation Status	Favourable (FV)
2.9.6 Overall trend in Conservation Status	N/A

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	N/A		
	min		max	
3.1.2 Method used	N/A			
3.1.3 Trend of population size within	N/A			

3.2 Conservation Measures

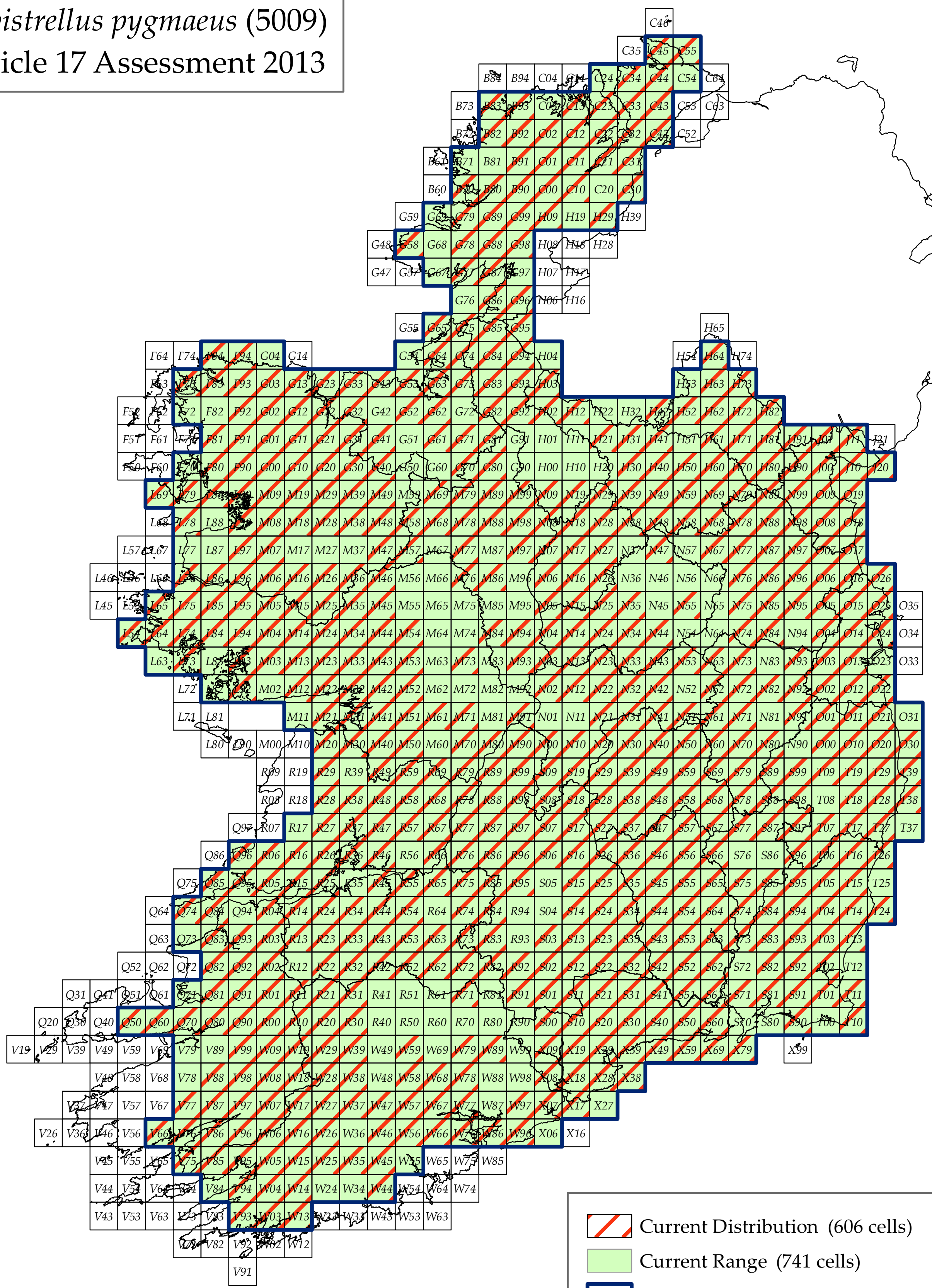
Field label	Note
Species: 5009	**Soprano pipistrelle**
0.2.01 Species code	The soprano pipistrelle can easily be confused with the common pipistrelle. The most reliable way to separate these two species is in flight. The two species emit echolocation calls at slightly different peak frequencies. The soprano pipistrelle is widespread and common, and it is one of Ireland's smallest mammals. Roost records for the soprano pipistrelle are mainly from buildings. According to Lundy et al. (2011) the soprano pipistrelle favours buildings constructed from brick. It is occasionally recorded roosting in trees, bat boxes and under bridges. The mean size of soprano pipistrelle roosts recorded in Ireland is 100 and the largest known bat roosts on the island are for this species. Roosts with more than 1,500 individuals have been recorded. The species has rarely been found in hibernation in winter. To date, there is only one record of an individual tucked into a crevice in stonework. The soprano pipistrelle is adaptable in its use of foraging habitats although some studies suggest that it favours riparian habitats for foraging more than the common pipistrelle. It can also be found in urban settings, albeit in relatively low numbers.
1.1.01 Distribution map	This map was derived from the transformation of the map referred to in 1.1.4 to the LAEA projection.
1.1.02 Method used - map	Distribution map shows location of all records collected in the 2007-2012 period. Records have been derived from BATLAS 2010 field surveys (Carden et al. 2010) which were carried out in 10km squares across the island, car-based bat monitoring data (e.g. Roche et al., 2011) & ad-hoc records collected by Bat Conservation Ireland staff and volunteers, NPWS staff, ecological consultants and academic institutions. The majority of records have been collected using bat detectors from bats in flight. This map does not include any extrapolation or modelling of the data, nor have all possible locations been surveyed for the species.
1.1.03 Year or period	This shows records for 2007-2012, collected as described for 1.1.2 above.
1.1.04 Additional distribution map	All Irish grid records were intersected with the Irish grid 10km grid map to derive this additional map.
1.1.05 Range map	Range Map has been generated using the Range Tool and is based on all records collated by BCIreland in the 2007-2012 period.
2.2 Published sources	Population estimates for the island and yearly trend information for the soprano pipistrelle have been derived from car-based bat monitoring (Roche et al., 2009; 2011; 2012). This scheme collects information on relative activity levels for the species along roadsides across the island from surveys carried out in July and August every year. Information on distribution was collected during the BATLAS 2010 project which involved bat detector surveys at 3-4 locations within 10km squares across the island (Carden et al., 2010). Habitat and roosting associations were modelled using a Maximum Entropy model and CORINE landscape data by Lundy et al. (2011) to determine likelihood of occurrence in specific habitats in the Irish landscape and maternity roost preferences. This modelling was carried out using roost and bat detector location data from 2000-2009 which is stored on the Bat Conservation Ireland bat database and includes records from monitoring schemes, BATLAS 2010 and records contributed by ecologists, academics and volunteers, among others. There have been no detailed field or lab-based ecological or behavioural studies published on the species in Ireland, detailed information on feeding and other behaviours is, therefore, inferred from studies from the UK and continental Europe.
2.3.01 Surface area - Range	The range of 74,100km2 is based on distribution records for 606 x 10km cells collected between 2007 and 2012 (see 1.1.1). The Range Tool was run on this data with gap closure set at 20km.

Field label	Note
Species: 5009	**Soprano pipistrelle**
2.3.04 Short term trend - Trend direction	Range Trend is described as stable, although more squares are covered in the current reporting period than for the 2001-2006 reporting period. This may simply be due to increased survey effort rather than a true range increase for the species. The Car-based Bat Monitoring Scheme indicates that the species has been increasing since 2004. Insufficient information is available to determine whether this increasing trend has resulted in an expanded range or not, it may simply be due to improved information. Therefore 0 or Stable has been selected since it is, at the very least, stable at present.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	The apparent increase in range since 2007 is thought to be largely explained by the availability of better data, rather than true range increase. A considerable number of new records for the species have been collected since the last reporting round (e.g. Roche et al., 2012; Carden et al. 2010) providing a better reflection of true range.
2.4.01 a) Population size estimation (using individuals or agreed exceptions where possible) - Unit	Since all soprano pipistrelle bat roosts are not known it is not possible to count the population based on a complete census. Therefore, the population of mature (volant) individuals has been estimated using data from the Car-based Bat Monitoring Scheme. This population estimate is calculated based on the detection range for echolocating soprano pipistrelle bats (20-30m) and the approximate area that is detectable. The area of Ireland is divided by the approximate detectable area and multiplied by the probability of detecting a common pipistrelle bat along any given roadside (2007-2012) on any given evening, from Car-based Bat Monitoring data. The minimum end of the range is based on the wider detection range (30m) while the maximum end is based on the closer detection range (20m). This population estimate uses a number of assumptions which may be only approximately correct and it could be improved with more detailed information on size and shape of detectable areas, greater knowledge of soprano pipistrelle habitat use around roadsides and other factors. However, it may be considered a starting point from which to refine future estimates. See Roche et al. (2013) for further details.
2.4.04 Year or period	Population estimate is derived from the average probability of detecting a soprano pipistrelle bat from Car-based Bat Monitoring using 2007-2012 data inclusive, to correspond with the current reporting period. Also, since yearly estimates from monitoring schemes can vary considerably it was considered best practice to derive a mean from the six years of the reporting period, rather than using data from the last year of the series (Roche et al., 2013).
2.4.06 Short-term trend - Period	2004-2012 data is used because a smaller dataset was available in 2003 and it is better to use a second year as the base year in a trend index.
2.4.08 a) Short-term trend - Magnitude - Minimum	Trend in population of soprano pipistrelle bat is not expressed in change of absolute numbers since annual surveillance measures levels of activity along roadsides, rather than numbers of bats. Therefore, annual trend estimates can be considered an index of activity that is likely to mirror population levels. In order to facilitate easy interpretation of this trend the base year, 2004, is set as 100 so that deviations from the base year can be easily understood and visualised. For reporting purposes, the confidence intervals are expressed as the final year upper and lower (95%) estimates. If both upper and lower intervals are less than 100 this indicates a declining trend. Increasing trends will have an upper and lower interval both greater than 100. For the soprano pipistrelle General Linear Model (GLM) modelling with Generalised Additive Model (GAM) smoothing indicates that there has been a close to significant upwards trend since the base year, 2004. The lower 95%confidence limit of the trend only just encompasses the baseline, meaning that the lower interval reads as 99.2 (i.e. <100). The upper interval in 2012 was at 187. Therefore, the soprano pipistrelle appears to be increasing, but the increase is not quite significant at a 95% level (see Roche et al., 2013).
2.4.08 b) Short-term trend - Magnitude - Maximum	See 2.4.8a for explanation of population trend calculations.

Field label	Note
Species: 5009	**Soprano pipistrelle**
2.4.15 b) Reason for change - improved knowledge/more accurate data?	The Population for the species was set as a number of grid squares for the 2001-2006 reporting period. However, substantial information has been collected since then allowing an estimate of actual population size to be made.
2.4.15 c) Reason for change - use of different method	The Population for the species was set as a number of grid squares for the 2001-2006 reporting period. However, substantial information has been collected since then allowing an estimate of actual population size to be made (see Roche et al. 2013 for full details).
2.5.01 Area estimation	Habitat and roosting associations of all Irish bat species including the soprano pipistrelle bat, were modelled using a Maximum Entropy model by Lundy et al. (2011) to determine likelihood of occurrence in specific habitats in the Irish landscape and maternity roost preferences. This modelling was carried out using roost and bat detector location data from 2000-2009 which is stored on the Bat Conservation Ireland bat database and includes records from monitoring schemes, BATLAS 2010 and records contributed by ecologists, academics and volunteers, among others. CORINE landcover, altitude, climate data, soil pH and human bias layers were included in the model. Modelling was carried out to a 5km scale. Soprano pipistrelle bat records were found to be associated broadly with broadleaved woodland, riparian habitats and small amounts of urbanisation (Lundy et al. 2011). The area 57452km2 is derived from the model and is the estimated total core area of favourable landscape for the species for the Republic of Ireland.
2.5.02 Year or period	The Lundy et al (2011) analysis was carried out on available bat records for the years 2000-2009 which had been collated on the BCIreland National Bat Database.
2.5.03 Method used Habitat for the species	This is calculated from Maximum Entropy modelling of bat records (2000-2009) combined with CORINE landcover, altitude, soil pH, climate and human bias layers (see Lundy et al. 2011).
2.5.06 Short-term trend - Trend direction	This estimation of habitat for the species is based on modelling of known records from 2000-2009 along with various land cover and other layers (Lundy et al. 2011). Limited data on area of occupancy from the National Bat Survey in the 1980s (O'Sullivan 1994) suggests that there has been no losses in the area occupied by this population in the long term past (i.e. from 1985 onwards), even though the common and soprano pipistrelle were not distinguished at the time. These comparisons stretch beyond the trend period, however there is also no evidence to suggest losses since 2000. Also, there is no evidence of loss of important habitats for the species. Therefore the short term trend for habitat area is considered to be stable. This assessment is based mainly on expert opinion.
2.5.10 b) Reason for change - improved knowledge/more accurate data?	The habitat for the species has been modelled using a Maximum Entropy method described above (Lundy et al., 2011) and the resulting core area (57452) is assumed to more accurately represent available and potential habitat for the soprano pipistrelle than the higher figure (64000) that was included for the previous reporting period.
2.5.10 b) Reason for change - improved knowledge/more accurate data?	The habitat for the species has been modelled using a Maximum Entropy method described above (Lundy et al., 2011) and the resulting core area (57452km2) is assumed to more accurately represent available and potential habitat for the soprano pipistrelle than the higher figure (64000km2) that was included for the previous reporting period.
2.5.10 c) Reason for change - use of different method (e.g. 'Range tool')?	The habitat for the species has been modelled using a Maximum Entropy method described above (Lundy et al., 2011) and the resulting core area (57452) is assumed to more accurately represent available and potential habitat for the soprano pipistrelle than the higher figure (64000) that was included for the previous reporting period.

Field label	Note
Species: **5009**	**Soprano pipistrelle**
2.6 Main pressures - Pressure	G05 refers to pressure from deliberate disturbance to or exclusion from roosts (with or without licence). Other pressures have been listed based on available literature and published research such as Eurobats guidelines for windfarms (Rodrigues et al. 2008), information on the use of trees by roosting soprano pipistrelle bats (e.g. BCIreland database), extrapolation from findings by Lundy et al. (2011) about areas avoided by the species such as dense urbanisation, and information on important habitats from studies overseas (e.g. Davidson-Watts et al., 2006), the importance of linear landscape features (e.g. Boughey et al., 2011) and observed detrimental impact of major roads (Berthinussen and Altringham, 2012). Ranking of importance is based on expert opinion on likely impact of each pressure on the species.
2.7 Threats - Threat	As there is no evidence that the current pressures will cease they are also listed as threats. Ranking of importance is based on expert opinion on likely impact of each threat on the species.
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The soprano pipistrelle is the most widespread of all our bat species and is found throughout the country. Range is not lower than the favourable reference value and is stable. It is assessed as Favourable.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The favourable reference value falls within the current population estimate of 502,000 to 1,129,000 individuals. Indications are that population has increased. It is assessed as Favourable.
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Lundy et al. (2011) demonstrated that there is sufficient good quality habitat to support the long term survival of the species. There is no evidence to suggest that the extent or quality of the habitat for the species has changed in the recent past. Habitat for the species is therefore assessed as Favourable.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	While a number of pressures act on the soprano pipistrelle such as roost loss and exclusion, or vulnerability in the vicinity of large motorways, on the whole, the species is widely dispersed, occurs commonly, is adaptable and has widespread available suitable habitat. There is no reason to believe that the population will be threatened with debilitating losses in the future, therefore, future prospects are considered good.
2.9.05 Overall assessment of Conservation Status	Considerable survey and research has been carried out since the last assessment. BATLAS 2010 (Carden et al., 2010) provided new data for distribution and range. Continued Car-based Bat Monitoring has provided new figures for population size and trends (Roche et al., 2012; Roche et al., 2013). All available records from 2000-2009 were modelled with land cover and other data to assess favourable habitat types for the species across the island (Lundy et al., 2011). There is evidence for a short term recent increase in the species and there is no evidence of decline in range or habitat. There is no evidence of any major pressures currently impacting populations. Future prospects are considered good. Therefore, all attributes have been assessed as Favourable.

Soprano Pipistrelle
Pipistrellus pygmaeus (5009)
Article 17 Assessment 2013



Current Distribution (606 cells)

Current Range (741 cells)

Favourable Reference Range (741 cells)

An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 10 20 30 40 50 km

N
Map - Léarscáil
V 1.0
Date - Dáta
27-05-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**5020**
0.2.2 Species name	**Balaenoptera musculus**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	Blue whale

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	1995-2012
1.1.4 Additional map	No
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Marine Atlantic (MATL)

2.2 Published sources

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Wall, D., O'Kelly, I.,Tyndall, P. and Whooley, P. (2009). New record of blue whales (Balaenoptera musculus) feeding on the Continental Shelf Slopes to the west of Ireland. Marine Biodiversity Records of the Marine Biological Association (UK) Vol.2, e128. 4pp.

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Wall, D., O'Brien, J., Kavanagh, L., Ryan, C., Hunt, L. & Fennelly, S. (2012). Monitoring of spatial and temporal habitat use and abundance of cetaceans. In S.D. Berrow, J.O'Brien, I. O'Connor, D. McGrath & D. Wall. Marine Mammals and Megafauna in Irish Waters – behaviour, distribution and habitat use. Final project report for Grant-Aid Agreement No. PBA/ME/07/005(02) under the Sea Change Strategy with the support of the Marine Institute, the Marine Research Sub-Programme of the National Development Plan 2007–2013 and the Department of Arts, Heritage and the Gaeltacht. Galway-Mayo Institute of Technology, Galway. p.1-187.

IWC. (2012). International Whaling Commission species status and population estimates. International Whaling Commission, Cambridge. Http://iwc.int/home .

Wall, D., Murray, C., O'Brien, J., Kavanagh, L., Wilson, C., Ryan, C., Glanville, B., Williams, D., Enlander, I., O'Connor, I., McGrath, D., Whooley, P. & Berrow, S. (2013). Atlas of the distribution and relative abundance of marine mammals in Irish offshore waters 2005 - 2011. Irish Whale and Dolphin Group, Kilrush, Co. Clare. 62pp.

Pollock, C.M., Reid, J.R., Webb, A. & Tasker, M.L. (1997). The distribution of seabirds and cetaceans in the waters around Ireland. JNCC Report No. 267. Joint Nature Conservation Committee, Peterborough. 167pp.

2.3 Range

2.3.1 Surface area - Range (km²)	355000	
2.3.2 Method - Range surface area	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	355000
	operator	N/A
	unknown	No
	method	The range value derived from the range map referred to in 1.1.5 is considered to be the baseline for this species. As there is no evidence of a decline since the Directive came into force the current range is set as the FRR.
2.3.10 Reason for change	Improved knowledge/more accurate data	

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	number of individuals (i)		
	min	2	max	1500

2.4.2 Population size (other than individuals)	Unit	N/A
	min	max
2.4.3 Additional information	Definition of locality	
	Conversion method	
	Problems	Evidence from deep water acoustic surveillance (Charif & Clark, 2009) indicates that the species occurs annually in Irish waters. The number of blue whales recorded visually has commonly been 1-2 animals with two individuals on separate occasions (Wall et al., 2009; IWDG, 2012 - unpublished data), providing a rudimentary figure for the minimum population size. Nor can a precise figure for the maximum population size be provided due to data limitations, including the scarcity of positive records from Irish waters. Instead a provisional maximum figure is given based on approximate population estimates for the species in the North Atlantic (Reilly et al., 2008; Sears & Perrin, 2009), while there is some evidence indicating a degree of subdivision into central/eastern and western North Atlantic components.
2.4.4 Year or period	2001-2012	
2.4.5 Method – population size	Estimate based on expert opinion with no or minimal sampling (1)	
2.4.6 Short-term trend period	2001-2012	
2.4.7 Short term trend direction	unknown (x)	
2.4.8 Short-term trend magnitude	min	max / confidence interval
2.4.9 Short-term trend method	Estimate based on expert opinion with no or minimal sampling (1)	
2.4.10 Long-term trend period		
2.4.11 Long term trend direction	N/A	
2.4.12 Long-term trend magnitude	min	max / confidence interval
2.4.13 Long-term trend method	N/A	
2.4.14 Favourable reference population	number	
	operator	N/A
	unknown	Yes
	method	Robust data on blue whale population size and trends in Irish waters are not available, mirroring continued uncertainty regarding this depleted species throughout its North Atlantic range. Since it has not been possible to determine a realistic baseline value since the Directive came into force the FRP is unknown.
2.4.15 Reason for change	Improved knowledge/more accurate data	

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	355000
2.5.2 Year or period	2001-2012
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Good
2.5.4 b) Quality of habitat - method	The quality of habitat for this species was determined by consideration of the relevant direct and indirect pressures thought to be acting on the species and/or its functional group, and its habitat within its natural environment. These pressures were evaluated in development of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009) using available scientific data concerning

	inter alia habitat use, population size, distribution and ecology, and threats to the species' protection (e.g., via natural/biological sources, human sectoral activities, management gaps, etc).
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	stable (0)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	355000
2.5.10 Reason for change	Improved knowledge/more accurate data

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	low importance (L)	N/A
death or injury by collision (G05.11)	low importance (L)	N/A
Noise nuisance, noise pollution (H06.01)	low importance (L)	N/A
Seismic exploration, explosions (H06.05)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A

2.6.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	low importance (L)	N/A
death or injury by collision (G05.11)	low importance (L)	N/A
Noise nuisance, noise pollution (H06.01)	low importance (L)	N/A
Seismic exploration, explosions (H06.05)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	Research into the appropriate use of statistics and a range of data sources for population trend analysis is currently under way. Until the results of this work become available, it is not considered scientifically valid to attempt to determine population trends.
2.8.2 Other relevant Information	
2.8.3 Trans-boundary assessment	Given the mobility of this marine species, and in particular the potential for seasonal movements in response to breeding requirements, prey distribution and abundance, and other natural processes, it is likely that individuals and/or groups of this species move between Irish waters and adjacent marine jurisdictions. A transboundary assessment in the next reporting period would allow a fuller appreciation of the range and status of this species.

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment Favourable (FV) qualifiers N/A
2.9.2. Population	assessment Unknown (XX) qualifiers N/A

2.9.3. Habitat	assessment Favourable (FV) qualifiers N/A
2.9.4. Future prospects	assessment Unknown (XX) qualifiers N/A
2.9.5 Overall assessment of Conservation Status	Unknown (XX)
2.9.6 Overall trend in Conservation Status	N/A

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	N/A		
	min		max	
3.1.2 Method used	N/A			
3.1.3 Trend of population size within	N/A			

3.2 Conservation Measures

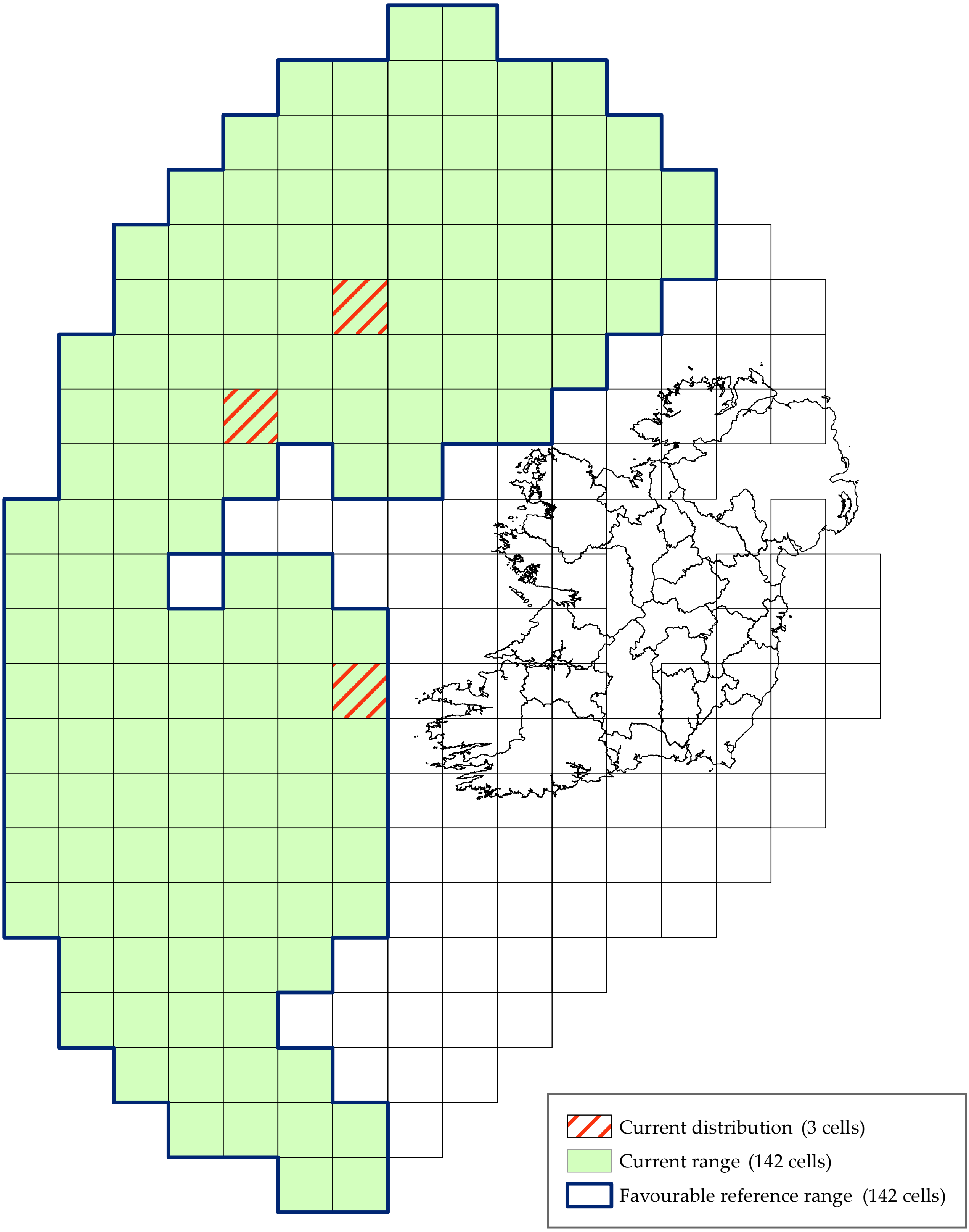
Field label	Note
Species: 5020	**Blue whale**
0.1 Member State	Ireland
0.2.01 Species code	The blue whale is Ireland's largest mammal by far, measuring up to 30m in length. Classified as an Endangered species (Reilly et al., 2008), it remains one of the most rarely observed baleen whales in Irish waters. This may be due in part to its migratory nature and severe population decline as a result of historic industrial hunting throughout its North Atlantic range (Reilly et al., 2008; Sears & Perrin, 2009). Ireland is one of a few EU member states inhabited by the blue whale and the species tends to be recorded in deeper offshore Atlantic waters.
0.2.04 Common name	Blue whale = Míol mór gorm
1.1.01 Distribution map	The distribution map presented for this species represents a significant proportion of all live sightings recorded during targeted scientific surveillance in Irish waters between 1994/95 and 2012. The surveillance programmes that contributed data to this projection are cited as follows: Pollock et al. (1997), Reid et al. (2003), Ó Cadhla et al. (2004) and Wall et al. (2013). These data and the results of other survey effort (e.g., SCANS-II, 2008; CODA, 2009; Berrow et al., 2010) were integrated into the development of the species range map presented under section 1.1.5. This distribution map for the species has been drawn in 50km x 50km resolution and is mapped in the LAEA projection.
1.1.02 Method used - map	Live sighting records of this depleted migratory species in Irish waters have been sporadic and rare over the last century. Occasional new records have emerged, simultaneous to more rigorous surveillance in the last 15-20 years. These number four distinct sighting records in total since 2000 (Ó Cadhla et al., 2004; Wall et al., 2009; Berrow et al., 2010; IWDG, 2012 - unpublished data). However, positive detections may be underestimated due to intrinsic difficulty in discriminating large baleen whale species from one another in the offshore Atlantic environment. The distribution of recent sightings, along with regional sighting and acoustic records obtained across three preceding decades (Reid et al., 2003; Charif & Clark, 2009; DEHLG, 2009) indicate a predominant distribution in deep Atlantic waters to the west and southwest of Ireland, including marine waters overlying the continental slope. While all reliable cetacean records obtained in Irish waters were not available for use in this exercise, the map drawn for this species provides a good sample of the species' observed distribution.
1.1.03 Year or period	The period selected for mapping the distribution of this species represents a period of intensive surveillance for cetaceans in Irish waters across a range of research and monitoring programmes.
1.1.05 Range map	The species' natural range in Irish waters is a small component of its wider North Atlantic migratory range (DEHLG, 2009; Sears & Perrin, 2009). The range map provided consists of its recorded and likely natural range based on recent data (2001-2012) and expert judgement, and is partly derived from 1.1.1. It consists of a block of contiguous 50km x 50km grid cells distributed in Irish marine waters of 500m depth or greater.
2.3.02 Method used - Surface area of Range	This figure has been derived from the range map referred to in 1.1.5.
2.3.03 Short-term trend - Period	Prior to 1999-2000, survey effort targeting cetacean species in Irish offshore waters was comparatively limited in coverage, both spatially and temporally. Since 1999-2000 a number of dedicated multi-annual surveillance programmes for cetaceans have operated in Irish waters, with survey effort extending to the limits of Ireland's EEZ and beyond. Consequently, with regard to this species it is considered that the years 2001-2012 represent an appropriate period for the evaluation of short-term trends.

Field label	Note
Species: 5020	**Blue whale**
2.3.04 Short term trend - Trend direction	Sighting and acoustic records from dedicated surveillance effort in Irish waters (Ó Cadhla et al., 2004; Charif & Clark, 2009; Berrow et al., 2010; Wall et al., 2012) provide no evidence of a decline in distribution/range in the recent past; therefore accordingly the short-term trend for range is considered to be stable.
2.3.06 Long-term trend - Period	A long-term trend period for this species is not considered appropriate, for reasons outlined in 2.3.3.
2.3.09 a) Favourable reference range - In km2	The range value derived from the range map referred to in 1.1.5 is considered to be the baseline for this species. As there is no evidence of a decline since the Directive came into force the current range is set as the FRR. [Note: (1) The species is known to be migratory; thus its range in Irish waters is likely to represent only a small component of its range in marine waters covered by the Directive and the wider North Atlantic Ocean; (2) There is an assumption that the current range in Irish waters is large enough (a) to encompass all of the ecological variation required by this species during its occurrences therein and (b) to contribute to the long-term survival of the species.
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Additional sighting records of this rarely observed species have been obtained since the previous reporting round. Along with previous data from a range of sources, this has resulted in an improved knowledge of the range from that reported in 2007. There is no scientific reason to assume that the species was not similarly present in 2001-2006.
2.4.04 Year or period	The period 2001-2012 has been selected in order to represent the most current population information available for this species.
2.4.05 Method used - Population size	Evidence from deep water acoustic surveillance (Charif & Clark, 2009) indicates that the species occurs annually in Irish waters. The number of blue whales recorded visually has commonly been 1-2 animals with two individuals on separate occasions (Wall et al., 2009; IWDG, 2012 - unpublished data), providing a rudimentary figure for the minimum population size. Nor can a precise figure for the maximum population size be provided due to data limitations, including the scarcity of positive records from Irish waters. Instead a provisional maximum figure is given based on approximate population estimates for the species in the North Atlantic (Reilly et al., 2008; Sears & Perrin, 2009), while there is some evidence indicating a degree of subdivision into central/eastern and western North Atlantic components.
2.4.06 Short-term trend - Period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.4.09 Short-term trend - Method used	While there are indications that the North Atlantic population, at least in its central/eastern component, is increasing following the cessation of whaling (Reilly et al., 2008; IWC, 2012 - unpublished data), the origin/stock identity of blue whales occurring in Irish waters is not known at present. Considering this key data gap and the scarcity of positive sighting records from Irish waters, there is insufficient evidence to reliably determine the short-term population trend for the species.
2.4.10 Long-term trend - Period	A long-term trend period for this species is not considered appropriate, for reasons outlined in 2.3.3.
2.4.14 d) Favourable reference population - Indicate method used to set reference value if other than operators	Robust data on population size and trends for this species in Irish waters are not available, mirroring continued uncertainty regarding this depleted species throughout its North Atlantic range. Since it has not been possible to determine a realistic baseline value since the Directive came into force the FRP is unknown.
2.5.01 Area estimation	The surface area estimate for range (derived from the range map referred to in 1.1.5) is used as a proxy for habitat surface area.
2.5.02 Year or period	The period 2001-2012 has been selected, consistent with 2.3.3.

Field label	Note
Species: 5020	**Blue whale**
2.5.03 Method used Habitat for the species	Use of the range descriptor as a proxy for habitat is judged appropriate for this wide-ranging pelagic species.
2.5.04 b) Quality of the habitat - Explain how the quality was assessed	The quality of habitat for blue whale was determined by consideration of the relevant direct and indirect pressures thought to be acting on the species and/or its functional group, and its habitat within its natural environment. These pressures were evaluated in development of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009) using available scientific data concerning inter alia habitat use, population size, distribution and ecology, and threats to the species' protection (e.g., via natural/biological sources, human sectoral activities, management gaps, etc). Blue whale may be subject to a number of local and/or regional environmental pressures throughout its range in Irish waters (see 2.3, 2.6; DEHLG, 2009). However based on current data available none are considered to be of sufficient spatial or temporal impact on the species to be causing a significant deterioration in overall habitat quality in Ireland from a "good" status.
2.5.05 Short-term trend - Period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.5.06 Short-term trend - Trend direction	The trend for range in 2.3.4 is applied as a proxy for habitat.
2.5.07 Long-term trend - Period	A long-term trend period for this species is not considered appropriate, for reasons outlined in 2.3.3.
2.5.09 Area of suitable habitat for the species (km2)	It is not known to what extent, if any, continental shelf waters may represent a potential habitat for this species. Given the uncertainty and very limited data as outlined, the Area of suitable habitat is considered to be equal to the Habitat for the species.
2.6 Main pressures - Pressure	In the development and preparation of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009), a comprehensive review of the pressures believed and/or documented to be acting on this species and/or its functional group (i.e., threats to their protection) was undertaken. The main pressures thought to be acting on this species are considered to occur primarily on a local or regional scale and/or on a temporary or intermittent basis (e.g., impacts arising from shipping movements or seismic exploration; DEHLG, 2009). Since blue whale distribution is likely to be exclusively offshore Atlantic in nature, the ranking given in most cases is one of low importance. Nevertheless where a pressure may be regionally intensive the ranking given is one of medium importance due also to the species' depleted status. It should be noted that in relation to seismic exploration, which tends to occur on a local or occasionally regional scale in the waters of Ireland's EEZ and is comparatively low in coverage relative to several other member states, a robust regulatory and management regime applies in order to avoid potentially significant impacts on all species of marine mammal. The impact on this species of changes in sea temperature and other abiotic factors in the marine environment can also not be discounted.
2.7 Threats - Threat	There is no evidence to suggest a change in the main pressures thought to be acting on this species in the near future. However surveillance of the species and the pressures potentially acting upon it will continue into the future, while the application of strong management measures (e.g., via the statutory/regulatory process) to avoid potentially significant impacts is also expected to continue.
2.8.01 Justification of % thresholds for trends	A detailed analysis of the statistical ability and power to robustly determine population trends for cetacean species occurring in western European waters is under way via the Joint Cetacean Protocol (JCP) project in the UK. This phased work is due for completion in 2013 and it will inform whether and for which species the measurement of population trends may be possible based on survey data from a range of sources.

Field label	Note
Species: 5020	**Blue whale**
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	While records of blue whale in Irish waters have been comparatively rare, contemporary sightings and acoustic data indicate a wide occurrence in deep oceanic waters and those overlying the continental slope. Hence the Range is considered to be favourable.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	While there are indications that the North Atlantic blue whale population, at least in its central/eastern component, is increasing following the cessation of whaling, the origin/stock identity of whales occurring in Irish waters is not known at present. Considering this key data gap and the scarcity of positive sighting records from Irish waters, the population parameter is considered unknown.
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The habitat for this species in Ireland is considered favourable given its broad occurrence in deeper offshore waters.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	A number of pressures have been identified. While the effect of these pressures may act on a temporary and/or regional scale and some are likely to continue to act as pressures into the future, the impacts on individuals or populations of blue whale in Irish waters are not well understood. This is largely due to the species’ occurrence far offshore and to limited data on its numbers and ecology within Ireland’s marine area. While ongoing threats as listed or identified into the future via surveillance will be managed appropriately, the future prospects for the species are therefore considered to be unknown.
2.9.05 Overall assessment of Conservation Status	Based on the assessments for the Range, Population, Habitat and Future Prospects parameters, the overall conclusion is that the conservation status of blue whale in Ireland is considered "Unknown". This overall result is the same as in the previous Article 17 assessment due to limited ongoing information on this depleted species' occurrence and population ecology in Irish waters. However improvements are reported in the assessments for the Range and Habitat parameters, due to improved knowledge.

Blue whale - *Balaenoptera musculus* (5020)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

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Scale - Scála
0 25 50 75 100 km

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Map - Léarscáil
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Date - Dáta
11-06-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**5029**
0.2.2 Species name	**Delphinapterus leucas**
0.2.3 Alternative species scientific name	White whale
0.2.4 Common name	Beluga

1. National Level

1.1 Maps

1.1.1 Distribution Map	No
1.1.1a Sensitive species	No
1.1.2 Method used - map	N/A
1.1.3 Year or period	
1.1.4 Additional map	No
1.1.5 Range map	No

2. Biogeographical Or Marine Level

2.1 Biogeographical Region	**Marine Atlantic (MATL)**
2.2 Published sources	

2.3 Range

2.3.1 Surface area - Range (km²)		
2.3.2 Method - Range surface area	N/A	
2.3.3 Short-term trend period		
2.3.4 Short-term trend direction	N/A	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	
	operator	N/A
	unknown	No
	method	
2.3.10 Reason for change		

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	N/A
	min	max
2.4.2 Population size (other than individuals)	Unit	N/A
	min	max
2.4.3 Additional information	Definition of locality	
	Conversion method	
	Problems	
2.4.4 Year or period		
2.4.5 Method – population size	N/A	
2.4.6 Short-term trend period		
2.4.7 Short term trend direction	N/A	

2.4.8 Short-term trend magnitude	min	max	confidence interval
2.4.9 Short-term trend method	N/A		
2.4.10 Long-term trend period			
2.4.11 Long term trend direction	N/A		
2.4.12 Long-term trend magnitude	min	max	confidence interval
2.4.13 Long-term trend method	N/A		
2.4.14 Favourable reference population	number		
	operator	N/A	
	unknown	No	
	method		
2.4.15 Reason for change			

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km^2)	
2.5.2 Year or period	
2.5.3 Method used - habitat	N/A
2.5.4 a) Quality of habitat	
2.5.4 b) Quality of habitat - method	
2.5.5 Short term trend period	
2.5.6 Short term trend direction	N/A
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km^2)	
2.5.10 Reason for change	

2.6 Main Pressures

2.6.1 Method used – pressures	N/A

2.7 Main Threats

2.7.1 Method used – threats	N/A

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant Information	
2.8.3 Trans-boundary assessment	

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment	Unknown (XX)
	qualifiers	N/A
2.9.2. Population	assessment	Unknown (XX)
	qualifiers	N/A
2.9.3. Habitat	assessment	Unknown (XX)
	qualifiers	N/A
2.9.4. Future prospects	assessment	Unknown (XX)
	qualifiers	N/A
2.9.5 Overall assessment of Conservation Status	Unknown (XX)	
2.9.6 Overall trend in Conservation Status	N/A	

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	N/A		
	min		max	
3.1.2 Method used	N/A			
3.1.3 Trend of population size within	N/A			

3.2 Conservation Measures

Field label	Note
Species: 5029	**Beluga**
0.1 Member State	Ireland
0.2.04 Common name	Beluga/White whale = Míol mór bán
1.1.02 Method used - map	No live records of this species have been obtained from Ireland within the current reporting round or since the Directive came into force.
2.9.05 Overall assessment of Conservation Status	Since no live records of this species have been obtained from Ireland within the current reporting round or since the Directive came into force, the conservation status of this vagrant species is assessed as unknown.

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**5031**
0.2.2 Species name	**Physeter catodon**
0.2.3 Alternative species scientific name	Physeter macrocephalus
0.2.4 Common name	Sperm whale

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	1995-2012
1.1.4 Additional map	No
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region: **Marine Atlantic (MATL)**

2.2 Published sources:

Whitehead, H. (2009). Sperm whale. Physeter macrocephalus. In W.F. Perrin, B. Würsig, J.G.M. Thewissen (eds.). Encyclopedia of Marine Mammals – 2nd edition. Academic Press, Elsevier Inc. p.1091-1097.

Aguilar de Soto, N., Rogan, E., O Cadhla, O., Gordon, J.C.D., Mackey, M., and Connolly, N. (2004) Cetaceans and Seabirds of Ireland's Atlantic Margin. Volume III-Acoustic Surveys for Cetaceans. Report on research carried out under the Irish Infrastructure Programme (PIP): Rockall Studies Group (RSG) projects 98/6 and 00/13, Porcupine Studies Group project P00/15 and Offshore Support Group (OSG) project 99/38. 51pp.

Ó Cadhla, O., Mackey, M., Aguilar de Soto, N., Rogan, E. & Connolly, N. (2004). Cetaceans and Seabirds of Ireland's Atlantic Margin. Volume II - Cetacean distribution and abundance. Report on research carried out under the Irish Petroleum Infrastructure Programme (PIP): Rockall Studies Group (RSG) projects 98/6 and 00/13, Porcupine Studies Group project P00/15 and Offshore Support Group (OSG) project 99/38. 82pp.

CODA (2009). Cetacean offshore distribution and abundance in the European Atlantic (CODA). Sea Mammal Research Unit, Gatty Marine Laboratory, University of St Andrews, St Andrews, Fife, KY16 8LB. 43pp.

Berrow, S.D., Whooley, P., O'Connell, M. & Wall, D. (2010). Irish Cetacean Review (2000-2009). Irish Whale and Dolphin Group, Kilrush, Co. Clare. 60pp.

Wall, D., O'Brien, J., Kavanagh, L., Ryan, C., Hunt, L. & Fennelly, S. (2012). Monitoring of spatial and temporal habitat use and abundance of cetaceans. In S.D. Berrow, J.O'Brien, I. O'Connor, D. McGrath & D. Wall. Marine Mammals and Megafauna in Irish Waters – behaviour, distribution and habitat use. Final project report for Grant-Aid Agreement No. PBA/ME/07/005(02) under the Sea Change Strategy with the support of the Marine Institute, the Marine Research Sub-Programme of the National Development Plan 2007–2013 and the Department of Arts, Heritage and the Gaeltacht. Galway-Mayo Institute of Technology, Galway. p.1-187.

DEHLG. (2009). Conservation Plan for Cetaceans in Irish Waters. Department of the Environment, Heritage and Local Government, 7 Ely Place, Dublin. 97pp.

Taylor, B.L., Baird, R., Barlow, J., Dawson, S.M., Ford, J., Mead, J.G., Notarbartolo di Sciara, G., Wade, P. & Pitman, R.L. (2008). Physeter macrocephalus. In IUCN 2012. IUCN Red List of Threatened Species. Version 2012.2. http://www.iucnredlist.org.

Berrow, S.D., Whooley, P. & Ferriss, S. (2002). Irish Whale and Dolphin Group Cetacean Sighting Review (1991-2001). Irish Whale and Dolphin Group, Kilrush, Co. Clare. 34 pp.

Reid, J.B., Evans, P.G.H. & Northridge, S.P. (2003). Atlas of Cetacean Distribution in North-west European Waters. Joint Nature Conservation Committee, Peterborough, 76pp.

SCANS-II (2008). Small Cetaceans in the European Atlantic and North Sea. Final Report to the European Commission under project LIFE04NAT/GB/000245. Sea Mammal Research Unit, Gatty Marine Laboratory, University of St Andrews, St Andrews, Fife, KY16 8LB.

Wall, D., Murray, C., O'Brien, J., Kavanagh, L., Wilson, C., Ryan, C., Glanville, B., Williams, D., Enlander, I., O'Connor, I., McGrath, D., Whooley, P. & Berrow, S. (2013). Atlas of the distribution and relative abundance of marine mammals in Irish offshore waters 2005 - 2011. Irish Whale and Dolphin Group, Kilrush, Co. Clare. 62pp.

Pollock, C.M., Reid, J.R., Webb, A. & Tasker, M.L. (1997). The distribution of seabirds and cetaceans in the waters around Ireland. JNCC Report No. 267. Joint Nature Conservation Committee, Peterborough. 167pp.

2.3 Range

2.3.1 Surface area - Range (km²)	357500	
2.3.2 Method - Range surface area	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	357500
	operator	N/A
	unknown	No
	method	The range value derived from the range map referred to in 1.1.5 is considered to be the baseline for this species. As there is no evidence of a decline since the Directive came into force the current range is set as the FRR.
2.3.10 Reason for change	Improved knowledge/more accurate data	

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	number of individuals (i)		
	min	1404	max	3073
2.4.2 Population size (other than individuals)	Unit	N/A		
	min		max	
2.4.3 Additional information	Definition of locality			
	Conversion method			
	Problems	Evidence from multi-annual surveillance programmes (Aguilar de Soto et al., 2004; Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012) indicate that sperm whales occur widely in deeper Irish Atlantic waters and do so throughout the year. Recent summer estimates of total abundance in waters overlying the western European continental slope and deeper oceanic waters numbered approximately 2,100 animals (95%CL = 1,404-3,073; CODA, 2009) with the majority of sightings occurring in the Bay of Biscay and northwest of the Iberian peninsula but numerous records also obtained in the Rockall Trough. Abundance globally was previously estimated at 360,000, down from a pre-whaling population of more than one million individuals (Whitehead, 2009). In seeking to approximate population size range for Irish waters from such broad-scale datasets, there are significant difficulties due (i) to the species' wide pelagic distribution throughout Atlantic and western European waters making jurisdictional separation somewhat arbitrary, (ii) to problems associated with the narrow temporal focus of the limited surveys undertaken thus far (e.g., one month in one season in one year, or separate years for coverage of continental shelf and deeper oceanic waters), and (iii) to high CVs (i.e., estimation uncertainty) particularly from regions where recorded numbers of sightings have been low. The population estimates given for this species are based on the summation of regional estimates presented in CODA (2009) and they assume the free ranging of animals across and within the regions concerned (e.g., from the Iberian peninsula and Bay of Biscay to the Rockall Trough).		
2.4.4 Year or period	2001-2012			
2.4.5 Method – population size	Estimate based on partial data with some extrapolation and/or modelling (2)			
2.4.6 Short-term trend period	2001-2012			
2.4.7 Short term trend direction	unknown (x)			
2.4.8 Short-term trend magnitude	min	max	confidence interval	
2.4.9 Short-term trend method	Estimate based on expert opinion with no or minimal sampling (1)			
2.4.10 Long-term trend period				

2.4.11 Long term trend direction	N/A		
2.4.12 Long-term trend magnitude	min	max	confidence interval
2.4.13 Long-term trend method	N/A		
2.4.14 Favourable reference population	number		
	operator	N/A	
	unknown	Yes	
	method	Robust data on sperm whale population trends in Irish waters are not available although knowledge of the species' distribution and summer abundance has improved since the Directive came into force. Nevertheless the use of current population figures as descriptors for FRP require further work. The FRP for this species is therefore considered to be unknown.	
2.4.15 Reason for change	Improved knowledge/more accurate data		

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	357500
2.5.2 Year or period	2001-2012
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Good
2.5.4 b) Quality of habitat - method	The quality of habitat for this species was determined by consideration of the relevant direct and indirect pressures thought to be acting on the species and/or its functional group, and its habitat within its natural environment. These pressures were evaluated in development of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009) using available scientific data concerning inter alia habitat use, population size, distribution and ecology, and threats to the species' protection (e.g., via natural/biological sources, human sectoral activities, management gaps, etc).
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	stable (0)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	357500
2.5.10 Reason for change	Improved knowledge/more accurate data

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	low importance (L)	N/A
death or injury by collision (G05.11)	low importance (L)	N/A
Noise nuisance, noise pollution (H06.01)	low importance (L)	N/A
Seismic exploration, explosions (H06.05)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A

2.6.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	low importance (L)	N/A
death or injury by collision (G05.11)	low importance (L)	N/A
Noise nuisance, noise pollution (H06.01)	low importance (L)	N/A

Seismic exploration, explosions (H06.05)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	Research into the appropriate use of statistics and a range of data sources for population trend analysis is currently under way. Until the results of this work become available, it is not considered scientifically valid to attempt to determine population trends.
2.8.2 Other relevant Information	
2.8.3 Trans-boundary assessment	Given the mobility of this marine species, and in particular the potential for seasonal movements in response to breeding requirements, prey distribution and abundance, and other natural processes, it is possible or likely that individuals and/or groups of this species move between Irish waters and adjacent marine jurisdictions. A transboundary assessment in the next reporting period would allow a fuller appreciation of the range and status of this species.

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.9.2. Population	assessment	Unknown (XX)
	qualifiers	N/A
2.9.3. Habitat	assessment	Favourable (FV)
	qualifiers	N/A
2.9.4. Future prospects	assessment	Unknown (XX)
	qualifiers	N/A
2.9.5 Overall assessment of Conservation Status	Unknown (XX)	
2.9.6 Overall trend in Conservation Status	N/A	

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	N/A	
	min		max
3.1.2 Method used	N/A		
3.1.3 Trend of population size within	N/A		

3.2 Conservation Measures

Field label	Note
Species: 5031	**Sperm whale**
0.1 Member State	Ireland
0.2.01 Species code	The sperm whale is the largest member of the toothed cetaceans (Odontoceti) occurring in Irish waters with adult males averaging up to 16-18m in body length. Females are notably smaller in size (c. 10-12m on average), making this species the most sexually dimorphic of cetaceans in body length and weight (Whitehead, 2009). Found throughout the world's oceans from equatorial to polar regions, this distinctive deep-diving species has regularly been recorded during visual and acoustic surveys of deeper Atlantic waters to the west of Ireland (e.g., Aguilar de Soto et al., 2004; Ó Cadhla et al., 2004; CODA, 2009; Berrow et al., 2010; Wall et al., 2012). Sperm whales are quite readily identified in the field due to their body size, a low angular bushy blow when the animal exhales at the surface, a characteristic low bump-like dorsal fin that may even be difficult to see when the animal surfaces, and a notably vertical blunt or square-shaped forehead. Some sperm whale populations are reported to undertake seasonal movements but clear latitudinal migrations are not commonly described; however the geographic segregation of adults is well documented with only adult males occupying the higher cold temperate and sub-polar latitudes (Whitehead, 2009). The vast majority of Irish records are thought to be males of the species (DEHLG, 2009) and Ireland is one of a few EU member states inhabited by the sperm whale, which remains classified as a Vulnerable species (Taylor et al., 2008) due to industrial hunting on a wide spatial and temporal scale (Taylor et al., 2008; Whitehead, 2009).
0.2.04 Common name	Sperm whale = Caisealóid
1.1.01 Distribution map	The distribution map presented for this species represents a significant proportion of all live sightings recorded during targeted scientific surveillance in Irish waters between 1994/95 and 2012. The surveillance programmes that contributed data to this projection are cited as follows: Pollock et al. (1997), Reid et al. (2003), Ó Cadhla et al. (2004) and Wall et al. (2013). These data and the results of other survey effort (e.g., SCANS-II, 2008; CODA, 2009; Berrow et al., 2010) were integrated into the development of the species range map presented under section 1.1.5. This distribution map for the species has been drawn in 50km x 50km resolution and is mapped in the LAEA projection.
1.1.02 Method used - map	Over the last 2-3 decades records of the occurrence of this species in Irish waters have been far more numerous than most other deep-diving toothed cetacean species. Simultaneous to more rigorous surveillance in the last 15-20 years numerous sperm whale records have continued to emerge from deep oceanic and continental slope waters to the northwest, west and southwest of Ireland (Ó Cadhla et al., 2004; CODA, 2009; Berrow et al., 2010; Wall et al., 2012). The distribution of recent sightings along with regional sighting records obtained across three preceding decades (Berrow et al., 2002; Reid et al., 2003) indicate a predominant distribution in deeper Atlantic waters overlying the continental slope and in the Rockall Trough and Porcupine Seabight. Occurrences in shallower Irish waters are very rare and have been linked to stranding events (Berrow et al., 2010). While all reliable cetacean records obtained in Irish waters were not available for use in this exercise, the map drawn for this species provides a good sample of the species' observed distribution.
1.1.03 Year or period	The period selected for mapping the distribution of this species represents a period of intensive surveillance for cetaceans in Irish waters across a range of research and monitoring programmes.

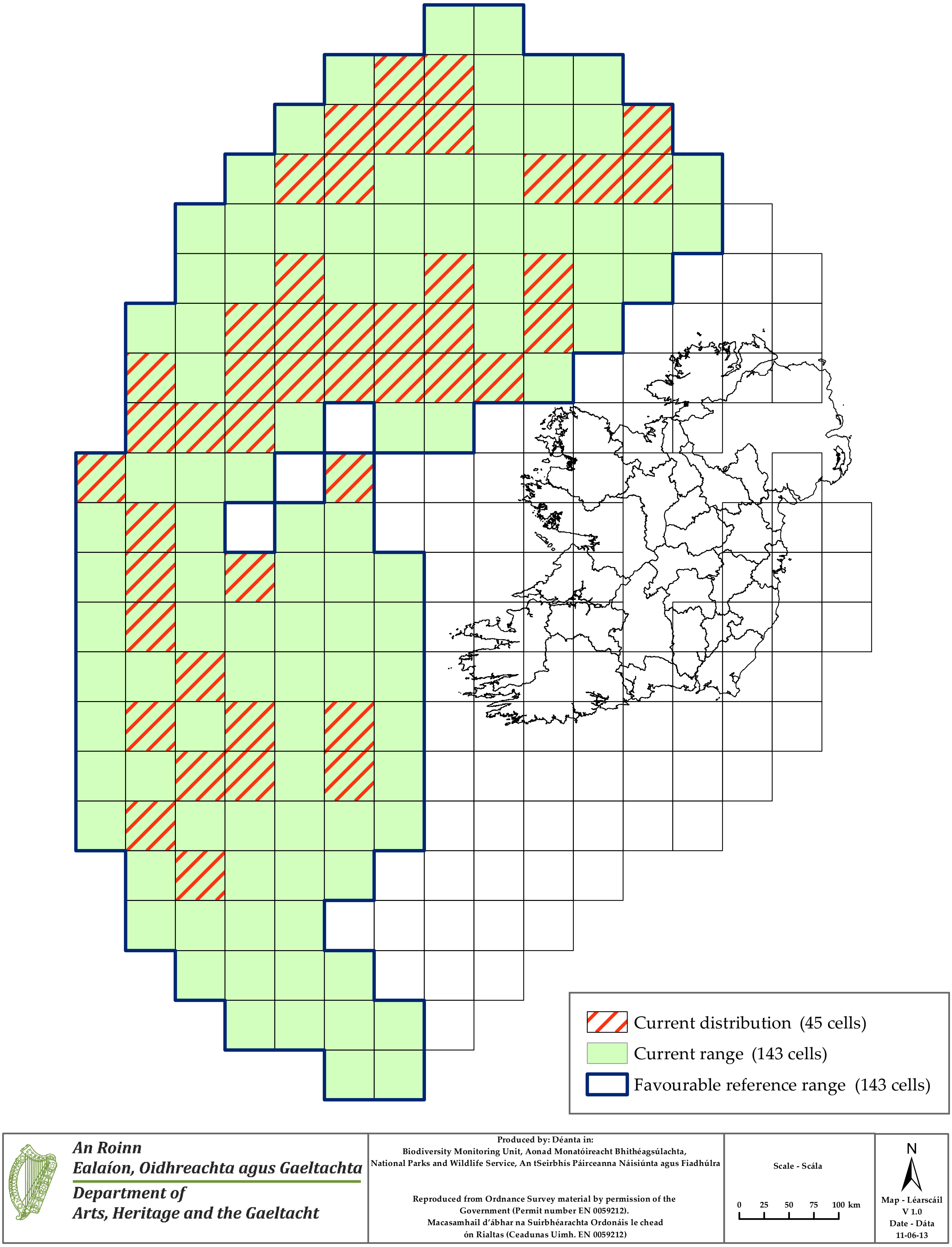
Field label	Note
Species: 5031	**Sperm whale**
1.1.05 Range map	The species' natural range in Irish waters is a small component of its wider North Atlantic range (DEHLG, 2009; Whitehead, 2009). The range map provided consists of its recorded and likely natural range based on recent data (2001-2012) and expert judgement, and is partly derived from 1.1.1. It consists of a block of contiguous 50km x 50km grid cells distributed in Irish marine waters of 500m depth or greater.
2.3.02 Method used - Surface area of Range	This figure has been derived from the range map referred to in 1.1.5.
2.3.03 Short-term trend - Period	Prior to 1999-2000, survey effort targeting cetacean species in Irish offshore waters was comparatively limited in coverage, both spatially and temporally. Since 1999-2000 a number of dedicated multi-annual surveillance programmes for cetaceans have operated in Irish waters, with survey effort extending to the limits of Ireland's EEZ and beyond. Consequently, with regard to this species it is considered that the years 2001-2012 represent an appropriate period for the evaluation of short-term trends.
2.3.04 Short term trend - Trend direction	Sighting and acoustic records from dedicated surveillance effort in Irish waters (Aguilar de Soto et al., 2004; Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012) provide no evidence of a decline in distribution/range in the recent past; therefore accordingly the short-term trend for range is considered to be stable.
2.3.06 Long-term trend - Period	A long-term trend period for this species is not considered appropriate, for reasons outlined in 2.3.3.
2.3.09 a) Favourable reference range - In km2	The range value derived from the range map referred to in 1.1.5 is considered to be the baseline for this species. As there is no evidence of a decline since the Directive came into force the current range is set as the FRR. [Note: (1) The species may conduct seasonal movements but has not been shown to be migratory, thus regional population components may be present year-round. Nevertheless the species' range in Irish waters is likely to represent only a component of its range in marine waters covered by the Directive and the northeast Atlantic Ocean. (2) There is an assumption that the current range in Irish waters is large enough (a) to encompass all of the ecological variation required by this species during its occurrences therein and (b) to contribute to the long term survival of the species.]
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Additional sighting records of this commonly identified large toothed whale species have been obtained since the previous reporting round (e.g., CODA, 2009; Berrow et al., 2010; Wall et al., 2012). Along with previous data from a range of sources, this has resulted in an improved knowledge and ability to assess the range from that reported in 2007. There is no scientific reason to assume that the species was not similarly present in 2001-2006.
2.4.04 Year or period	The period 2001-2012 has been selected in order to represent the most current population information available for this species.

Field label	Note
Species: 5031	**Sperm whale**
2.4.05 Method used - Population size	Evidence from multi-annual surveillance programmes (Aguilar de Soto et al., 2004; Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012) indicate that sperm whales occur widely in deeper Irish Atlantic waters and do so throughout the year. Recent summer estimates of total abundance in waters overlying the western European continental slope and deeper oceanic waters numbered approximately 2,100 animals (95%CL = 1,404-3,073; CODA, 2009) with the majority of sightings occurring in the Bay of Biscay and northwest of the Iberian peninsula but numerous records also obtained in the Rockall Trough. Abundance globally was previously estimated at 360,000, down from a pre-whaling population of more than one million individuals (Whitehead, 2009). In seeking to approximate population size range for Irish waters from such broad-scale datasets, there are significant difficulties due (i) to the species' wide pelagic distribution throughout Atlantic and western European waters making jurisdictional separation somewhat arbitrary, (ii) to problems associated with the narrow temporal focus of the limited surveys undertaken thus far (e.g., one month in one season in one year, or separate years for coverage of continental shelf and deeper oceanic waters), and (iii) to high CVs (i.e., estimation uncertainty) particularly from regions where recorded numbers of sightings have been low. The population estimates given for this species are based on the summation of regional estimates presented in CODA (2009) and they assume the free ranging of animals across and within the regions concerned (e.g., from the Iberian peninsula and Bay of Biscay to the Rockall Trough).
2.4.06 Short-term trend - Period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.4.09 Short-term trend - Method used	There is little evidence of growth or decline in the global population of sperm whale since the cessation of large scale whaling (Taylor et al., 2008). Given that recent population estimates for the species (CODA, 2009) are the only figures for western European waters since the Directive came into force, the reliable determination of short-term population trend for this species is not possible.
2.4.10 Long-term trend - Period	A long-term trend period for this species is not considered appropriate for reasons outlined in 2.3.3.
2.4.14 d) Favourable reference population - Indicate method used to set reference value if other than operators	Robust data on sperm whale population size and trends in Irish waters are not available, although broader-scale abundance estimates have been derived for the European Atlantic based on comparable surveys of the continental shelf area (SCANS-II, 2008) and deeper oceanic waters (CODA, 2009). While the population figures derived represent the first comparatively robust estimates since the Directive came into force, they are transboundary figures captured from a short snapshot in time, the associated Lower and Upper 95% Confidence Limits are significantly different, and their use as descriptors for FRP require further work. The FRP for this species is therefore considered to be unknown.
2.5.01 Area estimation	The surface area estimate for range (derived from the range map referred to in 1.1.5) is used as a proxy for habitat surface area.
2.5.02 Year or period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.5.03 Method used Habitat for the species	Use of the range descriptor as a proxy for habitat is judged appropriate for this wide-ranging pelagic species.

Field label	Note
Species: 5031	**Sperm whale**
2.5.04 b) Quality of the habitat - Explain how the quality was assessed	The quality of habitat for sperm whale was determined by consideration of the relevant direct and indirect pressures thought to be acting on the species and/or its functional group, and its habitat within its natural environment. These pressures were evaluated in development of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009) using available scientific data concerning inter alia habitat use, population size, distribution and ecology, and threats to the species' protection (e.g., via natural/biological sources, human sectoral activities, management gaps, etc). Sperm whale may be subject to a number of local and/or regional environmental pressures throughout its range in Irish waters (see 2.3, 2.6; DEHLG, 2009). However based on current data available none are considered to be of sufficient spatial or temporal impact on the species to be causing a significant deterioration in overall habitat quality in Ireland from a "good" status.
2.5.05 Short-term trend - Period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.5.06 Short-term trend - Trend direction	The trend for range in 2.3.4 is applied as a proxy for habitat.
2.5.07 Long-term trend - Period	A long-term trend period for this species is not considered appropriate, for reasons outlined in 2.3.3.
2.5.09 Area of suitable habitat for the species (km2)	Sperm whales have been steadily recorded in deeper Irish Atlantic waters both historically and to the present day and the known habitats for this species include waters overlying the continental slope and its canyonated margins, deep ocean basins and abyssal zones. The Area of suitable habitat is considered to be equal to the Habitat for the species.
2.6 Main pressures - Pressure	In the development and preparation of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009), a comprehensive review of the pressures believed and/or documented to be acting on this species and/or its functional group (i.e., threats to their protection) was undertaken. The main pressures thought to be acting on this species are considered to occur primarily on a local or regional scale and/or on a temporary or intermittent basis (e.g., impacts arising from seismic exploration; DEHLG, 2009). Since sperm whale distribution is likely to be exclusively offshore Atlantic in nature, the ranking given in most cases is one of low importance. Nevertheless where a pressure may be regionally intensive the ranking given is one of medium importance due to the species' depleted status, its preference for deep water habitats, conferring greater physiological constraints on individual animals, and potential sensitivity to underwater noise in such circumstances. It should be noted that in relation to seismic exploration, which tends to occur on a local or occasionally regional scale in the waters of Ireland's EEZ and is comparatively low in coverage relative to several other member states, a robust regulatory and management regime applies in order to avoid potentially significant impacts on all species of marine mammal. The impact on this species of changes in sea temperature and other abiotic factors in the marine environment can also not be discounted.
2.7 Threats - Threat	There is no evidence to suggest a change in the main pressures thought to be acting on this species in the near future. However surveillance of the species and the pressures potentially acting upon it will continue into the future, while the application of strong management measures (e.g., via the statutory/regulatory process) to avoid potentially significant impacts is also expected to continue.
2.8.01 Justification of % thresholds for trends	A detailed analysis of the statistical ability and power to robustly determine population trends for cetacean species occurring in western European waters is under way via the Joint Cetacean Protocol (JCP) project in the UK. This phased work is due for completion in 2013 and it will inform whether and for which species the measurement of population trends may be possible based on survey data from a range of sources.

Field label	Note
Species: 5031	**Sperm whale**
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The sperm whale is widely recorded in offshore Irish waters from deep oceanic waters to those overlying the continental slope. Hence the Range is considered to be favourable.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	There is little evidence of a growth or decline in the global population of sperm whale since the cessation of large scale whaling. While robust data on sperm whale population size and trends in Irish waters as a whole are not available, knowledge of the species' seasonal distribution and summer abundance in western European waters has improved since the Directive came into force. Broad-scale abundance estimates have been derived for the European Atlantic based on comparable surveys of the continental shelf area and deeper oceanic waters. This indicates that sperm whales number in the low thousands regionally (see 2.4). Given this information and ongoing uncertainty in the trajectory of northeast Atlantic populations since the cessation of whaling, the population parameter is considered unknown.
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The habitat for this species in Ireland is considered favourable. Sperm whales have been steadily recorded in deeper Irish Atlantic waters both historically and to the present day and the known habitats for this species include waters overlying the continental slope and its canyonated margins, deep ocean basins and abyssal zones.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	A number of pressures have been identified. While the effect of these pressures may act on a temporary and/or regional scale and some are likely continue to act as pressures into the future, the impacts on individuals or populations of sperm whale in Irish waters are not well understood. This is largely due to the species' occurrence far offshore and to limited data on its numbers and ecology within Ireland's marine area. While ongoing threats as listed or identified into the future via surveillance will be managed appropriately, the future prospects for the species are therefore considered to be unknown.
2.9.05 Overall assessment of Conservation Status	Based on the assessments for the Range, Population, Habitat and Future Prospects parameters, the overall conclusion is that the conservation status of sperm whale in Ireland is considered "Unknown". This overall result is the same as in the previous Article 17 assessment due to limited ongoing information on this depleted species' population ecology in Irish waters. However improvements are reported in the assessments for the Range and Habitat parameters, due to improved knowledge.

Sperm whale - *Physeter macrocephalus* (5031)
Article 17 Assessment 2013



Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**5033**
0.2.2 Species name	**Hyperoodon ampullatus**
0.2.3 Alternative species scientific name	Bottlenose whale
0.2.4 Common name	Northern bottlenose whale

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	1995-2012
1.1.4 Additional map	No
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Marine Atlantic (MATL)

2.2 Published sources

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Berrow, S.D., Whooley, P., O'Connell, M. & Wall, D. (2010). Irish Cetacean Review (2000-2009). Irish Whale and Dolphin Group, Kilrush, Co. Clare. 60pp.

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Reid, J.B., Evans, P.G.H. & Northridge, S.P. (2003). Atlas of Cetacean Distribution in North-west European Waters. Joint Nature Conservation Committee, Peterborough, 76pp.

DEHLG. (2009). Conservation Plan for Cetaceans in Irish Waters. Department of the Environment, Heritage and Local Government, 7 Ely Place, Dublin. 97pp.

SCANS-II (2008). Small Cetaceans in the European Atlantic and North Sea. Final Report to the European Commission under project LIFE04NAT/GB/000245. Sea Mammal Research Unit, Gatty Marine Laboratory, University of St Andrews, St Andrews, Fife, KY16 8LB.

Cañadas, A., Macleod, K., Mikkelsen, B., Rogan, E., Uriarte, A., Antonio Vázquez, J., Van Canneyt, O. & Hammond, P.S. (2011). Abundance and distribution of beaked whales in the European Atlantic. Report to the Scientific Committee of the International Whaling Commission, Cambridge. SC/63/SM13. 16pp.

Wall, D., Murray, C., O'Brien, J., Kavanagh, L., Wilson, C., Ryan, C., Glanville, B., Williams, D., Enlander, I., O'Connor, I., McGrath, D., Whooley, P. & Berrow, S. (2013). Atlas of the distribution and relative abundance of marine mammals in Irish offshore waters 2005 - 2011. Irish Whale and Dolphin Group, Kilrush, Co. Clare. 62pp.

Pollock, C.M., Reid, J.R., Webb, A. & Tasker, M.L. (1997). The distribution of seabirds and cetaceans in the waters around Ireland. JNCC Report No. 267. Joint Nature Conservation Committee, Peterborough. 167pp.

2.3 Range

2.3.1 Surface area - Range (km²)	570000	
2.3.2 Method - Range surface area	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	unknown (x)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	570000
	operator	N/A
	unknown	No
	method	The range value derived from the range map referred to in 1.1.5 is considered to be the baseline for this species. As there is no evidence of a decline since the Directive came into force the current range is set as the FRR.
2.3.10 Reason for change	Improved knowledge/more accurate data	

2.4 Population

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

2.4.1 Population size (individuals or agreed exception)	Unit: number of individuals (i) min 1372 max 12683
2.4.2 Population size (other than individuals)	Unit: N/A min max
2.4.3 Additional information	Definition of locality Conversion method Problems: Evidence from multi-annual surveillance programmes (Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012) indicate that northern bottlenose whales occur widely in Irish Atlantic waters although it remains unclear whether the species is present year-round. Recent estimates of total abundance in waters overlying the western European continental slope and deeper oceanic waters numbered approximately 3,200-4,200 animals (95%CL = 1,372-12,683; Cañadas et al., 2011). Previously, abundance in the northeastern Atlantic was approximated at 40,000 in the mid-1990s (Taylor et al., 2008). In seeking to approximate population size range for Irish waters from these limited datasets, there are significant difficulties due (i) to the species' apparently wide pelagic distribution throughout northeast Atlantic and European offshore waters making jurisdictional separation somewhat arbitrary, (ii) to problems associated with the narrow temporal focus of such surveys (e.g., one month in one season in one year, or separate years for coverage of shelf and deeper oceanic waters), and (iii) to high CVs (i.e., estimation uncertainty) particularly from regions where recorded numbers of sightings have been low. The minimum and maximum population estimates given for this species are based on the summation of regional estimates derived by Cañadas et al. (2011) and driven by data gathered in the 2007 CODA survey (CODA, 2009). They assume the free ranging of animals across and within the regions concerned (e.g., from deep oceanic waters west of the Bay of Biscay to the Rockall Trough and northern UK waters).
2.4.4 Year or period	2001-2012
2.4.5 Method – population size	Estimate based on partial data with some extrapolation and/or modelling (2)
2.4.6 Short-term trend period	2001-2012
2.4.7 Short term trend direction	unknown (x)
2.4.8 Short-term trend magnitude	min max confidence interval
2.4.9 Short-term trend method	Estimate based on expert opinion with no or minimal sampling (1)
2.4.10 Long-term trend period	

2.4.11 Long term trend direction	N/A		
2.4.12 Long-term trend magnitude	min	max	confidence interval
2.4.13 Long-term trend method	N/A		
2.4.14 Favourable reference population	number		
	operator	N/A	
	unknown	Yes	
	method	Robust data on northern bottlenose whale population trends in Irish waters are not available although knowledge of the species' distribution and occurrence has improved since the Directive came into force. Nevertheless the use of current population figures as descriptors for FRP require further work. The FRP for this species is therefore considered to be unknown.	
2.4.15 Reason for change	Improved knowledge/more accurate data		

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km^2)	570000
2.5.2 Year or period	2001-2012
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Good
2.5.4 b) Quality of habitat - method	The quality of habitat for this species was determined by consideration of the relevant direct and indirect pressures thought to be acting on the species and/or its functional group, and its habitat within its natural environment. These pressures were evaluated in development of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009) using available scientific data concerning inter alia habitat use, population size, distribution and ecology, and threats to the species' protection (e.g., via natural/biological sources, human sectoral activities, management gaps, etc).
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	unknown (x)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km^2)	570000
2.5.10 Reason for change	Improved knowledge/more accurate data

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	low importance (L)	N/A
death or injury by collision (G05.11)	low importance (L)	N/A
Noise nuisance, noise pollution (H06.01)	low importance (L)	N/A
Seismic exploration, explosions (H06.05)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A
Threats and pressures from outside the Member State (XO)	low importance (L)	N/A

2.6.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
Fishing and harvesting aquatic resources (F02)	low importance (L)	N/A
death or injury by collision (G05.11)	low importance (L)	N/A
Noise nuisance, noise pollution (H06.01)	low importance (L)	N/A
Seismic exploration, explosions (H06.05)	medium importance (M)	N/A
Changes in abiotic conditions (M01)	low importance (L)	N/A
Threats and pressures from outside the Member State (XO)	low importance (L)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	Research into the appropriate use of statistics and a range of data sources for population trend analysis is currently under way. Until the results of this work become available, it is not considered scientifically valid to attempt to determine population trends.
2.8.2 Other relevant Information	
2.8.3 Trans-boundary assessment	Given the mobility of this marine species, and in particular the potential for seasonal movements in response to breeding requirements, prey distribution and abundance, and other natural processes, it is possible or likely that individuals and/or groups of this species move between Irish waters and adjacent marine jurisdictions. A transboundary assessment in the next reporting period would allow a fuller appreciation of the range and status of this species.

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.9.2. Population	assessment	Unknown (XX)
	qualifiers	N/A
2.9.3. Habitat	assessment	Favourable (FV)
	qualifiers	N/A
2.9.4. Future prospects	assessment	Unknown (XX)
	qualifiers	N/A
2.9.5 Overall assessment of Conservation Status	Unknown (XX)	
2.9.6 Overall trend in Conservation Status	N/A	

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	N/A		
	min		max	
3.1.2 Method used	N/A			
3.1.3 Trend of population size within	N/A			

3.2 Conservation Measures

Article 17 - SPECIES NOTES

Field label	Note
Species: 5033	**Northern bottlenose whale**
0.1 Member State	Ireland
0.2.01 Species code	The northern bottlenose whale is the largest member of the beaked whale family (Ziphiidae) to occur in Irish waters with adults averaging up to 7-9m in body length. Found only in the North Atlantic where it occurs mostly in temperate and sub polar regions, its populations range from Greenland, Iceland and Svalbard to the Azores and Strait of Gibraltar (Taylor et al., 2008; Gowans, 2009). It is classified as a Data Deficient species, one that has undergone significant depletion from intensive whaling (Taylor et al., 2008) yet whose status remains contentious and uncertain (Whitehead & Hooker, 2012). Northern bottlenose whales are generally recorded in deeper Atlantic waters bu sightings in Irish waters have been infrequent and sporadic (Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012) with even the occasional coastal occurrence. The species is quite readily identifiable due to its large body length for a toothed cetacean, the position of its curved dorsal fin about two-thirds of the way along its back, its characteristic broad bulbous melon (forehead), its prominent but short rounded beak and the absence of a central notch in its tail flukes. Very little is known about the species' natural history or ecology in the waters of western Europe and wider northeast Atlantic; separate populations or breeding stocks and clear patterns in latitudinal/longitudinal movement are not apparent at present (Whitehead & Hooker, 2012).
0.2.04 Common name	Northern bottlenose whale = Míol mór bolgshrónach
1.1.01 Distribution map	The distribution map presented for this species represents a significant proportion of al live sightings recorded during targeted scientific surveillance in Irish waters between 1994/95 and 2012. The surveillance programmes that contributed data to this projection are cited as follows: Pollock et al. (1997), Reid et al. (2003), Ó Cadhla et al. (2004) and Wall et al. (2013). These data and the results of other survey effort (e.g., SCANS-II, 2008; CODA, 2009; Berrow et al., 2010) were integrated into the developmen of the species range map presented under section 1.1.5. This distribution map for the species has been drawn in 50km x 50km resolution and is mapped in the LAEA projection.
1.1.02 Method used - map	Over the last 2-3 decades records of the occurrence of this species in Irish waters have been in short supply. Simultaneous to more rigorous surveillance in the last 15-20 years northern bottlenose whale records have continued to emerge however, mainly from deeper oceanic and continental slope waters to the north, west and southwest of Ireland as well as occasionally in waters overlying the continental shelf (Ó Cadhla et al., 2004; CODA, 2009; Berrow et al., 2010; Wall et al., 2012). The distribution of recent sightings along with regional sighting records obtained across three preceding decades (Reid et al., 2003) indicate a predominant distribution in deeper Atlantic waters overlying the continental slope and in the Rockall Trough and Porcupine Seabight. Records in the Irish Sea are comparatively rare. While all reliable cetacean records obtained in Irish waters were not available for use in this exercise, the map drawn for this species provides a good sample of the species' observed distribution.
1.1.03 Year or period	The period selected for mapping the distribution of this species represents a period of intensive surveillance for cetaceans in Irish waters across a range of research and monitoring programmes.

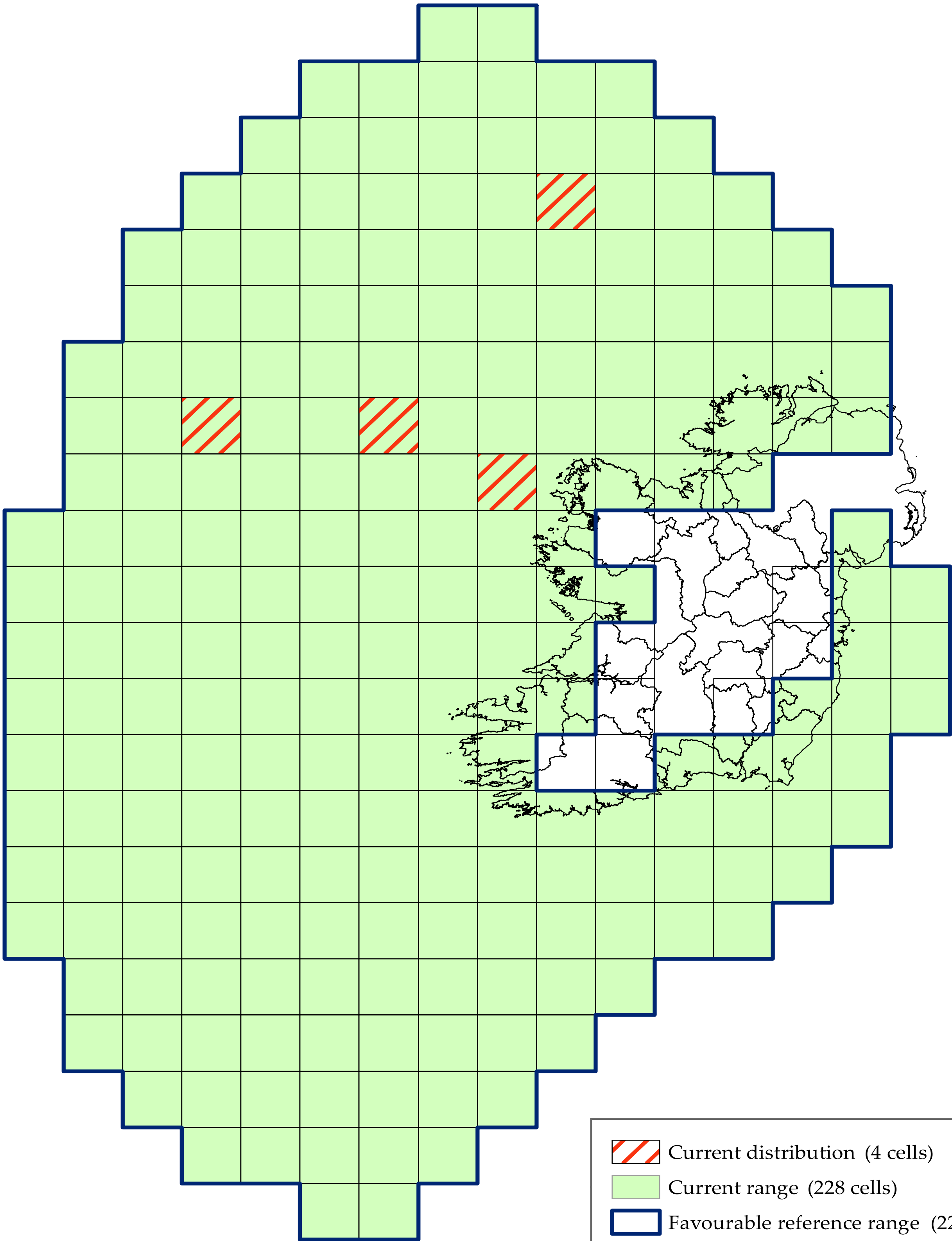
Field label	Note
Species: 5033	**Northern bottlenose whale**
1.1.05 Range map	The species' natural range in Irish waters is believed to be a small component of its wider North Atlantic range (Taylor et al., 2008; Gowans, 2009; DEHLG, 2009). However, a degree of seasonal/interannual association with or residency within particular preferred deep-water habitats, as observed in the western Atlantic (Whitehead & Hooker, 2012) cannot be discounted at this stage. The range map provided consists of its recorded and likely natural range based on recent data (2001-2012) and expert judgement, and is partly derived from 1.1.1. It consists of a block of contiguous 50km x 50km grid cells distributed in Irish marine waters, excluding enclosed shallow bays.
2.3.02 Method used - Surface area of Range	This figure has been derived from the range map referred to in 1.1.5.
2.3.03 Short-term trend - Period	Prior to 1999-2000, survey effort targeting cetacean species in Irish offshore waters was comparatively limited in coverage, both spatially and temporally. Since 1999-2000 a number of dedicated multi-annual surveillance programmes for cetaceans have operated in Irish waters, with survey effort extending to the limits of Ireland's EEZ and beyond. Consequently, with regard to this species it is considered that the years 2001-2012 represent an appropriate period for the evaluation of short-term trends.
2.3.04 Short term trend - Trend direction	Sighting records from dedicated surveillance effort in Irish waters (Ó Cadhla et al., 2004; CODA, 2009; Berrow et al., 2010; Wall et al., 2012) have been occasional and sporadic, and they do not provide a sufficient basis for the evaluation of trends in distribution/range in the recent past; therefore accordingly the short-term trend for range is considered to be unknown.
2.3.06 Long-term trend - Period	A long-term trend period for this species is not considered appropriate, for reasons outlined in 2.3.3.
2.3.09 a) Favourable reference range - In km2	The range value derived from the range map referred to in 1.1.5 is considered to be the baseline for this species. As there is no evidence of a decline since the Directive came into force the current range is set as the FRR. [Note: (1) The species may undertake seasonal movements although regional population components may also be present year-round; nevertheless the species' range in Irish waters is likely to represent only a component of its range in marine waters covered by the Directive and the northeast Atlantic Ocean; (2) There is an assumption that the current range in Irish waters is large enough (a) to encompass all of the ecological variation required by this species during its occurrences therein and (b) to contribute to the long-term survival of the species.]
2.3.10 b) Reason for change - improved knowledge/more accurate data?	Additional sighting records of this larger beaked whale species have been obtained since the previous reporting round (e.g., CODA, 2009; Berrow et al., 2010; Wall et al., 2012). Along with previous data from a range of sources, this has resulted in an improved knowledge and ability to assess the range from that reported in 2007. There is no scientific reason to assume that the species was not similarly present in 2001-2006
2.4.04 Year or period	The period 2001-2012 has been selected in order to represent the most current population information available for this species.

Field label	Note
Species: 5033	**Northern bottlenose whale**
2.4.05 Method used - Population size	Evidence from multi-annual surveillance programmes (Ó Cadhla et al., 2004; Berrow et al., 2010; Wall et al., 2012) indicate that northern bottlenose whales occur widely in Irish Atlantic waters although it remains unclear whether the species is present year-round. Recent estimates of total abundance in waters overlying the western European continental slope and deeper oceanic waters numbered approximately 3,200-4,200 animals (95%CL = 1,372-12,683; Cañadas et al., 2011). Previously, abundance in the northeastern Atlantic was approximated at 40,000 in the mid-1990s (Taylor et al., 2008). In seeking to approximate population size range for Irish waters from these limited datasets, there are significant difficulties due (i) to the species' apparently wide pelagic distribution throughout northeast Atlantic and European offshore waters making jurisdictional separation somewhat arbitrary, (ii) to problems associated with the narrow temporal focus of such surveys (e.g., one month in one season in one year, or separate years for coverage of shelf and deeper oceanic waters), and (iii) to high CVs (i.e., estimation uncertainty) particularly from regions where recorded numbers of sightings have been low. The minimum and maximum population estimates given for this species are based on the summation of regional estimates derived by Cañadas et al. (2011) and driven by data gathered in the 2007 CODA survey (CODA, 2009). They assume the free ranging of animals across and within the regions concerned (e.g., from deep oceanic waters west of the Bay of Biscay to the Rockall Trough and northern UK waters).
2.4.06 Short-term trend - Period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.4.09 Short-term trend - Method used	There is little evidence of post-whaling growth or further decline in the northeast Atlantic population(s) of northern bottlenose whale, although a recent assessment of overall population size in the offshore waters of western Europe (Cañadas et al., 2011) indicate that in regional terms the species could be in a healthy state. However, given that these estimates for the species are the only figures for western European waters since the Directive came into force, the reliable determination of short-term population trend for this species is not possible.
2.4.10 Long-term trend - Period	A long-term trend period for this species is not considered appropriate for reasons outlined in 2.3.3.
2.4.14 d) Favourable reference population - Indicate method used to set reference value if other than operators	Robust data on northern bottlenose whale population trends in Irish waters are not available. However broad-scale population estimates have recently been derived for the European Atlantic based on comparable surveys of the continental shelf area (SCANS-II, 2008) and deeper oceanic waters (Cañadas et al., 2011). While these population figures represent the first comparatively robust estimates since the Directive came into force, they are captured from a short snapshot in time, the associated Lower and Upper 95% Confidence Limits are significantly different, and their use as descriptors for FRP require further work. The FRP for this species is therefore considered to be unknown.
2.5.01 Area estimation	The surface area estimate for range (derived from the range map referred to in 1.1.5) is used as a proxy for habitat surface area.
2.5.02 Year or period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.5.03 Method used Habitat for the species	Use of the range descriptor as a proxy for habitat is judged appropriate for this wide-ranging pelagic species.

Field label	Note
Species: 5033	**Northern bottlenose whale**
2.5.04 b) Quality of the habitat - Explain how the quality was assessed	The quality of habitat for northern bottlenose whale was determined by consideration of the relevant direct and indirect pressures thought to be acting on the species and/or its functional group, and its habitat within its natural environment. These pressures were evaluated in development of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009) using available scientific data concerning inter alia habitat use, population size, distribution and ecology, and threats to the species' protection (e.g., via natural/biological sources, human sectoral activities, management gaps, etc). Northern bottlenose whale may be subject to a number of local and/or regional environmental pressures throughout its range in Irish waters (see 2.3, 2.6; DEHLG, 2009). However based on current data available none are considered to be of sufficient spatial or temporal impact on the species to be causing a significant deterioration in overall habitat quality in Ireland from a "good" status.
2.5.05 Short-term trend - Period	The period 2001-2012 has been selected, consistent with 2.3.3.
2.5.06 Short-term trend - Trend direction	The trend for range in 2.3.4 is applied as a proxy for habitat.
2.5.07 Long-term trend - Period	A long-term trend period for this species is not considered appropriate, for reasons outlined in 2.3.3.
2.5.09 Area of suitable habitat for the species (km2)	Northern bottlenose whales have been quite widely recorded in Irish waters both historically and to the present day and the known habitats for this predominantly deep water species include waters overlying the continental slope and occasionally continental shelf waters. The Area of suitable habitat is considered to be equal to the Habitat for the species.
2.6 Main pressures - Pressure	In the development and preparation of the Conservation Plan for Cetaceans in Irish waters (DEHLG, 2009), a comprehensive review of the pressures believed and/or documented to be acting on this species and/or its functional group (i.e., threats to their protection) was undertaken. The main pressures thought to be acting on this species are considered to occur primarily on a local or regional scale and/or on a temporary or intermittent basis (e.g., impacts arising from shipping movements or seismic exploration; DEHLG, 2009). Since Northern bottlenose whale distribution is thought to be predominantly offshore Atlantic in nature, the ranking given in most cases is one of low importance. Nevertheless where a pressure may be regionally intensive the ranking given is one of medium importance due to the species' potential preference for deep Atlantic habitats, conferring greater physiological constraints on individual animals, and apparent sensitivity to underwater noise in such circumstances. It should be noted that in relation to seismic exploration, which tends to occur on a local or occasionally regional scale in the waters of Ireland's EEZ and is comparatively low in coverage relative to several other member states, a robust regulatory and management regime applies in order to avoid potentially significant impacts on all species of marine mammal. The impact on this species of changes in sea temperature and other abiotic factors in the marine environment can also not be discounted.
2.7 Threats - Threat	There is no evidence to suggest a change in the main pressures thought to be acting on this species in the near future. However surveillance of the species and the pressures potentially acting upon it will continue into the future, while the application of strong management measures (e.g., via the statutory/regulatory process) to avoid potentially significant impacts is also expected to continue.
2.8.01 Justification of % thresholds for trends	A detailed analysis of the statistical ability and power to robustly determine population trends for cetacean species occurring in western European waters is under way via the Joint Cetacean Protocol (JCP) project in the UK. This phased work is due for completion in 2013 and it will inform whether and for which species the measurement of population trends may be possible based on survey data from a range of sources.

Field label	Note
Species: 5033	**Northern bottlenose whale**
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The Northern bottlenose whale has been widely recorded in Irish waters from deep oceanic areas and those overlying the continental shelf and slope to coastal waters on occasion. Hence the Range is considered to be favourable.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	There is little evidence of post-whaling growth or further decline in the northeast Atlantic population(s) of Northern bottlenose whale, although a recent assessment of overall population size in the offshore waters of western Europe indicate that in regional terms the species could be in a healthy state. However the status, distribution and origin/stock identity of those whales occurring in Irish waters is poorly understood. Considering these key data gaps and the infrequency and inconsistency of positive sighting records from Irish waters the population parameter is considered unknown.
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The habitat for this species in Ireland is considered favourable. Northern bottlenose whales have been quite widely recorded in Irish waters both historically and to the present day and the known habitats for this predominantly deep water species include waters overlying the continental slope and occasionally continental shelf waters.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	A number of pressures have been identified. While the effect of these pressures may act on a temporary and/or regional scale and some are likely to continue to act as pressures into the future, the impacts on individuals or populations of Northern bottlenose whale in Irish waters are not well understood. This is largely due to the species' predominant occurrence far offshore and to limited data on its numbers and ecology within Ireland's marine area. While ongoing threats as listed or identified into the future via surveillance will be managed appropriately, the future prospects for the species are therefore considered to be unknown.
2.9.05 Overall assessment of Conservation Status	Based on the assessments for the Range, Population, Habitat and Future Prospects parameters, the overall conclusion is that the conservation status of Northern bottlenose whale in Ireland is considered "Unknown". This overall result is the same as in the previous Article 17 assessment due to limited ongoing information on this depleted species' population ecology in Irish waters. However improvements are reported in the assessments for the Range and Habitat parameters, due to improved knowledge.

Northern bottlenose whale - *Hyperoodon ampullatus* (5033)
Article 17 Assessment 2013



Current distribution (4 cells)
Current range (228 cells)
Favourable reference range (228 cells)

An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 25 50 75 100 km

N
Map - Léarscáil
V 1.0
Date - Dáta
11-06-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**5034**
0.2.2 Species name	**Mesoplodon europaeus**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	Gervais' beaked whale

1. National Level

1.1 Maps

1.1.1 Distribution Map	No
1.1.1a Sensitive species	No
1.1.2 Method used - map	N/A
1.1.3 Year or period	
1.1.4 Additional map	No
1.1.5 Range map	No

2. Biogeographical Or Marine Level

2.1 Biogeographical Region	**Marine Atlantic (MATL)**
2.2 Published sources	

2.3 Range

2.3.1 Surface area - Range (km²)		
2.3.2 Method - Range surface area	N/A	
2.3.3 Short-term trend period		
2.3.4 Short-term trend direction	N/A	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period		
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	
	operator	N/A
	unknown	No
	method	
2.3.10 Reason for change		

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit N/A	
	min	max
2.4.2 Population size (other than individuals)	Unit N/A	
	min	max
2.4.3 Additional information	Definition of locality	
	Conversion method	
	Problems	
2.4.4 Year or period		
2.4.5 Method – population size	N/A	
2.4.6 Short-term trend period		
2.4.7 Short term trend direction	N/A	

2.4.8 Short-term trend magnitude	min	max	confidence interval
2.4.9 Short-term trend method	N/A		
2.4.10 Long-term trend period			
2.4.11 Long term trend direction	N/A		
2.4.12 Long-term trend magnitude	min	max	confidence interval
2.4.13 Long-term trend method	N/A		
2.4.14 Favourable reference population	number		
	operator N/A		
	unknown No		
	method		
2.4.15 Reason for change			

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	
2.5.2 Year or period	
2.5.3 Method used - habitat	N/A
2.5.4 a) Quality of habitat	
2.5.4 b) Quality of habitat - method	
2.5.5 Short term trend period	
2.5.6 Short term trend direction	N/A
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	
2.5.10 Reason for change	

2.6 Main Pressures

2.6.1 Method used – pressures	N/A

2.7 Main Threats

2.7.1 Method used – threats	N/A

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant Information	
2.8.3 Trans-boundary assessment	

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment	Unknown (XX)
	qualifiers	N/A
2.9.2. Population	assessment	Unknown (XX)
	qualifiers	N/A
2.9.3. Habitat	assessment	Unknown (XX)
	qualifiers	N/A
2.9.4. Future prospects	assessment	Unknown (XX)
	qualifiers	N/A
2.9.5 Overall assessment of Conservation Status	Unknown (XX)	
2.9.6 Overall trend in Conservation Status	N/A	

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	N/A		
	min		max	
3.1.2 Method used	N/A			
3.1.3 Trend of population size within	N/A			

3.2 Conservation Measures

Article 17 - SPECIES NOTES

Field label	Note
Species: 5034	**Gervais' beaked whale**
0.1 Member State	Ireland
0.2.04 Common name	Gervais' beaked whale = Míol mór socach an tSrutha
1.1.02 Method used - map	No live records of this species have been obtained from Ireland within the current reporting round or since the Directive came into force.
2.9.05 Overall assessment of Conservation Status	Since no live records of this species have been obtained from Ireland within the current reporting round or since the Directive came into force, the conservation status of this vagrant species is assessed as unknown.

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**5046**
0.2.2 Species name	**Alosa killarnensis**
0.2.3 Alternative species scientific name	N/A
0.2.4 Common name	Killarney Shad (Sead fhallacsach Chill Airne; gabhairín Chill Airne)

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Complete survey/Complete survey or a statistically robust estimate (3)
1.1.3 Year or period	2007-2012
1.1.4 Additional map	Yes
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published sources

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Kelly, F.L., Connor, L., Morrissey, E., Wogerbauer, C., Matson, R., Feeney, R. and Rocks, K. (2012) Water Framework Directive Fish Stock Survey of Lough Leane, September 2011. Inland Fisheries Ireland, Swords Business Campus, Swords, Co. Dublin, Ireland. (http://www.wfdfish.ie/wp-content/uploads/2011/10/Leane_report1.pdf)

King, J.J. & Roche, W.K. (2000) Fish Populations in L. Leane, Killarney: Report of a fish stock survey carried out in June 1999. A report commissioned by the Lough Leane Catchment Monitoring and Management group and prepared by the Central Fisheries Board. Central Fisheries Board. Dublin.

King, J.J., Marnell, F., Kingston, N., Rosell, R., Boylan, P., Caffrey, J.M., FitzPatrick, Ú., Gargan, P.G., Kelly, F.L., O'Grady, M.F., Poole, R., Roche, W.K. & Cassidy, D. (2011) Ireland Red List No. 5:Amphibians, Reptiles & Freshwater Fish. National

Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

O' Grady, M. F. (1993) A fish stock survey of L. Leane, Co. Kerry and management recommendations for this resource. Report commissioned by Office of Public Works (Parks and Monuments Section), Central Fisheries Board.

O' Maoleidigh, N. (1990) A study of fish populations in the Killarney Lakes. Unpublished Ph.D. Thesis, National University of Ireland.

Roche, W.K. and Rosell, R.S. (2003) Killarney shad (Alosa fallax killarnensis) investigations, 2003. Unpublished report to National Parks and Wildlife Service. Central fisheries Board. Dublin.

2.3 Range

2.3.1 Surface area - Range (km²)	300	
2.3.2 Method - Range surface area	Complete survey/Complete survey or a statistically robust estimate (3)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period	1988-2012	
2.3.7 Long-term trend direction	stable (0)	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	300
	operator	N/A
	unknown	No
	method	This species is endemic to Lough leane. The suite of habitats required by the species as spawning areas, nursery and adult habitat are contained within L. Leane and are not available in the adjoining lakes. FRR is the same as the range.
2.3.10 Reason for change	Use of different method	

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	number of individuals (i)	
	min	20000	max
2.4.2 Population size (other than individuals)	Unit	N/A	
	min		max
2.4.3 Additional information	Definition of locality		
	Conversion method		
	Problems	This population estimate is based on hydroacoustic survey data, supplemented by netting surveys, from Roche and Rosell (2003). Some extrapolation was required. Estimates are further complicated by lake bathymetry; it is not possible to survey all parts of the lake. Follow up surveys would help underpin this estimate, but subsequent efforts in 2008 and 2011 were hampered by weather conditions.	
2.4.4 Year or period	2003-2011		
2.4.5 Method – population size	Estimate based on partial data with some extrapolation and/or modelling (2)		

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

2.4.6 Short-term trend period	2001-2012
2.4.7 Short term trend direction	stable (0)
2.4.8 Short-term trend magnitude	min max confidence interval
2.4.9 Short-term trend method	Estimate based on partial data with some extrapolation and/or modelling (2)
2.4.10 Long-term trend period	
2.4.11 Long term trend direction	N/A
2.4.12 Long-term trend magnitude	min max confidence interval
2.4.13 Long-term trend method	N/A
2.4.14 Favourable reference population	number 20000 operator N/A unknown No method The Favourable Reference Population from the 2007 assessment of 20,000 1+ individuals is retained. This figure was based on a comprehensive hydroacoustic survey of the lake supplemented by netting (see Roche and Rosell, 2003). Subsequent surveys of Killarney shad (in 2008 and 2011) have failed to produce a more reliable figure.
2.4.15 Reason for change	Use of different method

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	19.52
2.5.2 Year or period	2007-2012
2.5.3 Method used - habitat	Estimate based on expert opinion with no or minimal sampling (1)
2.5.4 a) Quality of habitat	Good
2.5.4 b) Quality of habitat - method	Habitat assessment is based on outcomes of surveys for WFD attributes by EPA (phytoplankton) and fish surveys by IFI.
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	stable (0)
2.5.7 Long-term trend period	
2.5.8 Long term trend direction	N/A
2.5.9 Area of suitable habitat (km²)	19.52
2.5.10 Reason for change	

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
Discharges (E03)	high importance (H)	N/A

2.6.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
invasive non-native species (I01)	high importance (H)	N/A
Discharges (E03)	high importance (H)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant Information	
2.8.3 Trans-boundary assessment	

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.9.2. Population	assessment	Favourable (FV)
	qualifiers	N/A
2.9.3. Habitat	assessment	Favourable (FV)
	qualifiers	N/A
2.9.4. Future prospects	assessment	Favourable (FV)
	qualifiers	N/A
2.9.5 Overall assessment of Conservation Status		Favourable (FV)
2.9.6 Overall trend in Conservation Status		N/A

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	number of individuals (i)		
	min	20000	max	
3.1.2 Method used	Estimate based on partial data with some extrapolation and/or modelling (2)			
3.1.3 Trend of population size within	stable (0)			

3.2 Conservation Measures

3.2.1 Measure	3.2.2 Type	3.2.3 Ranking	3.2.4 Location	3.2.5 Broad Evaluation
Legal protection of habitats and species (6.3)	Legal	high importance (H)	Inside	Long term
Other resource use measures (9.0)	Administrative	high importance (H)	Inside	Long term

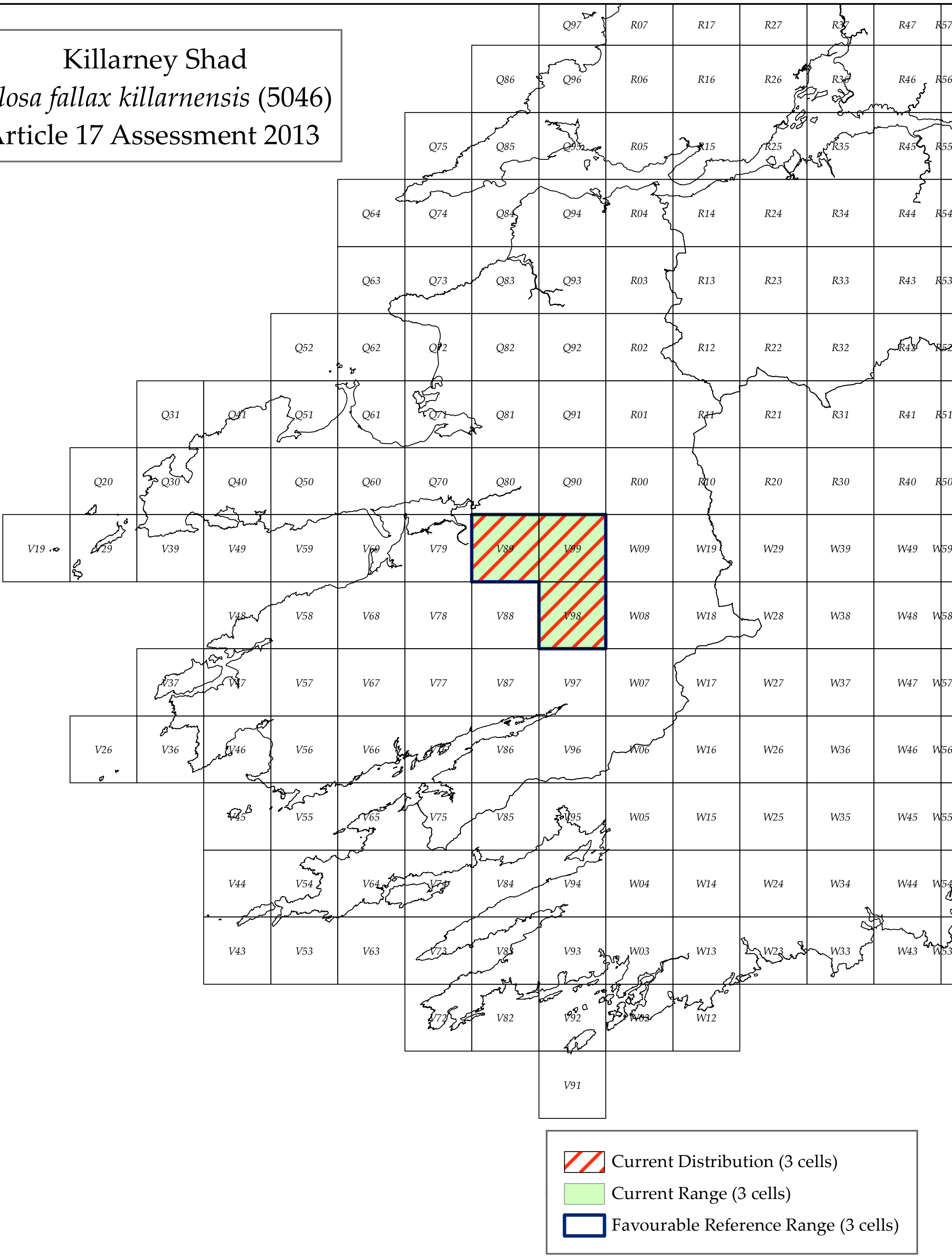
Field label	Note
Species: 5046	**Killarney Shad**
0.2.01 Species code	The Killarney shad (Alosa fallax killarnensis Regan) is unique to Ireland and is only recorded in Lough Leane in the Killarney National Park SAC. It is listed in the Irish Red Data Book (King et al 2011) as 'Vulnerable D2' – indicating a species with restricted occupancy or number of locations. The species has been the subject of investigations since the late 1980s and whole-lake surveys in the last three decades have confirmed the continued presence of the species. The Killarney shad is a member of the Alosid group of fish, members of the herring family, and it is closely related to the Twaite and Allis shads. It is non-anadromous, unlike the Twaite and Allis shads. Anecdotal reports and observations indicate that the species spawns within Lough Leane along shallow gravelled shores and on gravel shoals adjoining the various islands. The adult fish live in shoals in the lake, feeding on zooplankton. Thus the full life cycle is undertaken within the lake. The species is considered to derive from ancestral post-glacial populations that became isolated in the lake. Lough Leane has unimpeded connectivity to the transitional waters of Castlemaine Harbour via the R. Laune. There are no records of anadromous shads being taken in either the transitional or riverine waters.
1.1.01 Distribution map	This map was derived from the transformation of the map referred to in 1.1.4 to the LAEA projection.
1.1.02 Method used - map	The distribution map is based on netting surveys undertaken by IFI, most recently in 2008 and 2011.
1.1.04 Additional distribution map	All Irish records were intersected with the Irish 10km grid map to derive this additional map.
1.1.05 Range map	The species Range, based on IFI data from 2007 to 2012, is considered to equate to the surface area of Lough Leane
2.3.01 Surface area - Range	This species is only found in Lough Leane. The surface of Lough Leane intersects with 3 x 10km grid cells.
2.3.04 Short term trend - Trend direction	This population has been surveyed over three decades, most recently in 2008 and 2011. The species is found in L. Leane only and has never been found outside it. An increase in Range would require colonisation of another water, from the resident population. Neither adjoining waters - Muckross Lake or Upper Lake - is considered suitable for the species. The Range is judged to have remained stable.
2.3.07 Long-term trend - Trend direction	see 2.3.4
2.3.10 c) Reason for change - use of different method?	In the 2007 assessment, range was based on the number of 1km cells intersected. For this assessment it is necessary to present range at the 10km level. The distribution of the species in Lough Leane intersects with 3 x 10km cells.

Field label	Note
Species: 5046	**Killarney Shad**
2.4.01 a) Population size estimation (using individuals or agreed exceptions where possible) - Unit	Killarney shad were the most abundant species of fish caught in the 2003 fish survey of Lough Leane (Roche and Rosell, 2003), with a total of 166 specimens caught at 8 different locations. Both length-frequency and age-frequency investigations of these 166 fish suggested that the population showed good levels of recruitment and survival and normal growth patterns. Scale analysis revealed animals from 1+ to 8+ years, that first spawning normally occurs at age 3 in both males and females, and that multiple spawning did occur. In the 2003 survey, 52% of females and 88% of males captured were spent fish. This would suggest a normal degree of spawning success. From their hydroacoustic data, Roche and Rosell (2003) estimated that the shad population in L. Leane probably exceeds 20,000 individuals of 1+ years or older. Surveys by IFI's Water Framework Directive fish team in 2008 and 2011 involved netting surveys only, the weather conditions precluding deployment of the hydroacoustic gear and consequently the 2003 population estimate remains the most reliable.
2.4.14 a) Favourable reference population - Number of individuals/agreed exceptions/other units	The Favourable Reference Population from the 2007 assessment of 20,000 1+ individuals is retained.
2.5.01 Area estimation	The species has been recorded in a series of netting surveys, carried out by IFI (and its predecessor) in the 1990 – 2011 period as well as studies by O' Maoleidigh (1990) throughout the lake. It is considered that the entire lake (19.52km2) acts as habitat for the species. Their distribution within the lake varies diurnally in response to prey migration, but also seasonally, as they move to shallower waters to spawn. Spawning has been observed along the southeastern shoreline of Castle Bay by NPWS staff and anecdotal reports of anglers refer to spawning activity in the shallows and gravelled areas adjoining the islands immediately west of Ross Bay. Hydroacoustic surveys have recorded shoals of the species in a variety of open, deep-water areas of the lake.
2.5.04 a) Quality of the habitat - Good / moderate / bad / unknown	The quality of the habitat is considered 'Good' on the basis of water quality and physical habitat requirements of the species. Well-gravelled areas of lake bed in well-mixed areas of the waterbody are available as spawning habitat. These are adjoined by large areas of shallow littoral habitat that may be used by juvenile shad. There is extensive adult habitat in the open-water areas of the lake, including areas of considerable depth that can be used in situations of summer warming or thermocline development. The continual presence of adult fish in successive fish surveys indicates an on-going successful spawning effort. L. Leane has been subject to considerable pressure, primarily due to nutrient enrichment. This has been a repeat problem since the 1970s. However, populations of Killarney shad have been recorded in a succession of fish surveys. Most recently, Lough Leane has been assigned an ecological status of ‘Good’ based on the fish populations present. The ecological status assigned to the lake based on the 2008 survey data was also Good. In the 2007 to 2009 surveillance monitoring reporting period, the EPA assigned Lough Leane an overall ecological status of Good, based on all monitored physico-chemical and biological elements, including fish.
2.6 Main pressures - Pressure	Lough Leane is at the centre of a major tourism industry at Killarney. Tourist traffic leads to a very substantial, transient increase in human population over several months each year with a consequent pressure on water supply and an increased production of waste to be treated at the local waste water treatment works. In the past, this pressure has led to nutrient overloading to the lake with consequent eutrophication. Improvements to waste water treatment works capacity and to treatment strategies has reduced this pressure. It is notable that the Killarney shad population appears to have survived impacts of eutrophication in the 1970s and early 1980s. However, the potential for adverse impact on L. Leane from anthropogenic eutrophication particularly in combination with reduced summer water levels remains.

Field label	Note
Species: 5046	**Killarney Shad**
2.7 Threats - Threat	The seasonal explosion of human pressure in Killarney will continue to pose a eutrophication threat to the lake. Invasive non-native species pose a growing threat to Irish aquatic ecosystems. L. Leane is unique among Irish lakes in its fish community in containing a predominance of native species - Atlantic salmon, brown trout, eel, Killarney shad, arctic char - and an absence of the pike, a significant predator, and of widespread introductions - the roach or dace. The arrival of pike wold introduce a top predator into a habitat that currently lacks such functional groups among the fish community. Introduction of roach or dace would lead to significant competition with Killarney shad for zooplankton food. There would also be a likelihood of competition for spawning habitats. Other potentially significant aquatic invasives would include the molluscs Dreissena (Zebra mussel) and Corbicula (Asian clam) and a variety of crustacean species.
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Although any species restricted to a single location must be considered vulnerable to extinction (e,g, under IUCN Red List criteria), the Killarney shad is endemic to L. Leane and has never been found elsewhere, even in immediately adjacent lakes. Its range is equal to its FRR and stable and consequently this parameter is considered favourable.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Detailed surveys of Lough Leane in the 1990s, following a number of eutrophication incidents, and again in 2003 indicated a large, healthy population of Killarney shad at a wide range of locations within L. Leane. There was also good evidence of spawning and recruitment. Catch per unit effort data from surveys in 2008 and 2011 confirmed the continued presence of a large population in the lake. The population is considered to be stable and in favourable status.
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The habitat in Lough Leane for shad is considered 'Good' on the basis of water quality and physical habitat requirements of the species. Well-gravelled areas of lake bed in well-mixed areas of the waterbody are available as spawning habitat. These are adjoined by large areas of shallow littoral habitat that may be used by juvenile shad. There is extensive adult habitat in the open-water areas of the lake, including areas of considerable depth that can be used in situations of summer warming or thermocline development. Limited sampling in 2011 by IFI indicated substantial supply of zooplankton, an important food item for Killarney shad, in the areas examined. In the 2007 to 2009 surveillance monitoring reporting period, the EPA assigned Lough Leane an overall ecological status of Good, based on all monitored physico-chemical and biological elements, including fish. Most recently, Lough Leane has been assigned an ecological status of ‘Good’ based on the fish populations present.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	The fact that Killarney shad is only found in L. Leane makes it vulnerable to extinction. However, if threats from discharges and invasive alien species can be controlled successfully, it is considered that the Killarney shad has good prospects of retaining its population status in L. Leane. The current population size is robust and available habitat is good. The species has coped successfully with eutrophication incidents before and its entire range is protected within Killarney National Park.
2.9.05 Overall assessment of Conservation Status	This species is maintaining a robust population in Lough Leane and the available habitat is considered good. The species has coped successfully with eutrophication incidents before and its entire range is protected within Killarney National Park. Overall, the conservation status of this endemic fish is considered favourable.
3.1.01 a) Population size - Unit	The whole of the Killarney Shad population, estimated as 20,000 1+ individuals (Roche & Rosell, 2003), is within the Killarney National Park SAC.

Field label	Note	
Species: **5046**	**Killarney Shad**	
3.2 Conservation measures	Two important measures are identified as being pertinent to Killarney shad. The first (6.3) is the legal provisions provided for under the amended Habitats Regulations (2011). The second measure (9.0) is a local regulatory one operated by the National Parks and Wildlife Service on the Killarney Lakes. This precludes use or bringing onto the lakes of any craft without a permit from NPWS. This permitting system includes a provision that all applicants must produce documentation that their craft has been power-hosed as recently as possible locally in order to reduce opportunities for introduction of invasive aquatic organisms into the lake ecosystems.	

Killarney Shad
Alosa fallax killarnensis (5046)
Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
Department of
Arts, Heritage and the Gaeltacht

Produced by: Déanta in:
Biodiversity Monitoring Unit, Aonad Monatóireacht Bhithéagsúlachta,
National Parks and Wildlife Service, An tSeirbhís Páirceanna Náisiúnta agus Fiadhúlra

Scale - Scála
0 3.5 7 10.5 14 17.5 km

N

Map - Léarscáil
V 1.0
Date - Dáta
12-06-13

Report on the main results of the surveillance under article 11 for annex II, IV and V species (Annex B)

0.1 Member State	**IE**
0.2.1 Species code	**5076**
0.2.2 Species name	**Coregonus pollan**
0.2.3 Alternative species scientific name	Coregonus autumnalis pollan
0.2.4 Common name	Pollan (Polláin)

1. National Level

1.1 Maps

1.1.1 Distribution Map	Yes
1.1.1a Sensitive species	No
1.1.2 Method used - map	Estimate based on partial data with some extrapolation and/or modelling (2)
1.1.3 Year or period	2006-2012
1.1.4 Additional map	Yes
1.1.5 Range map	Yes

2. Biogeographical Or Marine Level

2.1 Biogeographical Region

Atlantic (ATL)

2.2 Published sources

Anonymous (2005) All Ireland Species Action Plans: Irish Lady's-tresses Spiranthes romanzoffiana, Pollan Coregonus autumnalis, Hare Lepus timidus hibernicus, Corncrake Crex crex. National Parks & Wildlife Service, Ireland and the Environment & Heritage Service, Northern Ireland.

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Harrod, C., Griffiths, D., McCarthy, T. K. & Rosell, R. (2001) The Irish Pollan, Coregonus autumnalis: options for its conservation. Journal of Fish Biology 59: 339-355.

King, J.L., Marnell, F., Kingston, N., Rosell, R., Boylan, P., Caffrey, J.M., FitzPatrick, Ú., Gargan, P.G., Kelly, F.L., O'Grady, M.F., Poole, R., Roche, W.K. & Cassidy, D. (2011) Ireland Red List No. 5: Amphibians, Reptiles & Freshwater Fish. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht, Dublin, Ireland.

Rosell R.S., Harrod, C., Griffiths, D. & Mc Carthy, T. K. (2004) Conservation of the Irish populations of the pollan Coregonus autumnalis. Biology and Environment:

Proceedings of the Royal Irish Academy. 104B, 67-72.

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Toner, P., Bowman, J., Clabby, K., Lucey, J., McGarrigle, M., Concannon, C., Clenaghan, C., Cunningham, P., Delaney, J., O'Boyle, S., MacCárthaigh, M., Craig M. & Quinn R. (2005) Water Quality in Ireland 2001-2003. EPA, Ireland.

2.3 Range

2.3.1 Surface area - Range (km²)	1800	
2.3.2 Method - Range surface area	Estimate based on partial data with some extrapolation and/or modelling (2)	
2.3.3 Short-term trend period	2001-2012	
2.3.4 Short-term trend direction	stable (0)	
2.3.5 Short-term trend magnitude	min	max
2.3.6 Long-term trend period	1988-2012	
2.3.7 Long-term trend direction	N/A	
2.3.8 Long-term trend magnitude	min	max
2.3.9 Favourable reference range	area (km²)	1800
	operator	N/A
	unknown	No
	method	The Favourable Reference Range is equal to the range. There are only three lakes which support populations of pollan. Without human intervention, the current Range and FRR are all that are available to the species.
2.3.10 Reason for change	Use of different method	

2.4 Population

2.4.1 Population size (individuals or agreed exception)	Unit	number of individuals (i)		
	min	1000	max	6000
2.4.2 Population size (other than individuals)	Unit	N/A		
	min		max	
2.4.3 Additional information	Definition of locality			
	Conversion method			
	Problems	Some hydroacoustic surveys with ground truthing by gill netting have allowed rough population estimates to be made for L. Ree and L. Allen. No such estimate is available for L. Derg.		
2.4.4 Year or period	2006-2012			
2.4.5 Method – population size	Estimate based on partial data with some extrapolation and/or modelling (2)			
2.4.6 Short-term trend period	2001-2012			
2.4.7 Short term trend direction	unknown (x)			
2.4.8 Short-term trend magnitude	min	max	confidence interval	
2.4.9 Short-term trend method	Absent data (0)			
2.4.10 Long-term trend period	1988-2012			

2.4.11 Long term trend direction	decrease (-)		
2.4.12 Long-term trend magnitude	min	max	confidence interval
2.4.13 Long-term trend method	N/A		

2.4.14 Favourable reference population	number	
	operator	N/A
	unknown	Yes
	method	Three known populations of pollan exist in Ireland on Loughs Allen, Ree and Derg. Population size has been estimated for L. Ree and L. Allen , based on hydroacoustic surveying (Harrison et al. 2012, 2012). Evidence from surveys and by-catch indicate a degree of spawning success and recruitment into these populations. Nonetheless, population size is low in each of these waters. Without further data on the ecological requirements and population biology of this species, together with information on the carrying capacity of the lakes, no estimate of how much larger the population would need to be to ensure long term viability is possible. The situation is further complicated by the potential genetic isolation of each lake population. Further genetic studies are required, but ultimately individual reference populations for each lake may be neccesary.
2.4.15 Reason for change	Use of different method	

2.5 Habitat for the Species

2.5.1 Surface area - Habitat (km²)	250
2.5.2 Year or period	2006-2012
2.5.3 Method used - habitat	Estimate based on partial data with some extrapolation and/or modelling (2)
2.5.4 a) Quality of habitat	Moderate
2.5.4 b) Quality of habitat - method	Based on literature and expert judgement in conjunction with knowledge of the lakes which support populations of pollan.
2.5.5 Short term trend period	2001-2012
2.5.6 Short term trend direction	stable (0)
2.5.7 Long-term trend period	1988-2012
2.5.8 Long term trend direction	unknown (x)
2.5.9 Area of suitable habitat (km²)	250
2.5.10 Reason for change	Improved knowledge/more accurate data

2.6 Main Pressures

Pressure	ranking	pollution qualifier(s)
diffuse pollution to surface waters due to agricultural and forestry activities (H01.05)	high importance (H)	N/A
invasive non-native species (I01)	high importance (H)	N/A

2.6.1 Method used – pressures	mainly based on expert judgement and other data (2)

2.7 Main Threats

Threat	ranking	pollution qualifier(s)
invasive non-native species (I01)	high importance (H)	N/A
Pollution to surface waters (limnic & terrestrial, marine & brackish) (H01)	high importance (H)	N/A
Water abstractions from surface waters (J02.06)	medium importance (M)	N/A

2.7.1 Method used – threats	expert opinion (1)

2.8 Complementary Information

2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant Information	Ideally, Inland Fisheries Ireland would like to create "reservoir populations" of pollan, as per the All-Ireland Species Action Plan. Efforts to secure mature adults on both Loughs Derg and Ree yielded no individuals. Mature adults were targeted at spawning time in both lakes in order to strip the adults and on-rear juveniles to create a reservoir stock population.
2.8.3 Trans-boundary assessment	

2.9 Conclusions (assessment of conservation status at end of reporting period)

2.9.1 Range	assessment	Favourable (FV)
	qualifiers	N/A
2.9.2. Population	assessment	Bad (U2)
	qualifiers	unknown (x)
2.9.3. Habitat	assessment	Inadequate (U1)
	qualifiers	unknown (x)
2.9.4. Future prospects	assessment	Inadequate (U1)
	qualifiers	unknown (x)
2.9.5 Overall assessment of Conservation Status	Bad (U2)	
2.9.6 Overall trend in Conservation Status	unknown (x)	

3. Natura 2000 coverage and conservation measures - Annex II species

3.1 Population

3.1.1 Population Size	Unit	N/A		
	min		max	
3.1.2 Method used	N/A			
3.1.3 Trend of population size within	N/A			

3.2 Conservation Measures

Field label	Note
Species: 5076	**Pollan**
0.2.01 Species code	The pollan Coregonus autumnalis pollan (Pallas, 1776) is a member of the Arctic cisco (Coregonus autumnalis) taxonomic group. The cisco is an anadromous species of whitefish that inhabits the Arctic parts of Siberia, Canada and Alaska. The pollan is found at the most southerly range of the group, with related whitefish found in isolated waters in the UK. There is argument as to its specific uniqueness, but it is clear that the pollan is unique to the Irish vertebrate fauna (Anon., 2005). The pollan is found in three large lakes of the R. Shannon main stem – L. Derg, L. Ree and L. Allen (Harrison et al., 2010). In Northern Ireland, it is found in Lower Lough Erne (Rosell, 1997) and L. Neagh. The species is considered to be extinct in L. Erne Upper. Apart from L. Neagh, the other lakes are characterized by large size and significant areas of deep water. Enrichment of these lakes, combined with thermal stratification, can lead to depletion of oxygen in the deep waters of the hypolimnion. If this occurs, pollan are squeezed between warmer surface water areas and deeper areas which, though cooler, may have reduced oxygen concentrations. L. Neagh, in contrast to the other lakes, is relatively shallow but is strongly wind-mixed. It is also highly enriched but supports a limited commercial fishery for pollan. The species feeds on a mix of plankton, insect larvae and some benthic food items, depending on site. In calm conditions in Lough Neagh they will feed on surface insects. They may make diurnal feeding movements up and down the water column in feeding. The physical isolation of the large pollan lakes contributes to the likelihood of genetic uniqueness of the populations. Spawning is considered to occur on gravelled areas in the shallow littoral on exposed lake shores in the December – January period. The pollan is considered to be a native Irish species and to have colonised after the last ice age. It has been assessed as Vulnerable (B2ab(iii, v), D2)(King et al 2011) on the basis of geographic range being restricted to small number of locations and small size of populations within these waterbodies.
1.1.01 Distribution map	This map was derived from the transformation of the map referred to in 1.1.4 to the LAEA projection.
1.1.02 Method used - map	Surveys were conducted by Inland Fisheries Ireland on L. Allen (Harrison et al 2010), L. Derg (2009, 2012) and L. Ree (Harrison et al 2012). Pollan were recorded in all of the three lakes.
1.1.04 Additional distribution map	The distribution map covers the surface area of the three lakes - L. Derg, L. Ree and L. Allen - on the R. Shannon where populations of pollan have been recorded in the period 2006 - 2012. While fish were captured at specific locations in these surveys, it is considered appropriate to include the entire waterbody, in each case, when describing distribution as the species is mobile and is likely to use a range of areas and niche habitats at different stages of its life cycle.
1.1.05 Range map	Range and Distribution are considered synonymous as the species will occupy a variety of habitats and locations during the life cycle and these habitats will be spread widely in the lake - both laterally across the waterbody and vertically within the water column. In the case of the pollan, the range in the national territory is limited to the three lakes where the species occurs - Derg, Ree and Allen - intersected with the 10km grid. The range tool was not used.
2.3.01 Surface area - Range	The surface area value is based on the combined area of the three lakes in which pollan are found (Loughs Allen, Ree and Derg). L. Allen intersects with 2 x 10km grid cells; L. Ree with 7 x 10km cells and L. Derg with 9 x 10kms grids, giving a total of 18 x 10km cells - 1,700km2.
2.3.04 Short term trend - Trend direction	The species actual range is unchanged, being present in all three major lakes of the R. Shannon main stem.

Field label	Note
Species: 5076	**Pollan**
2.3.10 c) Reason for change - use of different method?	The range in the 2007 report was based on the actual surface area of the three Shannon lakes, rather than the intersection of those lakes with the 10km grid used in the current assessment. There is no inherent difference in range or FRR between the two assessments.
2.4.01 a) Population size estimation (using individuals or agreed exceptions where possible) - Unit	Hydroacoustic fish survey data is available for two of the lakes which pollan inhabit (Loughs Allen and Ree, see references) and population sizes are estimated based on data obtained. The minimum value derives from L. Allen and the higher value from L. Ree. The hydroacoustic outputs from L. Derg in 2012 did not facilitate discrimination of pollan - suggesting a small and dispersed population in that lake.
2.4.07 Short-term trend - Trend direction	Anecdotal evidence suggests numbers of pollan declined significantly on the Shannon pre 2001 (Rosell et al 2004). It is not clear if this decline has continued into the current century or whether numbers have stabilised.The pollan in L. Allen were first recorded in 2006 and were unknown from this lake previously. This does NOT signify any trend of increase - merely a recording of what had previously existed. Sampling of by-catch over several years of the present 6-year period (2007 - 12) reported presence of young pollan at nets in Killaloe, downstream of L. Derg. This points to some degree of annual spawning success. Capture data over time on L. Erne Lower points to a substantial decline of pollan in that lake (Rosell 1997). Overall, although the longer term trend indicates decline, the recent trend is unknown.
2.4.15 c) Reason for change - use of different method	Recent surveys by IFI (Harrison et al 2012, 2012) have provided the first estimates of acutal population levels for this species; the previous assessment only referred to their being 3 populations.
2.5.01 Area estimation	The value of 250 km sq is based on the area of the three lakes.
2.5.04 b) Quality of the habitat - Explain how the quality was assessed	Based on literature on the biology and ecology of pollan the habitat available is moderate in terms of water quality. Pollan tend to inhabit cooler deeper waters during the day and remain relatively immobile; at night the fish rise and disperse to the surface waters. Mature fish require exposed gravel shores in which to spawn. A visual survey of such habitats in 2011 by IFI indicated the presence of a number of suitable spawning areas in L. Ree (IFI Habitats Report 2011). The three lakes have deep, cool sections for the fish to inhabit and also exposed gravel shores for reproduction.
2.5.06 Short-term trend - Trend direction	Although habitat quality is considered moderate there is no evidence of any loss in extent of habitat since 2001.
2.5.10 b) Reason for change - improved knowledge/more accurate data?	The current value is lower than the area quoted in 2007 (442km2) but the current value is based on more recent survey work and is believed to provide a truer reflection of the area of habitat occupied by the pollan (Harrison et al. 2010, 2012).

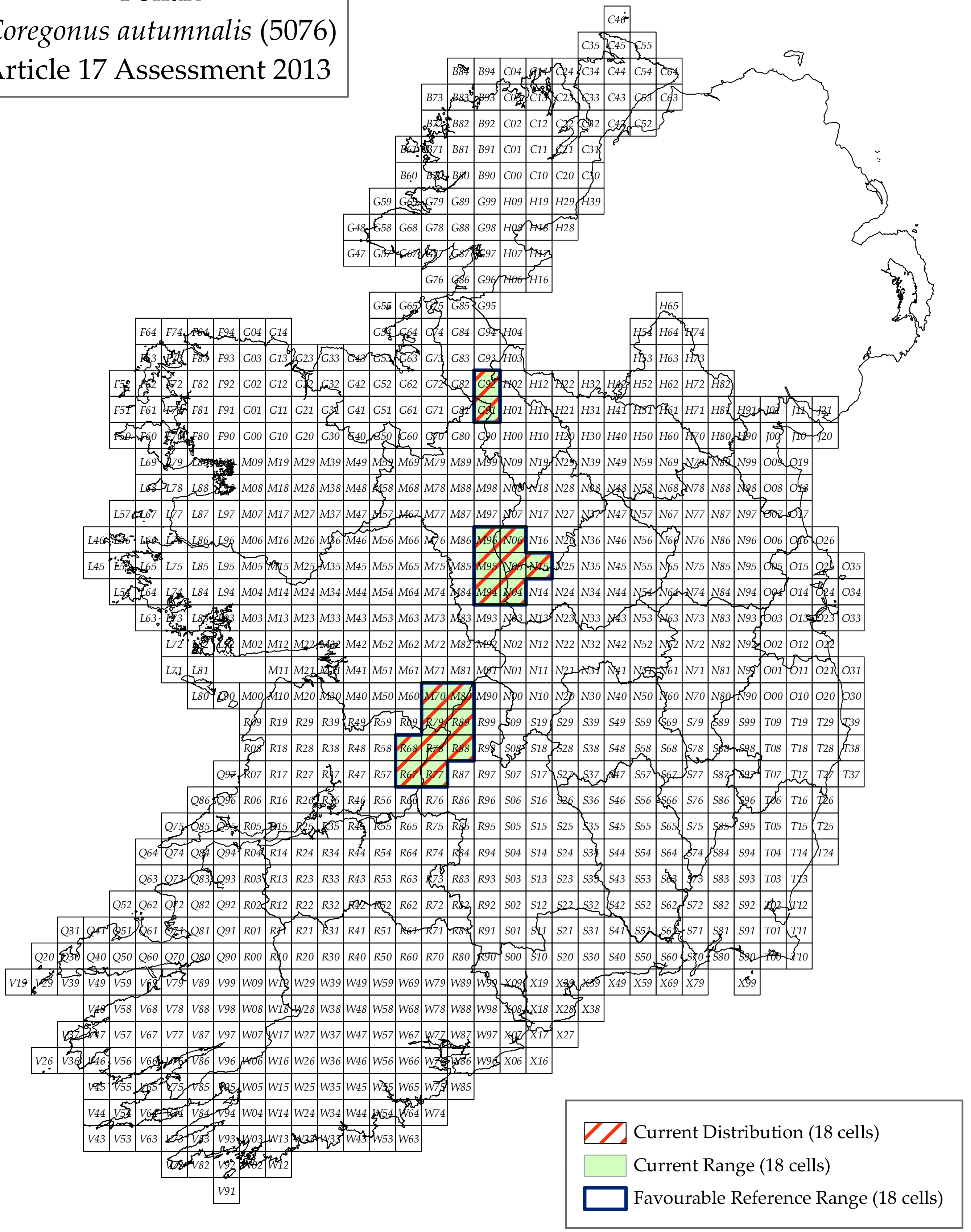
Field label	Note
Species: 5076	**Pollan**
2.6 Main pressures - Pressure	H01.05 - Pollution to surface waters Eutrophication has been cited as a factor influencing the reduced stocks of pollan. In large lakes with areas of substantial depth, stratification of the water column can occur in summer months, with the deeper water layer becoming 'separated' from the upper layer. If substantial amounts of algae and other biological material die and drop down into the deeper, unmixed layer their decomposition uses up oxygen from the water and this loss is not made good by whole-water column mixing. Oxygen concentrations in the lower, cooler layer may become depleted to the extent that pollan may have to move out of this cooler layer and are then obliged to cope with the warmer upper layers of the water column. The impact of eutrophication may impact directly on pollan as well as indirectly through its food chain. Both the pollan and one of its prime food items, the shrimp Mysis relicta, are post glacial colonisers. Both are subject to enrichment pressures and losses to Mysis populations would have a further adverse impact on pollan I01 - invasive non-native species Dreissena polymorpha has been established on the River Shannon and its lakes since the mid 1990s. Dreissena polymorpha reduces the phytoplankton, thus altering the abundance, community, composition and structure of zooplankton communities. Corbicula fluminea has been identified on the River Shannon and in Lough Derg, which poses a further pressure for pollan. The impact from introduced coarse fish, such as roach and roach-bream hybrids, will also need to be monitored closely.
2.6.01 Method used - Pressures	Knowledge of the biology and ecology of pollan in conjunction with the literature present informed the expert opinion.
2.7 Threats - Threat	The current pressure are expected to continue to pose a threat to the pollan in the future. In addition Water abstraction is considered a threat. These operations may pose a threat to pollan especially in or around spawning time. Pollan are known to spawn on gravels and stones so water abstraction may leave these shores exposed and thus the eggs dessicate. There are current proposals to abstract large volumes of water from one of the major Shannon lakes with a view to providing long-term potable supplies to the greater Dublin area.
2.7.01 Method used ? Threats	Knowledge of the biology and ecology of pollan in conjunction with the litrature present informed the expert opinion.
2.9.01 a) Range - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The current range is stable and equal to Favourable Reference Range.
2.9.02 a) Population - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	Recent hydroacoustic surveys on L. Allen and L. Ree have produced low population estimates. The population in L. Ree might be considered to be of very modest size. In comparison, the estimated population in L. Allen is very low and that of L. Derg, based on gill net groundtruthing, is likely to be smaller still. Data collected indicated that the populations were reproducing but overall numbers are very low. Focussed sampling by IFI for spawning fish in L. Derg and L. Ree during the winter spawning period 2010-11 and 2011-12 failed to record any pollan. The sampling on L. Ree followed a focussed physical habitat survey on that lake to pin-point likely spawning locations. Spawning may be confined to a very small number of areas and that may be indicative of a very small population of spawning fish. Although it is unclear how much larger the population of pollan would need to be to ensure long term viability, there is evidence that declines in the order of 80-90% have occurred since the middle of the last century (Rosell, 2004) and consequently population is considered to be Bad.

Field label	Note
Species: 5076	**Pollan**
2.9.03 a) Habitat for the species - Favourable (FV) / Inadequate (U1) / Bad (U2) / Unknown (XX)	The IFI survey of 2011 indicated a substantial number of suitable spawning grounds for pollan in L. Ree. Similar habitats were not as common In L. Derg and no assessment of habitats has been made in L. Allen to date. Based on Water Framework Directive fish community assessment, L. Ree was classified as poor/bad. Perch and roach were a substantial component of the fish community in that lake and these species may compete with pollan for zooplankton food elements. Eutrophication may contribute to reduced oxygen levels in deeper water habitats of the lake during the summer period. The habitat conditions of the three lakes may differ, with L. Allen less likely to be exposed to the same degree of nutrient enrichment as L. Derg and L. Ree. Overall, Habitat is assessed as 'inadequate' for this species.
2.9.04 a) Future prospects - Favourable (FV) / Inadequate (U1)/ Bad (U2) / Unknown (XX)	Although pollan has persisted in the Shannon lakes through previous pollution episodes, this species remains vulnerable to the direct and indirect impacts of eutrophication. The impacts of invasive species such as Dreissena and Corbicula are also a concern. In addition Water abstraction, and in particular, the current proposals to abstract large volumes of water from one of the Shannon lakes to supply the greater Dublin area, is an additional threat. Overall, future prospects are assessed as 'Inadequate'.
2.9.05 Overall assessment of Conservation Status	Although the current range for the species is considered favourable, population is assessed as Bad and both Habitat and Future Prospects are assessed as Inadequate. The Overall Assessment for Pollan is Bad.
2.9.06 Overall trend in Conservation Status	This is entered as 'unknown'. However, the indications from scientific surveys are that the populations of pollan are low in the three Shannon lakes. Pressures on these ecosystems are increasing, from such sources as invasive species, pollution/nutrient enrichment and boating pressures. All of these impact on the overall ecosystem in which the pollan lives. Climate change, with rising water temperatures, is a further, more long-term threat to pollan status.

Pollan

Coregonus autumnalis (5076)

Article 17 Assessment 2013



An Roinn
Ealaíon, Oidhreachta agus Gaeltachta
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Arts, Heritage and the Gaeltacht

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Scale - Scála

0 10 20 30 40 50 km

N

Map - Léarscáil
V 1.0
Date - Dáta
12-06-13