

# National Parks and Wildlife Service

## *Conservation Objectives Series*

### Urlaur Lakes SAC 001571



An Roinn  
Cultúir, Oidhreachta agus Gaeltachta  

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Department of  
Culture, Heritage and the Gaeltacht



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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*

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001571      Urlaur Lakes SAC

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3140      Hard oligo-mesotrophic waters with benthic vegetation of *O<sup>+</sup>l<sup>+</sup>ac* spp.

## Supporting documents, relevant reports & publications

Supporting documents, NPWS reports and publications are available for download from: [www.npws.ie/Publications](http://www.npws.ie/Publications)

### NPWS Documents

|                 |   |
|-----------------|---|
| <b>Year :</b>   | 2013  |
| <b>Title :</b>  | A survey of the benthic macrophytes of three hard-water lakes: Lough Bunny, Lough Carra and Lough Owel  |
| <b>Author :</b> | Roden, C.; Murphy, P.   |
| <b>Series :</b> | Irish Wildlife Manual No. 70  |
| <b>Year :</b>   | 2013  |
| <b>Title :</b>  | The status of EU protected habitats and species in Ireland. Volume 2. Habitats assessments  |
| <b>Author :</b> | NPWS  |
| <b>Series :</b> | Conservation assessments  |
| <b>Year :</b>   | 2015  |
| <b>Title :</b>  | Habitats Directive Annex I lake habitats: a working interpretation for the purposes of site-specific conservation objectives and Article 17 reporting |
| <b>Author :</b> | O Connor, Á.  |
| <b>Series :</b> | Unpublished document by NPWS  |

### Other References

|                 |  |
|-----------------|--|
| <b>Year :</b>   | 1982   |
| <b>Title :</b>  | Eutrophication of waters. Monitoring assessment and control  |
| <b>Author :</b> | OECD   |
| <b>Series :</b> | OECD, Paris  |
| <b>Year :</b>   | 2000   |
| <b>Title :</b>  | Colour in Irish lakes  |
| <b>Author :</b> | Free, G.; Allott, N.; Mills, P.; Kennelly, C.; Day, S.   |
| <b>Series :</b> | Verhandlungen Internationale Vereinigung für theoretische und angewandte Limnologie, 27: 2620-2623   |
| <b>Year :</b>   | 2006   |
| <b>Title :</b>  | A reference-based typology and ecological assessment system for Irish lakes. Preliminary investigations. Final report. Project 2000-FS-1-M1 Ecological assessment of lakes pilot study to establish monitoring methodologies EU (WFD)                          |
| <b>Author :</b> | Free, G.; Little, R.; Tierney, D.; Donnelly, K.; Coroni, R.  |
| <b>Series :</b> | EPA, Wexford   |
| <b>Year :</b>   | 2015   |
| <b>Title :</b>  | Water quality in Ireland 2010-2012   |
| <b>Author :</b> | 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. |
| <b>Series :</b> | EPA, Wexford   |
| <b>Year :</b>   | in prep.   |
| <b>Title :</b>  | Monitoring of hard-water lakes in Ireland using charophytes and other macrophytes  |
| <b>Author :</b> | Roden, C.; Murphy, P.  |
| <b>Series :</b> | Unpublished report to NPWS   |

## Spatial data sources

**Year :** 2008

**Title :** OSi 1:5000 IG vector dataset

**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)

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

**To restore the favourable conservation condition of Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp. in Urlaur Lakes 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   | Urlaur Lakes SAC contains three marl lakes with habitat 3140 (Urlaur Lough, Lough Nanoge and Lough Roe). The vegetation of Urlaur Lough was surveyed in 2012 and assessed as being in poor conservation condition (Roden and Murphy, in prep.). Urlaur Lough is on the Water Framework Directive (WFD) monitoring programme and regular macrophyte surveys are conducted by the Environmental Protection Agency (EPA). Two measures of extent should be used: 1. the area of the lake itself and; 2. the extent of the vegetation communities/zones that typify the habitat. Further information relating to all attributes is provided in the lake habitats supporting document for the purposes of site-specific conservation objectives and Article 17 reporting (O Connor, 2015)   |
| Habitat distribution                            | Occurrence | No decline, subject to natural processes  | As noted above, lake habitat 3140 occurs in Urlaur Lough, Lough Nanoge and Lough Roe in the SAC. See map 2   |
| Vegetation composition: typical species         | Occurrence | Typical species present, in good condition, and demonstrating typical abundances and distribution | For lists of 3140 typical species (cyanobacteria, algae, higher plants and water beetles), see the Article 17 habitat assessment for lake habitat 3140 (NPWS, 2013) and the lake habitats supporting document (O Connor, 2015). Roden and Murphy (in prep.) recorded <i>krustenstein</i> , <i>Chara aspera</i> , <i>C. contraria</i> , <i>C. curta</i> , <i>C. virgata</i> , <i>Ophrydium versatile</i> , <i>Baldellia ranunculoides</i> , <i>Callitriche hermaphroditica</i> , <i>Eleocharis palustris</i> , <i>Elodea canadensis</i> , <i>Fontinalis antipyretica</i> , <i>Hippuris vulgaris</i> , <i>Lemna trisulca</i> , <i>Littorella uniflora</i> , <i>Potamogeton berchtoldii</i> , <i>P. perfoliatus</i> , <i>Ranunculus flammula</i> , <i>Utricularia minor</i> and <i>U. vulgaris</i> in Urlaur Lough. NPWS site files also note <i>Cladium mariscus</i> , <i>Equisetum fluviatile</i> , <i>Nuphar lutea</i> , <i>Nymphaea alba</i> , <i>Phragmites australis</i> and <i>Schoenoplectus lacustris</i> in the SAC (NPWS internal files) |
| Vegetation composition: characteristic zonation | Occurrence | All characteristic zones should be present, correctly distributed and in good condition           | The characteristic zonation of lake habitat 3140 is described in Roden and Murphy (2013). Urlaur Lough had few charophyte bands in 2012: <i>Chara contraria</i> or <i>C. curta</i> and <i>C. virgata</i> extending to c.2m; common <i>Elodea canadensis</i> at the base of the euphotic zone and well-developed <i>krustenstein</i> on occasional boulders (Roden and Murphy, in prep.)  |
| Vegetation distribution: maximum depth          | Metres     | Restore maximum depth of vegetation, subject to natural processes                                 | Maximum vegetation depth is expected to be deep in clear, hard water lakes, and extremely clear marl lakes can have charophyte vegetation to more than 9m (e.g. Lough Rea has charophytes to 10-11m, Coolorta >9m) (Roden and Murphy, in prep.). The indicative target of >6m for lake habitat 3140 may need to be modified based on the habitat sub-type/form and/or the specific lake in question (Roden and Murphy, 2013, in prep.). In this SAC, the maximum depth of vegetation at Urlaur Lough was very shallow at 2-2.1m in 2012 (Roden and Murphy, in prep.). The water is highly coloured in Urlaur Lough and this may contribute to the limited vegetation development. Areas of drained peatland (for turf-cutting, conifer forest, agricultural use) in the catchments of Urlaur Lough, Lough Nanoge and Lough Roe are likely to artificially increase the lakes' water colour   |

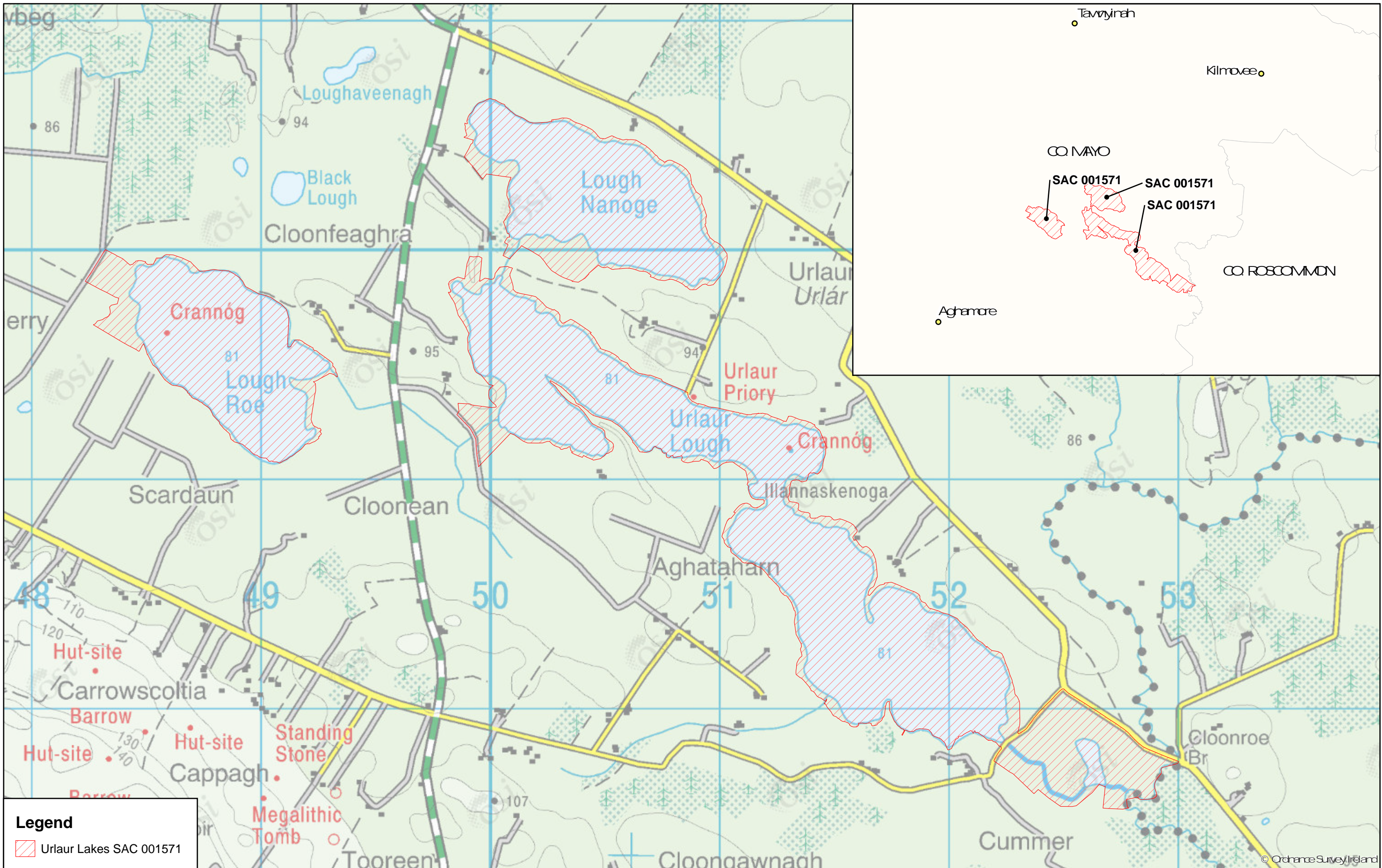
|   |                |  |   |
|---|----------------|--|---|
| Hydrological regime: water level fluctuations | Metres         | Maintain appropriate hydrological regime necessary to support the habitat  | The hydrological regime of lakes with habitat 3140 is driven by groundwater flows. Groundwater can discharge directly to the lake, via springs or seepages, or to in-flowing rivers. Fluctuations in lake water level are typical in Ireland, but can be amplified by activities such as abstraction and drainage. Increased water level fluctuations can increase wave action and turbidity, up-root vegetation, alter the substratum and lead to nutrient release from sediment. The hydrological regime, particularly the groundwater contribution, must be maintained so that the area, distribution and depth of the lake habitat and its constituent/characteristic vegetation zones and communities are not reduced  |
| Lake substratum quality                       | Various        | Maintain appropriate substratum type, extent and chemistry to support the vegetation   | The hard water lake habitat (3140) is associated with a range of base-rich substratum types, from marl and limestone bedrock, through rocks, cobbles, gravel, muds and even peat. Further research into substratum quality (notably calcium, iron and nutrient concentrations) in the hard water lake habitat would be beneficial. Roden and Murphy (in prep.) recorded sand, mud and occasional shoreline boulders at Urlaur Lough. The EPA have recorded cobble and gravel on the shoreline and silt at depth in Urlaur Lough. NPWS site files note stony, gravelly and sandy shorelines at Lough Nanoge (NPWS internal files)  |
| Water quality: transparency                   | Metres         | Restore appropriate Secchi transparency. There should be no decline in Secchi depth/transparency                                     | Transparency relates to light penetration and, hence, to the depth of colonisation of vegetation. It can be affected by phytoplankton blooms, water colour and turbidity. A target of >6m has been set for hard water lakes (3140) (Roden and Murphy, in prep.). The OECD fixed boundary system set transparency targets for oligotrophic lakes of ≥6m annual mean Secchi disk depth and ≥3m annual minimum Secchi disk depth. Hard water lakes typically have high transparency, particularly in the very clear and typical marl forms (Roden and Murphy, in prep.). Secchi depth at Urlaur Lough was 1.5m in 2001 (Free et al., 2006) and 1.54m in 2012 (Roden and Murphy, in prep.)  |
| Water quality: nutrients                      | µg/l P; mg/l N | Restore the concentration of nutrients in the water column to sufficiently low levels to support the habitat and its typical species | Lake habitat 3140 is typically associated with high water quality, as demonstrated by naturally low dissolved nutrients. The target for Loughs Urlaur, Nanoge and Roe is WFD High Status or oligotrophic (OECD, 1982). Annual average total phosphorus (TP) concentration should be ≤10µg/l TP, average annual total ammonia concentration should be ≤0.04mg/l N and annual 95th percentile for total ammonia should be ≤0.09mg/l N. Where nutrient concentrations are lower than the targets, there should be no upward trend in concentrations. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009. Free et al. (2006) measured <10µg/l TP in Urlaur Lough in April 2001. Urlaur Lough failed to reach the target in 2010-12, however, having good nutrient status (Bradley et al., 2015) |




|  |   |   |   |
|--|---|---|---|
| Water quality: phytoplankton biomass     | µg/l Chlorophyll <i>a</i>               | Maintain/restore appropriate water quality to support the habitat, including high chlorophyll <i>a</i> status                         | Lake habitat 3140 is associated with high water quality, as demonstrated by naturally low algal growth. As for nutrients, the default target is WFD High Status or oligotrophic (OECD, 1982). Average growing season (March-October) chlorophyll <i>a</i> concentration must be <5.8µg/l. Annual average chlorophyll <i>a</i> concentration should be <2.5µg/l and the annual peak should be <8.0µg/l. Where chlorophyll <i>a</i> concentrations are lower than the targets, there should be no upward trend in phytoplankton biomass. See also The European Communities Environmental Objectives (Surface Waters) Regulations 2009. In Urlaur Lough, Free et al. (2006) measured 7.7µg/l chlorophyll <i>a</i> in April 2001 and chlorophyll <i>a</i> status was high in 2010-12 (Bradley et al., 2015) |
| Water quality: phytoplankton composition | EPA phytoplankton composition metric    | Restore appropriate water quality to support the habitat, including high phytoplankton composition status                             | The EPA has developed a phytoplankton composition metric for nutrient enrichment of Irish lakes. As for other water quality indicators, the default target for lake habitat 3140 is WFD high status. Urlaur Lough failed to reach the target in 2010-12, having good phytoplankton composition status (Bradley et al., 2015)  |
| Water quality: attached algal biomass    | Algal cover and EPA phytobenthos metric | Maintain/restore trace/absent attached algal biomass (<5% cover) and high phytobenthos status   | Nutrient enrichment can favour epiphytic and epipelic algae that can out-compete the submerged vegetation. The cover abundance of attached algae in hard water lakes (3140) should, therefore, be trace/absent (<5% cover). EPA phytobenthos status can be used as an indicator of changes in attached algal biomass. As for other water quality indicators, the default target for lake habitat 3140 is high phytobenthos status. Phytobenthos status was high in Urlaur Lough in 2010-12 (Bradley et al., 2015); however, filamentous algae were recorded by the EPA in the lake in 2001 and 2011   |
| Water quality: macrophyte status         | EPA macrophyte metric (The Free Index)  | Restore high macrophyte status  | Nutrient enrichment can favour more competitive submerged macrophyte species that out-compete the typical and characteristic species for hard water lakes (3140). The EPA monitors macrophyte status for WFD purposes using the 'Free Index'. The target for lake habitat 3140 is high status or an Ecological Quality Ratio (EQR) for lake macrophytes of ≥0.90, as defined in Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations 2009. Urlaur Lough failed to reach the target in 2010-12, having good macrophyte status (Bradley et al., 2015)  |
| Acidification status                     | pH units; mg/l                          | Maintain appropriate water and sediment pH, alkalinity and cation concentrations to support the habitat, subject to natural processes | The specific requirements of lake habitat 3140, in terms of water and sediment pH, alkalinity and cation concentration, have not been fully determined. 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. See Schedule Five of the European Communities Environmental Objectives (Surface Waters) Regulations 2009   |
| Water colour                             | mg/l PtCo                               | Maintain/restore appropriate water colour to support the habitat  | Increased colour decreases light penetration and reduces the area of macrophyte habitat, particularly at the lower euphotic depths. Higher colour also appears to favour angiosperms over charophytes in hard water lakes (Roden and Murphy, in prep.). The primary source of increased colour in Ireland is peatland disturbance. No habitat-specific or national standards for water colour exist. Studies have shown median colour concentrations in Irish lakes of 38mg/l PtCo (Free et al., 2000) and 33mg/l PtCo (Free et al., 2006). Lake habitat 3140 is typically associated with very clear waters and expected colour would be <10mg/l PtCo or, more likely, <5mg/l PtCo. Free et al. (2006) recorded colour of 33mg/l PtCo in Urlaur Lough  |


|                                      |  |   |   |
|--------------------------------------|--|---|---|
| Dissolved organic carbon (DOC)       | mg/l   | Maintain/restore appropriate organic carbon levels to support the habitat   | Dissolved (and particulate) organic carbon (OC) in the water column is linked to water colour and acidification (organic acids). Increasing DOC in water has been documented across the Northern Hemisphere, including afforested peatland catchments in Ireland. Damage and degradation of peatland, leading to decomposition of peat is likely to be the predominant source of OC in Ireland. OC in water promotes decomposition by fungi and bacteria that, in turn, releases dissolved nutrients. The increased biomass of decomposers can also impact directly on the characteristic lake communities through shading, competition, etc. As noted above, increased water colour, low transparency and shallow vegetation zones at Urlaur Lough may be linked to peatland disturbance   |
| Turbidity                            | Nephelometric turbidity units/ mg/l SS/ other appropriate unit | Maintain appropriate turbidity to support the habitat   | 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  |
| 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 | Most lake shorelines have fringing habitats of reedswamp, other swamp, fen, marsh or wet woodland that 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. Fringing fen habitats can be particularly important around hard water lakes, notably the Annex I habitats alkaline fen, <i>Cladium</i> fen and petrifying springs (habitat codes 7230, 7210 and 7220). Reedbeds ( <i>Schoenoplectus lacustris</i> , <i>Phragmites australis</i> ), swamp ( <i>Carex rostrata</i> , <i>Cladium mariscus</i> , <i>Typha latifolia</i> , <i>Equisetum fluviatile</i> ), fen/flush, heath, revegetated cutaway bog, scrub and calcareous grassland have been recorded on the shores of Urlaur, Nanoge and Roe. Transition mire/quaking bog may also occur |





**Legend**

 Urlaur Lakes SAC 001571



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**MAP 1:  
URLAUR LAKES SAC  
CONSERVATION OBJECTIVES  
SAC DESIGNATION**

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

**SITE CODE:  
SAC 001571; version 3. CO. MAYO**

0 200 400 600 800 Meters

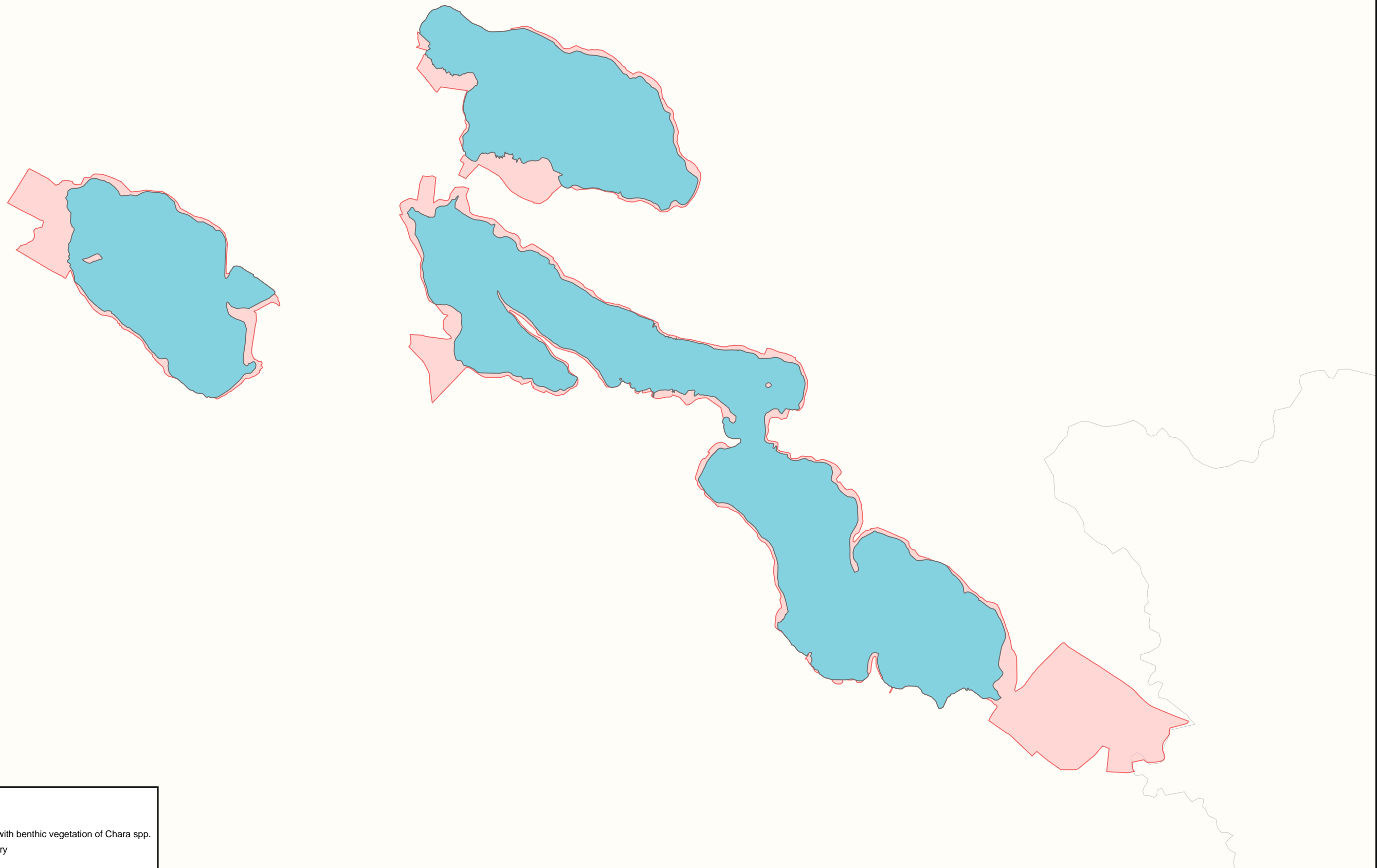
The mapped boundaries are of an indicative and general nature only. Boundaries of designated areas are subject to revision.  
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**Map Version 1  
Date: Nov 2017**





**Legend**

- Urlaur Lakes SAC 001571
- 3140 Hard oligo-mesotrophic waters with benthic vegetation of Chara spp.
- OSi Discovery Series County Boundary

