List of medium and high pressures and threats identified for each species covered under Lewis et al. (2019; Lewis, L. J., Burke, B., Fitzgerald, N., Tierney, T. D. & Kelly, S. (2019) Irish Wetland Bird Survey: Waterbird Status and Distribution 2009/10-2015/16. Irish Wildlife Manuals, No. 106). Only high and medium pressures and threats are included in this supplementary file, as per reporting requirements under Article 12 of the Birds Directive. Document finalised 31st May 2019.

Species code	Species	Pressure/ Threat Code	Pressure/Threat name	P/T	Pressure Rank	Pressure Location	Threat Rank	Threat Location	Sources/References	Rationale/Notes
A054	*Anas acuta*	D01	Wind, wave and tidal power, including infrastructure	T			M	Inside the Member State	DCENR (2010) Strategy for Renewable Energy: 2012 – 2020. Strategy Document. Department of Communications, Energy and Natural Resources, Dublin. Government of Ireland (2018) National Planning Framework – Project Ireland 2040. Government of Ireland, Dublin.	Scored on best expert opinion. Exploitation of renewable energy on land and offshore is a high priority for Ireland in the coming years that will see significant increases in the number of terrestrial and offshore windfarms, with wave and tidal energy to follow. The EU Renewable Energy Directive (2009/28/EC) requires the EU to meet 20+% of energy needs with renewables by 2020; the target for Ireland has been set at 16% renewable by 2020. The National Renewable Energy Action Plan (DCENR 2010) has set out strategies for Ireland to meet the 16% target by 2020, the first of which is "Progressively more renewable electricity from onshore and offshore wind power for the domestic and export markets". In the recent National Planning Framework 'Ireland 2040', exploitation of our terrestrial and offshore renewable energy potential was repeatedly highlighted as a priority.
A054	*Anas acuta*	F07	Sports, Tourism & Leisure Activities	PT	M	Inside the Member State	M	Inside the Member State	EU (2007) Management plan for Pintail Anas acuta 2007-2009. Madsen, J. & Pihl, S. 1993. Hunting- and disturbance-free refuges for waterbirds in Denmark. Danish National Environmental Research Institute Technical Report 72. 135pp. (In Danish). Cutts, N., Phelps, A. & Burdon, D. (2009) Construction and waterfowl - defining sensitivity, response, impacts and guidance. Report to Humber INCA.	Disturbance from humans walking with/without dogs is consistently found to the most disturbing activity at sites during assessments undertaken for SPA conservation objectives. Disturbance from shooting/hunting likely an issue at specific wetlands. Greenways, cycleways, walkways and similar access routes near important wintering waterbird sites are in various stages of the design, plan and consenting process in a number of locations around Ireland at present, including the Boyne Estuary, different parts of Dublin Bay, Wicklow coast, Wexford Harbour, Rosslare to Waterford, Waterford, Inch Island to Derry and more. If not adequately evaluated and developed these may cause significant increases in disturbance to wintering waterbirds. Recreation/tourism disturbance of staging and wintering Pintail is considered of significance in several countries (EU Man Plan). As a highly aggregated species both during migration and on the wintering grounds, Madsen & Pihl (1993) consider the species highly sensitive to disturbance. O'Donoghue & Gittings (2014) carried out a literature review of the potential impacts of pedestrian disturbance to waterbirds and found that Pintail may have higher levels of sensitivity to disturbance than most other species.
A054	*Anas acuta*	F28	Modification of flooding regimes, flood protection for residential or recreational development	T			M	Inside the Member State		Flooding in recent years has put flood defences high on the agenda across the country, with some coastal works under construction and plans to modify rivers, lakes and turloughs in the midlands, which may impact waterbirds in these areas. Given a precautionary 'medium' threat scoring. Cumulative impacts may be of particular concern.
A054	*Anas acuta*	G07	Hunting	PT	M	Inside the Member State	M	Inside the Member State	EU (2007) Management plan for Pintail Anas acuta 2007-2009.	A species on the open season list therefore this constitutes a direct pressure upon the population. Note that bag numbers are not mandatory and therefore not collated in Ireland, meaning it is not possible to quantify the extent of this pressure/threat on the population.
A054	*Anas acuta*	N01	Temperature changes (e.g. rise of temperature & extremes) due to climate change	PT	M	Both inside and outside the EU	M	Both inside and outside the EU	Pavón-Jordán, et al. (2018/2019) Short- and long-term changes in the distribution of abundances linked to variation in winter weather conditions in Europe differ between species with different habitat preferences. Diversity and Distributions.	Research by Pavon-Jordan et al (2018) indicates that shallow-water species such as Pintail have exhibited a NE shift in distribution in Europe in response to higher NAO index values.
A052	*Anas crecca*	D01	Wind, wave and tidal power, including infrastructure	T			M	Inside the Member State	DCENR (2010) Strategy for Renewable Energy: 2012 – 2020. Strategy Document. Department of Communications, Energy and Natural Resources, Dublin. Government of Ireland (2018) National Planning Framework – Project Ireland 2040. Government of Ireland, Dublin.	Scored on best expert opinion. Exploitation of renewable energy on land and offshore is a high priority for Ireland in the coming years that will see significant increases in the number of terrestrial and offshore windfarms, with wave and tidal energy to follow. The EU Renewable Energy Directive (2009/28/EC) requires the EU to meet 20+% of energy needs with renewables by 2020; the target for Ireland has been set at 16% renewable by 2020. The National Renewable Energy Action Plan (DCENR 2010) has set out strategies for Ireland to meet the 16% target by 2020, the first of which is "Progressively more renewable electricity from onshore and offshore wind power for the domestic and export markets". In the recent National Planning Framework 'Ireland 2040', exploitation of our terrestrial and offshore renewable energy potential was repeatedly highlighted as a priority.
A052	*Anas crecca*	F07	Sports, Tourism & Leisure Activities	PT	M	Inside the Member State	M	Inside the Member State	Cutts, N., Phelps, A. & Burdon, D. (2009) Construction and waterfowl - defining sensitivity, response, impacts and guidance. Report to Humber INCA. O'Donoghue, P.D. & Gittings, T. (2014) Presentation of geospatial data relating to the use of Cork Harbour by wintering waterbirds & a literature review of published data relating to waterbirds and disturbance. Unpublished Report prepared for Cork County Council.	Disturbance from humans walking with/without dogs is consistently found to the most disturbing activity at sites during assessments undertaken for SPA conservation objectives. Disturbance from shooting/hunting likely an issue at specific wetlands. Greenways, cycleways, walkways and similar access routes near important wintering waterbird sites are in various stages of the design, plan and consenting process in a number of locations around Ireland at present, including the Boyne Estuary, different parts of Dublin Bay, Wicklow coast, Wexford Harbour, Rosslare to Waterford, Waterford, Inch Island to Derry and more. If not adequately evaluated and developed these may cause significant increases in disturbance to wintering waterbirds. Various published resources point to the impact caused by nautical and other recreational activities. T. considered quite sensitive by some studies (e.g. Pease et al. 2005). Studies reviewed by Cutts et al (2009) assign Teal as a moderate risk species. O'Donoghue & Gittings (2014) carried out a literature review of the potential impacts of pedestrian disturbance to waterbirds and found that Teal may have higher levels of sensitivity to disturbance than most other species. In some areas, demand for increased access to lakes and river banks for angling reducing availability of areas to rest and feed undisturbed.
A052	*Anas crecca*	F28	Modification of flooding regimes, flood protection for residential or recreational development	T			M	Inside the Member State		Flooding in recent years has put flood defences high on the agenda across the country, with some coastal works under construction and plans to modify rivers, lakes and turloughs in the midlands, which may impact waterbirds in these areas. Given a precautionary 'medium' threat scoring. Cumulative impacts may be of particular concern.
A052	*Anas crecca*	G07	Hunting	PT	M	Inside the Member State	M	Inside the Member State	Wildlife (Wild Birds) (open Seasons) Orders 1979 to 2012. (S.I 402 of 2012)	A species on the open season list therefore this constitutes a direct pressure upon the population. Note that bag numbers are not mandatory and therefore not collated in Ireland, meaning it is not possible to quantify the extent of this pressure/threat on the population.

A053	*Anas platyrhynchos*	D01	Wind, wave and tidal power, including infrastructure	T			M	Inside the Member State	DCENR (2010) Strategy for Renewable Energy: 2012 – 2020. Strategy Document. Department of Communications, Energy and Natural Resources, Dublin. Government of Ireland (2018) National Planning Framework – Project Ireland 2040. Government of Ireland, Dublin.	Scored on best expert opinion. Exploitation of renewable energy on land and offshore is a high priority for Ireland in the coming years that will see significant increases in the number of terrestrial and offshore windfarms, with wave and tidal energy to follow. The EU Renewable Energy Directive (2009/28/EC) requires the EU to meet 20+% of energy needs with renewables by 2020; the target for Ireland has been set at 16% renewable by 2020. The National Renewable Energy Action Plan (DCENR 2010) has set out strategies for Ireland to meet the 16% target by 2020, the first of which is "Progressively more renewable electricity from onshore and offshore wind power for the domestic and export markets". In the recent National Planning Framework 'Ireland 2040', exploitation of our terrestrial and offshore renewable energy potential was repeatedly highlighted as a priority.
A053	*Anas platyrhynchos*	F07	Sports, Tourism & Leisure Activities	PT	M	Inside the Member State	M	Inside the Member State	Cutts, N., Phelps, A. & Burdon, D. (2009) Construction and waterfowl - defining sensitivity, response, impacts and guidance. Report to Humber INCA.	Disturbance from humans walking with/without dogs is consistently found to the most disturbing activity at sites during assessments undertaken for SPA conservation objectives. Disturbance from shooting/hunting likely an issue at specific wetlands. Species less sensitive than some others and show a degree of habituation hence low impact score assigned. In some areas, demand for increased access to lakes and river banks for angling reducing availability of areas to rest and feed undisturbed (J. Lynch, pers. comm.) Species also very widespread, therefore a lower impact score assigned than for other ducks.
A053	*Anas platyrhynchos*	F28	Modification of flooding regimes, flood protection for residential or recreational development	T			M	Inside the Member State		Flooding in recent years has put flood defences high on the agenda across the country, with some coastal works under construction and plans to modify rivers, lakes and turloughs in the midlands, which may impact waterbirds in these areas. Given a precautionary 'medium' threat scoring. Cumulative impacts may be of particular concern.
A053	*Anas platyrhynchos*	G07	Hunting	PT	M	Inside the Member State	M	Inside the Member State	Wildlife (Wild Birds) (open Seasons) Orders 1979 to 2012. (S.I 402 of 2012)	A species on the open season list therefore this constitutes a direct pressure upon the population. Note that bag numbers are not mandatory and therefore not collated in Ireland, meaning it is not possible to quantify the extent of this pressure/threat on the population.
A395	*Anser albifrons flavirostris*	A02	Conversion from one type of agricultural land use to another (excluding drainage and burning)	T			M	Inside the Member State		Changes to crops at key feeding sites has the potential to impact many flocks throughout the country, depending on crop type and spatial and temporal extent of change. Low impact but widespread issue.
A395	*Anser albifrons flavirostris*	B01	Conversion to forest from other land uses, or afforestation (excluding drainage)	T			M	Inside the Member State	Lewis, L., Cummins, S., Crowe, O., Duggan, O., Lusby, J. (2018) Bird Sensitivity Mapping for Forestry - a tool and guidance for strategic planning of new forestry in Ireland. Phase 1 - Scoping. BirdWatch Ireland, Wicklow.	Already problematic in Connemara, Mayo, Midland lakes, South Slob and elsewhere. Classified as high due to potential threat in the future. Many 'down-country' flocks utilise somewhat marginal agricultural land, which has been targeted for forestry in recent years, so future loss of NW sites in these areas could seriously impact the range of this species in Ireland. Assigned a 'High' Risk score by Lewis et al. 2018. Note that, with forestry, there is the potential for both direct and indirect habitat loss, the latter where the presence of forestry near an existing feeding site puts the Geese off feeding there.
A395	*Anser albifrons flavirostris*	D01	Wind, wave and tidal power, including infrastructure	T			M	Inside the Member State	Alerstam, T., Gudmundsson, G.A., Jonsson, P.E., Karlsson, J., Lindstrom, Á. (1990) Orientation, Migration Routes and Flight Behaviour of Knots, Turnstones and Brant Geese Departing from Iceland in Spring. Arctic, 48: 3, 201-214. Burke B, Egan F, Wilson HJ, Norriss and A Walsh (in prep) A review of the Greenland White-fronted Geese in Ireland 1982/83 – 2011/12. Unpublished report for NPWS, Dublin. Griffin, L., Rees, E. & Hughes, B. 2011. Migration routes of Whooper Swans and geese in relation to wind farm footprints: Final report. WWT, Slimbridge. 87 pp. Tierney, N., Murray, A., Cummins, S., Egan, S. & Lauder, A. (2012) Bird Sensitivity Map for Ireland: a tool to aid planning and conservation in relation to Wind Energy. BirdWatch Ireland, Wicklow. Langston, R.H.W. & Pullan, J.D. 2003 Windfarms and birds: an analysis of the effects of wind farms on birds, and guidance on environmental assessment criteria and site selection issues. Krijgsveld, K. (2014). Avoidance Behaviour of Birds around Offshore Wind Farms: Overview of Knowledge Including Effects of Configuration. Report by Bureau Waardenburg bv. pp 35.	A number of windfarms have been constructed (Connemara, Cahore), proposed and planned for the near future both beside and between the ranges of a number of Greenland White-fronted flocks. SPAs are protected areas, but potential for impact from windfarms etc away from protected sites when geese moving to grassland feeding sites etc. Data from GPS-tagged White-fronts (Weegman et al.) is in agreement with the published literature in finding that most wildfowl fly (and migrate) at altitudes between 50-150m. Three tag fixes from Geese at Wexford found the birds at heights of 47, 53 and 63 metres and 12 of 15 fixes (of GWFG in flight) currently available found the birds at heights under 150m. A proposed windfarm between Lough Iron and Glen Lake (Midland Lakes flock) would have turbines up to 184m high, and a windfarm near Lough Croan and the River Suck would have turbines up to 135 high. Furthermore, a number of large windfarms are proposed for the midlands that could be on the migration path used by Geese moving to and from Wexford. Therefore the increased number of windfarm developments in Ireland in the coming years are likely to pose a significant risk to GWFG on migration and moving between sites during the overwintering period (See Alerstam et al., 1990; Burke et al., 2013; Griffin et al., 2011; Langston & Pullan, 2003). Post-construction monitoring data/results largely lacking in Ireland and elsewhere.
A395	*Anser albifrons flavirostris*	D06	Transmission of electricity and communications (cables)	T			M	Inside the Member State	Stroud, D.A., Fox, A.D., Urquhart, C. & Francis, I.S. (compilers). 2010. International Single Species Action Plan for the conservation of the Greenland White-fronted Goose Anser albifrons flavirostris, 2010-2020. AEWA Technical Series No. XX. Bonn, Germany. Natura (2012) Ecology guidelines for electricity transmission projects: a standard approach to ecological impact assessment of high voltage transmission projects. Eirgrid 2012.	Collision (e.g. power lines). Unknown and little reported in Ireland. But as these birds are large and not particularly manoeuvrable (in comparison with other birds) it remains a threat. Eirgrid report (Natura 2012) list swans and geese species as high susceptibility to collision with powerlines. Note the lack of any systematic data collection for avian collisions with powerlines. The opportunity for an electrical link with France (Celtic Interconnector) was identified in EirGrids 'Interconnector Economic Feasibility Report' (2009). It is currently in the planning phase with a decision to be made in 2020/2021. The electricity networks in Northern Ireland and the Republic of Ireland are also due to be connected via the North/South Interconnector. There will be a lot of associated infrastructure with these interconnectors, including overhead powerlines across many counties.
A395	*Anser albifrons flavirostris*	E01	Roads, Paths, Railroads and Related Infrastructure (e.g. Bridges, Viaducts, Tunnels)	T			M	Inside the Member State		Attempts in the past to install boardwalk pathway on important feeding site in Killarney National park - has the potential to impact last remaining flock in the south-west. Species avoids busy paths and roadways etc, so any increased traffic or infrastructure likely to cause significant disturbance. Proposed Greenway around Wexford Harbour has similar potential to disturb the species at their largest wintering site.
A395	*Anser albifrons flavirostris*	F01	Conversion from other land uses to housing, settlement or recreational areas (excluding drainage and modification of coastline, estuary or coastal conditions)	T			M	Inside the Member State		Housing estates built beside Creggana Marsh in the past. Similar could happen beside or on other important feeding and roost sites; significantly increasing disturbance and with possible loss of habitat. There is currently some proposed housing developments within feeding range of some NW flock.

A395	*Anser albifrons flavirostris*	F07	Sports, Tourism & Leisure Activities	PT	M	Inside the Member State	H	Inside the Member State	Burke B, Egan F, Wilson HJ, Norriss and A Walsh (2013) A review of the Greenland White-fronted Geese in Ireland 1982/83 – 2011/12. Unpublished report for NPWS, Dublin.	People walking, sometimes with dogs off the leash, horse-riding, cycling etc. are all causes of disturbance to Goose flocks. Impacts Geese on a number of sites throughout the country. Duck shooting on rivers/lakes and other wetland sites is a significant cause of disturbance to many flocks from the time of arrival to the end of January. The disturbance causes some flocks to completely avoid certain feeding areas until the shooting season is over (e.g. North Lough Ree flocks avoids Rinanny). Reported country-wide. Use of boats during shooting adds to the disturbance. Disturbance by birdwatchers has been noted at least one flock. Greenways, cycleways, walkways and similar access routes near important wintering waterbird sites are in various stages of the design, plan and consenting process in a number of locations around Ireland at present, including the Boyne Estuary, different parts of Dublin Bay, Wicklow coast, Wexford Harbour, Rosslare to Waterford, Waterford, Inch Island to Derry and more. If not adequately evaluated and developed these may cause significant increases in disturbance to wintering waterbirds.
A395	*Anser albifrons flavirostris*	G01	Marine Fish and Shellfish Harvesting (Professional, Recreational) causing reduction of species/prey populations and disturbance of species	T			M	Inside the Member State		Bottom-grown mussels at Wexford Harbour. Currently diurnal harvesting is undertaken, where roughly 70% of the Irish population of NW roost at night. If harvesting continues after dark this has the potential to significantly impact on a large proportion of the population.
A395	*Anser albifrons flavirostris*	G10	Illegal Shooting/Killing	PT	M	Both inside and outside the EU	M	Both inside and outside the EU	Stroud, D.A., Fox, A.D., Urquhart, C.M., Francis, I.M. (compilers) (2012) International Single Species Action Plan for the conservation of the Greenland White-fronted Goose Anser albifrons flavirostris. AEWA Technical Series No. XX, Germany. 89 pp.	Hunting of NW is illegal in Ireland, but a small number of poaching incidents have come to light in recent years, and many incidents are likely to go unnoticed and unreported. A similar ban is in place in Iceland but over 1,000 Greenland White-fronted geese are known to have been shot during the previous reporting period, reported as mistakenly shot(See Stroud et al., 2012)
A395	*Anser albifrons flavirostris*	J02	Mixed Source Marine Water Pollution (Marine and Coastal)	T			H	Inside the Member State	McGarrigle, M., Lucey, J., Ó Cinnéide (2010) Water Quality in Ireland 2007-2009. Environmental Protection Agency, Wexford.	No recent figures available for offshore water pollution incidents around the Irish coast, but figures from 2007-2009 assessment by the EPA (McGarrigle et al., 2010) highlight the possibility and risk of future incidents. All marine pollution was considered including the threat of oil spills. No specific Irish studies so scores were based on best expert opinion. An incident near Wexford could potentially result in the majority of the Irish flock being exposed to oil when at roost; and would have a significant impact on the Irish and global population.
A043	*Anser anser*	A02	Conversion from one type of agricultural land use to another (excluding drainage and burning)	T			M	Inside the Member State		Species largely distributed across agricultural habitats which may be subject to habitat modifications that do not suit the geese (e.g. tree planting on field boundaries, field divisions, crop changes). Recent changes at Inch Island are noteworthy.
A043	*Anser anser*	D06	Transmission of electricity and communications (cables)	T			M	Inside the Member State	Natura (2012) Ecology guidelines for electricity transmission projects: a standard approach to ecological impact assessment of high voltage transmission projects. Eirgrid 2012.	Collision (e.g. power lines). Unknown and little reported in Ireland. But as these birds are large and not particularly manoeuvrable (in comparison with other birds) it remains a threat. Eirgrid report (Natura 2012) list swans and geese species as high susceptibility to collision with powerlines. Note the lack of any systematic data collection for avian collisions with powerlines. The opportunity for an electrical link with France (Celtic Interconnector) was identified in EirGrids 'Interconnector Economic Feasibility Report' (2009). It is currently in the planning phase with a decision to be made in 2020/2021. The electricity networks in Northern Ireland and the Republic of Ireland are also due to be connected via the North/South Interconnector. There will be a lot of associated infrastructure with these interconnectors, including overhead powerlines across many counties.
A043	*Anser anser*	F07	Sports, Tourism & Leisure Activities	PT	M	Inside the Member State	M	Inside the Member State		Disturbance from humans walking with/without dogs is consistently found to the most disturbing activity at sites during assessments undertaken for SPA conservation objectives. Disturbance from shooting/hunting likely an issue at specific wetlands. Greenways, cycleways, walkways and similar access routes near important wintering waterbird sites are in various stages of the design, plan and consenting process in a number of locations around Ireland at present, including the Boyne Estuary, different parts of Dublin Bay, Wicklow coast, Wexford Harbour, Rosslare to Waterford, Waterford, Inch Island to Derry and more. If not adequately evaluated and developed these may cause significant increases in disturbance to wintering waterbirds.
A043	*Anser anser*	F08	Modification of coastline, estuary and coastal conditions for development, use and protection of residential, commercial, industrial and recreational infrastructure and areas (including sea defence or coast protection works and infrastructures)	T			M	Inside the Member State	Brennan, Michael, Hochstrasser, Tamara, Shahumyan, Harutyun : Simulated future development of the Greater Dublin Area: consequences for protected areas and coastal flooding risk. Journal of Irish Urban Studies, 9 2010-12, pp.31-51. Duriez, O., Bruno, J.E., Choquet, R., Pradel, R., Klaassen, M. (2012) Comparing the seasonal survival of resident and migratory oystercatchers: carry-over effects of habitat quality and weather conditions. Oikos 121: 862-873.	Modification of coastline to prevent flooding and/or erosion is ongoing in a number of counties and likely to be carried out at new locations in the coming years. Development of coastal areas for commercial, residential, industrial and recreational purposes also increasing at present e.g. industrial development at Cork Harbour. A study by Brennan et al (2010), modelling future urban expansion in the greater Dublin area, highlighted the significant environmental impacts on protected areas (SPA, SAC) and other areas of high biodiversity to be expected if current trends of urban development continue – particularly in coastal regions. Coastal feeding sites e.g. Lurgangreen in Dundalk, are vulnerable to development and would have a significant impact on GJ in that part of the country should they be lost.
A043	*Anser anser*	G07	Hunting	PT	H	Outside the EU	H	Outside the EU	Frederiksen, M., Hearn, R. D., Mitchell, C., Sigfússon, A., Swann, R. L. and Fox, A. D. (2004), The dynamics of hunted Icelandic goose populations: a reassessment of the evidence. Journal of Applied Ecology, 41: 315–334. doi: 10.1111/j.0021-8901.2004.00886.x Hearn, RD & CR Mitchell. 2004. Greylag Goose Anser anser (Iceland population) in Britain and Ireland 1960/61 – 1999/2000. Waterbird Review Series, The Wildfowl & Wetlands Trust/Joint Nature Conservation Committee, Slimbridge. Greylag Goose bag numbers in Iceland available via Statistics Iceland at https://statice.is/	40,000+ Greylags have been harvested in Iceland in recent years, constituting a direct pressure on the population. (Hunting stats available via Statistics Iceland)
A040-B	*Anser brachyrhynchus*	D06	Transmission of electricity and communications (cables)	T			M	Inside the Member State	Natura (2012) Ecology guidelines for electricity transmission projects: a standard approach to ecological impact assessment of high voltage transmission projects. Eirgrid 2012.	Collision (e.g. power lines). Unknown and little reported in Ireland. But as these birds are large and not particularly manoeuvrable (in comparison with other birds) it remains a threat. Eirgrid report (Natura 2012) list swans and geese species as high susceptibility to collision with powerlines. Species occurs in Ireland in small numbers and with very scattered distribution, so little currently known about them but any one pressure or threat unlikely to impact current Irish wintering population to any large degree. Note the lack of any systematic data collection for avian collisions with powerlines. The opportunity for an electrical link with France (Celtic Interconnector) was identified in EirGrids 'Interconnector Economic Feasibility Report' (2009). It is currently in the planning phase with a decision to be made in 2020/2021. The electricity networks in Northern Ireland and the Republic of Ireland are also due to be connected via the North/South Interconnector. There will be a lot of associated infrastructure with these interconnectors, including overhead powerlines across many counties.

A169	*Arenaria interpres*	D01	Wind, wave and tidal power, including infrastructure	T			M	Inside the Member State	Percival, S. (2001). Assessment of the effects of off-shore wind farms on birds. ETSU Report W/13/00565/REP. DCENR (2010) Strategy for Renewable Energy: 2012 – 2020. Strategy Document. Department of Communications, Energy and Natural Resources, Dublin.	Most published literature concludes little determinable impacts of wind farms upon waders, nevertheless a risk is present especially during periods of migration, small-scale movements and e.g. during periods of movements en-masse (e.g. cold weather events). Birds are afforded a high degree of protection within SPA's, but areas outside/between SPA's are afforded much less protection. Percival (2001) notes that risk of collision with migrant waterfowl (i.e. wildfowl and wading birds) should be low/negligible if the wind farm is located several kilometres offshore. Exploitation of renewable energy on land and offshore is a high priority for Ireland in the coming years that will see significant increases in the number of terrestrial and offshore windfarms, with wave and tidal energy to follow. The EU Renewable Energy Directive (2009/28/EC) requires the EU to meet 20+% of energy needs with renewables by 2020; the target for Ireland has been set at 16% renewable by 2020. The National Renewable Energy Action Plan (DCENR 2010) has set out strategies for Ireland to meet the 16% target by 2020, the first of which is "Progressively more renewable electricity from onshore and offshore wind power for the domestic and export markets". In the recent National Planning Framework 'Ireland 2040', exploitation of our terrestrial and offshore renewable energy potential was repeatedly highlighted as a priority.
A169	*Arenaria interpres*	F07	Sports, Tourism & Leisure Activities	PT	M	Inside the Member State	M	Inside the Member State	Lewis, L.J., Adcock, T. (2017) An assessment of the effects of kitesurfing and other activities on the waterbirds using DOllymount Strand. BirdWatch Ireland, Wicklow. Cutts, N., Phelps, A. & Burdon, D. (2009) Construction and waterfowl - defining sensitivity, response, impacts and guidance. Report to Humber INCA. Burton, N.H.K. & Evans, P.R. 1997. Survival and winter site-fidelity of Turnstones Arenaria interpres and Purple Sandpipers Calidris maritima in north-east England. Bird Study 44: 35-44.	Disturbance from humans walking with/without dogs is consistently found to the most disturbing activity at sites during assessments undertaken for SPA conservation objectives. Disturbance from shooting/hunting likely an issue at specific wetlands. Greenways, cycleways, walkways and similar access routes near important wintering waterbird sites are in various stages of the design, plan and consenting process in a number of locations around Ireland at present, including the Boyne Estuary, different parts of Dublin Bay, Wicklow coast, Wexford Harbour, Rosslare to Waterford, Waterford, Inch Island to Derry and more. If not adequately evaluated and developed these may cause significant increases in disturbance to wintering waterbirds. Lewis & Adcock (2017) found that waterbird activity decreased as recreational disturbance (walkers, dogs, kite surfers etc) increased on Dollymount Strand (Dublin Bay). Cutts et al (2009) assign TT as a high risk species in terms of disturbance and document several studies where numbers have declined as a result of increased human activity. Roost sites particularly vulnerable - highly site faithful and studies have shown numbers to decline when disturbance increases near a roost site Burton & Evans (1997).
A169	*Arenaria interpres*	F08	Modification of coastline, estuary and coastal conditions for development, use and protection of residential, commercial, industrial and recreational infrastructure and areas (including sea defence or coast protection works and infrastructures)	T			M	Inside the Member State	Burton, N.H.K., Rehfisch, M.M., Clark, N.A. & Dodd, S.G. (2006) Impacts of sudden winter habitat loss on the body condition and survival of redshank Tringa totanus. Journal of Applied Ecology 43: 464-473. Brennan, Michael, Hochstrasser, Tamara, Shahumyan, Harutyun : Simulated future development of the Greater Dublin Area: consequences for protected areas and coastal flooding risk. Journal of Irish Urban Studies, 9 2010-12, pp.31-51. Duriez, O., Bruno, J.E., Choquet, R., Pradel, R., Klaassen, M. (2012) Comparing the seasonal survival of resident and migratory oystercatchers: carry-over effects of habitat quality and weather conditions. Oikos 121: 862-873.	Modification of coastline to prevent flooding and/or erosion is ongoing in a number of counties and likely to be carried out at new locations in the coming years. Development of coastal areas for commercial, residential, industrial and recreational purposes also increasing at present e.g. industrial development at Cork Harbour. A study by Brennan et al (2010), modelling future urban expansion in the greater Dublin area, highlighted the significant environmental impacts on protected areas (SPA, SAC) and other areas of high biodiversity to be expected if current trends of urban development continue – particularly in coastal regions. Duriez et al. (2012) found that habitat changes in the Dutch wintering grounds of Oystercatchers caused a reduction in food stocks, leading to a long-term reduction in survival rates. Burton et al. (2006) found that redshank displaced redshank had difficulty maintaining mass in the first winter after displacement, with reduced survival rates as a result. These studies indicate the potential impacts on wader populations of wintering habitat loss, or displacement from previously relied-upon wintering habitat.
A169	*Arenaria interpres*	N04	Sea-level and wave exposure changes due to climate change	T			M	Inside the Member State	Crowe, O., Lewis, L. J. & Anthony, S. (2013) Impacts of sea level rise on the birds and biodiversity of key coastal wetlands. Report to the Environmental Protection Agency. Draft. Austin, G. (2010) Waterbirds in MCCIP Annual Report Card 2010-11, MCCIP Science Review, 7pp. www.mccip.org.uk/arc	Climate change/sea level rise, considered high risk by Crowe et al (2013) as distribution is wholly intertidal.
A059	*Aythya ferina*	D01	Wind, wave and tidal power, including infrastructure	T			M	Inside the Member State	DCENR (2010) Strategy for Renewable Energy: 2012 – 2020. Strategy Document. Department of Communications, Energy and Natural Resources, Dublin. Government of Ireland (2018) National Planning Framework – Project Ireland 2040. Government of Ireland, Dublin.	Scored on best expert opinion. Exploitation of renewable energy on land and offshore is a high priority for Ireland in the coming years that will see significant increases in the number of terrestrial and offshore windfarms, with wave and tidal energy to follow. The EU Renewable Energy Directive (2009/28/EC) requires the EU to meet 20+% of energy needs with renewables by 2020; the target for Ireland has been set at 16% renewable by 2020. The National Renewable Energy Action Plan (DCENR 2010) has set out strategies for Ireland to meet the 16% target by 2020, the first of which is "Progressively more renewable electricity from onshore and offshore wind power for the domestic and export markets". In the recent National Planning Framework 'Ireland 2040', exploitation of our terrestrial and offshore renewable energy potential was repeatedly highlighted as a priority.
A059	*Aythya ferina*	F07	Sports, Tourism & Leisure Activities	PT	M	Inside the Member State	M	Inside the Member State	Evans, D. M. and Day, K. R. (2002), Hunting disturbance on a large shallow lake: the effectiveness of waterfowl refuges. Ibis, 144: 2–8. doi: 10.1046/j.0019-1019.2001.00001.x Cutts, N., Phelps, A. & Burdon, D. (2009) Construction and waterfowl - defining sensitivity, response, impacts and guidance. Report to Humber INCA.	Various published resources point to the impact caused by nautical and other recreational activities. Disturbance from humans walking with/without dogs is consistently found to the most disturbing activity at sites during assessments undertaken for SPA conservation objectives. Disturbance from shooting/hunting likely an issue at specific wetlands. Greenways, cycleways, walkways and similar access routes near important wintering waterbird sites are in various stages of the design, plan and consenting process in a number of locations around Ireland at present, including the Boyne Estuary, different parts of Dublin Bay, Wicklow coast, Wexford Harbour, Rosslare to Waterford, Waterford, Inch Island to Derry and more. If not adequately evaluated and developed these may cause significant increases in disturbance to wintering waterbirds.
A059	*Aythya ferina*	F28	Modification of flooding regimes, flood protection for residential or recreational development	T			M	Inside the Member State		Flooding in recent years has put flood defences high on the agenda across the country, with some coastal works under construction and plans to modify rivers, lakes and turloughs in the midlands, which may impact waterbirds in these areas. Given a precautionary 'medium' threat scoring. Cumulative impacts may be of particular concern.
A059	*Aythya ferina*	G07	Hunting	PT	M	Inside the Member State	M	Inside the Member State	Wildlife (Wild Birds) (open Seasons) Orders 1979 to 2012. (S.I 402 of 2012)	A species on the open season list therefore this constitutes a direct pressure upon the population. Note that bag numbers are not mandatory and therefore not collated in Ireland, meaning it is not possible to quantify the extent of this pressure/threat on the population.

A059	*Aythya ferina*	J01	Mixed Source Pollution to Surface and Ground Waters (Limnic and Terrestrial)	PT	H	Inside the Member State	M	Inside the Member State	Langdon, Peter G., Ruiz, Zoe, Brodersen, K.laus P. and Foster, Ian D. L. (2006) Assessing lake eutrophication using chironomids: understanding the nature of community response in different lake types. *Freshwater Biology* , 51,562-577. Allen, D., Mellon, C., Elander, I. & Watson, G. (2004) Lough Neagh diving ducks: recent changes in wintering populations. *Irish Birds* 7, 327-336. Maclean, I.M.D., Burton, N.H.K. & Austin, G.E. 92007) Declines in over-wintering diving ducks at Lough Neagh and Lough Beg: comparisons of site, regional, national and European trends. BTO Research report 432. BTO. Tierney, D., O'Boyle, S. (2018) Water Quality in 2016: An Indicators Report. Environmental Protection Agency, Wexford. Tománková, I., Harrod, C., Fox, A. D., & Reid, N. (2013). Chlorophyll-aconcentrations and macroinvertebrate declines coincide with the collapse of overwintering diving duck populations in a large eutrophic lake. Freshwater Biology, 59(2), 249–256. Tománková, I., Boland, H., Reid, N. & Fox, A.D. 2013. Assessing the extent to which temporal changes in waterbird community composition are driven by either local, regional or global factors. Aquatic Conservation: Marine and Freshwater Ecosystems 23: 343-355	Pollution incl. eutrophication can impact significantly upon the food sources of PO, including Chironomids. Lough Neagh holds major proportion of Irish/UK wintering population therefore any impacts there will impact significantly on total population. Tierney & O'Boyle (2018) report that a significant proportion of sites in ROI still have too much nutrients - a quarter of rivers and lakes, and a third of estuaries and coastal waters are failing environmental quality assessment criteria. High levels of phosphorus in the north-east of the country are impacting on lake water quality , while high nitrogen concentrations in the south and south-east are impacting on the quality of many of our estuaries.
A059	*Aythya ferina*	N01	Temperature changes (e.g. rise of temperature & extremes) due to climate change	PT	H	Both inside and outside the EU	H	Both inside and outside the EU	Brides, K., Wood, K.A., Hearn, R.D. & Fijen, T.P.M. (2017) Changes in the sex ratio of the Common Pochard Aythya ferina in Europe and North Africa. Wildfowl 67: 100-112. Pavón-Jordán, et al. (2018/2019) Short- and long-term changes in the distribution of abundances linked to variation in winter weather conditions in Europe differ between species with different habitat preferences. Diversity and Distributions.	There is some evidence to suggest that declines in numbers of wintering PO are (as with TU and GN) attributable to climate change. Species has undergone very large decline in Ireland since the 1980s. Research by Pavon-Jordan et al (2018) indicates that deep-water species such as Pochard have exhibited a NE shift in distribution in Europe in response to higher NAO index values.
A061	*Aythya fuligula*	D01	Wind, wave and tidal power, including infrastructure	T			M	Inside the Member State	DCENR (2010) Strategy for Renewable Energy: 2012 – 2020. Strategy Document. Department of Communications, Energy and Natural Resources, Dublin. Government of Ireland (2018) National Planning Framework – Project Ireland 2040. Government of Ireland, Dublin.	Scored on best expert opinion. Exploitation of renewable energy on land and offshore is a high priority for Ireland in the coming years that will see significant increases in the number of terrestrial and offshore windfarms, with wave and tidal energy to follow. The EU Renewable Energy Directive (2009/28/EC) requires the EU to meet 20+% of energy needs with renewables by 2020; the target for Ireland has been set at 16% renewable by 2020. The National Renewable Energy Action Plan (DCENR 2010) has set out strategies for Ireland to meet the 16% target by 2020, the first of which is "Progressively more renewable electricity from onshore and offshore wind power for the domestic and export markets". In the recent National Planning Framework 'Ireland 2040', exploitation of our terrestrial and offshore renewable energy potential was repeatedly highlighted as a priority.
A061	*Aythya fuligula*	F07	Sports, Tourism & Leisure Activities	PT	M	Inside the Member State	M	Inside the Member State	Evans, D. M. and Day, K. R. (2002), Hunting disturbance on a large shallow lake: the effectiveness of waterfowl refuges. Ibis, 144: 2–8. doi: 10.1046/j.0019-1019.2001.00001.x Cutts, N., Phelps, A. & Burdon, D. (2009) Construction and waterfowl - defining sensitivity, response, impacts and guidance. Report to Humber INCA.	Disturbance from humans walking with/without dogs is consistently found to the most disturbing activity at sites during assessments undertaken for SPA conservation objectives. Specific wetlands also have issues with other forms of disturbance e.g. shooting, kite-surfing etc. Greenways, cycleways, walkways and similar access routes near important wintering waterbird sites are in various stages of the design, plan and consenting process in a number of locations around Ireland at present, including the Boyne Estuary, different parts of Dublin Bay, Wicklow coast, Wexford Harbour, Rosslare to Waterford, Waterford, Inch Island to Derry and more. If not adequately evaluated and developed these may cause significant increases in disturbance to wintering waterbirds. Lough Neagh holds major proportion of Irish/UK wintering population therefore any impacts there will impact significantly on total population. Various published resources point to the impact caused by nautical and other recreational activities.
A061	*Aythya fuligula*	F28	Modification of flooding regimes, flood protection for residential or recreational development	T			M	Inside the Member State		Flooding in recent years has put flood defences high on the agenda across the country, with some coastal works under construction and plans to modify rivers, lakes and turloughs in the midlands, which may impact waterbirds in these areas. Given a precautionary 'medium' threat scoring. Cumulative impacts may be of particular concern.
A061	*Aythya fuligula*	G07	Hunting	PT	M	Inside the Member State	M	Inside the Member State	Wildlife (Wild Birds) (open Seasons) Orders 1979 to 2012. (S.I 402 of 2012)	A species on the open season list therefore this constitutes a direct pressure upon the population. Note that bag numbers are not mandatory and therefore not collated in Ireland, meaning it is not possible to quantify the extent of this pressure/threat on the population.
A061	*Aythya fuligula*	J01	Mixed Source Pollution to Surface and Ground Waters (Limnic and Terrestrial)	PT	H	Inside the Member State	M	Inside the Member State	Langdon, Peter G., Ruiz, Zoe, Brodersen, K.laus P. and Foster, Ian D. L. (2006) Assessing lake eutrophication using chironomids: understanding the nature of community response in different lake types. Freshwater Biology, 51,562-577. Allen, D., Mellon, C., Elander, I. & Watson, G. (2004) Lough Neagh diving ducks: recent changes in wintering populations. Irish Birds 7, 327-336. Maclean, I.M.D., Burton, N.H.K. & Austin, G.E. 92007) Declines in over-wintering diving ducks at Lough Neagh and Lough Beg: comparisons of site, regional, national and European trends. BTO Research report 432. BTO. Tierney, D., O'Boyle, S. (2018) Water Quality in 2016: An Indicators Report. Environmental Protection Agency, Wexford. Tománková, I., Harrod, C., Fox, A. D., & Reid, N. (2013). Chlorophyll-aconcentrations and macroinvertebrate declines coincide with the collapse of overwintering diving duck populations in a large eutrophic lake. Freshwater Biology, 59(2), 249–256. Tománková, I., Boland, H., Reid, N. & Fox, A.D. 2013. Assessing the extent to which temporal changes in waterbird community composition are driven by either local, regional or global factors. Aquatic Conservation: Marine and Freshwater Ecosystems 23: 343-355	Tierney & O'Boyle (2018) report that a significant proportion of sites in ROI still have too much nutrients - a quarter of rivers and lakes, and a third of estuaries and coastal waters are failing environmental quality assessment criteria. High levels of phosphorus in the north-east of the country are impacting on lake water quality , while high nitrogen concentrations in the south and south-east are impacting on the quality of many of our estuaries. Pollution incl. eutrophication can impact significantly upon the food sources of TU, including Chironomids. Lough Neagh holds major proportion of Irish/UK wintering population therefore any impacts there will impact significantly on total population.

A061	*Aythya fuligula*	N01	Temperature changes (e.g. rise of temperature & extremes) due to climate change	PT	H	Both inside and outside the EU	H	Both inside and outside the EU	Lehikoinen, A., Jaatinen, K., Vähätalo, A.V., Clausen, P., Crowe, O., Deceuninck, B., Hearn, R., Holt, C.A., Hornman, M., Keller, V., Nilsson, L., Langendoen, T., Tománkova, I., Wahl, J. & Fox, A.D. 2013. Rapid climate driven shifts in wintering distributions of three common waterbird species. Global Change Biology, doi: 10.1111/gcb.12200. Pavón-Jordán, et al. (2018/2019) Short- and long-term changes in the distribution of abundances linked to variation in winter weather conditions in Europe differ between species with different habitat preferences. Diversity and Distributions.	Recent research suggests that the wintering distribution has shifted north-eastward in response to changes in temperature. Species has undergone very large decline in Ireland since the 1980s. Research by Pavon-Jordan et al (2018) indicates that deep-water species such as Tufted Duck have exhibited a NE shift in distribution in Europe in response to higher NAO index values.
A062	*Aythya marila*	D01	Wind, wave and tidal power, including infrastructure	T			M	Inside the Member State	McCluskie, A.E., Langston, R.H.W. & Wilkinson, N.I. 2012. Birds and wave & tidal stream energy: an ecological review. RSPB Research Report No. 42. Sandy, Bedfordshire, UK. DCENR (2010) Strategy for Renewable Energy: 2012 – 2020. Strategy Document. Department of Communications, Energy and Natural Resources, Dublin. Government of Ireland (2018) National Planning Framework – Project Ireland 2040. Government of Ireland, Dublin.	Scored on best expert opinion. Exploitation of renewable energy on land and offshore is a high priority for Ireland in the coming years that will see significant increases in the number of terrestrial and offshore windfarms, with wave and tidal energy to follow. The EU Renewable Energy Directive (2009/28/EC) requires the EU to meet 20+% of energy needs with renewables by 2020; the target for Ireland has been set at 16% renewable by 2020. The National Renewable Energy Action Plan (DCENR 2010) has set out strategies for Ireland to meet the 16% target by 2020, the first of which is "Progressively more renewable electricity from onshore and offshore wind power for the domestic and export markets". In the recent National Planning Framework 'Ireland 2040', exploitation of our terrestrial and offshore renewable energy potential was repeatedly highlighted as a priority.
A062	*Aythya marila*	F07	Sports, Tourism & Leisure Activities	PT	M	Inside the Member State	M	Inside the Member State	Evans, D. M. and Day, K. R. (2002), Hunting disturbance on a large shallow lake: the effectiveness of waterfowl refuges. Ibis, 144: 2–8. doi: 10.1046/j.0019-1019.2001.00001.x Cutts, N., Phelps, A. & Burdon, D. (2009) Construction and waterfowl - defining sensitivity, response, impacts and guidance. Report to Humber INCA.	Disturbance from humans walking with/without dogs is consistently found to the most disturbing activity at sites during assessments undertaken for SPA conservation objectives. Disturbance from shooting/hunting likely an issue at specific wetlands. Greenways, cycleways, walkways and similar access routes near important wintering waterbird sites are in various stages of the design, plan and consenting process in a number of locations around Ireland at present, including the Boyne Estuary, different parts of Dublin Bay, Wicklow coast, Wexford Harbour, Rosslare to Waterford, Waterford, Inch Island to Derry and more. If not adequately evaluated and developed these may cause significant increases in disturbance to wintering waterbirds. Largely nocturnal foraging therefore impacts not as significant for some other wildfowl species. Few specific studies so relatively unknown effects. As the species forages largely nocturnally impacts may be less than for other species.
A062	*Aythya marila*	G07	Hunting	PT	M	Inside the Member State	M	Inside the Member State	EU (2009) Management plan for Scaup Aythya marila 2009-2011.	A species on the open season list therefore this constitutes a direct pressure upon the population. Note that bag numbers are not mandatory and therefore not collated in Ireland, meaning it is not possible to quantify the extent of this pressure/threat on the population.
A062	*Aythya marila*	G19	Other Impacts from Marine Aquaculture, Including Infrastructure	PT	M	Inside the Member State	M	Inside the Member State	EU (2009) Management plan for Scaup Aythya marila 2009-2011. Marine Institute (2013) Appropriate assessment of aquaculture and fisheries in Lough Swilly	Given that molluscs form a principal part of the diet, a positive association between bottom growing and this species could occur. Subtidal oyster cultivation may however may cause displacement (MI, 2013). Direct competition for a common resource. Scored on best expert opinion. Significant dredging for shellfish at Wexford Harbour and Dundalk Bay, most notably.
A062	*Aythya marila*	J01	Mixed Source Pollution to Surface and Ground Waters (Limnic and Terrestrial)	PT	H	Inside the Member State	M	Inside the Member State	Langdon, Peter G., Ruiz, Zoe, Brodersen, K.laus P. and Foster, Ian D. L. (2006) Assessing lake eutrophication using chironomids: understanding the nature of community response in different lake types. *Freshwater Biology* , 51,562-577. Allen, D., Mellon, C., Elander, I. & Watson, G. (2004) Lough Neagh diving ducks: recent changes in wintering populations. *Irish Birds* 7, 327-336. Maclean, I.M.D., Burton, N.H.K. & Austin, G.E. 92007) Declines in over-wintering diving ducks at Lough Neagh and Lough Beg: comparisons of site, regional, national and European trends. BTO Research report 432. BTO. Tierney, D., O'Boyle, S. (2018) Water Quality in 2016: An Indicators Report. Environmental Protection Agency, Wexford.	Tierney & O'Boyle (2018) report that a significant proportion of sites in ROI still have too much nutrients - a quarter of rivers and lakes, and a third of estuaries and coastal waters are failing environmental quality assessment criteria. High levels of phosphorus in the north-east of the country are impacting on lake water quality , while high nitrogen concentrations in the south and south-east are impacting on the quality of many of our estuaries. Eutrophication to surface waters can lead to changes in abundance and in severe cases loss of chironomids, a major prey of Scaup in inland waters (e.g. Lough Neagh). Lough Neagh is the major wintering site for SP in both Ireland and Britain therefore an impact there will impact significantly on the overall wintering population.
A674-A	*Branta bernicla hrota*	D06	Transmission of electricity and communications (cables)	T			M	Inside the Member State	Natura (2012) Ecology guidelines for electricity transmission projects: a standard approach to ecological impact assessment of high voltage transmission projects. Eirgrid 2012.	Collision (e.g. power lines). Unknown and little reported in Ireland. But as these birds are large and not particularly manoeuvrable (in comparison with other birds) it remains a threat. Eirgrid report (Natura 2012) list swans and geese species as high susceptibility to collision with powerlines. Note the lack of any systematic data collection for avian collisions with powerlines. The opportunity for an electrical link with France (Celtic Interconnector) was identified in EirGrids 'Interconnector Economic Feasibility Report' (2009). It is currently in the planning phase with a decision to be made in 2020/2021. The electricity networks in Northern Ireland and the Republic of Ireland are also due to be connected via the North/South Interconnector. There will be a lot of associated infrastructure with these interconnectors, including overhead powerlines across many counties.
A674-A	*Branta bernicla hrota*	F01	Conversion from other land uses to housing, settlement or recreational areas (excluding drainage and modification of coastline, estuary or coastal conditions)	T			M	Inside the Member State	Phalan, B. & Nairn, R. G. W. (2007) Disturbance to waterbirds in South Dublin Bay. Irish Birds 8, 223-230. https://www.thetimes.co.uk/article/feathers-fly-over-push-for-artificial-turf-on-sport-fields-gcfrcdd72 https://www.independent.ie/irish-news/news/500-homes-in-dublin-city-opposed-over-concerns-for-geese-36698384.html Scott Cawley (2017) Information for Stage 2 appropriate assessment – Proposed residential development – St. Paul's College, Sybil Hill, Raheny, Dublin 5. [Natura Impact Statement] Scott Cawley, Dublin.	Development of urban green spaces used by the geese - astroturfing pitches, housing developments etc. Work by Scott Cawley consultants identified 117 terrestrial inland feeding sites used by PB in Dublin Bay, over 40% of which were used by peaks of over 400 geese and 8 of which were used by 400+ geese in each of the 5 seasons examined. This network of inland feeding sites is of huge importance to the Dublin Bay flock, particularly in the latter half of the winter. PB elsewhere are likely to be similarly reliant on inland feeding sites. There are current proposals for housing developments at St. Annes park in Raheny as well as another PB site in Blackrock. Disturbance also caused by increase recreational usage of these areas. Some examples at Brent feeding sites in Dublin late 2017 and early 2018, likely to increase given housing pressure, improving economy and lack of available space to build - assigned moderate score as a result.
A674-A	*Branta bernicla hrota*	F07	Sports, Tourism & Leisure Activities	PT	M	Inside the Member State	M	Inside the Member State	Phalan, B. & Nairn, R. G. W. (2007) Disturbance to waterbirds in South Dublin Bay. Irish Birds 8, 223-230. Wilkes, R., Bennion, M., McQuaid, N., Beer, C., McCullough-Annett, G., Colhoun, K., Inger, R. & Morrison, L. (2017) Intertidal seagrass in Ireland: Pressures, WFD status and an assessment of trace element contamination in intertidal habitats using Zostera noltei. Ecological Indicators 82:117-130.	Increased recreational usage of urban green spaces has the potential to cause disturbance at many important sites, including intentional disturbance (specifically in north county Dublin). Elsewhere, disturbance from humans walking with/without dogs is consistently found to the most disturbing activity at sites during assessments undertaken for SPA conservation objectives. Disturbance from shooting/hunting likely an issue at specific wetlands. Greenways, cycleways, walkways and similar access routes near important wintering waterbird sites are in various stages of the design, plan and consenting process in a number of locations around Ireland at present, including the Boyne Estuary, different parts of Dublin Bay, Wicklow coast, Wexford Harbour, Rosslare to Waterford, Waterford, Inch Island to Derry and more. If not adequately evaluated and developed these may cause significant increases in disturbance to wintering waterbirds. Foot and vehicular traffic on intertidal areas also damages seagrass beds, with known examples at Dungarvan Bay, Killala Bay, Dublin Bay, Cromane etc (Wilkes et al 2017)

A674-A	*Branta bernicla hrota*	F08	Modification of coastline, estuary and coastal conditions for development, use and protection of residential, commercial, industrial and recreational infrastructure and areas (including sea defence or coast protection works and infrastructures)	T			M	Inside the Member State	Brennan, Michael, Hochstrasser, Tamara, Shahumyan, Harutyun : Simulated future development of the Greater Dublin Area: consequences for protected areas and coastal flooding risk. Journal of Irish Urban Studies, 9 2010-12, pp.31-51. Duriez, O., Bruno, J.E., Choquet, R., Pradel, R., Klaassen, M. (2012) Comparing the seasonal survival of resident and migratory oystercatchers: carry-over effects of habitat quality and weather conditions. Oikos 121: 862-873.	Modification of coastline to prevent flooding and/or erosion is ongoing in a number of counties and likely to be carried out at new locations in the coming years. Development of coastal areas for commercial, residential, industrial and recreational purposes also increasing at present e.g. industrial development at Cork Harbour. A study by Brennan et al (2010), modelling future urban expansion in the greater Dublin area, highlighted the significant environmental impacts on protected areas (SPA, SAC) and other areas of high biodiversity to be expected if current trends of urban development continue – particularly in coastal regions.
A674-A	*Branta bernicla hrota*	G01	Marine Fish and Shellfish Harvesting (Professional, Recreational) causing reduction of species/prey populations and disturbance of species	T			M	Inside the Member State	Wilkes, R., Bennion, M., McQuaid, N., Beer, C., McCullough-Annett, G., Colhoun, K., Inger, R. & Morrison, L. (2017) Intertidal seagrass in Ireland: Pressures, WFD status and an assessment of trace element contamination in intertidal habitats using Zostera noltei. Ecological Indicators 82:117-130.	Disturbance from boats, vehicles and personnel involved in marine aquaculture. Damage to intertidal seagrass beds from same (Wilkes et al., 2017).
A045-A	*Branta leucopsis*	D06	Transmission of electricity and communications (cables)	T			M	Inside the Member State	Natura (2012) Ecology guidelines for electricity transmission projects: a standard approach to ecological impact assessment of high voltage transmission projects. Eirgrid Report.	Collision (e.g. power lines). Unknown and little reported in Ireland. But as these birds are large and not particularly manoeuvrable (in comparison with other birds) it remains a threat. Eirgrid report (Natura 2012) list swans and geese species as high susceptibility to collision with powerlines. Note the lack of any systematic data collection for avian collisions with powerlines. The opportunity for an electrical link with France (Celtic Interconnector) was identified in EirGrids 'Interconnector Economic Feasibility Report' (2009). It is currently in the planning phase with a decision to be made in 2020/2021. The electricity networks in Northern Ireland and the Republic of Ireland are also due to be connected via the North/South Interconnector. There will be a lot of associated infrastructure with these interconnectors, including overhead powerlines across many counties.
A067	*Bucephala clangula*	D01	Wind, wave and tidal power, including infrastructure	T			M	Inside the Member State	DCENR (2010) Strategy for Renewable Energy: 2012 – 2020. Strategy Document. Department of Communications, Energy and Natural Resources, Dublin. Government of Ireland (2018) National Planning Framework – Project Ireland 2040. Government of Ireland, Dublin.	Scored on best expert opinion. Exploitation of renewable energy on land and offshore is a high priority for Ireland in the coming years that will see significant increases in the number of terrestrial and offshore windfarms, with wave and tidal energy to follow. The EU Renewable Energy Directive (2009/28/EC) requires the EU to meet 20+% of energy needs with renewables by 2020; the target for Ireland has been set at 16% renewable by 2020. The National Renewable Energy Action Plan (DCENR 2010) has set out strategies for Ireland to meet the 16% target by 2020, the first of which is "Progressively more renewable electricity from onshore and offshore wind power for the domestic and export markets". In the recent National Planning Framework 'Ireland 2040', exploitation of our terrestrial and offshore renewable energy potential was repeatedly highlighted as a priority.
A067	*Bucephala clangula*	F07	Sports, Tourism & Leisure Activities	PT	M	Inside the Member State	M	Inside the Member State	Evans, D. M. and Day, K. R. (2002), Hunting disturbance on a large shallow lake: the effectiveness of waterfowl refuges. Ibis, 144: 2–8. doi: 10.1046/j.0019-1019.2001.00001.x Tuite, C.H., Owen, M. & Paynter, D. (1983). Interaction between wildfowl and recreation at Llangorse Lake and Talybont reservoir, South Wales. Wildfowl, 34, 48-63.	Disturbance from humans walking with/without dogs is consistently found to the most disturbing activity at sites during assessments undertaken for SPA conservation objectives. Disturbance from shooting/hunting likely an issue at specific wetlands. Greenways, cycleways, walkways and similar access routes near important wintering waterbird sites are in various stages of the design, plan and consenting process in a number of locations around Ireland at present, including the Boyne Estuary, different parts of Dublin Bay, Wicklow coast, Wexford Harbour, Rosslare to Waterford, Waterford, Inch Island to Derry and more. If not adequately evaluated and developed these may cause significant increases in disturbance to wintering waterbirds. Lough Neagh is the major wintering site for GN in Ireland and UK therefore an impact there will impact significantly on the overall wintering population. Various published resources point to the impact caused by nautical and other recreational activities.
A067	*Bucephala clangula*	F28	Modification of flooding regimes, flood protection for residential or recreational development	T			M	Inside the Member State		Flooding in recent years has put flood defences high on the agenda across the country, with some coastal works under construction and plans to modify rivers, lakes and turloughs in the midlands, which may impact waterbirds in these areas. Given a precautionary 'medium' threat scoring. Cumulative impacts may be of particular concern.
A067	*Bucephala clangula*	G07	Hunting	PT	M	Inside the Member State	M	Inside the Member State	Wildlife (Wild Birds) (open Seasons) Orders 1979 to 2012. (S.I 402 of 2012)	A species on the open season list therefore this constitutes a direct pressure upon the population. Note that bag numbers are not mandatory and therefore not collated in Ireland, meaning it is not possible to quantify the extent of this pressure/threat on the population.
A067	*Bucephala clangula*	J01	Mixed Source Pollution to Surface and Ground Waters (Limnic and Terrestrial)	PT	H	Inside the Member State	M	Inside the Member State	Langdon, Peter G., Ruiz, Zoe, Brodersen, K.laus P. and Foster, Ian D. L. (2006) Assessing lake eutrophication using chironomids: understanding the nature of community response in different lake types. Freshwater Biology, 51,562-577. Allen, D., Mellon, C., Elander, I. & Watson, G. (2004) Lough Neagh diving ducks: recent changes in wintering populations. Irish Birds 7, 327-336. Maclean, I.M.D., Burton, N.H.K. & Austin, G.E. 92007) Declines in over-wintering diving ducks at Lough Neagh and Lough Beg: comparisons of site, regional, national and European trends. BTO Research report 432. BTO. Tierney, D., O'Boyle, S. (2018) Water Quality in 2016: An Indicators Report. Environmental Protection Agency, Wexford. Tománková, I., Harrod, C., Fox, A. D., & Reid, N. (2013). Chlorophyll-aconcentrations and macroinvertebrate declines coincide with the collapse of overwintering diving duck populations in a large eutrophic lake. Freshwater Biology, 59(2), 249–256. Tománková, I., Boland, H., Reid, N. & Fox, A.D. 2013. Assessing the extent to which temporal changes in waterbird community composition are driven by either local, regional or global factors. Aquatic Conservation: Marine and Freshwater Ecosystems 23: 343-355	Eutrophication to surface waters can lead to changes in abundance and in severe cases loss of chironomids, a major prey of GN in inland waters (e.g. Lough Neagh). Lough Neagh is the major wintering site for GN in Ireland and UK therefore an impact there will impact significantly on the overall wintering population. Tierney & O'Boyle (2018) report that a significant proportion of sites in ROI still have too much nutrients - a quarter of rivers and lakes, and a third of estuaries and coastal waters are failing environmental quality assessment criteria. High levels of phosphorus in the north-east of the country are impacting on lake water quality , while high nitrogen concentrations in the south and south-east are impacting on the quality of many of our estuaries.
A067	*Bucephala clangula*	N01	Temperature changes (e.g. rise of temperature & extremes) due to climate change	PT	H	Both inside and outside the EU	H	Both inside and outside the EU	Lehikoinen, A., Jaatinen, K., Vähätalo, A.V., Clausen, P., Crowe, O., Deceuninck, B., Hearn, R., Holt, C.A., Hornman, M., Keller, V., Nilsson, L., Langendoen, T., Tománkova, I., Wahl, J. & Fox, A.D. 2013. Rapid climate driven shifts in wintering distributions of three common waterbird species. Global Change Biology, doi: 10.1111/gcb.12200. Pavón-Jordán, et al. (2018/2019) Short- and long-term changes in the distribution of abundances linked to variation in winter weather conditions in Europe differ between species with different habitat preferences. Diversity and Distributions.	Recent research suggests that the wintering distribution has shifted north-eastward in response to changes in temperature. Species has undergone very large decline in Ireland since the 1980s. Research by Pavon-Jordan et al (2018) indicates that deep-water species such as Goldeneye have exhibited a NE shift in distribution in Europe in response to higher NAO index values.

A067	*Bucephala clangula*	N04	Sea-level and wave exposure changes due to climate change	T			M	Inside the Member State	Crowe, O., Lewis, L. J. & Anthony, S. (2013) Impacts of sea level rise on the birds and biodiversity of key coastal wetlands. Report to the Environmental Protection Agency. Draft.	Implications of climate change/SLR . Considered a low risk species as per other waterfowl species.
A144	*Calidris alba*	D01	Wind, wave and tidal power, including infrastructure	T			M	Inside the Member State	Percival, S. (2001). Assessment of the effects of off-shore wind farms on birds. ETSU Report W/13/00565/REP. DCENR (2010) Strategy for Renewable Energy: 2012 – 2020. Strategy Document. Department of Communications, Energy and Natural Resources, Dublin.	Most published literature concludes little determinable impacts of wind farms upon waders, nevertheless a risk is present especially during periods of migration, small-scale movements and e.g. during periods of movements en-masse (e.g. cold weather events). Birds are afforded a high degree of protection within SPA's, but areas outside/between SPA's are afforded much less protection. Percival (2001) notes that risk of collision with migrant waterfowl (i.e. wildfowl and wading birds) should be low/negligible if the wind farm is located several kilometres offshore. Exploitation of renewable energy on land and offshore is a high priority for Ireland in the coming years that will see significant increases in the number of terrestrial and offshore windfarms, with wave and tidal energy to follow. The EU Renewable Energy Directive (2009/28/EC) requires the EU to meet 20+% of energy needs with renewables by 2020; the target for Ireland has been set at 16% renewable by 2020. The National Renewable Energy Action Plan (DCENR 2010) has set out strategies for Ireland to meet the 16% target by 2020, the first of which is "Progressively more renewable electricity from onshore and offshore wind power for the domestic and export markets". In the recent National Planning Framework 'Ireland 2040', exploitation of our terrestrial and offshore renewable energy potential was repeatedly highlighted as a priority.
A144	*Calidris alba*	F07	Sports, Tourism & Leisure Activities	PT	M	Inside the Member State	M	Inside the Member State	Lewis, L.J., Adcock, T. (2017) An assessment of the effects of kitesurfing and other activities on the waterbirds using DOllymount Strand. BirdWatch Ireland, Wicklow. Cutts, N., Phelps, A. & Burdon, D. (2009) Construction and waterfowl - defining sensitivity, response, impacts and guidance. Report to Humber INCA. Thomas K., Kvitek R.G. & Bretz C. 2003. Effects of human activity on the foraging behaviour of sanderlings Calidris alba. Biological Conservation 109: 67-71. Burger & Gochfeld 1991 Human activity influence and diurnal and nocturnal foraging of sanderlings. Condor 93, 259-265	Disturbance from humans walking with/without dogs is consistently found to the most disturbing activity at sites during assessments undertaken for SPA conservation objectives. Disturbance from shooting/hunting likely an issue at specific wetlands. Greenways, cycleways, walkways and similar access routes near important wintering waterbird sites are in various stages of the design, plan and consenting process in a number of locations around Ireland at present, including the Boyne Estuary, different parts of Dublin Bay, Wicklow coast, Wexford Harbour, Rosslare to Waterford, Waterford, Inch Island to Derry and more. If not adequately evaluated and developed these may cause significant increases in disturbance to wintering waterbirds. Lewis & Adcock (2017) found that waterbird activity decreased as recreational disturbance (walkers, dogs, kite surfers etc) increased on Dollymount Strand (Dublin Bay). Cutts et al (2009) ranked SS as moderate in their sensitivity to disturbance. One study found 100% response to humans when they are 30m or closer. Habitat use e.g. sandy areas, often coincides with areas used by walkers and dogs (e.g. Castlemaine). Species often occurs (e.g. roosts) in sandy habitats (strands) where pressures from motorised vehicles will occur.
A144	*Calidris alba*	F08	Modification of coastline, estuary and coastal conditions for development, use and protection of residential, commercial, industrial and recreational infrastructure and areas (including sea defence or coast protection works and infrastructures)	T			M	Inside the Member State	Lewis, L.J, Austin, G.m Boland, H., Frost, T., Crowe, O. & Tierney, D.T. (2017) Waterbird populations on non-estuarine coasts of Ireland: results of the 2015/16 Non-Estuarine Coastal Waterbird Survey (NEWS-III). Irish Birds 10:4, 511-522. Burton, N.H.K., Rehfisch, M.M., Clark, N.A. & Dodd, S.G. (2006) Impacts of sudden winter habitat loss on the body condition and survival of redshank Tringa totanus. Journal of Applied Ecology 43: 464-473. Brennan, Michael, Hochstrasser, Tamara, Shahumyan, Harutyun : Simulated future development of the Greater Dublin Area: consequences for protected areas and coastal flooding risk. Journal of Irish Urban Studies, 9 2010-12, pp.31-51. Duriez, O., Bruno, J.E., Choquet, R., Pradel, R., Klaassen, M. (2012) Comparing the seasonal survival of resident and migratory oystercatchers: carry-over effects of habitat quality and weather conditions. Oikos 121: 862-873.	Modification of coastline to prevent flooding and/or erosion is ongoing in a number of counties and likely to be carried out at new locations in the coming years. Development of coastal areas for commercial, residential, industrial and recreational purposes also increasing at present e.g. industrial development at Cork Harbour. A study by Brennan et al (2010), modelling future urban expansion in the greater Dublin area, highlighted the significant environmental impacts on protected areas (SPA, SAC) and other areas of high biodiversity to be expected if current trends of urban development continue – particularly in coastal regions. Duriez et al. (2012) found that habitat changes in the Dutch wintering grounds of Oystercatchers caused a reduction in food stocks, leading to a long-term reduction in survival rates. Burton et al. (2006) found that redshank displaced redshank had difficulty maintaining mass in the first winter after displacement, with reduced survival rates as a result. These studies indicate the potential impacts on wader populations of wintering habitat loss, or displacement from previously relied-upon wintering habitat.
A144	*Calidris alba*	G01	Marine Fish and Shellfish Harvesting (Professional, Recreational) causing reduction of species/prey populations and disturbance of species	PT	M	Inside the Member State	M	Inside the Member State		Disturbance from activities related to the harvesting of shellfish etc. and bait digging.
A144	*Calidris alba*	G19	Other Impacts from Marine Aquaculture, Including Infrastructure	PT	M	Inside the Member State	M	Inside the Member State	Gittings & O'Donoghue (2012) The effect of intertidal oyster cultivation (Crassostrea gigas) on the spatial distribution of waterbirds	Gittings & O'Donoghue (2012) found an 'possibly negative' effect of oyster trestles upon SS.
A144	*Calidris alba*	N04	Sea-level and wave exposure changes due to climate change	T			M	Inside the Member State	Crowe, O., Lewis, L. J. & Anthony, S. (2013) Impacts of sea level rise on the birds and biodiversity of key coastal wetlands. Report to the Environmental Protection Agency. Draft. Austin, G. (2010) Waterbirds in MCCIP Annual Report Card 2010-11, MCCIP Science Review, 7pp. www.mccip.org.uk/arc	Climate change/sea level rise, considered high risk by Crowe et al (2013) as distribution is wholly intertidal.
A149	*Calidris alpina*	D01	Wind, wave and tidal power, including infrastructure	T			M	Inside the Member State	Percival, S. (2001). Assessment of the effects of off-shore wind farms on birds. ETSU Report W/13/00565/REP. DCENR (2010) Strategy for Renewable Energy: 2012 – 2020. Strategy Document. Department of Communications, Energy and Natural Resources, Dublin. G	Most published literature concludes little determinable impacts of wind farms upon waders, nevertheless a risk is present especially during periods of migration, small-scale movements and e.g. during periods of movements en-masse (e.g. cold weather events). Birds are afforded a high degree of protection within SPA's, but areas outside/between SPA's are afforded much less protection. Percival (2001) notes that risk of collision with migrant waterfowl (i.e. wildfowl and wading birds) should be low/negligible if the wind farm is located several kilometres offshore. Exploitation of renewable energy on land and offshore is a high priority for Ireland in the coming years that will see significant increases in the number of terrestrial and offshore windfarms, with wave and tidal energy to follow. The EU Renewable Energy Directive (2009/28/EC) requires the EU to meet 20+% of energy needs with renewables by 2020; the target for Ireland has been set at 16% renewable by 2020. The National Renewable Energy Action Plan (DCENR 2010) has set out strategies for Ireland to meet the 16% target by 2020, the first of which is "Progressively more renewable electricity from onshore and offshore wind power for the domestic and export markets". In the recent National Planning Framework 'Ireland 2040', exploitation of our terrestrial and offshore renewable energy potential was repeatedly highlighted as a priority.

A149	*Calidris alpina*	F07	Sports, Tourism & Leisure Activities	PT	M	Inside the Member State	M	Inside the Member State	Lewis, L.J., Adcock, T. (2017) An assessment of the effects of kitesurfing and other activities on the waterbirds using DOllymount Strand. BirdWatch Ireland, Wicklow. Nairn, R.G.W. (2017) Factors affecting the choice of roost site by wintering waders in South Dublin Bay, Ireland. Irish Birds 10: 527-534. Cutts, N., Phelps, A. & Burdon, D. (2009) Construction and waterfowl - defining sensitivity, response, impacts and guidance. Report to Humber INCA. Burton, N.H.K., Rehfisch, M.M. & Clark, N.A. 2002. Impacts of disturbance from construction work on the densities and feeding behaviour of waterbirds using the intertidal mudflats of Cardiff Bay, UK. Environmental Management 30: 865-871. O'Donoghue, P.D. & Gittings, T. (2014) Presentation of geospatial data relating to the use of Cork Harbour by wintering waterbirds & a literature review of published data relating to waterbirds and disturbance. Unpublished Report prepared for Cork County Council.	Disturbance from humans walking with/without dogs is consistently found to the most disturbing activity at sites during assessments undertaken for SPA conservation objectives. Disturbance from shooting/hunting likely an issue at specific wetlands. Greenways, cycleways, walkways and similar access routes near important wintering waterbird sites are in various stages of the design, plan and consenting process in a number of locations around Ireland at present, including the Boyne Estuary, different parts of Dublin Bay, Wicklow coast, Wexford Harbour, Rosslare to Waterford, Waterford, Inch Island to Derry and more. If not adequately evaluated and developed these may cause significant increases in disturbance to wintering waterbirds. Lewis & Adcock (2017) found that waterbird activity decreased as recreational disturbance (walkers, dogs, kite surfers etc) increased on Dollymount Strand (Dublin Bay).Cutts et al (2009) ranked DN as moderate in their sensitivity to disturbance; Some previous studies found DN to be more sensitive than other waders. Habitat use e.g. sandy areas, often coincides with areas used by walkers and dogs. O'Donoghue & Gittings (2014) carried out a literature review of the potential impacts of pedestrian disturbance to waterbirds and found that species that mainly occur in large flocks may have higher levels of sensitivity to disturbance than most other species.
A149	*Calidris alpina*	F08	Modification of coastline, estuary and coastal conditions for development, use and protection of residential, commercial, industrial and recreational infrastructure and areas (including sea defence or coast protection works and infrastructures)	T			M	Inside the Member State	Burton, N.H.K., Rehfisch, M.M., Clark, N.A. & Dodd, S.G. (2006) Impacts of sudden winter habitat loss on the body condition and survival of redshank Tringa totanus. Journal of Applied Ecology 43: 464-473. Brennan, Michael, Hochstrasser, Tamara, Shahumyan, Harutyun : Simulated future development of the Greater Dublin Area: consequences for protected areas and coastal flooding risk. Journal of Irish Urban Studies, 9 2010-12, pp.31-51. Duriez, O., Bruno, J.E., Choquet, R., Pradel, R., Klaassen, M. (2012) Comparing the seasonal survival of resident and migratory oystercatchers: carry-over effects of habitat quality and weather conditions. Oikos 121: 862-873.	Modification of coastline to prevent flooding and/or erosion is ongoing in a number of counties and likely to be carried out at new locations in the coming years. Development of coastal areas for commercial, residential, industrial and recreational purposes also increasing at present e.g. industrial development at Cork Harbour. A study by Brennan et al (2010), modelling future urban expansion in the greater Dublin area, highlighted the significant environmental impacts on protected areas (SPA, SAC) and other areas of high biodiversity to be expected if current trends of urban development continue – particularly in coastal regions. Duriez et al. (2012) found that habitat changes in the Dutch wintering grounds of Oystercatchers caused a reduction in food stocks, leading to a long-term reduction in survival rates. Burton et al. (2006) found that redshank displaced redshank had difficulty maintaining mass in the first winter after displacement, with reduced survival rates as a result. These studies indicate the potential impacts on wader populations of wintering habitat loss, or displacement from previously relied-upon wintering habitat.
A149	*Calidris alpina*	G01	Marine Fish and Shellfish Harvesting (Professional, Recreational) causing reduction of species/prey populations and disturbance of species	PT	M	Inside the Member State	M	Inside the Member State		Various scientific references as to the negative effects of dredging for mussels and oysters upon benthic sediments and communities. DN could be affected by indirect effects i.e. changes in benthic communities, and is assigned a moderate impact score as distribution often midshore and sandier substrates that may coincide with areas dredged.
A149	*Calidris alpina*	G19	Other Impacts from Marine Aquaculture, Including Infrastructure	PT	M	Inside the Member State	M	Inside the Member State	Gittings & O'Donoghue (2012) The effect of intertidal oyster cultivation (Crassostrea gigas) on the spatial distribution of waterbirds	Gittings & O'Donoghue (2012) found an 'possibly negative' effect of oyster trestles upon DN.
A149	*Calidris alpina*	N04	Sea-level and wave exposure changes due to climate change	T			M	Inside the Member State	Crowe, O., Lewis, L. J. & Anthony, S. (2013) Impacts of sea level rise on the birds and biodiversity of key coastal wetlands. Report to the Environmental Protection Agency. Draft. Austin, G. (2010) Waterbirds in MCCIP Annual Report Card 2010-11, MCCIP Science Review, 7pp. www.mccip.org.uk/arc	Climate change/sea level rise, considered high risk by Crowe et al (2013) as distribution is wholly intertidal.
A143	*Calidris canutus*	D01	Wind, wave and tidal power, including infrastructure	T			M	Inside the Member State	Percival, S. (2001). Assessment of the effects of off-shore wind farms on birds. ETSU Report W/13/00565/REP. DCENR (2010) Strategy for Renewable Energy: 2012 – 2020. Strategy Document. Department of Communications, Energy and Natural Resources, Dublin. G	Most published literature concludes little determinable impacts of wind farms upon waders, nevertheless a risk is present especially during periods of migration, small-scale movements and e.g. during periods of movements en-masse (e.g. cold weather events). Birds are afforded a high degree of protection within SPA's, but areas outside/between SPA's are afforded much less protection. Percival (2001) notes that risk of collision with migrant waterfowl (i.e. wildfowl and wading birds) should be low/negligible if the wind farm is located several kilometres offshore. Exploitation of renewable energy on land and offshore is a high priority for Ireland in the coming years that will see significant increases in the number of terrestrial and offshore windfarms, with wave and tidal energy to follow. The EU Renewable Energy Directive (2009/28/EC) requires the EU to meet 20+% of energy needs with renewables by 2020; the target for Ireland has been set at 16% renewable by 2020. The National Renewable Energy Action Plan (DCENR 2010) has set out strategies for Ireland to meet the 16% target by 2020, the first of which is "Progressively more renewable electricity from onshore and offshore wind power for the domestic and export markets". In the recent National Planning Framework 'Ireland 2040', exploitation of our terrestrial and offshore renewable energy potential was repeatedly highlighted as a priority.
A143	*Calidris canutus*	F07	Sports, Tourism & Leisure Activities	PT	M	Inside the Member State	M	Inside the Member State	Lewis, L.J., Adcock, T. (2017) An assessment of the effects of kitesurfing and other activities on the waterbirds using DOllymount Strand. BirdWatch Ireland, Wicklow. Nairn, R.G.W. (2017) Factors affecting the choice of roost site by wintering waders in South Dublin Bay, Ireland. Irish Birds 10: 527-534. Cutts, N., Phelps, A. & Burdon, D. (2009) Construction and waterfowl - defining sensitivity, response, impacts and guidance. Report to Humber INCA. Pfister, C., B.A. Harrington, and M. Lavine. (1992) The impact of human disturbance on shorebirds at a migration staging area. Biological Conservation 60:115-126. O'Donoghue, P.D. & Gittings, T. (2014) Presentation of geospatial data relating to the use of Cork Harbour by wintering waterbirds & a literature review of published data relating to waterbirds and disturbance. Unpublished Report prepared for Cork County Council.	Disturbance from humans walking with/without dogs is consistently found to the most disturbing activity at sites during assessments undertaken for SPA conservation objectives. Disturbance from shooting/hunting likely an issue at specific wetlands. Greenways, cycleways, walkways and similar access routes near important wintering waterbird sites are in various stages of the design, plan and consenting process in a number of locations around Ireland at present, including the Boyne Estuary, different parts of Dublin Bay, Wicklow coast, Wexford Harbour, Rosslare to Waterford, Waterford, Inch Island to Derry and more. If not adequately evaluated and developed these may cause significant increases in disturbance to wintering waterbirds. Lewis & Adcock (2017) found that waterbird activity decreased as recreational disturbance (walkers, dogs, kite surfers etc) increased on Dollymount Strand (Dublin Bay). Various and many references within the review by Cutts et al. (2009) find that KN are highly sensitive to disturbance, especially at roost sites. Some previous studies found KN to be more sensitive than other waders. O'Donoghue & Gittings (2014) carried out a literature review of the potential impacts of pedestrian disturbance to waterbirds and found that species that mainly occur in large flocks may have higher levels of sensitivity to disturbance than most other species.

A143	*Calidris canutus*	F08	Modification of coastline, estuary and coastal conditions for development, use and protection of residential, commercial, industrial and recreational infrastructure and areas (including sea defence or coast protection works and infrastructures)	T			M	Inside the Member State	Burton, N.H.K., Rehfisch, M.M., Clark, N.A. & Dodd, S.G. (2006) Impacts of sudden winter habitat loss on the body condition and survival of redshank Tringa totanus. Journal of Applied Ecology 43: 464-473. Brennan, Michael, Hochstrasser, Tamara, Shahumyan, Harutyun : Simulated future development of the Greater Dublin Area: consequences for protected areas and coastal flooding risk. Journal of Irish Urban Studies, 9 2010-12, pp.31-51. Duriez, O., Bruno, J.E., Choquet, R., Pradel, R., Klaassen, M. (2012) Comparing the seasonal survival of resident and migratory oystercatchers: carry-over effects of habitat quality and weather conditions. Oikos 121: 862-873.	Modification of coastline to prevent flooding and/or erosion is ongoing in a number of counties and likely to be carried out at new locations in the coming years. Development of coastal areas for commercial, residential, industrial and recreational purposes also increasing at present e.g. industrial development at Cork Harbour. A study by Brennan et al (2010), modelling future urban expansion in the greater Dublin area, highlighted the significant environmental impacts on protected areas (SPA, SAC) and other areas of high biodiversity to be expected if current trends of urban development continue – particularly in coastal regions. Duriez et al. (2012) found that habitat changes in the Dutch wintering grounds of Oystercatchers caused a reduction in food stocks, leading to a long-term reduction in survival rates. Burton et al. (2006) found that redshank displaced redshank had difficulty maintaining mass in the first winter after displacement, with reduced survival rates as a result. These studies indicate the potential impacts on wader populations of wintering habitat loss, or displacement from previously relied-upon wintering habitat.
A143	*Calidris canutus*	G01	Marine Fish and Shellfish Harvesting (Professional, Recreational) causing reduction of species/prey populations and disturbance of species	PT	M	Inside the Member State	M	Inside the Member State	van Gils, J. A., Piersma, T., Dekinga, A., Spaans, B. and Kraan, C. (2006) Shellfish dredging pushes a flexible avian top predator out of a marine protected area. PLoS Biol. 4: 2399–2404. Burger, J. & Niles, L.J. (2017) Habitat use by Red Knots (Calidris canutus rufa): experiments with oyster racks and reefs on the beach and intertidal of Delaware bay, New Jersey. Estuarine, Coastal and Shelf Science. Burger (2018) Use of intertidal habitat by four species of shorebirds in an experimental array of oyster racks, reefs and controls on Delaware Bay, New Jersey: Avoidance of oyster racks. Science of the Total Environment 624: 1234-1243.	Various scientific references as to the negative effects of dredging for mussels and oysters. Direct effects upon KN as fisheries target prey species plus indirect effects upon the fishery non-target species/benthic communities.
A143	*Calidris canutus*	G19	Other Impacts from Marine Aquaculture, Including Infrastructure	PT	M	Inside the Member State	M	Inside the Member State	Gittings & O'Donoghue (2012) The effect of intertidal oyster cultivation (Crassostrea gigas) on the spatial distribution of waterbirds	Gittings & O'Donoghue (2012) found an 'possibly negative' (exclusion) effect of oyster trestles upon KN.
A143	*Calidris canutus*	N04	Sea-level and wave exposure changes due to climate change	T			M	Inside the Member State	Crowe, O., Lewis, L. J. & Anthony, S. (2013) Impacts of sea level rise on the birds and biodiversity of key coastal wetlands. Report to the Environmental Protection Agency. Draft. Austin, G. (2010) Waterbirds in MCCIP Annual Report Card 2010-11, MCCIP Science Review, 7pp. www.mccip.org.uk/arc	Climate change/sea level rise, considered high risk by Crowe et al (2013) as distribution is wholly intertidal.
A148	*Calidris maritima*	D01	Wind, wave and tidal power, including infrastructure	T			M	Inside the Member State	Percival, S. (2001). Assessment of the effects of off-shore wind farms on birds. ETSU Report W/13/00565/REP. DCENR (2010) Strategy for Renewable Energy: 2012 – 2020. Strategy Document. Department of Communications, Energy and Natural Resources, Dublin.	Most published literature concludes little determinable impacts of wind farms upon waders, nevertheless a risk is present especially during periods of migration, small-scale movements and e.g. during periods of movements en-masse (e.g. cold weather events). Birds are afforded a high degree of protection within SPA's, but areas outside/between SPA's are afforded much less protection. Percival (2001) notes that risk of collision with migrant waterfowl (i.e. wildfowl and wading birds) should be low/negligible if the wind farm is located several kilometres offshore. Exploitation of renewable energy on land and offshore is a high priority for Ireland in the coming years that will see significant increases in the number of terrestrial and offshore windfarms, with wave and tidal energy to follow. The EU Renewable Energy Directive (2009/28/EC) requires the EU to meet 20+% of energy needs with renewables by 2020; the target for Ireland has been set at 16% renewable by 2020. The National Renewable Energy Action Plan (DCENR 2010) has set out strategies for Ireland to meet the 16% target by 2020, the first of which is "Progressively more renewable electricity from onshore and offshore wind power for the domestic and export markets". In the recent National Planning Framework 'Ireland 2040', exploitation of our terrestrial and offshore renewable energy potential was repeatedly highlighted as a priority.
A148	*Calidris maritima*	F07	Sports, Tourism & Leisure Activities	PT	M	Inside the Member State	M	Inside the Member State	Lewis, L.J., Adcock, T. (2017) An assessment of the effects of kitesurfing and other activities on the waterbirds using DOllymount Strand. BirdWatch Ireland, Wicklow. Cutts, N., Phelps, A. & Burdon, D. (2009) Construction and waterfowl - defining sensitivity, response, impacts and guidance. Report to Humber INCA. Burton, N.H.K. & Evans, P.R. 1997. Survival and winter site-fidelity of Turnstones Arenaria interpres and Purple Sandpipers Calidris maritima in north-east England. Bird Study 44: 35-44.	Disturbance from humans walking with/without dogs is consistently found to the most disturbing activity at sites during assessments undertaken for SPA conservation objectives. Disturbance from shooting/hunting likely an issue at specific wetlands. Greenways, cycleways, walkways and similar access routes near important wintering waterbird sites are in various stages of the design, plan and consenting process in a number of locations around Ireland at present, including the Boyne Estuary, different parts of Dublin Bay, Wicklow coast, Wexford Harbour, Rosslare to Waterford, Waterford, Inch Island to Derry and more. If not adequately evaluated and developed these may cause significant increases in disturbance to wintering waterbirds. Lewis & Adcock (2017) found that waterbird activity decreased as recreational disturbance (walkers, dogs, kite surfers etc) increased on Dollymount Strand (Dublin Bay). Species highly localised distribution despite good stretches of seemingly suitable (undisturbed) rocky coastline available. Cutts et al (2009) assign TT as a high risk species in terms of disturbance; given similarities in habitat use to TT, and PS' limited range, impacts of disturbance arguably greater. Furthermore, species is very site faithful Burton & Evans (1997), thus increased risk to disturbance at limited range.
A148	*Calidris maritima*	F08	Modification of coastline, estuary and coastal conditions for development, use and protection of residential, commercial, industrial and recreational infrastructure and areas (including sea defence or coast protection works and infrastructures)	T			M	Inside the Member State	Lewis, L.J, Austin, G.m Boland, H., Frost, T., Crowe, O. & Tierney, D.T. (2017) Waterbird populations on non-estuarine coasts of Ireland: results of the 2015/16 Non-Estuarine Coastal Waterbird Survey (NEWS-III). Irish Birds 10:4, 511-522. Burton, N.H.K., Rehfisch, M.M., Clark, N.A. & Dodd, S.G. (2006) Impacts of sudden winter habitat loss on the body condition and survival of redshank Tringa totanus. Journal of Applied Ecology 43: 464-473. Brennan, Michael, Hochstrasser, Tamara, Shahumyan, Harutyun : Simulated future development of the Greater Dublin Area: consequences for protected areas and coastal flooding risk. Journal of Irish Urban Studies, 9 2010-12, pp.31-51. Duriez, O., Bruno, J.E., Choquet, R., Pradel, R., Klaassen, M. (2012) Comparing the seasonal survival of resident and migratory oystercatchers: carry-over effects of habitat quality and weather conditions. Oikos 121: 862-873.	Modification of coastline to prevent flooding and/or erosion is ongoing in a number of counties and likely to be carried out at new locations in the coming years. Development of coastal areas for commercial, residential, industrial and recreational purposes also increasing at present e.g. industrial development at Cork Harbour. A study by Brennan et al (2010), modelling future urban expansion in the greater Dublin area, highlighted the significant environmental impacts on protected areas (SPA, SAC) and other areas of high biodiversity to be expected if current trends of urban development continue – particularly in coastal regions. Duriez et al. (2012) found that habitat changes in the Dutch wintering grounds of Oystercatchers caused a reduction in food stocks, leading to a long-term reduction in survival rates. Burton et al. (2006) found that redshank displaced redshank had difficulty maintaining mass in the first winter after displacement, with reduced survival rates as a result. These studies indicate the potential impacts on wader populations of wintering habitat loss, or displacement from previously relied-upon wintering habitat.

A148	*Calidris maritima*	N04	Sea-level and wave exposure changes due to climate change	T			M	Inside the Member State	Crowe, O., Lewis, L. J. & Anthony, S. (2013) Impacts of sea level rise on the birds and biodiversity of key coastal wetlands. Report to the Environmental Protection Agency. Draft. Austin, G. (2010) Waterbirds in MCCIP Annual Report Card 2010-11, MCCIP Science Review, 7pp. www.mccip.org.uk/arc	Climate change/sea level rise, considered high risk by Crowe et al (2013) as distribution is wholly intertidal.
A137	*Charadrius hiaticula*	D01	Wind, wave and tidal power, including infrastructure	T			M	Inside the Member State	Percival, S. (2001). Assessment of the effects of off-shore wind farms on birds. ETSU Report W/13/00565/REP. DCENR (2010) Strategy for Renewable Energy: 2012 – 2020. Strategy Document. Department of Communications, Energy and Natural Resources, Dublin.	Most published literature concludes little determinable impacts of wind farms upon waders, nevertheless a risk is present especially during periods of migration, small-scale movements and e.g. during periods of movements en-masse (e.g. cold weather events). Birds are afforded a high degree of protection within SPA's, but areas outside/between SPA's are afforded much less protection. Percival (2001) notes that risk of collision with migrant waterfowl (i.e. wildfowl and wading birds) should be low/negligible if the wind farm is located several kilometres offshore. Exploitation of renewable energy on land and offshore is a high priority for Ireland in the coming years that will see significant increases in the number of terrestrial and offshore windfarms, with wave and tidal energy to follow. The EU Renewable Energy Directive (2009/28/EC) requires the EU to meet 20+% of energy needs with renewables by 2020; the target for Ireland has been set at 16% renewable by 2020. The National Renewable Energy Action Plan (DCENR 2010) has set out strategies for Ireland to meet the 16% target by 2020, the first of which is "Progressively more renewable electricity from onshore and offshore wind power for the domestic and export markets". In the recent National Planning Framework 'Ireland 2040', exploitation of our terrestrial and offshore renewable energy potential was repeatedly highlighted as a priority.
A137	*Charadrius hiaticula*	F07	Sports, Tourism & Leisure Activities	PT	M	Inside the Member State	M	Inside the Member State	Lewis, L.J., Adcock, T. (2017) An assessment of the effects of kitesurfing and other activities on the waterbirds using DOllymount Strand. BirdWatch Ireland, Wicklow. Cutts, N., Phelps, A. & Burdon, D. (2009) Construction and waterfowl - defining sensitivity, response, impacts and guidance. Report to Humber INCA.	Disturbance from humans walking with/without dogs is consistently found to the most disturbing activity at sites during assessments undertaken for SPA conservation objectives. Disturbance from shooting/hunting likely an issue at specific wetlands. Greenways, cycleways, walkways and similar access routes near important wintering waterbird sites are in various stages of the design, plan and consenting process in a number of locations around Ireland at present, including the Boyne Estuary, different parts of Dublin Bay, Wicklow coast, Wexford Harbour, Rosslare to Waterford, Waterford, Inch Island to Derry and more. If not adequately evaluated and developed these may cause significant increases in disturbance to wintering waterbirds. Lewis & Adcock (2017) found that waterbird activity decreased as recreational disturbance (walkers, dogs, kite surfers etc) increased on Dollymount Strand (Dublin Bay). Numbers of RP are reduced close to roads (Burton et al. 2002). Cutts et al (2009) ranked RP as moderate in their sensitivity to disturbance. Habitat use e.g. sandy areas, often coincides with areas used by walkers and dogs (e.g. Castlemaine). Highly site faithful to roosts; many traditional areas disturbed by walkers. Species often occurs (e.g. roosts) in sandy habitats (strands) where pressures from motorised vehicles will occur.
A137	*Charadrius hiaticula*	F08	Modification of coastline, estuary and coastal conditions for development, use and protection of residential, commercial, industrial and recreational infrastructure and areas (including sea defence or coast protection works and infrastructures)	T			M	Inside the Member State	Lewis, L.J, Austin, G.m Boland, H., Frost, T., Crowe, O. & Tierney, D.T. (2017) Waterbird populations on non-estuarine coasts of Ireland: results of the 2015/16 Non-Estuarine Coastal Waterbird Survey (NEWS-III). Irish Birds 10:4, 511-522. Burton, N.H.K., Rehfisch, M.M., Clark, N.A. & Dodd, S.G. (2006) Impacts of sudden winter habitat loss on the body condition and survival of redshank Tringa totanus. Journal of Applied Ecology 43: 464-473. Brennan, Michael, Hochstrasser, Tamara, Shahumyan, Harutyun : Simulated future development of the Greater Dublin Area: consequences for protected areas and coastal flooding risk. Journal of Irish Urban Studies, 9 2010-12, pp.31-51. Duriez, O., Bruno, J.E., Choquet, R., Pradel, R., Klaassen, M. (2012) Comparing the seasonal survival of resident and migratory oystercatchers: carry-over effects of habitat quality and weather conditions. Oikos 121: 862-873.	Modification of coastline to prevent flooding and/or erosion is ongoing in a number of counties and likely to be carried out at new locations in the coming years. Development of coastal areas for commercial, residential, industrial and recreational purposes also increasing at present e.g. industrial development at Cork Harbour. A study by Brennan et al (2010), modelling future urban expansion in the greater Dublin area, highlighted the significant environmental impacts on protected areas (SPA, SAC) and other areas of high biodiversity to be expected if current trends of urban development continue – particularly in coastal regions. Duriez et al. (2012) found that habitat changes in the Dutch wintering grounds of Oystercatchers caused a reduction in food stocks, leading to a long-term reduction in survival rates. Burton et al. (2006) found that redshank displaced redshank had difficulty maintaining mass in the first winter after displacement, with reduced survival rates as a result. These studies indicate the potential impacts on wader populations of wintering habitat loss, or displacement from previously relied-upon wintering habitat.
A137	*Charadrius hiaticula*	G19	Other Impacts from Marine Aquaculture, Including Infrastructure	PT	M	Inside the Member State	M	Inside the Member State	Gittings & O'Donoghue (2012) The effect of intertidal oyster cultivation (Crassostrea gigas) on the spatial distribution of waterbirds	Various scientific references as to the negative effects of dredging for mussels and oysters upon benthic sediments and communities. RP could be affected by indirect effects i.e. changes in benthic communities, but is assigned a low impact score as distribution is often not spatially coinciding with sandy shellfishery areas and lower risk of impacts than species such as OC, KN and BA. Gittings & O'Donoghue (2012) found an 'possibly negative' effect of oyster trestles upon this species.
A137	*Charadrius hiaticula*	N04	Sea-level and wave exposure changes due to climate change	T			M	Inside the Member State	Crowe, O., Lewis, L. J. & Anthony, S. (2013) Impacts of sea level rise on the birds and biodiversity of key coastal wetlands. Report to the Environmental Protection Agency. Draft. Austin, G. (2010) Waterbirds in MCCIP Annual Report Card 2010-11, MCCIP Science Review, 7pp. www.mccip.org.uk/arc	Implications of climate change/SLR . Considered a high risk species by Crowe et al. 2013) as species depends wholly on intertidal foraging resources.
A037	*Cygnus columbianus bewickii*	N01	Temperature changes (e.g. rise of temperature & extremes) due to climate change	PT	H	Both inside and outside the EU	H	Both inside and outside the EU	Crowe, O., Lewis, L. J. & Anthony, S. (2013) Impacts of sea level rise on the birds and biodiversity of key coastal wetlands. Report to the Environmental Protection Agency. Draft.	Implications of climate change. Various published references suggest that this species is at the edge of its range. Warmer winters may have led to species wintering closer to breeding grounds. Scored on best expert opinion.
A038	*Cygnus cygnus*	D01	Wind, wave and tidal power, including infrastructure	T			M	Inside the Member State	Larsen, J., & Clausen, P. (2002). Potential Wind Park Impacts on Whooper Swans in Winter: The Risk of Collision. Waterbirds: The International Journal of Waterbird Biology, 25, 327-330. Langston, R.H.W. & Pullan, J.D. 2003 Windfarms and birds: an analysis of the effects of wind farms on birds, and guidance on environmental assessment criteria and site selection issues. Tierney, N., Murray, A., Cummins, S., Egan, S. & Lauder, A. (2012) Bird Sensitivity Map for Ireland: a tool to aid planning and conservation in relation to Wind Energy. BirdWatch Ireland, Wicklow. Rees, E. (2012) Impacts of wind farms on swans and geese: a review. Wildfowl 62: 37-72. DCENR (2010) Strategy for Renewable Energy: 2012 – 2020. Strategy Document. Department of Communications, Energy and Natural Resources, Dublin. Government of Ireland (2018) National Planning Framework – Project Ireland 2040. Government of Ireland, Dublin.	Published literature suggests that swans are sensitive to wind farm developments and may incur higher rates of collision due to flight heights and lower manoeuvrability, compared to other species. Risk of displacement during and post-construction too (Rees 2012).Exploitation of renewable energy on land and offshore is a high priority for Ireland in the coming years that will see significant increases in the number of terrestrial and offshore windfarms, with wave and tidal energy to follow. The EU Renewable Energy Directive (2009/28/EC) requires the EU to meet 20+% of energy needs with renewables by 2020; the target for Ireland has been set at 16% renewable by 2020. The National Renewable Energy Action Plan (DCENR 2010) has set out strategies for Ireland to meet the 16% target by 2020, the first of which is "Progressively more renewable electricity from onshore and offshore wind power for the domestic and export markets". In the recent National Planning Framework 'Ireland 2040', exploitation of our terrestrial and offshore renewable energy potential was repeatedly highlighted as a priority.

A038	*Cygnus cygnus*	D06	Transmission of electricity and communications (cables)	T			M	Inside the Member State	Natura (2012) Ecology guidelines for electricity transmission projects: a standard approach to ecological impact assessment of high voltage transmission projects. Eirgrid 2012. Hall, C., Crowe, O., McElwaine, G., Einarsson, O., Calbrade, N. & Rees, E. (2016) Population size and breeding success of the Icelandic Whooper Swan Cygnus cygnus: results of the 2015 international census. Wildfowl 66: 75-97. Crowe, O., McElwaine, J.G., Boland, H. & Enlander, I.J. (2015) Whooper Cygnus cygnus and Bewick's C. columbianus bewickii Swans in Ireland: results of the International Swan Census, January 2015. Irish Birds 10: 151-158. https://www.irishtimes.com/news/ireland/irish-news/migrating-swans-electrocuted-by-power-lines-in-co-donegal-1.3287671. Eirgrid (2017) Outline and update of Eirgrid's consideration of the transmission technology options as presented to the independent expert group. Eirgrid report, Dublin.	Collision (e.g. power lines). Unknown and little reported in Ireland, though one notable case in November 2017 at Carrigans in Donegal, linked to local land use change. Over 15 birds died, almost all of which were juveniles. These birds are large and not particularly manoeuvrable in comparison with other birds. Eirgrid report (Natura 2012) list swans and geese species as high susceptibility to collision with powerlines. Note the lack of any systematic data collection for avian collisions with powerlines. A proposed interconnector between the ROI and NI would put overhead powerlines through counties Monaghan, Cavan and Meath in ROI, and Armagh and Tyrone in NI, potentially putting birds in these counties, or moving through, under threat.
A038	*Cygnus cygnus*	F07	Sports, Tourism & Leisure Activities	T			M	Inside the Member State	Rees, E.C., Bruce, J.H. & White, G.T. 2005. Factors affecting the behavioural responses of whooper swans (Cygnus c. cygnus) to various human activities. Biological Conservation 121: 369-382. Schneider-Jacoby, M., Frenzel, P.,Jacoby, H., Knotzsch, G. & Kolb, K.H. (1991) The impact of hunting disturbance on a protected species, the Whooper Swan Cygnus cygnus at Lake Constance. Wildfowl, Supplement 1, 378-382.	Disturbance from humans walking with/without dogs is consistently found to the most disturbing activity at sites during assessments undertaken for SPA conservation objectives. Specific wetlands also have issues with other forms of disturbance e.g. shooting, kite-surfing etc. Greenways, cycleways, walkways and similar access routes near important wintering waterbird sites are in various stages of the design, plan and consenting process in a number of locations around Ireland at present, including the Boyne Estuary, different parts of Dublin Bay, Wicklow coast, Wexford Harbour, Rosslare to Waterford, Waterford, Inch Island to Derry and more. If not adequately evaluated and developed these may cause significant increases in disturbance to wintering waterbirds. Previous studies have shown feeding behaviour affected by human disturbance (Rees et al. 2005).
A038	*Cygnus cygnus*	F28	Modification of flooding regimes, flood protection for residential or recreational development	T			M	Inside the Member State	Hall, C., Crowe, O., McElwaine, G., Einarsson, O., Calbrade, N. & Rees, E. (2016) Population size and breeding success of the Icelandic Whooper Swan Cygnus cygnus: results of the 2015 international census. Wildfowl 66: 75-97. Crowe, O., McElwaine, J.G., Boland, H. & Enlander, I.J. (2015) Whooper Cygnus cygnus and Bewick's C. columbianus bewickii Swans in Ireland: results of the International Swan Census, January 2015. Irish Birds 10: 151-158	Flooding in recent years has put flood defences high on the agenda across the country, with some coastal works under construction and plans to modify rivers, lakes and turloughs in the midlands, which may impact waterbirds in these areas.
A125	*Fulica atra*	J01	Mixed Source Pollution to Surface and Ground Waters (Limnic and Terrestrial)	PT	M	Inside the Member State	M	Inside the Member State	Tierney, D., O'Boyle, S. (2018) Water Quality in 2016: An Indicators Report. Environmental Protection Agency, Wexford. Tománková, I., Harrod, C., Fox, A. D., & Reid, N. (2013). Chlorophyll-aconcentrations and macroinvertebrate declines coincide with the collapse of overwintering diving duck populations in a large eutrophic lake. Freshwater Biology, 59(2), 249–256. Tománková, I., Boland, H., Reid, N. & Fox, A.D. 2013. Assessing the extent to which temporal changes in waterbird community composition are driven by either local, regional or global factors. Aquatic Conservation: Marine and Freshwater Ecosystems 23: 343-355	Pollution to inland waterbodies, includes eutrophication. Effects largely unknown. Best expert opinion. Tierney & O'Boyle (2018) report that a significant proportion of sites still have too much nutrients - a quarter of rivers and lakes, and a third of estuaries and coastal waters are failing environmental quality assessment criteria. High levels of phosphorus in the north-east of the country are impacting on lake water quality , while high nitrogen concentrations in the south and south-east are impacting on the quality of many of our estuaries.
A125	*Fulica atra*	N01	Temperature changes (e.g. rise of temperature & extremes) due to climate change	PT	M	Both inside and outside the EU	M	Both inside and outside the EU	Pavón-Jordán, et al. (2018/2019) Short- and long-term changes in the distribution of abundances linked to variation in winter weather conditions in Europe differ between species with different habitat preferences. Diversity and Distributions.	Research by Pavon-Jordan et al (2018) indicates that deep-water species such as Coot have exhibited a NE shift in distribution in Europe in response to higher NAO index values.
A002	*Gavia arctica*	G01	Marine Fish and Shellfish Harvesting (Professional, Recreational) causing reduction of species/prey populations and disturbance of species	PT	M	Inside the Member State	M	Inside the Member State		Potential competition for a common resource. No specific Irish studies so scores were based on published literature and best expert opinion.
A003	*Gavia immer*	D01	Wind, wave and tidal power, including infrastructure	T			M	Inside the Member State	Ramiro, B. & Cummins, S. (2016) Feasibility study of marine birds sensitivity mapping for offshore renewable energy developments in Ireland. Birdwatch Ireland, Kilcoole, Wicklow. Garthe, S. & Hüppop, O. 2004. Scaling possible adverse effects of marine wind farms on seabirds: developing and applying a vulnerability index. Journal of Applied Ecology, 41: 724-734. McCluskie, A.E., Langston, R.H.W. & Wilkinson, N.I. 2012. Birds and wave & tidal stream energy: an ecological review. RSPB Research Report No. 42. Sandy, Bedfordshire, UK. DCENR (2010) Strategy for Renewable Energy: 2012 – 2020. Strategy Document. Department of Communications, Energy and Natural Resources, Dublin. Government of Ireland (2018) National Planning Framework – Project Ireland 2040. Government of Ireland, Dublin.	Ramiro & Cummins 2016 found the species to be highly sensitive to disturbance/displacement from offshore windfarms, of moderate sensitivity to tidal turbines and high sensitivity to wave turbines. Many offshore windfarms are in various stages of the planning and consenting process in the Irish sea. Exploitation of renewable energy on land and offshore is a high priority for Ireland in the coming years that will see significant increases in the number of terrestrial and offshore windfarms, with wave and tidal energy to follow. The EU Renewable Energy Directive (2009/28/EC) requires the EU to meet 20+% of energy needs with renewables by 2020; the target for Ireland has been set at 16% renewable by 2020. The National Renewable Energy Action Plan (DCENR 2010) has set out strategies for Ireland to meet the 16% target by 2020, the first of which is "Progressively more renewable electricity from onshore and offshore wind power for the domestic and export markets". In the recent National Planning Framework 'Ireland 2040', exploitation of our terrestrial and offshore renewable energy potential was repeatedly highlighted as a priority. Note that in some areas, cumulative impacts may be of particular concern. Published literature suggests that divers are highly sensitive but as a widespread species impact score assigned is lower than for other divers. Scored on best expert opinion.
A003	*Gavia immer*	G01	Marine Fish and Shellfish Harvesting (Professional, Recreational) causing reduction of species/prey populations and disturbance of species	PT	M	Inside the Member State	M	Inside the Member State		Potential competition for a common resource. No specific Irish studies so scores were based on published literature and best expert opinion.

A001	*Gavia stellata*	D01	Wind, wave and tidal power, including infrastructure	T			M	Inside the Member State	Ramiro, B. & Cummins, S. (2016) Feasibility study of marine birds sensitivity mapping for offshore renewable energy developments in Ireland. Birdwatch Ireland, Kilcoole, Wicklow. Garthe, S. & Hüppop, O. 2004. Scaling possible adverse effects of marine wind farms on seabirds: developing and applying a vulnerability index. Journal of Applied Ecology, 41: 724-734. McCluskie, A.E., Langston, R.H.W. & Wilkinson, N.I. 2012. Birds and wave & tidal stream energy: an ecological review. RSPB Research Report No. 42. Sandy, Bedfordshire, UK. Furness, B. & Wade, H. (2012) Vulnerability of Scottish seabirds to offshore wind farms. Report to the Scottish Government. DCENR (2010) Strategy for Renewable Energy: 2012 – 2020. Strategy Document. Department of Communications, Energy and Natural Resources, Dublin. Government of Ireland (2018) National Planning Framework – Project Ireland 2040. Government of Ireland, Dublin.	Ramiro & Cummins 2016 found the species to be highly sensitive to disturbance/displacement from offshore windfarms, of moderate sensitivity to tidal turbines and wave turbines. Knowledge of RH distribution in Ireland is not comprehensive, nor do we know what the future rate of windfarm development in Ireland will be, though many offshore windfarms are in various stages of the planning and consenting process in the Irish sea. Published literature suggests that divers are highly sensitive. Exploitation of renewable energy on land and offshore is a high priority for Ireland in the coming years that will see significant increases in the number of terrestrial and offshore windfarms, with wave and tidal energy to follow. The EU Renewable Energy Directive (2009/28/EC) requires the EU to meet 20+% of energy needs with renewables by 2020; the target for Ireland has been set at 16% renewable by 2020. The National Renewable Energy Action Plan (DCENR 2010) has set out strategies for Ireland to meet the 16% target by 2020, the first of which is "Progressively more renewable electricity from onshore and offshore wind power for the domestic and export markets". In the recent National Planning Framework 'Ireland 2040', exploitation of our terrestrial and offshore renewable energy potential was repeatedly highlighted as a priority. Note that in some areas, cumulative impacts may be of particular concern.
A001	*Gavia stellata*	G01	Marine Fish and Shellfish Harvesting (Professional, Recreational) causing reduction of species/prey populations and disturbance of species	PT	M	Inside the Member State	M	Inside the Member State		Potential competition for a common resource. No specific Irish studies so scores were based on published literature and best expert opinion.
A130	*Haematopus ostralegus*	D01	Wind, wave and tidal power, including infrastructure	T			M	Inside the Member State	Percival, S. (2001). Assessment of the effects of off-shore wind farms on birds. ETSU Report W/13/00565/REP. DCENR (2010) Strategy for Renewable Energy: 2012 – 2020. Strategy Document. Department of Communications, Energy and Natural Resources, Dublin. Government of Ireland (2018) National Planning Framework – Project Ireland 2040. Government of Ireland, Dublin.	Most published literature concludes little determinable impacts of wind farms upon waders, nevertheless a risk is present especially during periods of migration, small-scale movements and e.g. during periods of movements en-masse (e.g. cold weather events). Birds are afforded a high degree of protection within SPA's, but areas outside/between SPA's are afforded much less protection. Percival (2001) notes that risk of collision with migrant waterfowl (i.e. wildfowl and wading birds) should be low/negligible if the wind farm is located several kilometres offshore. Exploitation of renewable energy on land and offshore is a high priority for Ireland in the coming years that will see significant increases in the number of terrestrial and offshore windfarms, with wave and tidal energy to follow. The EU Renewable Energy Directive (2009/28/EC) requires the EU to meet 20+% of energy needs with renewables by 2020; the target for Ireland has been set at 16% renewable by 2020. The National Renewable Energy Action Plan (DCENR 2010) has set out strategies for Ireland to meet the 16% target by 2020, the first of which is "Progressively more renewable electricity from onshore and offshore wind power for the domestic and export markets". In the recent National Planning Framework 'Ireland 2040', exploitation of our terrestrial and offshore renewable energy potential was repeatedly highlighted as a priority.
A130	*Haematopus ostralegus*	F07	Sports, Tourism & Leisure Activities	PT	M	Inside the Member State	M	Inside the Member State	Lewis, L.J., Adcock, T. (2017) An assessment of the effects of kitesurfing and other activities on the waterbirds using DOllymount Strand. BirdWatch Ireland, Wicklow. Nairn, R.G.W. (2017) Factors affecting the choice of roost site by wintering waders in South Dublin Bay, Ireland. Irish Birds 10: 527-534. Cutts, N., Phelps, A. & Burdon, D. (2009) Construction and waterfowl - defining sensitivity, response, impacts and guidance. Report to Humber INCA. Goss-Custard, J. D. and Verboven, N. 1993. Disturbance and feeding shorebirds on the Exe estuary. - Wader Study Group Bulletin 68, Special Issue: 59-66.	Walking of humans (with/without dogs) is consistently found to be the most disturbing activity at sites during the assessments undertaken for SPA conservation objectives. For OC, a random check of sites/subsites show those with numbers ranked as 'high' or 'very high' can be subject to a range of disturbing activities scored as moderately disturbing. Previous study found feeding rates of OC reduced by 33%-50% as a result of human disturbance (Goss-Custard & Verboven, 1993). Species often occurs (e.g. roosts) in sandy habitats (strands) where pressures from motorised vehicles will occur. Disturbance from shooting/hunting likely an issue at specific wetlands. Greenways, cycleways, walkways and similar access routes near important wintering waterbird sites are in various stages of the design, plan and consenting process in a number of locations around Ireland at present, including the Boyne Estuary, different parts of Dublin Bay, Wicklow coast, Wexford Harbour, Rosslare to Waterford, Waterford, Inch Island to Derry and more. If not adequately evaluated and developed these may cause significant increases in disturbance to wintering waterbirds. Lewis & Adcock (2017) found that waterbird activity decreased as recreational disturbance (walkers, dogs, kite surfers etc) increased on Dollymount Strand (Dublin Bay).
A130	*Haematopus ostralegus*	F08	Modification of coastline, estuary and coastal conditions for development, use and protection of residential, commercial, industrial and recreational infrastructure and areas (including sea defence or coast protection works and infrastructures)	T			M	Inside the Member State	Lewis, L.J, Austin, G.M Boland, H., Frost, T., Crowe, O. & Tierney, D.T. (2017) Waterbird populations on non-estuarine coasts of Ireland: results of the 2015/16 Non-Estuarine Coastal Waterbird Survey (NEWS-III). Irish Birds 10:4, 511-522. Burton, N.H.K., Rehfisch, M.M., Clark, N.A. & Dodd, S.G. (2006) Impacts of sudden winter habitat loss on the body condition and survival of redshank Tringa totanus. Journal of Applied Ecology 43: 464-473. Brennan, Michael, Hochstrasser, Tamara, Shahumyan, Harutyun : Simulated future development of the Greater Dublin Area: consequences for protected areas and coastal flooding risk. Journal of Irish Urban Studies, 9 2010-12, pp.31-51. Duriez, O., Bruno, J.E., Choquet, R., Pradel, R., Klaassen, M. (2012) Comparing the seasonal survival of resident and migratory oystercatchers: carry-over effects of habitat quality and weather conditions. Oikos 121: 862-873.	Modification of coastline to prevent flooding and/or erosion is ongoing in a number of counties and likely to be carried out at new locations in the coming years. Development of coastal areas for commercial, residential, industrial and recreational purposes also increasing at present e.g. industrial development at Cork Harbour. A study by Brennan et al (2010), modelling future urban expansion in the greater Dublin area, highlighted the significant environmental impacts on protected areas (SPA, SAC) and other areas of high biodiversity to be expected if current trends of urban development continue – particularly in coastal regions. Duriez et al. (2012) found that habitat changes in the Dutch wintering grounds of Oystercatchers caused a reduction in food stocks, leading to a long-term reduction in survival rates. Burton et al. (2006) found that redshank displaced redshank had difficulty maintaining mass in the first winter after displacement, with reduced survival rates as a result. These studies indicate the potential impacts on wader populations of wintering habitat loss, or displacement from previously relied-upon wintering habitat.

A130	*Haematopus ostralegus*	G01	Marine Fish and Shellfish Harvesting (Professional, Recreational) causing reduction of species/prey populations and disturbance of species	PT	M	Inside the Member State	M	Inside the Member State	Dias, M. (2008) Factors influencing the use of intertidal areas by waders: implications for conservation. PhD Thesis. University of Lisbon. Atkinson, P. W., Maclean, I. M. D. and Clark, N. A. (2010) Impacts of shellfisheries and nutrient inputs on waterbird communities in the Wash, England. J. Appl. Ecol. 47: 191–199. BirdLife International (2010) Commercial shellfisheries can negatively impact migratory waterbirds. Presented as part of the BirdLife State of the world's birds website. Available from: http://www.birdlife.org/datazone/sowb/casestudy/23. Checked: 21/08/2013. Ens, B. J. (2006) The conflict between shellfisheries and migratory waterbirds in the Dutch Wadden Sea. Pp. 806–811 in G. C. Boere, C. A. Galbraith and D. A. Stroud, eds, Waterbirds around the world. Edinburgh: The Stationary Office.	Various scientific references as to the negative effects of dredging for mussels and oysters as well as the much-publicised crash in the OC populations in the Wadden Sea following commercial shell fishing. Impacts may be the direct effects upon OC as fisheries target prey species (i.e. competition for a common resource), plus potential indirect effects upon the fishery non-target species/benthic communities. Also relates to the hand collection of molluscs including mussels. This can constitute a direct removal of prey species (mussels) of the Oystercatcher. Likely low levels but this activity is unmanaged at sites and large groups of collectors may cause an impact.
A130	*Haematopus ostralegus*	G19	Other Impacts from Marine Aquaculture, Including Infrastructure	PT	M	Inside the Member State	M	Inside the Member State	Caldow, R. W. G., Beadsman, H. A., McGroarty, S., Kaiser, M. J., Goss-Custard, J. D., Mould, K. & Wilson, A. (2003) effects of intertidal mussel cultivation on bird assemblages. Marine Ecology Progress Series 259, 173-183. Gittings & O'Donoghue (2012) The effect of intertidal oyster cultivation (Crassostrea gigas) on the spatial distribution of waterbirds	Gittings & O'Donoghue (2012) found an 'neutral/ possibly positive' effect of oyster trestles upon OC. Neutral effect found by Caldow et al. 2003.
A862	*Hydrocoleous minutus*	D01	Wind, wave and tidal power, including infrastructure	T			M	Inside the Member State	Ramiro, B. & Cummins, S. (2016) Feasibility study of marine birds sensitivity mapping for offshore renewable energy developments in Ireland. Birdwatch Ireland, Kilcoole, Wicklow. DCENR (2010) Strategy for Renewable Energy: 2012 – 2020. Strategy Document. Department of Communications, Energy and Natural Resources, Dublin.. Government of Ireland (2018) National Planning Framework – Project Ireland 2040. Government of Ireland, Dublin.	Ramiro & Cummins (2016) assigned a very high sensitivity score to Little Gull in relation to collision with offshore wind farms, but very low sensitivity to displacement/disturbance by offshore windfarms, or impact by wave and tidal devices. Exploitation of renewable energy on land and offshore is a high priority for Ireland in the coming years that will see significant increases in the number of terrestrial and offshore windfarms, with wave and tidal energy to follow. The EU Renewable Energy Directive (2009/28/EC) requires the EU to meet 20+% of energy needs with renewables by 2020; the target for Ireland has been set at 16% renewable by 2020. The National Renewable Energy Action Plan (DCENR 2010) has set out strategies for Ireland to meet the 16% target by 2020, the first of which is "Progressively more renewable electricity from onshore and offshore wind power for the domestic and export markets". In the recent National Planning Framework 'Ireland 2040', exploitation of our terrestrial and offshore renewable energy potential was repeatedly highlighted as a priority.
A895	*Larus argentatus argenteus*	D01	Wind, wave and tidal power, including infrastructure	T			M	Inside the Member State	McCluskie, A.E., Langston, R.H.W. & Wilkinson, N.I. 2012. Birds and wave & tidal stream energy: an ecological review. RSPB Research Report No. 42. Sandy, Bedfordshire, UK. Garthe, S. & Hüppop, O. 2004. Scaling possible adverse effects of marine wind farms on seabirds: developing and applying a vulnerability index. Journal of Applied Ecology, 41: 724-734. Furness, B. & Wade, H. (2012) Vulnerability of Scottish seabirds to offshore wind farms. Report to the Scottish Government. Ramiro, B. & Cummins, S. (2016) Feasibility study of marine birds sensitivity mapping for offshore renewable energy developments in Ireland. Birdwatch Ireland, Kilcoole, Wicklow. DCENR (2010) Strategy for Renewable Energy: 2012 – 2020. Strategy Document. Department of Communications, Energy and Natural Resources, Dublin. Government of Ireland (2018) National Planning Framework – Project Ireland 2040. Government of Ireland, Dublin.	Garthe & Huppop (2004) assigned a relatively low sensitivity score based on attributes such as flight height, manoeuvrability, habitat use etc.. Hence a low impact score assigned. Furness & Wade (2012) assigned a low disturbance score to gulls but a high score in relation to potential collision impacts. Ramiro & Cummins (2016) assigned a very high sensitivity score to HG in relation to collision with offshore wind farms, but very low sensitivity to displacement/disturbance by offshore windfarms, or impact by wave and tidal devices. Exploitation of renewable energy on land and offshore is a high priority for Ireland in the coming years that will see significant increases in the number of terrestrial and offshore windfarms, with wave and tidal energy to follow. The EU Renewable Energy Directive (2009/28/EC) requires the EU to meet 20+% of energy needs with renewables by 2020; the target for Ireland has been set at 16% renewable by 2020. The National Renewable Energy Action Plan (DCENR 2010) has set out strategies for Ireland to meet the 16% target by 2020, the first of which is "Progressively more renewable electricity from onshore and offshore wind power for the domestic and export markets". In the recent National Planning Framework 'Ireland 2040', exploitation of our terrestrial and offshore renewable energy potential was repeatedly highlighted as a priority.
A489	*Larus fuscus*	D01	Wind, wave and tidal power, including infrastructure	T			M	Inside the Member State	McCluskie, A.E., Langston, R.H.W. & Wilkinson, N.I. 2012. Birds and wave & tidal stream energy: an ecological review. RSPB Research Report No. 42. Sandy, Bedfordshire, UK. Garthe, S. & Hüppop, O. 2004. Scaling possible adverse effects of marine wind farms on seabirds: developing and applying a vulnerability index. Journal of Applied Ecology, 41: 724-734. Furness, B. & Wade, H. (2012) Vulnerability of Scottish seabirds to offshore wind farms. Report to the Scottish Government. Ramiro, B. & Cummins, S. (2016) Feasibility study of marine birds sensitivity mapping for offshore renewable energy developments in Ireland. Birdwatch Ireland, Kilcoole, Wicklow. DCENR (2010) Strategy for Renewable Energy: 2012 – 2020. Strategy Document. Department of Communications, Energy and Natural Resources, Dublin. Government of Ireland (2018) National Planning Framework – Project Ireland 2040. Government of Ireland, Dublin.	Garthe & Huppop (2004) assigned a relatively low sensitivity score based on attributes such as flight height, manoeuvrability, habitat use etc.. Hence a low impact score assigned. Furness & Wade (2012) assigned a low disturbance score to gulls but a high score in relation to potential collision impacts. Ramiro & Cummins (2016) assigned a very high sensitivity score to HG in relation to collision with offshore wind farms, but very low sensitivity to displacement/disturbance by offshore windfarms, or impact by wave and tidal devices. Exploitation of renewable energy on land and offshore is a high priority for Ireland in the coming years that will see significant increases in the number of terrestrial and offshore windfarms, with wave and tidal energy to follow. The EU Renewable Energy Directive (2009/28/EC) requires the EU to meet 20+% of energy needs with renewables by 2020; the target for Ireland has been set at 16% renewable by 2020. The National Renewable Energy Action Plan (DCENR 2010) has set out strategies for Ireland to meet the 16% target by 2020, the first of which is "Progressively more renewable electricity from onshore and offshore wind power for the domestic and export markets". In the recent National Planning Framework 'Ireland 2040', exploitation of our terrestrial and offshore renewable energy potential was repeatedly highlighted as a priority.

A157	*Limosa lapponica*	D01	Wind, wave and tidal power, including infrastructure	T			M	Inside the Member State	Percival, S. (2001). Assessment of the effects of off-shore wind farms on birds. ETSU Report W/13/00565/REP. DCENR (2010) Strategy for Renewable Energy: 2012 – 2020. Strategy Document. Department of Communications, Energy and Natural Resources, Dublin.	Most published literature concludes little determinable impacts of wind farms upon waders, nevertheless a risk is present especially during periods of migration, small-scale movements and e.g. during periods of movements en-masse (e.g. cold weather events). Birds are afforded a high degree of protection within SPA's, but areas outside/between SPA's are afforded much less protection. Percival (2001) notes that risk of collision with migrant waterfowl (i.e. wildfowl and wading birds) should be low/negligible if the wind farm is located several kilometres offshore. Exploitation of renewable energy on land and offshore is a high priority for Ireland in the coming years that will see significant increases in the number of terrestrial and offshore windfarms, with wave and tidal energy to follow. The EU Renewable Energy Directive (2009/28/EC) requires the EU to meet 20+% of energy needs with renewables by 2020; the target for Ireland has been set at 16% renewable by 2020. The National Renewable Energy Action Plan (DCENR 2010) has set out strategies for Ireland to meet the 16% target by 2020, the first of which is "Progressively more renewable electricity from onshore and offshore wind power for the domestic and export markets". In the recent National Planning Framework 'Ireland 2040', exploitation of our terrestrial and offshore renewable energy potential was repeatedly highlighted as a priority.
A157	*Limosa lapponica*	F07	Sports, Tourism & Leisure Activities	PT	M	Inside the Member State	M	Inside the Member State	Lewis, L.J., Adcock, T. (2017) An assessment of the effects of kitesurfing and other activities on the waterbirds using Dolly mount Strand. BirdWatch Ireland, Wicklow. Nairn, R.G.W. (2017) Factors affecting the choice of roost site by wintering waders in South Dublin Bay, Ireland. Irish Birds 10: 527-534. Cutts, N., Phelps, A. & Burdon, D. (2009) Construction and waterfowl - defining sensitivity, response, impacts and guidance. Report to Humber INCA.	Disturbance from humans walking with/without dogs is consistently found to the most disturbing activity at sites during assessments undertaken for SPA conservation objectives. Disturbance from shooting/hunting likely an issue at specific wetlands. Greenways, cycleways, walkways and similar access routes near important wintering waterbird sites are in various stages of the design, plan and consenting process in a number of locations around Ireland at present, including the Boyne Estuary, different parts of Dublin Bay, Wicklow coast, Wexford Harbour, Rosslare to Waterford, Waterford, Inch Island to Derry and more. If not adequately evaluated and developed these may cause significant increases in disturbance to wintering waterbirds. Lewis & Adcock (2017) found that waterbird activity decreased as recreational disturbance (walkers, dogs, kite surfers etc) increased on Dollymount Strand (Dublin Bay). Cutts et al (2009) ranked BA as moderate in their sensitivity to disturbance; Some previous studies found BA to be more sensitive than other waders.
A157	*Limosa lapponica*	F08	Modification of coastline, estuary and coastal conditions for development, use and protection of residential, commercial, industrial and recreational infrastructure and areas (including sea defence or coast protection works and infrastructures)	T			M	Inside the Member State	Burton, N.H.K., Rehfisch, M.M., Clark, N.A. & Dodd, S.G. (2006) Impacts of sudden winter habitat loss on the body condition and survival of redshank Tringa totanus. Journal of Applied Ecology 43: 464-473. Brennan, Michael, Hochstrasser, Tamara, Shahumyan, Harutyun : Simulated future development of the Greater Dublin Area: consequences for protected areas and coastal flooding risk. Journal of Irish Urban Studies, 9 2010-12, pp.31-51. Duriez, O., Bruno, J.E., Choquet, R., Pradel, R., Klaassen, M. (2012) Comparing the seasonal survival of resident and migratory oystercatchers: carry-over effects of habitat quality and weather conditions. Oikos 121: 862-873.	Modification of coastline to prevent flooding and/or erosion is ongoing in a number of counties and likely to be carried out at new locations in the coming years. Development of coastal areas for commercial, residential, industrial and recreational purposes also increasing at present e.g. industrial development at Cork Harbour. A study by Brennan et al (2010), modelling future urban expansion in the greater Dublin area, highlighted the significant environmental impacts on protected areas (SPA, SAC) and other areas of high biodiversity to be expected if current trends of urban development continue – particularly in coastal regions. Duriez et al. (2012) found that habitat changes in the Dutch wintering grounds of Oystercatchers caused a reduction in food stocks, leading to a long-term reduction in survival rates. Burton et al. (2006) found that redshank displaced redshank had difficulty maintaining mass in the first winter after displacement, with reduced survival rates as a result. These studies indicate the potential impacts on wader populations of wintering habitat loss, or displacement from previously relied-upon wintering habitat.
A157	*Limosa lapponica*	G01	Marine Fish and Shellfish Harvesting (Professional, Recreational) causing reduction of species/prey populations and disturbance of species	PT	M	Inside the Member State	M	Inside the Member State		Incorporates bait digging (very widespread) and disturbance from those working at aquaculture sites i.e. activities surrounding the harvesting of shellfish etc.
A157	*Limosa lapponica*	G19	Other Impacts from Marine Aquaculture, Including Infrastructure	PT	M	Inside the Member State	M	Inside the Member State	Gittings & O'Donoghue (2012) The effect of intertidal oyster cultivation (Crassostrea gigas) on the spatial distribution of waterbirds	Gittings & O'Donoghue (2012) found an 'negative' effect of oyster trestles upon BA. This wader often feeds along the lower shore (tide edge) therefore the trestles may be obstructing this distribution pattern. Various scientific references as to the negative effects of dredging for mussels and oysters upon benthic sediments and communities. BA could be affected by indirect effects i.e. changes in benthic communities but not as affected as species such as OC, KN, BA therefore assigned a low impact score.
A157	*Limosa lapponica*	N04	Sea-level and wave exposure changes due to climate change	T			M	Inside the Member State	Crowe, O., Lewis, L. J. & Anthony, S. (2013) Impacts of sea level rise on the birds and biodiversity of key coastal wetlands. Report to the Environmental Protection Agency. Draft. Austin, G. (2010) Waterbirds in MCCIP Annual Report Card 2010-11, MCCIP Science Review, 7pp. www.mccip.org.uk/arc	Climate change/sea level rise, considered high risk by Crowe et al (2013) as distribution is wholly intertidal.
A156	*Limosa limosa*	D01	Wind, wave and tidal power, including infrastructure	T			M	Inside the Member State	Percival, S. (2001). Assessment of the effects of off-shore wind farms on birds. ETSU Report W/13/00565/REP. DCENR (2010) Strategy for Renewable Energy: 2012 – 2020. Strategy Document. Department of Communications, Energy and Natural Resources, Dublin. G	Most published literature concludes little determinable impacts of wind farms upon waders, nevertheless a risk is present especially during periods of migration, small-scale movements and e.g. during periods of movements en-masse (e.g. cold weather events). Birds are afforded a high degree of protection within SPA's, but areas outside/between SPA's are afforded much less protection. Percival (2001) notes that risk of collision with migrant waterfowl (i.e. wildfowl and wading birds) should be low/negligible if the wind farm is located several kilometres offshore. Exploitation of renewable energy on land and offshore is a high priority for Ireland in the coming years that will see significant increases in the number of terrestrial and offshore windfarms, with wave and tidal energy to follow. The EU Renewable Energy Directive (2009/28/EC) requires the EU to meet 20+% of energy needs with renewables by 2020; the target for Ireland has been set at 16% renewable by 2020. The National Renewable Energy Action Plan (DCENR 2010) has set out strategies for Ireland to meet the 16% target by 2020, the first of which is "Progressively more renewable electricity from onshore and offshore wind power for the domestic and export markets". In the recent National Planning Framework 'Ireland 2040', exploitation of our terrestrial and offshore renewable energy potential was repeatedly highlighted as a priority.

A156	*Limosa limosa*	F07	Sports, Tourism & Leisure Activities	PT	M	Inside the Member State	M	Inside the Member State	Lewis, L.J., Adcock, T. (2017) An assessment of the effects of kitesurfing and other activities on the waterbirds using Dolly mount Strand. BirdWatch Ireland, WIcklow.Cutts, N., Phelps, A. & Burdon, D. (2009) Construction and waterfowl - defining sensitivity, response, impacts and guidance. Report to Humber INCA. Jensen, F.P., Béchet, A. & Wymenga, E. (Compilers) 2008. International Single Species Action Plan for the Conservation of Black-tailed Godwit Limosa l. limosa & L. l. islandica. AEWA Technical Series No. 37. Bonn, Germany.	Disturbance from humans walking with/without dogs is consistently found to the most disturbing activity at sites during assessments undertaken for SPA conservation objectives. Disturbance from shooting/hunting likely an issue at specific wetlands. Greenways, cycleways, walkways and similar access routes near important wintering waterbird sites are in various stages of the design, plan and consenting process in a number of locations around Ireland at present, including the Boyne Estuary, different parts of Dublin Bay, Wicklow coast, Wexford Harbour, Rosslare to Waterford, Waterford, Inch Island to Derry and more. If not adequately evaluated and developed these may cause significant increases in disturbance to wintering waterbirds. Lewis & Adcock (2017) found that waterbird activity decreased as recreational disturbance (walkers, dogs, kite surfers etc) increased on Dollymount Strand (Dublin Bay). One of the least responsive waders to disturbance during the winter showing signs of habituation. Given positive population trend, species appears to co-exist with current levels of activity at sites although effects will be greater at some sites than others. Hence low score assigned. Decision supported by species Man. Plan
A156	*Limosa limosa*	F08	Modification of coastline, estuary and coastal conditions for development, use and protection of residential, commercial, industrial and recreational infrastructure and areas (including sea defence or coast protection works and infrastructures)	T			M	Inside the Member State	Brennan, Michael, Hochstrasser, Tamara, Shahumyan, Harutyun : Simulated future development of the Greater Dublin Area: consequences for protected areas and coastal flooding risk. Journal of Irish Urban Studies, 9 2010-12, pp.31-51. Duriez, O., Bruno, J.E., Choquet, R., Pradel, R., Klaassen, M. (2012) Comparing the seasonal survival of resident and migratory oystercatchers: carry-over effects of habitat quality and weather conditions. Oikos 121: 862-873.	Modification of coastline to prevent flooding and/or erosion is ongoing in a number of counties and likely to be carried out at new locations in the coming years. Development of coastal areas for commercial, residential, industrial and recreational purposes also increasing at present e.g. industrial development at Cork Harbour. A study by Brennan et al (2010), modelling future urban expansion in the greater Dublin area, highlighted the significant environmental impacts on protected areas (SPA, SAC) and other areas of high biodiversity to be expected if current trends of urban development continue – particularly in coastal regions.
A156	*Limosa limosa*	G19	Other Impacts from Marine Aquaculture, Including Infrastructure	PT	M	Inside the Member State	M	Inside the Member State	EU (2009) Management plan for Black-tailed Godwit 2009-2011.	Gittings & O'Donoghue (2012) found an 'negative' effect of oyster trestles upon BW, but limitations in analysis gave a low level of confidence in predictions. This waders preference for muddier sediments means that spatial overlap is unlikely at some sites (e.g. Dungarvan) but likely at others (e.g. Bannow)
A156	*Limosa limosa*	N04	Sea-level and wave exposure changes due to climate change	T			M	Inside the Member State	Crowe, O., Lewis, L. J. & Anthony, S. (2013) Impacts of sea level rise on the birds and biodiversity of key coastal wetlands. Report to the Environmental Protection Agency. Draft. Austin, G. (2010) Waterbirds in MCCIP Annual Report Card 2010-11, MCCIP Science Review, 7pp. www.mccip.org.uk/arc	Implications of climate change/SLR . Considered medium risk as distribution is mainly intertidal but species has capability to forage terrestrially and in other habitats (inland wetlands).
A152	*Lymnocryptes minimus*	B01	Conversion to forest from other land uses, or afforestation (excluding drainage)	T			M	Inside the Member State	Lewis, L., Cummins, S., Crowe, O., Duggan, O., Lusby, J. (2018) Bird Sensitivity Mapping for Forestry - a tool and guidance for strategic planning of new forestry in Ireland. Phase 1 - Scoping. BirdWatch Ireland, Wicklow.	Little known about this species in Ireland. Low numbers and scattered distribution. Not scored in Lewis et al (2018) but Snipe was scored as being of high risk through direct habitat loss and fragmentation, with draining of land for afforestation reducing the availability of damp grasslands.
A152	*Lymnocryptes minimus*	G07	Hunting	PT	M	Inside the Member State	M	Inside the Member State	Wildlife (Wild Birds) (open Seasons) Orders 1979 to 2012. (S.I 402 of 2012)	A species on the open season list therefore this constitutes a direct pressure upon the population. Note that bag numbers are not mandatory and therefore not collated in Ireland, meaning it is not possible to quantify the extent of this pressure/threat on the population.
A855	*Mareca penelope*	D01	Wind, wave and tidal power, including infrastructure	T			M	Inside the Member State	DCENR (2010) Strategy for Renewable Energy: 2012 – 2020. Strategy Document. Department of Communications, Energy and Natural Resources, Dublin. Government of Ireland (2018) National Planning Framework – Project Ireland 2040. Government of Ireland, Dublin.	Scored on best expert opinion. Exploitation of renewable energy on land and offshore is a high priority for Ireland in the coming years that will see significant increases in the number of terrestrial and offshore windfarms, with wave and tidal energy to follow. The EU Renewable Energy Directive (2009/28/EC) requires the EU to meet 20+% of energy needs with renewables by 2020; the target for Ireland has been set at 16% renewable by 2020. The National Renewable Energy Action Plan (DCENR 2010) has set out strategies for Ireland to meet the 16% target by 2020, the first of which is "Progressively more renewable electricity from onshore and offshore wind power for the domestic and export markets". In the recent National Planning Framework 'Ireland 2040', exploitation of our terrestrial and offshore renewable energy potential was repeatedly highlighted as a priority.
A855	*Mareca penelope*	F07	Sports, Tourism & Leisure Activities	PT	M	Inside the Member State	M	Inside the Member State	Cutts, N., Phelps, A. & Burdon, D. (2009) Construction and waterfowl - defining sensitivity, response, impacts and guidance. Report to Humber INCA. O'Donoghue, P.D. & Gittings, T. (2014) Presentation of geospatial data relating to the use of Cork Harbour by wintering waterbirds & a literature review of published data relating to waterbirds and disturbance. Unpublished Report prepared for Cork County Council.	Disturbance from humans walking with/without dogs is consistently found to the most disturbing activity at sites during assessments undertaken for SPA conservation objectives. Disturbance from shooting/hunting likely an issue at specific wetlands. Greenways, cycleways, walkways and similar access routes near important wintering waterbird sites are in various stages of the design, plan and consenting process in a number of locations around Ireland at present, including the Boyne Estuary, different parts of Dublin Bay, Wicklow coast, Wexford Harbour, Rosslare to Waterford, Waterford, Inch Island to Derry and more. If not adequately evaluated and developed these may cause significant increases in disturbance to wintering waterbirds. Study reviewed by Cutts et al. (2009) rank WN as a moderate species in relation to disturbance during winter. O'Donoghue & Gittings (2014) carried out a literature review of the potential impacts of pedestrian disturbance to waterbirds and found that Wigeon may have higher levels of sensitivity to disturbance than most other species. In some areas, demand for increased access to lakes and river banks for angling reducing availability of areas to rest and feed undisturbed (J. Lynch, pers. comm.)
A855	*Mareca penelope*	F08	Modification of coastline, estuary and coastal conditions for development, use and protection of residential, commercial, industrial and recreational infrastructure and areas (including sea defence or coast protection works and infrastructures)	T			M	Inside the Member State	Brennan, Michael, Hochstrasser, Tamara, Shahumyan, Harutyun : Simulated future development of the Greater Dublin Area: consequences for protected areas and coastal flooding risk. Journal of Irish Urban Studies, 9 2010-12, pp.31-51. Duriez, O., Bruno, J.E., Choquet, R., Pradel, R., Klaassen, M. (2012) Comparing the seasonal survival of resident and migratory oystercatchers: carry-over effects of habitat quality and weather conditions. Oikos 121: 862-873.	Modification of coastline to prevent flooding and/or erosion is ongoing in a number of counties and likely to be carried out at new locations in the coming years. Development of coastal areas for commercial, residential, industrial and recreational purposes also increasing at present e.g. industrial development at Cork Harbour. A study by Brennan et al (2010), modelling future urban expansion in the greater Dublin area, highlighted the significant environmental impacts on protected areas (SPA, SAC) and other areas of high biodiversity to be expected if current trends of urban development continue – particularly in coastal regions.
A855	*Mareca penelope*	F28	Modification of flooding regimes, flood protection for residential or recreational development	T			M	Inside the Member State		Flooding in recent years has put flood defences high on the agenda across the country, with some coastal works under construction and plans to modify rivers, lakes and turloughs in the midlands, which may impact waterbirds in these areas. Given a precautionary 'medium' threat scoring. Cumulative impacts may be of particular concern.
A855	*Mareca penelope*	G07	Hunting	PT	M	Inside the Member State	M	Inside the Member State	Wildlife (Wild Birds) (open Seasons) Orders 1979 to 2012. (S.I 402 of 2012)	A species on the open season list therefore this constitutes a direct pressure upon the population. Note that bag numbers are not mandatory and therefore not collated in Ireland, meaning it is not possible to quantify the extent of this pressure/threat on the population.

A855	*Mareca penelope*	N01	Temperature changes (e.g. rise of temperature & extremes) due to climate change	PT	M	Both inside and outside the EU	M	Both inside and outside the EU	Pavón-Jordán, et al. (2018/2019) Short- and long-term changes in the distribution of abundances linked to variation in winter weather conditions in Europe differ between species with different habitat preferences. Diversity and Distributions.	Research by Pavon-Jordan et al (2018) indicates that shallow-water species such as Wigeon have exhibited a NE shift in distribution in Europe in response to higher NAO index values.
A889	*Mareca strepera*	D01	Wind, wave and tidal power, including infrastructure	T			M	Inside the Member State	DCENR (2010) Strategy for Renewable Energy: 2012 – 2020. Strategy Document. Department of Communications, Energy and Natural Resources, Dublin. Government of Ireland (2018) National Planning Framework – Project Ireland 2040. Government of Ireland, Dublin.	Scored on best expert opinion. Exploitation of renewable energy on land and offshore is a high priority for Ireland in the coming years that will see significant increases in the number of terrestrial and offshore windfarms, with wave and tidal energy to follow. The EU Renewable Energy Directive (2009/28/EC) requires the EU to meet 20+% of energy needs with renewables by 2020; the target for Ireland has been set at 16% renewable by 2020. The National Renewable Energy Action Plan (DCENR 2010) has set out strategies for Ireland to meet the 16% target by 2020, the first of which is "Progressively more renewable electricity from onshore and offshore wind power for the domestic and export markets". In the recent National Planning Framework 'Ireland 2040', exploitation of our terrestrial and offshore renewable energy potential was repeatedly highlighted as a priority.
A889	*Mareca strepera*	F07	Sports, Tourism & Leisure Activities	PT	M	Inside the Member State	M	Inside the Member State	Cutts, N., Phelps, A. & Burdon, D. (2009) Construction and waterfowl - defining sensitivity, response, impacts and guidance. Report to Humber INCA. Pease, M. L., Rose, R. K. & Butler, M. J. (2005) Effects of human disturbances on the behaviour of wintering ducks. Wildlife Society Bulletin 33, 103-112	Disturbance from humans walking with/without dogs is consistently found to the most disturbing activity at sites during assessments undertaken for SPA conservation objectives. Disturbance from shooting/hunting likely an issue at specific wetlands. Greenways, cycleways, walkways and similar access routes near important wintering waterbird sites are in various stages of the design, plan and consenting process in a number of locations around Ireland at present, including the Boyne Estuary, different parts of Dublin Bay, Wicklow coast, Wexford Harbour, Rosslare to Waterford, Waterford, Inch Island to Derry and more. If not adequately evaluated and developed these may cause significant increases in disturbance to wintering waterbirds. Various published resources point to the impact caused by nautical and other recreational activities. GA considered quite sensitive by some studies (e.g. Pease et al. 2005). Pease et al (2005) found GA to be more sensitive than some other wildfowl species.
A889	*Mareca strepera*	F28	Modification of flooding regimes, flood protection for residential or recreational development	T			M	Inside the Member State		Flooding in recent years has put flood defences high on the agenda across the country, with some coastal works under construction and plans to modify rivers, lakes and turloughs in the midlands, which may impact waterbirds in these areas. Given a precautionary 'medium' threat scoring. Cumulative impacts may be of particular concern.
A889	*Mareca strepera*	G07	Hunting	PT	M	Inside the Member State	M	Inside the Member State	Wildlife (Wild Birds) (open Seasons) Orders 1979 to 2012. (S.I 402 of 2012)	A species on the open season list therefore this constitutes a direct pressure upon the population. Note that bag numbers are not mandatory and therefore not collated in Ireland, meaning it is not possible to quantify the extent of this pressure/threat on the population.
A889	*Mareca strepera*	J01	Mixed Source Pollution to Surface and Ground Waters (Limnic and Terrestrial)	PT	M	Inside the Member State	M	Inside the Member State	Tierney, D., O'Boyle, S. (2018) Water Quality in 2016: An Indicators Report. Environmental Protection Agency, Wexford.	Pollution to inland waterbodies, includes eutrophication. Effects largely unknown. Best expert opinion. Tierney & O'Boyle (2018) report that a significant proportion of sites still have too much nutrients - a quarter of rivers and lakes, and a third of estuaries and coastal waters are failing environmental quality assessment criteria. High levels of phosphorus in the north-east of the country are impacting on lake water quality , while high nitrogen concentrations in the south and south-east are impacting on the quality of many of our estuaries.
A900	*Melanitta nigra s. str.*	D01	Wind, wave and tidal power, including infrastructure	T			H	Inside the Member State	McCluskie, A.E., Langston, R.H.W. & Wilkinson, N.I. 2012. Birds and wave & tidal stream energy: an ecological review. RSPB Research Report No. 42. Sandy, Bedfordshire, UK. Garthe, S. & Hüppop, O. 2004. Scaling possible adverse effects of marine wind farms on seabirds: developing and applying a vulnerability index. Journal of Applied Ecology, 41: 724-734. Cook, A.,S.,C.,P., Johnston, A., Wright, L.,J. and Burton, N. H. K. (2012). A review of flight heights and avoidance rates of birds in relation to offshore windfarms. Crown Estate Strategic Ornithological Support Services. Project SOSS-02. Ramiro, B. & Cummins, S. (2016) Feasibility study of marine birds sensitivity mapping for offshore renewable energy developments in Ireland. Birdwatch Ireland, Kilcoole, Wicklow. DCENR (2010) Strategy for Renewable Energy: 2012 – 2020. Strategy Document. Department of Communications, Energy and Natural Resources, Dublin. Government of Ireland (2018) National Planning Framework – Project Ireland 2040. Government of Ireland, Dublin.	Ranked as of very high risk of displacement by offshore windfarms, low vulnerability to wave and tidal devices, by Ramiro & Cummins 2016. Several windfarms in Irish waters in various stages of planning and consenting process at present. Garthe & Huppop (2004) assigned a moderate sensitivity score based on attributes such as flight height, manoeuvrability, habitat use etc.. Cook et al (2012) showed via modelling that most birds were restricted to low altitudes, below the level of turbine blades and assigned an overall low risk of collision. Exploitation of renewable energy on land and offshore is a high priority for Ireland in the coming years that will see significant increases in the number of terrestrial and offshore windfarms, with wave and tidal energy to follow. The EU Renewable Energy Directive (2009/28/EC) requires the EU to meet 20+% of energy needs with renewables by 2020; the target for Ireland has been set at 16% renewable by 2020. The National Renewable Energy Action Plan (DCENR 2010) has set out strategies for Ireland to meet the 16% target by 2020, the first of which is "Progressively more renewable electricity from onshore and offshore wind power for the domestic and export markets". In the recent National Planning Framework 'Ireland 2040', exploitation of our terrestrial and offshore renewable energy potential was repeatedly highlighted as a priority.
A900	*Melanitta nigra s. str.*	E02	Shipping Lanes and Ferry Transport Operations	T			M	Inside the Member State	Larsen, J.K. & Laubek, B. (2005) Disturbance effects of high-speed ferries on wintering sea ducks. Wildfowl 55: 101-118.	Larsen & Laubek (2005) show that high-speed ferries may be an important source of disturbance that should be given due attention when the cumulative effects of offshore activities on site use by sea ducks are considered. Dundalk and Wexford are significant areas in the Irish Sea that coincide with a lot of shipping and ferry traffic and therefore have significant potential to disturb large numbers of this flocking species.
A900	*Melanitta nigra s. str.*	G01	Marine Fish and Shellfish Harvesting (Professional, Recreational) causing reduction of species/prey populations and disturbance of species	PT	M	Inside the Member State	M	Inside the Member State		Fisheries - competition for a common resource e.g. seed mussel.
A900	*Melanitta nigra s. str.*	G12	Bycatch and Incidental Killing (due to Fishing and Hunting Activities)	PT	M	Inside the Member State	M	Inside the Member State	Zydelis, R., Bellebaum, J., Osterblom, H., Vetemaa, M., Schirmeister, B., Stipniece, A., Dagys, M., van Eerden, M. and Garthe, Stefan (2009) Bycatch in gillnet fisheries - An overlooked threat to waterbird populations Biological Conservation, 142 (7). pp. 1269-1281	Fisheries by-catch. Review by Zydelis et al 2009 shows sea ducks, divers, diving ducks, auks dominate by-catch composition with proportion dependent on species distribution.

A069	*Mergus serrator*	D01	Wind, wave and tidal power, including infrastructure	T			M	Inside the Member State	McCluskie, A.E., Langston, R.H.W. & Wilkinson, N.I. 2012. Birds and wave & tidal stream energy: an ecological review. RSPB Research Report No. 42. Sandy, Bedfordshire, UK. DCENR (2010) Strategy for Renewable Energy: 2012 – 2020. Strategy Document. Department of Communications, Energy and Natural Resources, Dublin. Government of Ireland (2018) National Planning Framework – Project Ireland 2040. Government of Ireland, Dublin.	Scored on best expert opinion. Exploitation of renewable energy on land and offshore is a high priority for Ireland in the coming years that will see significant increases in the number of terrestrial and offshore windfarms, with wave and tidal energy to follow. The EU Renewable Energy Directive (2009/28/EC) requires the EU to meet 20+% of energy needs with renewables by 2020; the target for Ireland has been set at 16% renewable by 2020. The National Renewable Energy Action Plan (DCENR 2010) has set out strategies for Ireland to meet the 16% target by 2020, the first of which is "Progressively more renewable electricity from onshore and offshore wind power for the domestic and export markets". In the recent National Planning Framework 'Ireland 2040', exploitation of our terrestrial and offshore renewable energy potential was repeatedly highlighted as a priority. Note that in some areas, cumulative impacts may be of particular concern.
A069	*Mergus serrator*	E02	Shipping Lanes and Ferry Transport Operations	PT	M	Inside the Member State	M	Inside the Member State	Gittings, T. & O'Donoghue, P. (2016) Disturbance response of Red-breasted Mergansers Mergus serrator to boat traffic in wexford harbour. Irish Birds 10(3):329-334.	Wexford Harbour study indicates the species is highly sensitive to boat traffic. Species is relatively mobile and widespread (in contrast to species that have a localised distribution) so impacts are considered to be lower. Some of the most important sites for this species overlap with areas of significant shipping traffic however, including Dublin Bay, Cork Harbour, Dundalk Bay, Carlingford Lough, Galway Bay.
A069	*Mergus serrator*	G01	Marine Fish and Shellfish Harvesting (Professional, Recreational) causing reduction of species/prey populations and disturbance of species	PT	M	Inside the Member State	M	Inside the Member State	Marine Institute (2013) Appropriate assessment of aquaculture and fisheries in Lough Swilly.	Potential significant negative impacts identified in Lough Swilly AA (MI, 2013). This incorporates general displacement.
A768	*Numenius arquata arquata*	D01	Wind, wave and tidal power, including infrastructure	T			M	Inside the Member State	PEARCE-HIGGINS, J., BROWN, D., DOUGLAS, D., ALVES, J., BELLIO, M., BOCHER, P., . . . VERKUIL, Y. (2017). A global threats overview for Numeniini populations: Synthesising expert knowledge for a group of declining migratory birds. Bird Conservation International, 27(1), 6-34. Percival, S. (2001). Assessment of the effects of off-shore wind farms on birds. ETSU Report W/13/00565/REP. DCENR (2010) Strategy for Renewable Energy: 2012 – 2020. Strategy Document. Department of Communications, Energy and Natural Resources, Dublin. Government of Ireland (2018) National Planning Framework – Project Ireland 2040. Government of Ireland, Dublin.	Most published literature concludes little determinable impacts of wind farms upon waders, nevertheless a risk is present especially during periods of migration, small-scale movements and e.g. during periods of movements en-masse (e.g. cold weather events). Birds are afforded a high degree of protection within SPA's, but areas outside/between SPA's are afforded much less protection. Percival (2001) notes that risk of collision with migrant waterfowl (i.e. wildfowl and wading birds) should be low/negligible if the wind farm is located several kilometres offshore. Exploitation of renewable energy on land and offshore is a high priority for Ireland in the coming years that will see significant increases in the number of terrestrial and offshore windfarms, with wave and tidal energy to follow. The EU Renewable Energy Directive (2009/28/EC) requires the EU to meet 20+% of energy needs with renewables by 2020; the target for Ireland has been set at 16% renewable by 2020. The National Renewable Energy Action Plan (DCENR 2010) has set out strategies for Ireland to meet the 16% target by 2020, the first of which is "Progressively more renewable electricity from onshore and offshore wind power for the domestic and export markets". In the recent National Planning Framework 'Ireland 2040', exploitation of our terrestrial and offshore renewable energy potential was repeatedly highlighted as a priority.
A768	*Numenius arquata arquata*	F07	Sports, Tourism & Leisure Activities	PT	M	Inside the Member State	M	Inside the Member State	Lewis, L.J., Adcock, T. (2017) An assessment of the effects of kitesurfing and other activities on the waterbirds using DOllymount Strand. BirdWatch Ireland, Wicklow. Cutts, N., Phelps, A. & Burdon, D. (2009) Construction and waterfowl - defining sensitivity, response, impacts and guidance. Report to Humber INCA. O'Donoghue, P.D. & Gittings, T. (2014) Presentation of geospatial data relating to the use of Cork Harbour by wintering waterbirds & a literature review of published data relating to waterbirds and disturbance. Unpublished Report prepared for Cork County Council.	Disturbance from humans walking with/without dogs is consistently found to the most disturbing activity at sites during assessments undertaken for SPA conservation objectives. Disturbance from shooting/hunting likely an issue at specific wetlands. Greenways, cycleways, walkways and similar access routes near important wintering waterbird sites are in various stages of the design, plan and consenting process in a number of locations around Ireland at present, including the Boyne Estuary, different parts of Dublin Bay, Wicklow coast, Wexford Harbour, Rosslare to Waterford, Waterford, Inch Island to Derry and more. If not adequately evaluated and developed these may cause significant increases in disturbance to wintering waterbirds. Lewis & Adcock (2017) found that waterbird activity decreased as recreational disturbance (walkers, dogs, kite surfers etc) increased on Dollymount Strand (Dublin Bay). Species distributes widely which helps to lessen the significance of disturbance impacts. Cutts et al 2009 assign CU as a moderate risk species in terms of disturbance. A random check of two SPA sites (CO doc assessments) reveals that disturbing activities often overlap with subsites ranked high or very high in terms of species distribution. O'Donoghue & Gittings (2014) carried out a literature review of the potential impacts of pedestrian disturbance to waterbirds and found that Curlew may have higher levels of sensitivity to disturbance than most other species.
A768	*Numenius arquata arquata*	F08	Modification of coastline, estuary and coastal conditions for development, use and protection of residential, commercial, industrial and recreational infrastructure and areas (including sea defence or coast protection works and infrastructures)	T			M	Inside the Member State	Lewis, L.J, Austin, G.m Boland, H., Frost, T., Crowe, O. & Tierney, D.T. (2017) Waterbird populations on non-estuarine coasts of Ireland: results of the 2015/16 Non-Estuarine Coastal Waterbird Survey (NEWS-III). Irish Birds 10:4, 511-522. Brennan, Michael, Hochstrasser, Tamara, Shahumyan, Harutyun : Simulated future development of the Greater Dublin Area: consequences for protected areas and coastal flooding risk. Journal of Irish Urban Studies, 9 2010-12, pp.31-51. Duriez, O., Bruno, J.E., Choquet, R., Pradel, R., Klaassen, M. (2012) Comparing the seasonal survival of resident and migratory oystercatchers: carry-over effects of habitat quality and weather conditions. Oikos 121: 862-873. Burton, N.H.K., Rehfisch, M.M., Clark, N.A. & Dodd, S.G. (2006) Impacts of sudden winter habitat loss on the body condition and survival of redshank Tringa totanus. Journal of Applied Ecology 43: 464-473.	Modification of coastline to prevent flooding and/or erosion is ongoing in a number of counties and likely to be carried out at new locations in the coming years. Development of coastal areas for commercial, residential, industrial and recreational purposes also increasing at present e.g. industrial development at Cork Harbour. A study by Brennan et al (2010), modelling future urban expansion in the greater Dublin area, highlighted the significant environmental impacts on protected areas (SPA, SAC) and other areas of high biodiversity to be expected if current trends of urban development continue – particularly in coastal regions.
A768	*Numenius arquata arquata*	G01	Marine Fish and Shellfish Harvesting (Professional, Recreational) causing reduction of species/prey populations and disturbance of species	PT	M	Inside the Member State	M	Inside the Member State	Taylor & Dodd (2013): Negative impacts of hunting and suction-dredging on otherwise high and stable survival rates in Curlew Numenius arquata , Bird Study, DOI:10.1080/00063657.2013.775215 PEARCE-HIGGINS, J., BROWN, D., DOUGLAS, D., ALVES, J., BELLIO, M., BOCHER, P., . . . VERKUIL, Y. (2017). A global threats overview for Numeniini populations: Synthesising expert knowledge for a group of declining migratory birds. Bird Conservation International, 27(1), 6-34.	Benthic dredging (e.g. mussels) also removes non-target species; effects of which are largely un-assessed at present. Effects on species such as CU will only be known over time. Also incorporates bait digging - score assigned for those species that rely heavily on the large polychaete species taken by bait diggers. Although a widespread activity, considered low impact currently.
A768	*Numenius arquata arquata*	G19	Other Impacts from Marine Aquaculture, Including Infrastructure	PT	M	Inside the Member State	M	Inside the Member State	Caldow, R. W. G., Beadsman, H. A., McGroarty, S., Kaiser, M. J., Goss-Custard, J. D., Mould, K. & Wilson, A. (2003) effects of intertidal mussel cultivation on bird assemblages. Marine Ecology Progress Series 259, 173-183.	Removal of feeding grounds particularly pertinent to CU as they often feed in sandier substrates and on lower shore where trestles are situated. Study by Gittings and O'Donoghue found mixed results neutral/negative and appeared site specific. Additional factor is anti-predator measures also remove shore crabs, a potential prey of Curlew. Caldow et al 2003 found positive effect.

A683	*Phalacrocorax carbo carbo*	D01	Wind, wave and tidal power, including infrastructure	T			M	Inside the Member State	Ramiro, B. & Cummins, S. (2016) Feasibility study of marine birds sensitivity mapping for offshore renewable energy developments in Ireland. Birdwatch Ireland, Kilcoole, Wicklow. Garthe, S. & Hüppop, O. 2004. Scaling possible adverse effects of marine wind farms on seabirds: developing and applying a vulnerability index. Journal of Applied Ecology, 41: 724-734. Furness & Wade 92012) Vulnerability of Scottish seabirds to offshore wind turbines. Report to Scottish Government. DCENR (2010) Strategy for Renewable Energy: 2012 – 2020. Strategy Document. Department of Communications, Energy and Natural Resources, Dublin. Government of Ireland (2018) National Planning Framework – Project Ireland 2040. Government of Ireland, Dublin.	Ramiro & Cummins 2016 found the species to be very highly sensitive to disturbance/displacement from offshore windfarms, of high sensitivity to tidal turbines. According to the sensitivity index by Garthe & Huppop (2004), Cormorants are moderately sensitive based on attributes such as flight height, manoeuvrability, habitat use etc.. This species also scored as moderate by Furness & Wade (2012). Assessment with regards proposed windfarm of Kish and Bray Bank concluded no likely significant impacts. Exploitation of renewable energy on land and offshore is a high priority for Ireland in the coming years that will see significant increases in the number of terrestrial and offshore windfarms, with wave and tidal energy to follow. The EU Renewable Energy Directive (2009/28/EC) requires the EU to meet 20+% of energy needs with renewables by 2020; the target for Ireland has been set at 16% renewable by 2020. The National Renewable Energy Action Plan (DCENR 2010) has set out strategies for Ireland to meet the 16% target by 2020, the first of which is "Progressively more renewable electricity from onshore and offshore wind power for the domestic and export markets". In the recent National Planning Framework 'Ireland 2040', exploitation of our terrestrial and offshore renewable energy potential was repeatedly highlighted as a priority. Note that in some areas, cumulative impacts may be of particular concern.
A683	*Phalacrocorax carbo carbo*	G10	Illegal Shooting/Killing	T			M	Inside the Member State	Tierney, N., Lusby, J. & Lauder, A. (2011) A preliminary assessment of the potential impacts of Cormorant Phalacrocorax carbo predation on salmonids in four selected river systems. Inland Fisheries Ireland Report.	Levels unknown and likely to be localised and perhaps more of an issue in inland water bodies.
A683	*Phalacrocorax carbo carbo*	N01	Temperature changes (e.g. rise of temperature & extremes) due to climate change	PT	M	Both inside and outside the EU	M	Both inside and outside the EU	Pavón-Jordán, et al. (2018/2019) Short- and long-term changes in the distribution of abundances linked to variation in winter weather conditions in Europe differ between species with different habitat preferences. Diversity and Distributions.	Research by Pavon-Jordan et al (2018) indicates that deep-water species such as Cormorant have exhibited a NE shift in distribution in Europe in response to higher NAO index values.
A140	*Pluvialis apricaria*	D01	Wind, wave and tidal power, including infrastructure	T			M	Inside the Member State	DCENR (2010) Strategy for Renewable Energy: 2012 – 2020. Strategy Document. Department of Communications, Energy and Natural Resources, Dublin. Government of Ireland (2018) National Planning Framework – Project Ireland 2040. Government of Ireland, Dublin.	Assigned a higher impact score than other waders due to the species distribution extending inland with regular movements inland to coastal areas therefore vulnerable along these migration routes. Note that SPA sites are afforded a high level of protection, but that does not always extend to satellite feeding sites nor does it cover areas between SPAs that may be used by birds moving around. Exploitation of renewable energy on land and offshore is a high priority for Ireland in the coming years that will see significant increases in the number of terrestrial and offshore windfarms, with wave and tidal energy to follow. The EU Renewable Energy Directive (2009/28/EC) requires the EU to meet 20+% of energy needs with renewables by 2020; the target for Ireland has been set at 16% renewable by 2020. The National Renewable Energy Action Plan (DCENR 2010) has set out strategies for Ireland to meet the 16% target by 2020, the first of which is "Progressively more renewable electricity from onshore and offshore wind power for the domestic and export markets". In the recent National Planning Framework 'Ireland 2040', exploitation of our terrestrial and offshore renewable energy potential was repeatedly highlighted as a priority.
A140	*Pluvialis apricaria*	F07	Sports, Tourism & Leisure Activities	T			M	Inside the Member State	Cutts, N., Phelps, A. & Burdon, D. (2009) Construction and waterfowl - defining sensitivity, response, impacts and guidance. Report to Humber INCA. O'Donoghue, P.D. & Gittings, T. (2014) Presentation of geospatial data relating to the use of Cork Harbour by wintering waterbirds & a literature review of published data relating to waterbirds and disturbance. Unpublished Report prepared for Cork County Council.	Disturbance from humans walking with/without dogs is consistently found to the most disturbing activity at sites during assessments undertaken for SPA conservation objectives. Disturbance from shooting/hunting likely an issue at specific wetlands. Greenways, cycleways, walkways and similar access routes near important wintering waterbird sites are in various stages of the design, plan and consenting process in a number of locations around Ireland at present, including the Boyne Estuary, different parts of Dublin Bay, Wicklow coast, Wexford Harbour, Rosslare to Waterford, Waterford, Inch Island to Derry and more. If not adequately evaluated and developed these may cause significant increases in disturbance to wintering waterbirds. Tend to occur in wide open mud/sand flats and away from areas frequented by walkers; but flighty birds and disturbed easily by irregular noises. Additional pressures when feeding inland and severely affected in cold winters. Cutts et al. (2009) assign a moderate risk score re disturbance. A moderate impact score is assigned. O'Donoghue & Gittings (2014) carried out a literature review of the potential impacts of pedestrian disturbance to waterbirds and found that Golden Plover may have higher levels of sensitivity to disturbance than most other species.
A140	*Pluvialis apricaria*	F28	Modification of flooding regimes, flood protection for residential or recreational development	T			M	Inside the Member State		Flooding in recent years has put flood defences high on the agenda across the country, with some coastal works under construction and plans to modify rivers, lakes and turloughs in the midlands, which may impact waterbirds in these areas.
A140	*Pluvialis apricaria*	G07	Hunting	PT	M	Inside the Member State	M	Inside the Member State	EU (2009) Management plan for Golden Plover pluvialis apricaria 2009-2011. See also: S.I. No. 402 of 2012 - WILDLIFE (WILD BIRDS) (OPEN SEASONS) (AMENDMENT) ORDER 2012	A species on the open season list therefore this constitutes a direct pressure upon the population. Note that bag numbers are not mandatory and therefore not collated in Ireland, meaning it is not possible to quantify the extent of this pressure/threat on the population.
A140	*Pluvialis apricaria*	N01	Temperature changes (e.g. rise of temperature & extremes) due to climate change	PT	M	Both inside and outside the EU	M	Both inside and outside the EU	Simon Gillings , Graham E. Austin , Robert J. Fuller & William J. Sutherland (2006) Distribution shifts in wintering Golden Plover Pluvialis apricaria and Lapwing Vanellus vanellus in Britain, Bird Study, 53:3, 274-284,	From Gillings et al 2006 - "Mean winter temps have increased…and there has been a reduction in the frequency of cold spells… potentially allowing waders generally to winter closer to their breeding grounds… In the case of Golden Plover and Lapwing this would mean wintering further north/east and east, respectively. Evidence from this study, from Rehfisch et al (2004) and from studies on the continent (Jukema et al 2001) point to exactly this phenomenon."
A141	*Pluvialis squatarola*	D01	Wind, wave and tidal power, including infrastructure	T			M	Inside the Member State	Percival, S. (2001). Assessment of the effects of off-shore wind farms on birds. ETSU Report W/13/00565/REP. DCENR (2010) Strategy for Renewable Energy: 2012 – 2020. Strategy Document. Department of Communications, Energy and Natural Resources, Dublin. G	Most published literature concludes little determinable impacts of wind farms upon waders, nevertheless a risk is present especially during periods of migration, small-scale movements and e.g. during periods of movements en-masse (e.g. cold weather events). Birds are afforded a high degree of protection within SPA's, but areas outside/between SPA's are afforded much less protection. Percival (2001) notes that risk of collision with migrant waterfowl (i.e. wildfowl and wading birds) should be low/negligible if the wind farm is located several kilometres offshore. Exploitation of renewable energy on land and offshore is a high priority for Ireland in the coming years that will see significant increases in the number of terrestrial and offshore windfarms, with wave and tidal energy to follow. The EU Renewable Energy Directive (2009/28/EC) requires the EU to meet 20+% of energy needs with renewables by 2020; the target for Ireland has been set at 16% renewable by 2020. The National Renewable Energy Action Plan (DCENR 2010) has set out strategies for Ireland to meet the 16% target by 2020, the first of which is "Progressively more renewable electricity from onshore and offshore wind power for the domestic and export markets". In the recent National Planning Framework 'Ireland 2040', exploitation of our terrestrial and offshore renewable energy potential was repeatedly highlighted as a priority.

A141	*Pluvialis squatarola*	F07	Sports, Tourism & Leisure Activities	PT	M	Inside the Member State	M	Inside the Member State	Lewis, L.J., Adcock, T. (2017) An assessment of the effects of kitesurfing and other activities on the waterbirds using DOllymount Strand. BirdWatch Ireland, Wicklow. Cutts, N., Phelps, A. & Burdon, D. (2009) Construction and waterfowl - defining sensitivity, response, impacts and guidance. Report to Humber INCA.	Disturbance from humans walking with/without dogs is consistently found to the most disturbing activity at sites during assessments undertaken for SPA conservation objectives. Disturbance from shooting/hunting likely an issue at specific wetlands. Greenways, cycleways, walkways and similar access routes near important wintering waterbird sites are in various stages of the design, plan and consenting process in a number of locations around Ireland at present, including the Boyne Estuary, different parts of Dublin Bay, Wicklow coast, Wexford Harbour, Rosslare to Waterford, Waterford, Inch Island to Derry and more. If not adequately evaluated and developed these may cause significant increases in disturbance to wintering waterbirds. Lewis & Adcock (2017) found that waterbird activity decreased as recreational disturbance (walkers, dogs, kite surfers etc) increased on Dollymount Strand (Dublin Bay). Tend to occur in wide open mud/sand flats and away from areas frequented by walkers; but flighty birds and disturbed easily by irregular noises. Cutts et al. (2009) assign a moderate risk score re disturbance. Numbers of GV are reduced close to roads (Burton et al. 2002). Species distribution can coincide with areas of high activity (e.g. Tramore bay) - SPA CO doc.
A141	*Pluvialis squatarola*	G01	Marine Fish and Shellfish Harvesting (Professional, Recreational) causing reduction of species/prey populations and disturbance of species	PT	M	Inside the Member State	M	Inside the Member State		Various scientific references as to the negative effects of dredging for mussels and oysters upon benthic sediments and communities. GV could be affected by indirect effects i.e. changes in benthic communities, and is assigned a moderate impact score as distribution often mid/low shore and sandier substrates that may coincide with areas dredged.
A141	*Pluvialis squatarola*	G19	Other Impacts from Marine Aquaculture, Including Infrastructure	PT	M	Inside the Member State	M	Inside the Member State	Gittings & O'Donoghue (2012) The effect of intertidal oyster cultivation (Crassostrea gigas) on the spatial distribution of waterbirds	Gittings & O'Donoghue (2012) found an 'negative' (exclusion) effect of oyster trestles upon GV.
A141	*Pluvialis squatarola*	N04	Sea-level and wave exposure changes due to climate change	T			M	Inside the Member State	Crowe, O., Lewis, L. J. & Anthony, S. (2013) Impacts of sea level rise on the birds and biodiversity of key coastal wetlands. Report to the Environmental Protection Agency. Draft. Austin, G. (2010) Waterbirds in MCCIP Annual Report Card 2010-11, MCCIP Science Review, 7pp. www.mccip.org.uk/arc	Climate change/sea level rise, considered high risk by Crowe et al (2013) as distribution is wholly intertidal.
A005	*Podiceps cristatus*	E02	Shipping Lanes and Ferry Transport Operations	PT	M	Inside the Member State	M	Inside the Member State	Gittings, T. (2017) Nocturnal communal roosting behaviour in Great Crested Grebes *Podicipes dristatus.* Irish Birds 10: 483-492. Useful background reading: Waterbird Populations and Pressures in the Baltic Sea By Henrik Skov, Nordisk Ministerråd, Nordisk Råd. Garthe, S. & Hüppop, O. 2004. Scaling possible adverse effects of marine wind farms on seabirds: developing and applying a vulnerability index. Journal of Applied Ecology, 41: 724-734.	According to Gittings (2017) foraging GG are generally tolerant To vessel activity, but roosting flocks appear to be much more sensitive to disturbance. Garthe, S. & Hüppop, O. (2004) assign a moderate disturbance score. Score based on best expert opinion. Some of the most important sites for this species overlap with areas of significant shipping traffic including Dublin Bay, Cork Harbour, Galway Bay, Waterford Harbour.
A005	*Podiceps cristatus*	N01	Temperature changes (e.g. rise of temperature & extremes) due to climate change	PT	H	Both inside and outside the EU	H	Both inside and outside the EU	Pavón-Jordán, et al. (2018/2019) Short- and long-term changes in the distribution of abundances linked to variation in winter weather conditions in Europe differ between species with different habitat preferences. Diversity and Distributions.	Research by Pavon-Jordan et al (2018) indicates that deep-water species such as GG have exhibited a NE shift in distribution in Europe in response to higher NAO index values.
A063	*Somateria mollissima*	G01	Marine Fish and Shellfish Harvesting (Professional, Recreational) causing reduction of species/prey populations and disturbance of species	PT	M	Inside the Member State	M	Inside the Member State	BirdLife International (2013) Species factsheet: Somateria mollissima. Downloaded from http://www.birdlife.org. Camphuysen, C.J., Berrevoets, C.M., Cremers, H.J.W.M., Dekinga, A., Rekker, R., Ens, B.J., van der Have, T.M., Kats, R.K.H., Kuiken, T., Leopold, M.F., van der Meer, J. & Piersma, T. (2002) Mass mortality of common eiders (Somaeria mollissima) in the Dutch Wadden Sea, winter 1999/2000: starvation in a commercially exploited wetland of international importance. Biological Conservation 106(3):303-317.	Direct competition for a common resource. Mussel and Cockle harvesting in the Wadden Sea implicated in mass mortality in winter 1999/2000.
A063	*Somateria mollissima*	G12	Bycatch and Incidental Killing (due to Fishing and Hunting Activities)	PT	M	Inside the Member State	M	Inside the Member State	Zydelis, R., Bellebaum, J., Osterblom, H., Vetemaa, M., Schirmeister, B., Stipniece, A., Dagys, M., van Eerden, M. and Garthe, Stefan (2009) Bycatch in gillnet fisheries - An overlooked threat to waterbird populations Biological Conservation, 142 (7). pp. 1269-1281	Fisheries by-catch. Review by Zydelis et al 2009 shows sea ducks, divers, diving ducks, auks dominate by-catch composition with proportion dependent on species distribution.
A857	*Spatula clypeata*	D01	Wind, wave and tidal power, including infrastructure	T			M	Inside the Member State	DCENR (2010) Strategy for Renewable Energy: 2012 – 2020. Strategy Document. Department of Communications, Energy and Natural Resources, Dublin. Government of Ireland (2018) National Planning Framework – Project Ireland 2040. Government of Ireland, Dublin.	Scored on best expert opinion. Exploitation of renewable energy on land and offshore is a high priority for Ireland in the coming years that will see significant increases in the number of terrestrial and offshore windfarms, with wave and tidal energy to follow. The EU Renewable Energy Directive (2009/28/EC) requires the EU to meet 20+% of energy needs with renewables by 2020; the target for Ireland has been set at 16% renewable by 2020. The National Renewable Energy Action Plan (DCENR 2010) has set out strategies for Ireland to meet the 16% target by 2020, the first of which is "Progressively more renewable electricity from onshore and offshore wind power for the domestic and export markets". In the recent National Planning Framework 'Ireland 2040', exploitation of our terrestrial and offshore renewable energy potential was repeatedly highlighted as a priority.
A857	*Spatula clypeata*	F07	Sports, Tourism & Leisure Activities	PT	M	Inside the Member State	M	Inside the Member State	BirdLife International (2013) Species factsheet: Anas clypeata. Downloaded fromhttp://www.birdlife.org on 02/09/2013. Cutts, N., Phelps, A. & Burdon, D. (2009) Construction and waterfowl - defining sensitivity, response, impacts and guidance. Report to Humber INCA. O'Donoghue, P.D. & Gittings, T. (2014) Presentation of geospatial data relating to the use of Cork Harbour by wintering waterbirds & a literature review of published data relating to waterbirds and disturbance. Unpublished Report prepared for Cork County Council.	Disturbance from humans walking with/without dogs is consistently found to the most disturbing activity at sites during assessments undertaken for SPA conservation objectives. Disturbance from shooting/hunting likely an issue at specific wetlands. Greenways, cycleways, walkways and similar access routes near important wintering waterbird sites are in various stages of the design, plan and consenting process in a number of locations around Ireland at present, including the Boyne Estuary, different parts of Dublin Bay, Wicklow coast, Wexford Harbour, Rosslare to Waterford, Waterford, Inch Island to Derry and more. If not adequately evaluated and developed these may cause significant increases in disturbance to wintering waterbirds. Various published resources point to the impact caused by nautical and other recreational activities. O'Donoghue & Gittings (2014) carried out a literature review of the potential impacts of pedestrian disturbance to waterbirds and found that Shoveler may have higher levels of sensitivity to disturbance than most other species.

A857	*Spatula clypeata*	F28	Modification of flooding regimes, flood protection for residential or recreational development	T			M	Inside the Member State		Flooding in recent years has put flood defences high on the agenda across the country, with some coastal works under construction and plans to modify rivers, lakes and turloughs in the midlands, which may impact waterbirds in these areas. Given a precautionary 'medium' threat scoring. Cumulative impacts may be of particular concern.
A857	*Spatula clypeata*	G07	Hunting	PT	M	Inside the Member State	M	Inside the Member State	BirdLife International (2013) Species factsheet: Anas clypeata. Downloaded fromhttp://www.birdlife.org on 02/09/2013.	A species on the open season list therefore this constitutes a direct pressure upon the population. Note that bag numbers are not mandatory and therefore not collated in Ireland, meaning it is not possible to quantify the extent of this pressure/threat on the population.
A857	*Spatula clypeata*	N01	Temperature changes (e.g. rise of temperature & extremes) due to climate change	PT	M	Both inside and outside the EU	M	Both inside and outside the EU	Pavón-Jordán, et al. (2018/2019) Short- and long-term changes in the distribution of abundances linked to variation in winter weather conditions in Europe differ between species with different habitat preferences. Diversity and Distributions.	Research by Pavon-Jordan et al (2018) indicates that shallow-water species such as Shoveler have exhibited a NE shift in distribution in Europe in response to higher NAO index values.
A048	*Tadorna tadorna*	D01	Wind, wave and tidal power, including infrastructure	T			M	Inside the Member State	DCENR (2010) Strategy for Renewable Energy: 2012 – 2020. Strategy Document. Department of Communications, Energy and Natural Resources, Dublin. Government of Ireland (2018) National Planning Framework – Project Ireland 2040. Government of Ireland, Dublin.	Future onshore and offshore windfarm and renewable energy development has the potential for impact on wintering Shelduck through collision during migration and wintering periods. Exploitation of renewable energy on land and offshore is a high priority for Ireland in the coming years that will see significant increases in the number of terrestrial and offshore windfarms, with wave and tidal energy to follow. The EU Renewable Energy Directive (2009/28/EC) requires the EU to meet 20+% of energy needs with renewables by 2020; the target for Ireland has been set at 16% renewable by 2020. The National Renewable Energy Action Plan (DCENR 2010) has set out strategies for Ireland to meet the 16% target by 2020, the first of which is "Progressively more renewable electricity from onshore and offshore wind power for the domestic and export markets". In the recent National Planning Framework 'Ireland 2040', exploitation of our terrestrial and offshore renewable energy potential was repeatedly highlighted as a priority.
A048	*Tadorna tadorna*	F07	Sports, Tourism & Leisure Activities	PT	M	Inside the Member State	M	Inside the Member State	Cutts, N., Phelps, A. & Burdon, D. (2009) Construction and waterfowl - defining sensitivity, response, impacts and guidance. Report to Humber INCA. Smit, C.J. & Visser, G.J.M. 1993. Effects of disturbance on shorebirds: a summary of existing knowledge from the Dutch Wadden Sea and Delta area. Wader Study Group Bull. 68: 6-19.	Disturbance from humans walking with/without dogs is consistently found to the most disturbing activity at sites during assessments undertaken for SPA conservation objectives. Disturbance from shooting/hunting likely an issue at specific wetlands. Greenways, cycleways, walkways and similar access routes near important wintering waterbird sites are in various stages of the design, plan and consenting process in a number of locations around Ireland at present, including the Boyne Estuary, different parts of Dublin Bay, Wicklow coast, Wexford Harbour, Rosslare to Waterford, Waterford, Inch Island to Derry and more. If not adequately evaluated and developed these may cause significant increases in disturbance to wintering waterbirds. Various published resources point to the impact caused by nautical recreational activities. Smit & Visser (1993) reviewed study that showed that SU took flight in response to water craft at a greater distance than waders such as OC or BA. Study reviewed in Cutts et al (2009) assigned SU as a moderate risk species that shows some habituation.
A048	*Tadorna tadorna*	G19	Other Impacts from Marine Aquaculture, Including Infrastructure	PT	M	Inside the Member State	M	Inside the Member State	Gittings & O'Donoghue (2012) The effect of intertidal oyster cultivation (Crassostrea gigas) on the spatial distribution of waterbirds	Benthic dredging e.g. shellfisheries. Direct disturbance to benthic sediment- may have implications for prey species. Significant dredging for shellfish at Wexford Harbour and Dundalk Bay, most notably.
A048	*Tadorna tadorna*	N01	Temperature changes (e.g. rise of temperature & extremes) due to climate change	PT	M	Both inside and outside the EU	M	Both inside and outside the EU	Pavón-Jordán, et al. (2018/2019) Short- and long-term changes in the distribution of abundances linked to variation in winter weather conditions in Europe differ between species with different habitat preferences. Diversity and Distributions.	Research by Pavon-Jordan et al (2018) indicates that shallow-water species such as Shelduck have exhibited a NE shift in distribution in Europe in response to higher NAO index values.
A048	*Tadorna tadorna*	N04	Sea-level and wave exposure changes due to climate change	T			M	Inside the Member State	Crowe, O., Lewis, L. J. & Anthony, S. (2013) Impacts of sea level rise on the birds and biodiversity of key coastal wetlands. Report to the Environmental Protection Agency. Draft.	Implications of climate change/SLR. Considered a high risk species by Crowe et al. (2013) as species depends wholly on intertidal foraging resources.
A162	*Tringa nebularia*	N04	Sea-level and wave exposure changes due to climate change	T			M	Inside the Member State	Crowe, O., Lewis, L. J. & Anthony, S. (2013) Impacts of sea level rise on the birds and biodiversity of key coastal wetlands. Report to the Environmental Protection Agency. Draft. Austin, G. (2010) Waterbirds in MCCIP Annual Report Card 2010-11, MCCIP Science Review, 7pp. www.mccip.org.uk/arc	Climate change/sea level rise, considered high risk by Crowe et al (2013) as distribution is wholly intertidal.
A164	*Tringa nebularia*	D01	Wind, wave and tidal power, including infrastructure	T			M	Inside the Member State	Percival, S. (2001). Assessment of the effects of off-shore wind farms on birds. ETSU Report W/13/00565/REP. DCENR (2010) Strategy for Renewable Energy: 2012 – 2020. Strategy Document. Department of Communications, Energy and Natural Resources, Dublin. G	Most published literature concludes little determinable impacts of wind farms upon waders, nevertheless a risk is present especially during periods of migration, small-scale movements and e.g. during periods of movements en-masse (e.g. cold weather events). Birds are afforded a high degree of protection within SPA's, but areas outside/between SPA's are afforded much less protection. Percival (2001) notes that risk of collision with migrant waterfowl (i.e. wildfowl and wading birds) should be low/negligible if the wind farm is located several kilometres offshore. Exploitation of renewable energy on land and offshore is a high priority for Ireland in the coming years that will see significant increases in the number of terrestrial and offshore windfarms, with wave and tidal energy to follow. The EU Renewable Energy Directive (2009/28/EC) requires the EU to meet 20+% of energy needs with renewables by 2020; the target for Ireland has been set at 16% renewable by 2020. The National Renewable Energy Action Plan (DCENR 2010) has set out strategies for Ireland to meet the 16% target by 2020, the first of which is "Progressively more renewable electricity from onshore and offshore wind power for the domestic and export markets". In the recent National Planning Framework 'Ireland 2040', exploitation of our terrestrial and offshore renewable energy potential was repeatedly highlighted as a priority.
A164	*Tringa nebularia*	F07	Sports, Tourism & Leisure Activities	PT	M	Inside the Member State	M	Inside the Member State	Lewis, L.J., Adcock, T. (2017) An assessment of the effects of kitesurfing and other activities on the waterbirds using DOllymount Strand. BirdWatch Ireland, Wicklow. Cutts, N., Phelps, A. & Burdon, D. (2009) Construction and waterfowl - defining sensitivity, response, impacts and guidance. Report to Humber INCA.	Disturbance from humans walking with/without dogs is consistently found to the most disturbing activity at sites during assessments undertaken for SPA conservation objectives. Disturbance from shooting/hunting likely an issue at specific wetlands. Greenways, cycleways, walkways and similar access routes near important wintering waterbird sites are in various stages of the design, plan and consenting process in a number of locations around Ireland at present, including the Boyne Estuary, different parts of Dublin Bay, Wicklow coast, Wexford Harbour, Rosslare to Waterford, Waterford, Inch Island to Derry and more. If not adequately evaluated and developed these may cause significant increases in disturbance to wintering waterbirds. Lewis & Adcock (2017) found that waterbird activity decreased as recreational disturbance (walkers, dogs, kite surfers etc) increased on Dollymount Strand (Dublin Bay). Little known/studied about Greenshank response to disturbance. They appear highly flighty and as a territory holding species during winter this could lead to 'expensive' flights following disturbance events and affected foraging patterns.

A164	*Tringa nebularia*	F08	Modification of coastline, estuary and coastal conditions for development, use and protection of residential, commercial, industrial and recreational infrastructure and areas (including sea defence or coast protection works and infrastructures)	T			M	Inside the Member State	Lewis, L.J, Austin, G.m Boland, H., Frost, T., Crowe, O. & Tierney, D.T. (2017) Waterbird populations on non-estuarine coasts of Ireland: results of the 2015/16 Non-Estuarine Coastal Waterbird Survey (NEWS-III). Irish Birds 10:4, 511-522. Brennan, Michael, Hochstrasser, Tamara, Shahumyan, Harutyun : Simulated future development of the Greater Dublin Area: consequences for protected areas and coastal flooding risk. Journal of Irish Urban Studies, 9 2010-12, pp.31-51. Duriez, O., Bruno, J.E., Choquet, R., Pradel, R., Klaassen, M. (2012) Comparing the seasonal survival of resident and migratory oystercatchers: carry-over effects of habitat quality and weather conditions. Oikos 121: 862-873. Burton, N.H.K., Rehfisch, M.M., Clark, N.A. & Dodd, S.G. (2006) Impacts of sudden winter habitat loss on the body condition and survival of redshank Tringa totanus. Journal of Applied Ecology 43: 464-473.	Modification of coastline to prevent flooding and/or erosion is ongoing in a number of counties and likely to be carried out at new locations in the coming years. Development of coastal areas for commercial, residential, industrial and recreational purposes also increasing at present e.g. industrial development at Cork Harbour. A study by Brennan et al (2010), modelling future urban expansion in the greater Dublin area, highlighted the significant environmental impacts on protected areas (SPA, SAC) and other areas of high biodiversity to be expected if current trends of urban development continue – particularly in coastal regions.
A162	*Tringa totanus*	D01	Wind, wave and tidal power, including infrastructure	T			M	Inside the Member State	Percival, S. (2001). Assessment of the effects of off-shore wind farms on birds. ETSU Report W/13/00565/REP. DCENR (2010) Strategy for Renewable Energy: 2012 – 2020. Strategy Document. Department of Communications, Energy and Natural Resources, Dublin.	Most published literature concludes little determinable impacts of wind farms upon waders, nevertheless a risk is present especially during periods of migration, small-scale movements and e.g. during periods of movements en-masse (e.g. cold weather events). Birds are afforded a high degree of protection within SPA's, but areas outside/between SPA's are afforded much less protection. Percival (2001) notes that risk of collision with migrant waterfowl (i.e. wildfowl and wading birds) should be low/negligible if the wind farm is located several kilometres offshore. Exploitation of renewable energy on land and offshore is a high priority for Ireland in the coming years that will see significant increases in the number of terrestrial and offshore windfarms, with wave and tidal energy to follow. The EU Renewable Energy Directive (2009/28/EC) requires the EU to meet 20+% of energy needs with renewables by 2020; the target for Ireland has been set at 16% renewable by 2020. The National Renewable Energy Action Plan (DCENR 2010) has set out strategies for Ireland to meet the 16% target by 2020, the first of which is "Progressively more renewable electricity from onshore and offshore wind power for the domestic and export markets". In the recent National Planning Framework 'Ireland 2040', exploitation of our terrestrial and offshore renewable energy potential was repeatedly highlighted as a priority.
A162	*Tringa totanus*	F07	Sports, Tourism & Leisure Activities	PT	M	Inside the Member State	M	Inside the Member State	Lewis, L.J., Adcock, T. (2017) An assessment of the effects of kitesurfing and other activities on the waterbirds using DOllymount Strand. BirdWatch Ireland, Wicklow. Nairn, R.G.W. (2017) Factors affecting the choice of roost site by wintering waders in South Dublin Bay, Ireland. Irish Birds 10: 527-534. Cutts, N., Phelps, A. & Burdon, D. (2009) Construction and waterfowl - defining sensitivity, response, impacts and guidance. Report to Humber INCA. Burton, N.H.K., Rehfisch, M.M. & Clark, N.A. 2002. Impacts of disturbance from construction work on the densities and feeding behaviour of waterbirds using the intertidal mudflats of Cardiff Bay, UK. Environmental Management 30: 865-871. EU (2009) Management plan for Redshank Tringa totanus 2009-2011.	Disturbance from humans walking with/without dogs is consistently found to the most disturbing activity at sites during assessments undertaken for SPA conservation objectives. Disturbance from shooting/hunting likely an issue at specific wetlands. Greenways, cycleways, walkways and similar access routes near important wintering waterbird sites are in various stages of the design, plan and consenting process in a number of locations around Ireland at present, including the Boyne Estuary, different parts of Dublin Bay, Wicklow coast, Wexford Harbour, Rosslare to Waterford, Waterford, Inch Island to Derry and more. If not adequately evaluated and developed these may cause significant increases in disturbance to wintering waterbirds. Lewis & Adcock (2017) found that waterbird activity decreased as recreational disturbance (walkers, dogs, kite surfers etc) increased on Dollymount Strand (Dublin Bay). Cutts et al (2009) ranked RK as highly sensitive in their sensitivity to disturbance. Various references within this aforementioned review point to RK being sensitive, and particularly vulnerable during cold winters..
A162	*Tringa totanus*	F08	Modification of coastline, estuary and coastal conditions for development, use and protection of residential, commercial, industrial and recreational infrastructure and areas (including sea defence or coast protection works and infrastructures)	T			M	Inside the Member State	Lewis, L.J, Austin, G.m Boland, H., Frost, T., Crowe, O. & Tierney, D.T. (2017) Waterbird populations on non-estuarine coasts of Ireland: results of the 2015/16 Non-Estuarine Coastal Waterbird Survey (NEWS-III). Irish Birds 10:4, 511-522. Burton, N.H.K., Rehfisch, M.M., Clark, N.A. & Dodd, S.G. (2006) Impacts of sudden winter habitat loss on the body condition and survival of redshank Tringa totanus. Journal of Applied Ecology 43: 464-473. Brennan, Michael, Hochstrasser, Tamara, Shahumyan, Harutyun : Simulated future development of the Greater Dublin Area: consequences for protected areas and coastal flooding risk. Journal of Irish Urban Studies, 9 2010-12, pp.31-51. Duriez, O., Bruno, J.E., Choquet, R., Pradel, R., Klaassen, M. (2012) Comparing the seasonal survival of resident and migratory oystercatchers: carry-over effects of habitat quality and weather conditions. Oikos 121: 862-873.	Modification of coastline to prevent flooding and/or erosion is ongoing in a number of counties and likely to be carried out at new locations in the coming years. Development of coastal areas for commercial, residential, industrial and recreational purposes also increasing at present e.g. industrial development at Cork Harbour. A study by Brennan et al (2010), modelling future urban expansion in the greater Dublin area, highlighted the significant environmental impacts on protected areas (SPA, SAC) and other areas of high biodiversity to be expected if current trends of urban development continue – particularly in coastal regions. Duriez et al. (2012) found that habitat changes in the Dutch wintering grounds of Oystercatchers caused a reduction in food stocks, leading to a long-term reduction in survival rates. Burton et al. (2006) found that redshank displaced redshank had difficulty maintaining mass in the first winter after displacement, with reduced survival rates as a result. These studies indicate the potential impacts on wader populations of wintering habitat loss, or displacement from previously relied-upon wintering habitat.
A162	*Tringa totanus*	N04	Sea-level and wave exposure changes due to climate change	T			M	Inside the Member State	Crowe, O., Lewis, L. J. & Anthony, S. (2013) Impacts of sea level rise on the birds and biodiversity of key coastal wetlands. Report to the Environmental Protection Agency. Draft. Austin, G. (2010) Waterbirds in MCCIP Annual Report Card 2010-11, MCCIP Science Review, 7pp. www.mccip.org.uk/arc	Climate change/sea level rise, considered high risk by Crowe et al (2013) as distribution is wholly intertidal.

A142	*Vanellus vanellus*	D01	Wind, wave and tidal power, including infrastructure	T			M	Inside the Member State	DCENR (2010) Strategy for Renewable Energy: 2012 – 2020. Strategy Document. Department of Communications, Energy and Natural Resources, Dublin. Government of Ireland (2018) National Planning Framework – Project Ireland 2040. Government of Ireland, Dublin.	Assigned a higher impact score than other waders due to the species distribution extending inland with regular movements inland to coastal areas therefore vulnerable along these migration routes. Note that SPA sites are afforded a high level of protection, but that does not always extend to satellite feeding sites nor does it cover areas between SPAs that may be used by birds moving around. Exploitation of renewable energy on land and offshore is a high priority for Ireland in the coming years that will see significant increases in the number of terrestrial and offshore windfarms, with wave and tidal energy to follow. The EU Renewable Energy Directive (2009/28/EC) requires the EU to meet 20+% of energy needs with renewables by 2020; the target for Ireland has been set at 16% renewable by 2020. The National Renewable Energy Action Plan (DCENR 2010) has set out strategies for Ireland to meet the 16% target by 2020, the first of which is "Progressively more renewable electricity from onshore and offshore wind power for the domestic and export markets". In the recent National Planning Framework 'Ireland 2040', exploitation of our terrestrial and offshore renewable energy potential was repeatedly highlighted as a priority.
A142	*Vanellus vanellus*	F07	Sports, Tourism & Leisure Activities	T			M	Inside the Member State	Cutts, N., Phelps, A. & Burdon, D. (2009) Construction and waterfowl - defining sensitivity, response, impacts and guidance. Report to Humber INCA.	Disturbance from humans walking with/without dogs is consistently found to the most disturbing activity at sites during assessments undertaken for SPA conservation objectives. Disturbance from shooting/hunting likely an issue at specific wetlands. Greenways, cycleways, walkways and similar access routes near important wintering waterbird sites are in various stages of the design, plan and consenting process in a number of locations around Ireland at present, including the Boyne Estuary, different parts of Dublin Bay, Wicklow coast, Wexford Harbour, Rosslare to Waterford, Waterford, Inch Island to Derry and more. If not adequately evaluated and developed these may cause significant increases in disturbance to wintering waterbirds. Tend to occur in wide open mud/sand flats and away from areas frequented by walkers; but flighty birds and disturbed easily by irregular noises. Additional pressures when feeding inland and severely affected in cold winters when finding suitable feeding habitat might be difficult. Cutts et al. (2009) assign a low risk score re disturbance
A142	*Vanellus vanellus*	F28	Modification of flooding regimes, flood protection for residential or recreational development	T			M	Inside the Member State		Flooding in recent years has put flood defences high on the agenda across the country, with some coastal works under construction and plans to modify rivers, lakes and turloughs in the midlands, which may impact waterbirds in these areas.
A142	*Vanellus vanellus*	N01	Temperature changes (e.g. rise of temperature & extremes) due to climate change	PT	M	Both inside and outside the EU	M	Both inside and outside the EU	Simon Gillings , Graham E. Austin , Robert J. Fuller & William J. Sutherland (2006) Distribution shifts in wintering Golden Plover Pluvialis apricaria and Lapwing Vanellus vanellus in Britain, Bird Study, 53:3, 274-284,	From Gillings et al 2006 - "Mean winter temps have increased…and there has been a reduction in the frequency of cold spells… potentially allowing waders generally to winter closer to their breeding grounds… In the case of Golden Plover and Lapwing this would mean wintering further north/east and east, respectively. Evidence from this study, from Rehfisch et al (2004) and from studies on the continent (Jukema et al 2001) point to exactly this phenomenon."