

National Parks and Wildlife Service

Conservation Objectives Series

White Lough, Ben Loughs and Lough Doo SAC 001810



An Roinn Tithíochta,
Rialtais Áitiúil agus Oidhreachta
Department of Housing,
Local Government and Heritage

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Introduction

The overall aim of the Habitats Directive is to maintain or restore the favourable conservation status of habitats and species of community interest. These habitats and species are listed in the Habitats and Birds Directives and Special Areas of Conservation and Special Protection Areas are designated to afford protection to the most vulnerable of them. These two designations are collectively known as the Natura 2000 network.

European and national legislation places a collective obligation on Ireland and its citizens to maintain habitats and species in the Natura 2000 network at favourable conservation condition. The Government and its agencies are responsible for the implementation and enforcement of regulations that will ensure the ecological integrity of these sites.

A site-specific conservation objective aims to define favourable conservation condition for a particular habitat or species at that site.

The maintenance of habitats and species within Natura 2000 sites at favourable conservation condition will contribute to the overall maintenance of favourable conservation status of those habitats and species at a national level.

Favourable conservation status of a habitat is achieved when:

- its natural range, and area it covers within that range, are stable or increasing, and
- the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- the conservation status of its typical species is favourable.

The favourable conservation status of a species is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

Notes/Guidelines:

1. The targets given in these conservation objectives are based on best available information at the time of writing. As more information becomes available, targets for attributes may change. These will be updated periodically, as necessary.
2. An appropriate assessment based on these conservation objectives will remain valid even if the targets are subsequently updated, providing they were the most recent objectives available when the assessment was carried out. It is essential that the date and version are included when objectives are cited.
3. Assessments cannot consider an attribute in isolation from the others listed for that habitat or species, or for other habitats and species listed for that site. A plan or project with an apparently small impact on one attribute may have a significant impact on another.
4. Please note that the maps included in this document do not necessarily show the entire extent of the habitats and species for which the site is listed. This should be borne in mind when appropriate assessments are being carried out.
5. When using these objectives, it is essential that the relevant backing/supporting documents are consulted, particularly where instructed in the targets or notes for a particular attribute.

Qualifying Interests

** indicates a priority habitat under the Habitats Directive*

001810	White Lough, Ben Loughs and Lough Doo SAC
1092	White-clawed Crayfish <i>Austropotamobius pallipes</i>
3140	Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara</i> spp.

Supporting documents, relevant reports & publications

Supporting documents, NPWS reports and publications are available for download from: www.npws.ie/Publications

NPWS Documents

Year :	1972
Title :	A Report on Areas of Scientific Interest in Co. Meath
Author :	Young, R.
Series :	Unpublished report
Year :	2009
Title :	Monitoring of white-clawed crayfish <i>Austropotamobius pallipes</i> in Irish lakes in 2007
Author :	O'Connor, W.; Hayes, G.; O'Keeffe, C.; Lynn, D.
Series :	Irish Wildlife Manuals, No. 37
Year :	2010
Title :	A technical manual for monitoring white-clawed crayfish (<i>Austropotamobius pallipes</i>) in Irish lakes
Author :	Reynolds, J.; O'Connor, W.; O'Keeffe, C.; Lynn, D.
Series :	Irish Wildlife Manuals, No.45
Year :	2013
Title :	A survey of the benthic macrophytes of three hard-water lakes: Lough Bunny, Lough Carra and Lough Owel
Author :	Roden, C.; Murphy, P.
Series :	Irish Wildlife Manuals, No. 70
Year :	2013
Title :	The status of EU protected habitats and species in Ireland. Volume 2. Habitats assessments
Author :	NPWS
Series :	Conservation assessments
Year :	2015
Title :	Habitats Directive Annex I lake habitats: a working interpretation for the purposes of site-specific conservation objectives and Article 17 reporting
Author :	O Connor, Á.
Series :	Unpublished document by NPWS
Year :	2019
Title :	The Status of EU Protected Habitats and Species in Ireland. Volume 2: Habitat Assessments
Author :	NPWS
Series :	Conservation assessments
Year :	2020
Title :	Marl Lake (Habitat 3140) Survey and Assessment Methods Manual
Author :	Roden, C.; Murphy, P.; Ryan, J.; Doddy, P.
Series :	Irish Wildlife Manuals, No. 125
Year :	2020
Title :	Benthic vegetation in Irish marl lakes: monitoring habitat 3140 condition 2011 to 2018
Author :	Roden, C.; Murphy, P.; Ryan, J.
Series :	Irish Wildlife Manuals, No. 124
Year :	2020
Title :	Benthic vegetation in Irish marl lakes: monitoring habitat 3140 condition 2011 to 2018. Appendix III, Site Reports
Author :	Roden, C.; Murphy, P.; Ryan, J.
Series :	Irish Wildlife Manuals, No. 124

Year : in prep.
Title : Survey of the status of white-clawed crayfish, *Austropotamobius pallipes*, in designated SACs in 2017
Author : Gammell, M.; McFarlane, A.; Brady, D.; O'Brien, J.; Mirimin, L.; Graham, C.; Lally, H.; Minto, C.; O'Connor, I.
Series : Irish Wildlife Manuals

Other References

Year : 1982
Title : Eutrophication of waters. Monitoring assessment and control
Author : OECD
Series : OECD, Paris

Year : 2008
Title : The effect of excessive water abstraction on the vegetation and conservation status of Lough Bane, County Meath/Westmeath. Special Area of Conservation no 002120. Updated October 2008
Author : Roden, C.
Series : Report to Meath County Council

Year : 2009
Title : The marl lakes of the British Isles
Author : Pentecost, A.
Series : Freshwater Reviews, 2(1): 167-197

Year : 2010
Title : Water Quality in Ireland 2007-2009
Author : McGarrigle, M.; Lucey, J.; Ó Cinnéide, M.
Series : Environmental Protection Agency, Wexford

Year : 2015
Title : Water Quality in Ireland 2010-2012
Author : Bradley, C.; Byrne, C.; Craig, M.; Free, G.; Gallagher, T.; Kennedy, B.; Little, R.; Lucey, J.; Mannix, A.; McCreesh, P.; McDermott, G.; McGarrigle, M.; Ní Longphuirt, S.; O'Boyle, S.; Plant, C.; Tierney, D.; Trodd, W.; Webster, P.; Wilkes, R.; Wynne, C.
Series : Environmental Protection Agency, Wexford

Year : 2016
Title : A narrative for conserving freshwater and wetland habitats in England
Author : Mainstone, C.; Hall, R.; Diack, I.
Series : Natural England Research Reports Number 064

Year : 2016
Title : Lake ecological assessment metrics in Ireland: relationships with phosphorus and typology parameters and the implications for setting nutrient standards
Author : Free, G.; Tierney, D.; Little, R.; Kelly, F.L.; Kennedy, B.; Plant, C.; Trodd, W.; Wynne, C.; Caroni R.; Byrne, C.
Series : Biology and Environment: Proceedings of the Royal Irish Academy, 116B: 191-204

Year : 2017
Title : Water Quality in Ireland 2010-2015
Author : Fanning, A.; Craig, M.; Webster, P.; Bradley, C.; Tierney, D.; Wilkes, R.; Mannix, A.; Treacy, P.; Kelly, F.; Geoghegan, R.; Kent, T.; Mageean, M.
Series : Environmental Protection Agency, Wexford

Spatial data sources

Year : 2021
Title : OSi Prime 2 water polygon file
GIS Operations : WaterPolygons feature class clipped to the SAC boundary. Expert opinion used to identify Annex I habitat and to resolve any issues arising
Used For : 3140 (map 2)

Year : 2021
Title : NPWS rare and threatened species database
GIS Operations : Dataset created from spatial references in database records. Expert opinion used as necessary to resolve any issues arising
Used For : 1092 (map 3)

Conservation Objectives for : White Lough, Ben Loughs and Lough Doo SAC [001810]

3140 Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp.

To maintain the favourable conservation condition of Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp. in White Lough, Ben Loughs and Lough Doo SAC, which is defined by the following list of attributes and targets:

Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes	The SAC contains a series of small hard-water lakes and ponds with lake habitat 3140, including Annagh or White Lough, Ben Loughs North, South and Middle, and Lough Doo. White Lough was monitored in 2018 and assessed as in good conservation condition overall; however, water level and euphotic depth were low (Roden et al., 2020). The surface area of the lake is the simplest measure of extent and should be stable or increasing. It may also be possible to estimate the area of the vegetation communities/zones that typify the habitat. Further information relating to all attributes is provided in Roden et al. (2020) and O Connor (2015). See also Pentecost (2009) and Roden et al. (2020) for an overview of marl lakes in Britain and Ireland
Habitat distribution	Occurrence	No decline, subject to natural processes	As noted above, lake habitat 3140 was monitored in White Lough in 2018, and surveyed by C. Roden in 2007 (Roden, 2008; Roden et al., 2020). It is also a Water Framework Directive (WFD) monitoring lake. There are limited data for the other lakes: Lough Doo was briefly surveyed by Young (1972); however, lake habitat 3140 is likely to occur in all lakes and ponds in the SAC
Vegetation composition: typical species	Occurrence	Typical species present, in good condition, and demonstrating typical abundances and distribution	See Roden et al. (2020) for records of characteristic marl lake species in White Lough, which include five charophyte species: <i>Chara aculeolata</i> , <i>C. contraria</i> , <i>C. curta</i> , <i>Chara rudis</i> , <i>C. virgata</i> . <i>Potamogeton filiformis</i> was another noteworthy species recorded (Roden et al., 2020). For lists of typical species for lake habitat 3140 (cyanobacteria, algae, higher plants and water beetles), see the habitat 3140 Article 17 assessments (NPWS, 2013, 2019) and O Connor (2015). Roden et al. (2020) list species present in marl lakes in good condition, as well as other widespread and local/rare species
Vegetation composition: characteristic zonation	Occurrence	Maintain/restore characteristic charophyte and crust zones	In 2018, <i>Chara curta</i> , <i>C. rudis</i> and <i>C. virgata</i> zones were present in White Lough; however, the water level was too low to find much cyanophyte crust (Roden et al., 2020). Young (1972) described Lough Doo as 'covered by a continuous thick blanket' of charophytes. The characteristic zonation of 3140 in marl lakes was described in Roden and Murphy (2013) and updated by Roden et al. (2020). Marl lakes in good condition should have four or more characteristic vegetation zones present, typically including a cyanophyte crust zone with occasional <i>Chara virgata</i> var. <i>annulata</i> , a <i>Chara curta</i> zone, a <i>Chara rudis</i> zone, a <i>Chara virgata</i> zone and, in some lakes, a <i>Chara denudata</i> or <i>Nitella flexilis</i> zone (Roden et al., 2020). Roden et al. (2020) also provide methods for assessing the condition of the cyanophyte crust (3 metrics) and a novel indicator (C&K score) of good structure and function

Vegetation distribution: maximum depth	Metres	Restore maximum depth of vegetation (euphotic depth), subject to natural processes	Maximum depth of vegetation was 6.4m in White Lough in 2018, a decrease from 8.1m in 2007 (Roden et al., 2020). Low water levels during sampling may have temporarily reduced the euphotic depth (Roden et al., 2020). The target for maximum depth of vegetation colonisation (euphotic depth) in marl lakes is >7m (Roden et al., 2020). Euphotic depth is considered to be a key measure of the structure and functions of marl lake vegetation and has been found to exceed 10m in some Irish marl lakes (Roden et al., 2020)
Hydrological regime: water level fluctuations	Metres	Maintain/restore appropriate hydrological regime necessary to support the habitat	Water level is monitored at White Lough for WFD purposes (see Environmental Protection Agency (EPA) HydroNet) and appears to fluctuate by over 2m in most years. In 2018, the water level was below the cyanophyte crust zone (Roden et al., 2020). Fluctuations in lake water level can be amplified by activities such as abstraction and drainage. In undisturbed marl lakes, fluctuations follow predictable seasonal trends and relationships exist with the vegetation zones (Roden et al., 2020). In summer, more than 90% of the crust zone should be covered and water level should never be lower than the top of the <i>Chara curta</i> zone; in winter, all zones should be submerged (Roden et al., 2020). Groundwater normally exerts a strong influence on the hydrology of marl lakes. Increased water level fluctuations can increase wave action, up-root vegetation, increase turbidity, alter the substratum and lead to release of nutrients from the sediment
Lake substratum quality	Various	Maintain appropriate substratum type, extent and chemistry to support the vegetation	Roden et al. (2020) recorded marl and rock at White Lough. Young (1972) stated that the bed of Lough Doo was covered with a deep, soft deposit of a cream-coloured marl. In general, marl lakes are dominated by limestone bedrock, calcareous silt and sand, and loose stones (Roden et al., 2020). Deposited peat may indicate excessive sediment inputs and sediment can accumulate phosphorus and release it into the water column (Roden et al., 2020). Further research into acceptable sediment phosphorus concentrations and other aspects of substratum quality in marl lakes would be beneficial
pH and Alkalinity	pH units, mg/l	Maintain appropriate water and sediment pH, alkalinity and cation concentrations to support the habitat, subject to natural processes	Roden et al. (2020) reported alkalinity of 191 mg/l and pH of 8.2 of in White Lough. Alkalinity in Irish marl lakes is generally 80–100 mEq/L (Roden et al., 2020). Acidification is not considered a threat to lake habitat 3140; however, eutrophication can lead to at least temporary increases in pH to toxic levels (>9/9.5 pH units). Maximum pH should be <9.0 pH units, in line with the surface water standards (The European Communities Environmental Objectives (Surface Waters) (Amendment) Regulations 2019). Further study of the sediment pH, alkalinity and cation concentration may assist in understanding of nutrient cycling

Nutrients	mg/l P; mg/l N	Maintain the concentration of nutrients in the water column at sufficiently low levels to support the habitat and its typical species	Roden et al. (2020) report average total phosphorus (TP) of 0.006mg/l in White Lough based on 2008-2015 EPA data. The EPA reported High nutrient status in White Lough 2010-2015. Roden et al. (in prep.) found that the majority of marl lakes in good condition have TP \leq 0.01mg/l. While vegetation attributes determine the conservation condition of the habitat and some good condition marl lakes have higher TP concentrations, \leq 0.01mg/l is the target for good condition proposed by Roden et al. (2020). The \leq 0.01mg/l TP target is equivalent to oligotrophic (OECD, 1982) and WFD High Status (The European Communities Environmental Objectives (Surface Waters) (Amendment) Regulations 2019). WFD High Status targets for total ammonia (annual average \leq 0.04mg/l N and annual 95th percentile \leq 0.09mg/l N) may also be appropriate. See also Free et al. (2016), McGarrigle et al. (2010), Bradley et al. (2015) and Fanning et al. (2017)
Water colour	mg/l PtCo	Maintain appropriate water colour to support the habitat	Roden et al. (2020) reported colour of 12.5mg/l PtCo in White Lough. Roden et al. (2020) found that water colour (dissolved light-absorbing compounds) is negatively correlated with euphotic depth, charophyte species richness and cover, and positively correlated with vascular plant cover in marl lakes. Roden et al. (2020) set good condition at $<$ 15mg/l PtCo; however, it should be noted that the most important Irish marl lakes have very clear waters with colour of $<$ 5mg/l PtCo. Roden et al. (2020) also set a TP \times Colour Index with a target of $<$ 0.1 for good; White Lough was 0.075 in 2018. Increased colour decreases light penetration and reduces the area of macrophyte habitat, particularly at the lower euphotic depths. The primary source of increased colour in Ireland is peatland disturbance
Dissolved organic carbon (DOC)	mg/l	Maintain appropriate organic carbon levels to support the habitat	Dissolved organic carbon (DOC) in the water column is linked to water colour. It can provide a substrate (food source) for heterotrophic organisms, which can impact directly (e.g. shading) and indirectly (e.g. nutrient release) on the characteristic lake communities. Damage and degradation of peatland, leading to decomposition of peat is likely to be the predominant source of dissolved and particulate organic carbon in Ireland
Turbidity	Nephelometric turbidity units/ mg/l SS/ other appropriate unit	Maintain appropriate turbidity to support the habitat	Roden et al. (2020) described White Lough as a very clear marl lake. Turbidity can significantly affect the quantity and quality of light reaching rooted and attached vegetation and can, therefore, impact on lake habitats. The settlement of higher loads of inorganic or organic material on lake vegetation communities may also have impacts on sensitive, delicate species. Turbidity can increase as a result of re-suspension of material within the lake, higher loads entering the lake, or eutrophication. Turbidity measurement and interpretation is challenging. As a result, it is likely to be difficult to set habitat-specific targets for turbidity in lakes
Transparency	Metres	Maintain appropriate Secchi transparency. There should be no decline in Secchi depth/transparency	Roden et al. (2020) measured Secchi depth of 9.1m in White Lough. Transparency relates to light penetration and, hence, to the depth of colonisation of vegetation. Roden et al. (2020) advised it is preferable to measure euphotic depth directly by observation, but noted that a decreasing trend in Secchi depth indicates declining water quality. Transparency can be affected by phytoplankton blooms, water colour and turbidity. Secchi depth in marl lakes in good condition is generally $>$ 6m. The OECD fixed boundary system set transparency targets for oligotrophic lakes of \geq 6m annual mean Secchi disk depth and \geq 3m annual minimum Secchi disk depth

Attached algal biomass	Algal cover	Maintain trace/absent attached algal biomass (<5% cover)	Roden et al. (2020) recorded an underwater spring in White Lough surrounded by <i>Hippuris vulgaris</i> and filamentous algae. Roden et al. (2020) said that springs in marl lakes should not be used in condition assessment and are typically favoured by bryophytes and vascular plants rather than charophytes. Nutrient enrichment can favour epiphytic and epipelagic algae that can out-compete the submerged vegetation. Roden et al. (2020) noted that occasional blooms of filamentous algae occur in marl lakes in the absence of excess nutrients, especially species of the orders Zygnematales or Oedogoniales. Drifting masses of <i>Cladophora</i> species may indicate a decline in water quality. In general, the cover abundance of attached algae in marl lakes (3140) should be trace/absent (<5% cover)
Fringing habitat: area and condition	Hectares	Maintain the area and condition of fringing habitats necessary to support the natural structure and functioning of habitat 3140	Young (1972) stated that Lough Doo had a very sparse reedbed of <i>Phragmites australis</i> , while the neighbouring lakes were surrounded by a wide, dense swamp, dominated by <i>Cladium mariscus</i> . As well as <i>Cladium</i> stands, alkaline fens with <i>Schoenus nigricans</i> are widespread in the SAC, while <i>Schoenoplectus lacustris</i> , wet grassland and some wet woodland also occur along lake shorelines (NPWS internal files). The fringing habitats along lake shorelines intergrade with and support the structure and functions of the lake habitat. Equally, fringing habitats are dependent on the lake, particularly its water levels, and support wetland communities and species of conservation concern. Many of the fringing wetland habitats support higher invertebrate and plant species richness than the lake habitats themselves. See also Mainstone et al. (2016)

Conservation Objectives for : White Lough, Ben Loughs and Lough Doo SAC [001810]

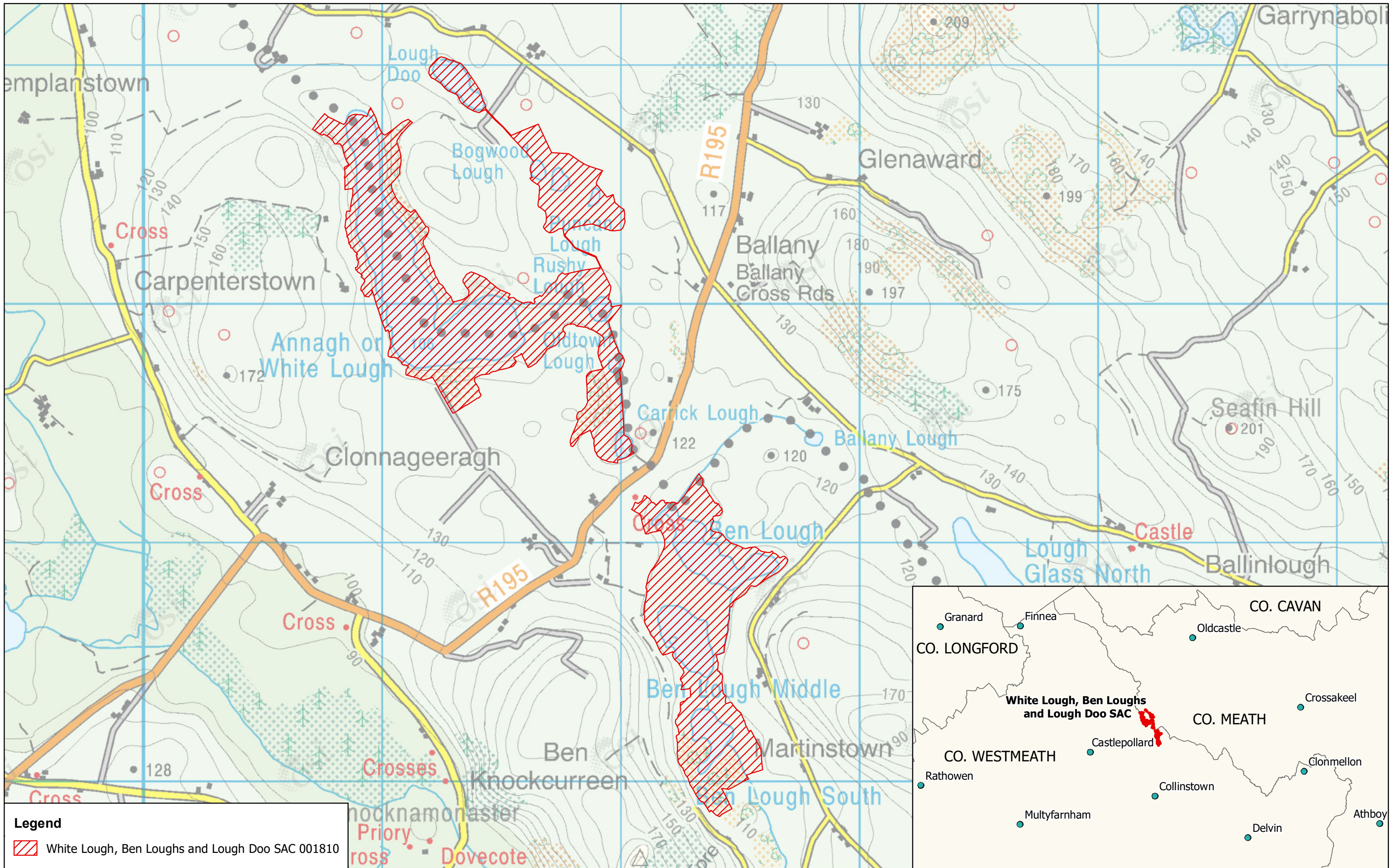
1092

White-clawed Crayfish *Austropotamobius pallipes*


To maintain the favourable conservation condition of White-clawed Crayfish (*Austropotamobius pallipes*) in White Lough, Ben Loughs and Lough Doo SAC, which is defined by the following list of attributes and targets:

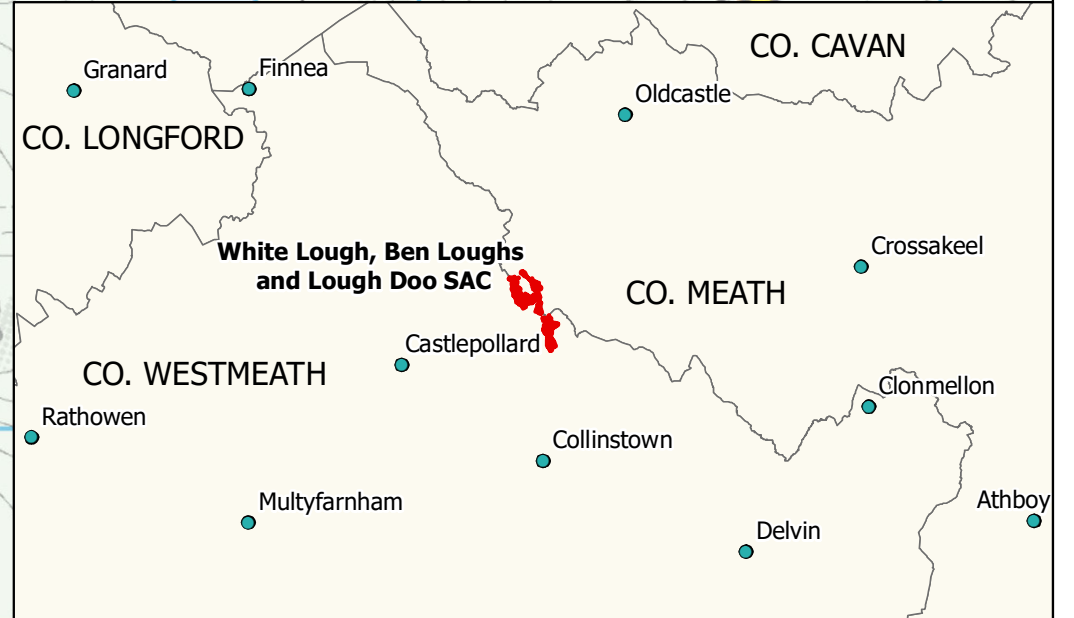
Attribute	Measure	Target	Notes
Distribution	Number of occupied 1km squares	No reduction from baseline. See map 3	Within this SAC, white-clawed crayfish (<i>Austropotamobius pallipes</i>) has been confirmed from White Lough by numerous surveys and research studies. The current population in White Lough is as the result of a re-introduction in the early 2000s (O'Connor et al., 2009). Gammell et al. (in prep.) confirmed the species was still present at this site. Information from the other lakes in the SAC is not so comprehensive. Presence in Lough Doo was confirmed by Gammell et al. (in prep.). The species could be present in Ben Loughs, but this has not been confirmed
Population structure: recruitment	Percentage occurrence of juveniles and females with eggs	Juveniles and females with eggs in at least 50% of positive samples taken at appropriate time and methodology	See Reynolds et al. (2010) for further details. Gammell et al. (in prep.) found juveniles in White Lough and Lough Doo
Population size	Catch per unit effort	No reduction from baseline of 0.79	The catch per unit effort (CPUE) figure is based on the figure calculated by Gammell et al. (in prep.) based on the mean of the samples for the two lakes. These may be refined in the future with a more thorough assessment of the stocks
Negative indicator species	Occurrence	No non-indigenous crayfish species	Non-indigenous crayfish species (NICS) are identified as a major direct threat to the white-clawed crayfish and as a disease vector, in particular crayfish plague (<i>Aphanomyces astaci</i>), which is fatal to white-clawed crayfish. The possession, import and intentional release of five species of invasive alien crayfish is banned by Statutory Instrument No. 354/2018
Disease	Occurrence	No instances of disease	Crayfish plague, caused by the water-borne mould <i>Aphanomyces astaci</i> , is identified as a major threat to the species in Ireland. Instances of crayfish plague have occurred in Ireland since 2015 causing local extinctions. Earlier outbreaks of crayfish plague occurred in the 1980s and affected this SAC, causing the extinction of white-clawed crayfish from White Lough. The current population in White Lough was re-introduced
Water quality	Water chemistry measures	Maintain appropriate water quality, particularly pH and nutrient levels, to support the natural structure and functioning of the habitat	White-clawed crayfish are not considered very sensitive of water quality but are intolerant of low pH and poorest water quality, and lack of calcareous influence. There should be no decline in the water quality as defined by the targets for Hard oligo-mesotrophic waters with benthic vegetation of <i>Chara</i> spp. (Annex I habitat 3140) as these are more stringent than white-clawed crayfish require. See the conservation objective for habitat 3140 in this volume for further details

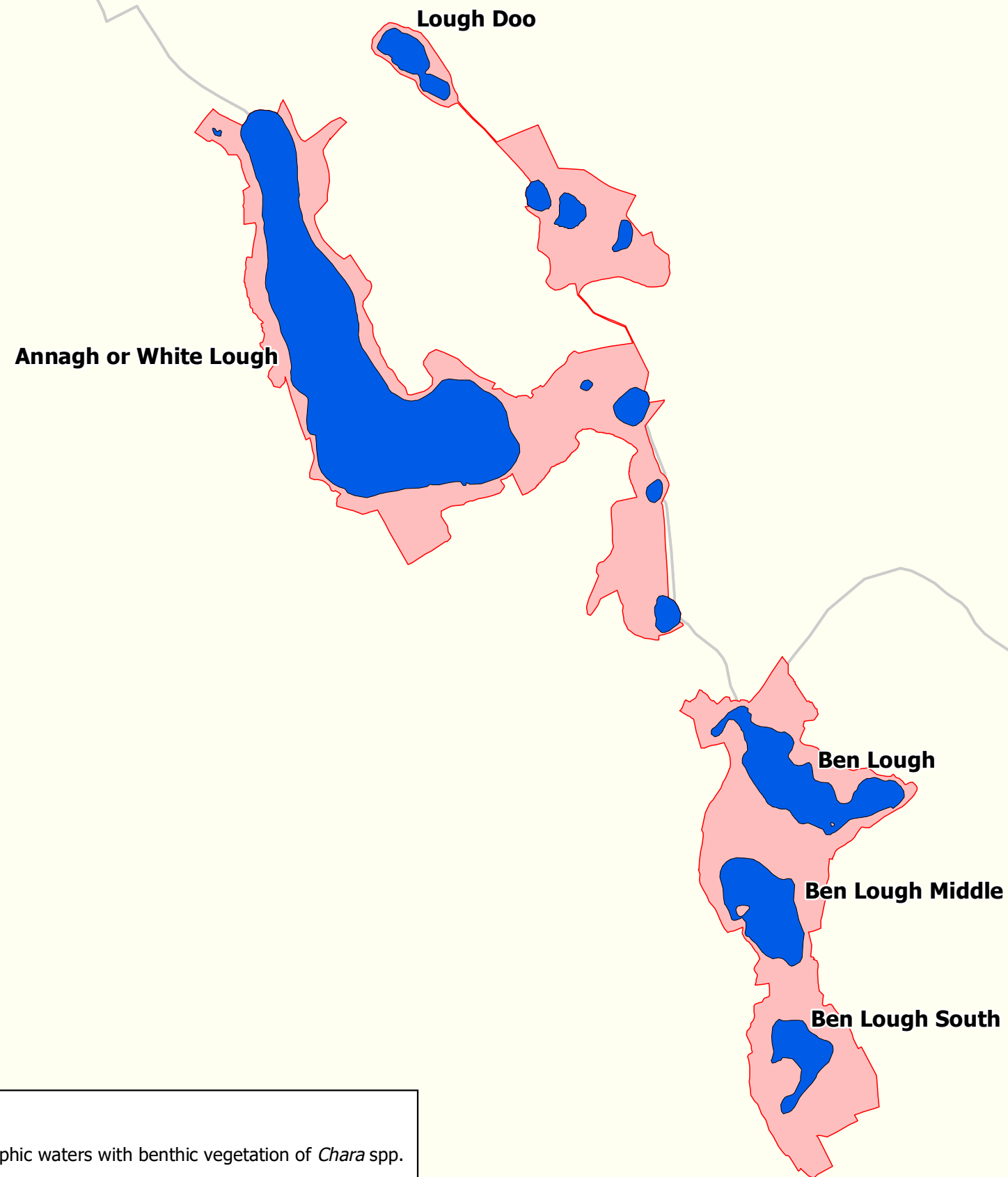
Habitat quality: heterogeneity	Occurrence of positive habitat features	No decline from the baseline	White-clawed crayfish need high habitat heterogeneity. Larger crayfish must have stones to hide under, or an earthen bank in which to burrow. Hatchlings shelter in vegetation, gravel and among fine tree roots. Smaller crayfish are typically found among weed and debris in shallow water. Larger juveniles in particular may also be found among cobbles and detritus such as leaf litter. These conditions and habitat features must be available on the whole length of occupied habitat. Gammell et al. (in prep.) scored the habitat heterogeneity for both White Lough and Lough Doo and following this methodology, the baseline scores of 0.2 for White Lough and 0.31 for Lough Doo are set
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Legend

 White Lough, Ben Loughs and Lough Doo SAC 001810





Legend

- 3140 Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp.
- White Lough, Ben Loughs and Lough Doo SAC 001810
- OSI Discovery Series County Boundary



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Department of Housing,
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**MAP 2:
WHITE LOUGH, BEN LOUGHS AND LOUGH DOO SAC
CONSERVATION OBJECTIVES
INDICATIVE LAKE HABITATS**

Map to be read in conjunction with the NPWS Conservation Objectives Document

**SITE CODE:
SAC 001810; version 3.02.
CO. WESTMEATH / MEATH**

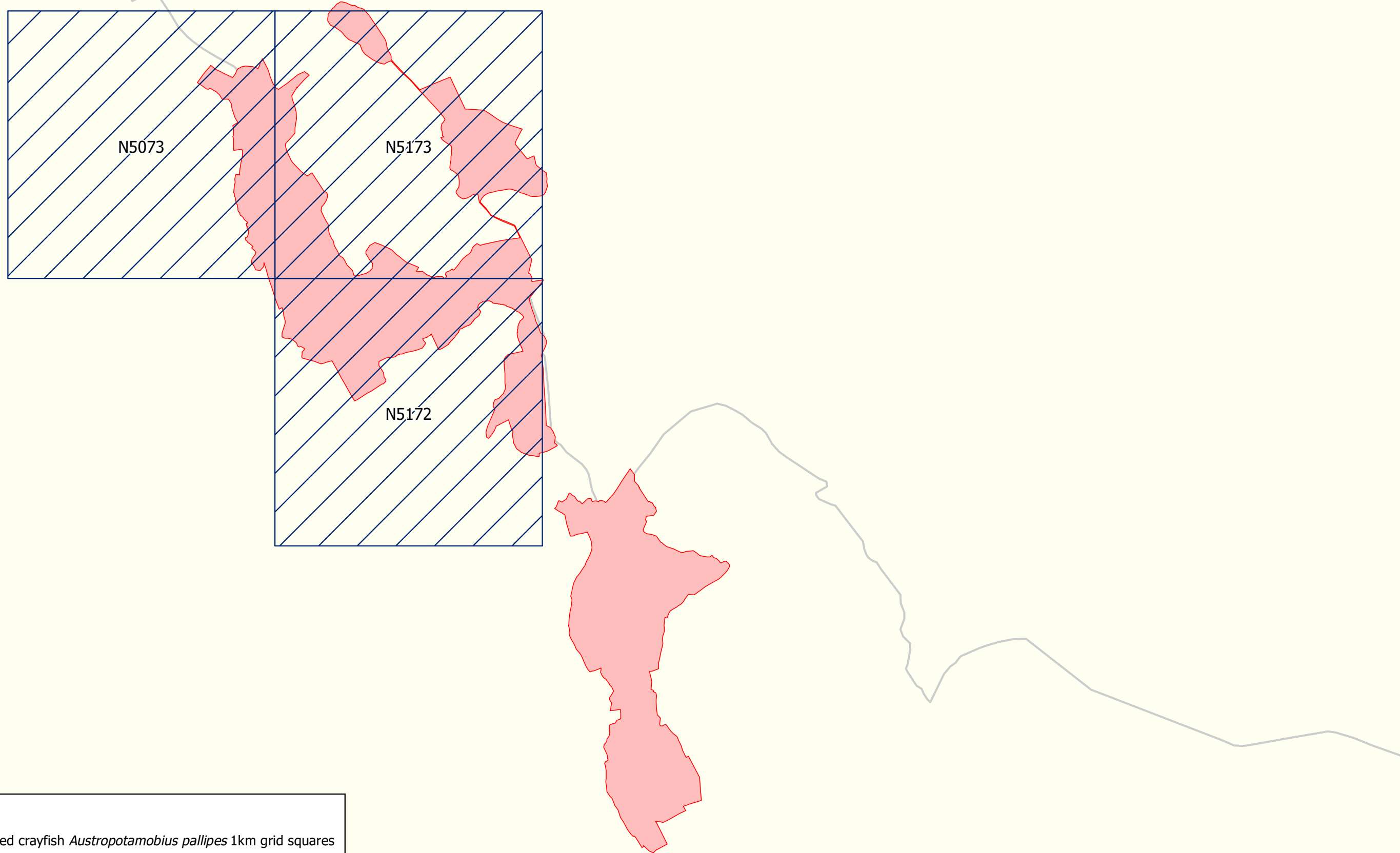


The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.
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Níl sna teorainneacha ar na léarscáileanna ach nod garshuíomhach ginearálta. Féadfar athbhreithnithe a déanamh ar theorainneacha na gceantar comharthaíthe. Suirbhéarachta Ordonáis na hÉireann Ceadúnas Uimh OSI-NMA-014. © Suirbhéarachta Ordonáis na hÉireann Rialtas na hÉireann



Date: October 2021



Legend

- 1092 White-clawed crayfish *Austropotamobius pallipes* 1km grid squares
- White Lough, Ben Loughs and Lough Doo SAC 001810
- OSi Discovery Series County Boundary

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**MAP 3:
WHITE LOUGH, BEN LOUGHS AND LOUGH DOO SAC
CONSERVATION OBJECTIVES
WHITE-CLAWED CRAYFISH**

Map to be read in conjunction with the NPWS Conservation Objectives Document

**SITE CODE:
SAC 001810; version 3.02.
CO. WESTMEATH / MEATH**

0 0.125 0.25 0.5 Kilometres

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Date: October 2021