



LOUTH COUNTY COUNCIL

NATURA IMPACT STATEMENT

FOR

PROPOSED COASTAL PROTECTION WORKS,

DRUMMULLAGH, OMEATH, CO. LOUTH

VOLUME II. APPENDICES

9th January 2024

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2	Desk Study Information on Topsoils, Subsoils, Geology, Hydrogeology, Hydrology, Borehole Drilling Data & Historical mapping from EPA, NIEA GSI, NIGSI, OSI, WWW.CATCHMENT.IE
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APPENDIX 1

APPROPRIATE ASSESSMENT SCREENING REPORT SUMMARY

APPROPRIATE ASSESSMENT SCREENING REPORT SUMMARY

According to the guidelines as laid by NPWS (2009), Appropriate Assessment Screening is the process that addresses and records the reasoning and conclusions in relation to the first two tests of Article 6(3):

*‘ i) Whether a plan or project is directly connected to or necessary for the management of the site; and
ii) Whether a plan or project, alone or in combination with other plans and projects, is likely to have significant effects on a Natura 2000 site in view of its conservation objectives.’*

The following is an Appropriate Assessment Screening Report Summary for the proposed Coastal Protection works at Drummullagh, Omeath, County Louth. The purpose of the screening exercise is to inform the AA process in determining whether the proposed works, alone or in combination with other plans and projects, is likely to have significant effects on the Natura 2000 sites within the study area (and in particular on Carlingford Shore Special Area of Conservation [002306]. If the effects are deemed to be significant, potentially significant, or uncertain, or if the screening process becomes overly complicated, then the AA process must proceed to Stage 2 - Appropriate Assessment and the preparation of a Natura Impact Statement (NIS).

Screening has been undertaken for this development in accordance with the European Commission’s Guidance on Appropriate Assessment (European Commission, 2001) which comprises the following:

- Description of the Project/Works;
- Identification of Natura 2000 sites potentially affected by the Project/Works;
- Identification and description of individual and cumulative impacts likely to result from the Project/Works;
- Assessment of the significance of the impacts identified on the conservation objectives of the site(s); and
- Exclusion of sites where it can be objectively concluded that there will be no significant impacts on conservation objectives.

In order to determine the potential impacts, if any, of the proposed coastal works on nearby Natura 2000 sites, a screening process was completed. This process identified 9 no. different Natura 2000 sites within a 15km radius, which are designated as either as an SAC or SPA. It has been determined that only one of these sites could be potentially impacted by the proposal (i.e., Carlingford Shore SAC [002306]). It should be noted that the footprint of the proposed Coastal Protection Works at Drummullagh is inside the boundary of the Carlingford Shore Special Area of Conservation [002306]. As such the proposed Coastal Protection Works are directly connected to the Carlingford Shore SAC which is a Natura 2000 Site. There is, therefore, a potentially direct Source-Pathway-Receptor linkage between the site works and this SAC. As Carlingford Shore SAC is dependent on water quality, a reduction in water quality or changes to local hydrology could negatively impact upon the conservation status of the SAC

with regard to habitat quality and size and with regard to the ecological integrity of those species occurring within it. It was determined that there is a potential risk to water quality/benthic biota within the Carlingford Shore SAC should contaminated surface water enter the foreshore as a consequence of site based runoff or other ongoing operations. Therefore, a full Stage 2 Appropriate Assessment has been conducted for the site, with an assessment of the potential mitigation of the afore-mentioned impacts.

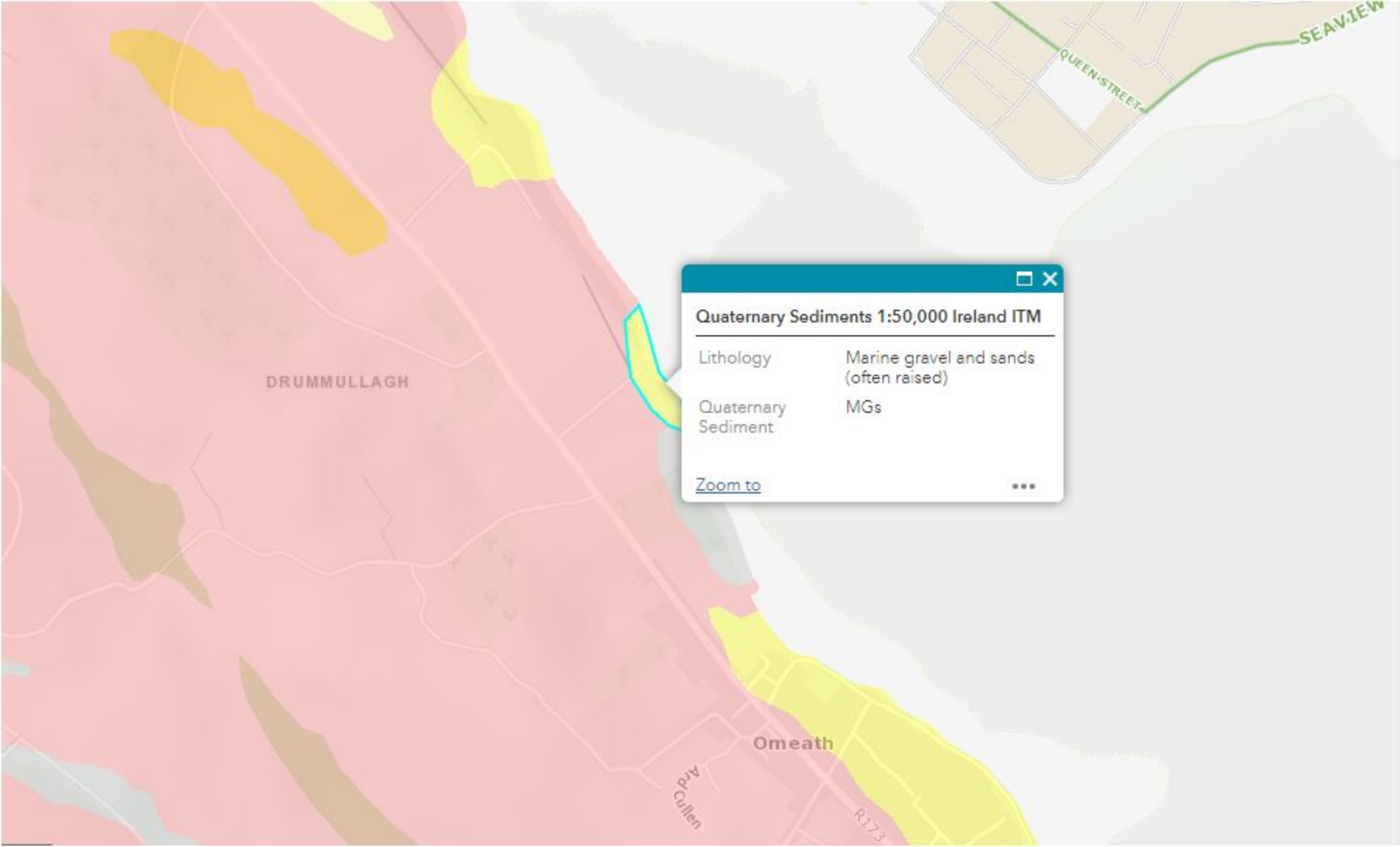
As a result of a European Court of Justice decision, Article 6(3) of Council Directive 92/43/EEC of 21st May, 1992 on the conservation of natural habitats and of wild fauna and flora must be interpreted as meaning that, in order to determine whether it is necessary to carry out, subsequently, an appropriate assessment of the implications for a site concerned, of a plan or project, it is not appropriate, at the screening stage, to take account of the measures intended to avoid or reduce the harmful effects of the plan or project on that site.

Given that the proposed Coastal Protection Works are within Carlingford Shore Special Area of Conservation [002306] and given the above ruling, although the screening process was ‘stepped through’ for this assessment, a separate AA screening report was not prepared for this development. As an alternative, this Appropriate Assessment Screening Report Summary was deemed sufficient to record the process.

A Natura Impact Statement has been prepared for the proposed Coastal Protection Works at Drummullagh as required under European and Irish legislation.

APPENDIX 2

DESK STUDY INFORMATION ON TOPSOILS, SUBSOILS,
GEOLOGY, HYDROGEOLOGY, HYDROLOGY, BOREHOLE
DRILLING DATA & HISTORICAL MAPPING FROM EPA, NIEA
GSI, NIGSI, OSI, WWW.CATCHMENT.IE



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Quaternary Sediments 1:50,000 Ireland ITM

Lithology	Alluvium
Quaternary Sediment	A

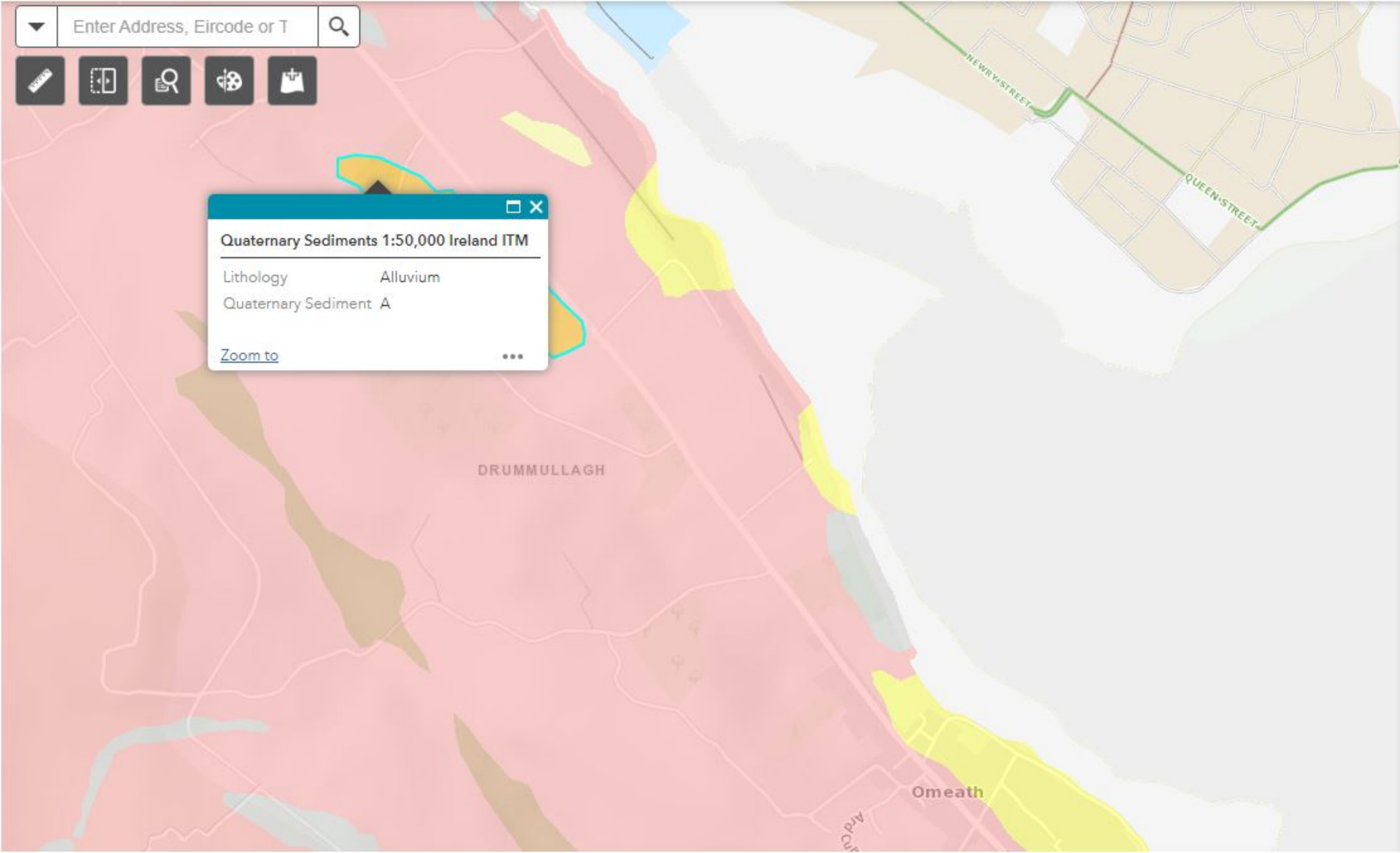
[Zoom to](#) ...

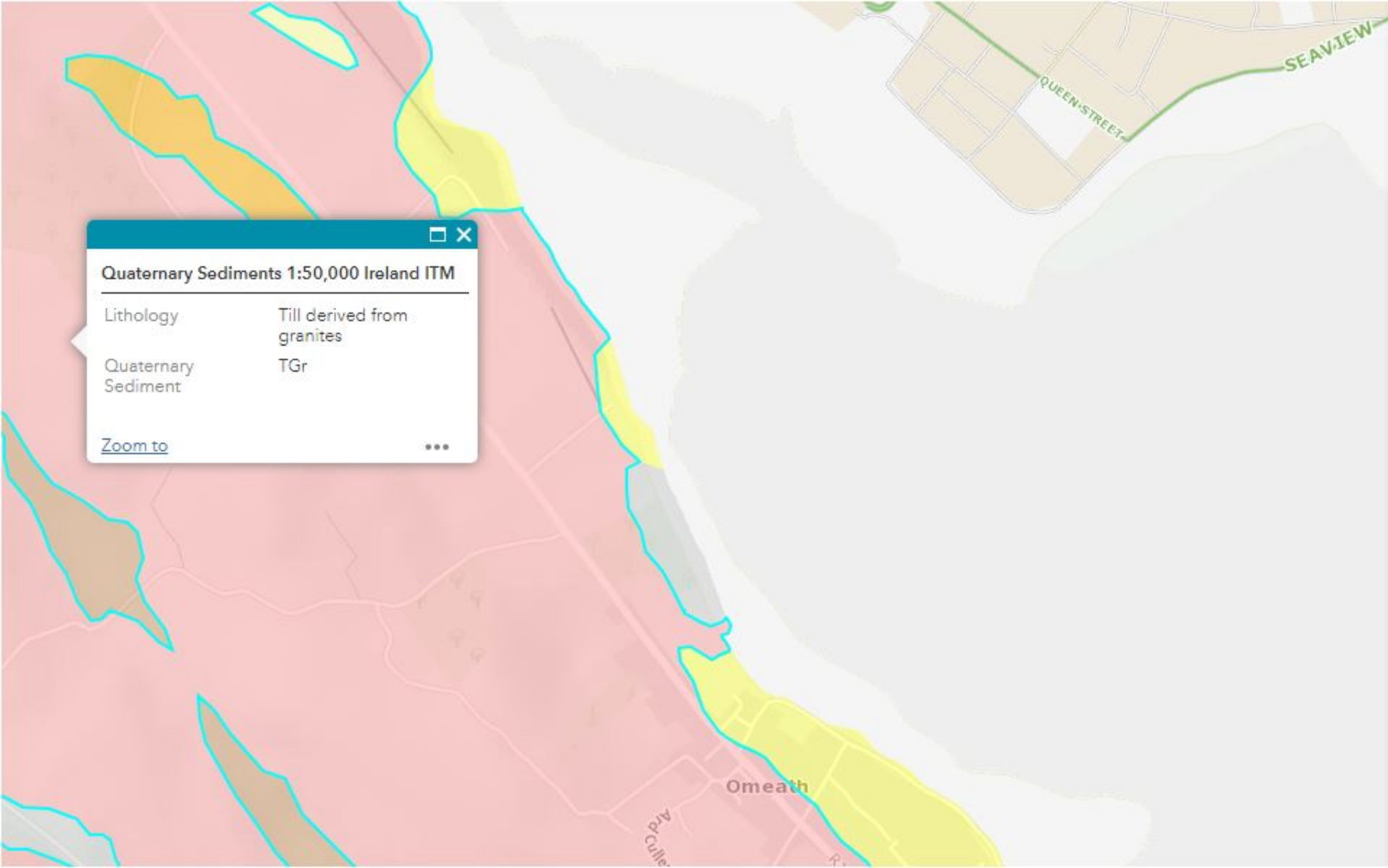
Legend

Subsoils (Quaternary Sediments)

IE_GSI_Quaternary_Sediments_50K_IE26_ITM

- A, Alluvium
- Ac, Alluvium (clayey)
- AcEsk, Eskers comprised of gravels of acidic reaction
- Ag, Alluvium (gravelly)
- Airfield/Airport
- As, Alluvium (sandy)
- Asi, Alluvium (silty)
- BasEsk, Eskers comprised of gravels of basic reaction
- BktPt, Blanket Peat
- Causeway, Causeway
- Crannog, Crannog
- Cut, Cut over raised peat
- Dam
- Embankment
- FenPt, Fen Peat
- Fill, Made ground
- GBi, Gravels derived from basic igneous rocks
- GCSsS, Gravels derived from Cambrian sandstones and shales
- GCh, Gravels derived from chert
- GDCSs, Gravels derived from Devonian and Carboniferous sandstones
- GDSs, Gravels derived from Devonian sandstones
- GGr, Gravels derived from granite
- GLCSsS, Gravels derived from Carboniferous sandstones and shales



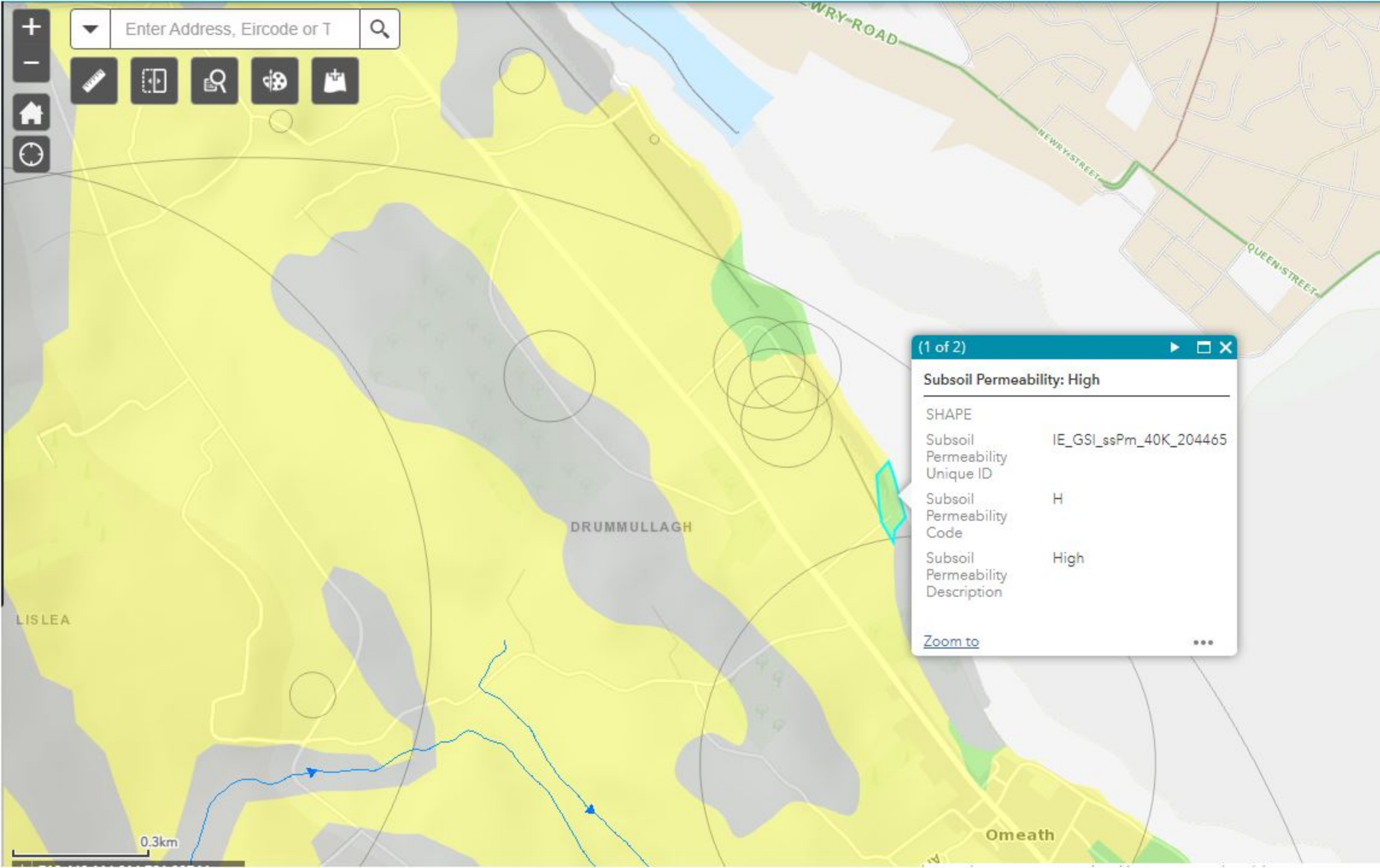


Quaternary Sediments 1:50,000 Ireland ITM

Lithology	Till derived from granites
Quaternary Sediment	TGr

[Zoom to](#) ⋮

- RsPt, Raised Peat (intact)
- Scree, Scree
- Spoil Heap, Spoil Heap
- TAv, Till derived from acidic volcanic rocks
- TBi, Till derived from basic igneous rocks
- TCSs, Till derived from Carboniferous sandstones
- TCSsCh, Till derived from Carboniferous sandstones and cherts
- TCSsS, Till derived from Cambrian sandstones and shales
- TCh, Till derived from cherts
- TDCSs, Till derived from Devonian and Carboniferous sandstones
- TDCSsS, Till derived from Devonian and Carboniferous sandstones and shales
- TDSs, Till derived from Devonian sandstones
- TGr, Till derived from granites
- TLCSsS, Till derived from lower Carboniferous sandstones and shales
- TLPCSsS, Till derived from Lower Palaeozoic and Carboniferous sandstones and shales
- TLPSDs, Till derived from Lower Palaeozoic and Devonian sandstones
- TLPS, Till derived from Lower Palaeozoic shales
- TLPSs, Till derived from Lower Palaeozoic sandstones
- TLPSsS, Till derived from Lower Palaeozoic sandstones and shales
- TLSCh, Till derived from Silicified Limestone and cherts
- TLs, Till derived from limestones



Legend

Groundwater Wells and Springs

- Groundwater Wells and Springs

Groundwater Karst Data

IE_GSI_Karst_Landforms_40K_IE32_ITM

- Borehole
- Cave
- Dry Valley
- Enclosed Depression
- Estavelle
- Spring
- Superficial Solution Feature
- Swallow Hole
- Turlough

IE_GSI_Traced_Underground_Connections_40K_IE32_ITM

Group Scheme and Public Supply Source Protection Areas

- Group Scheme Preliminary Source Protection Areas

Group Water Scheme Abstraction Points (NFGWS)

National_Federation_Group_Water_Schemes_10K_IE26_ITM

- 2011
- 2012
- 2013
- 2014

Results



Keep Previous Results

Ground Waterbody WFD Status 2013-2018

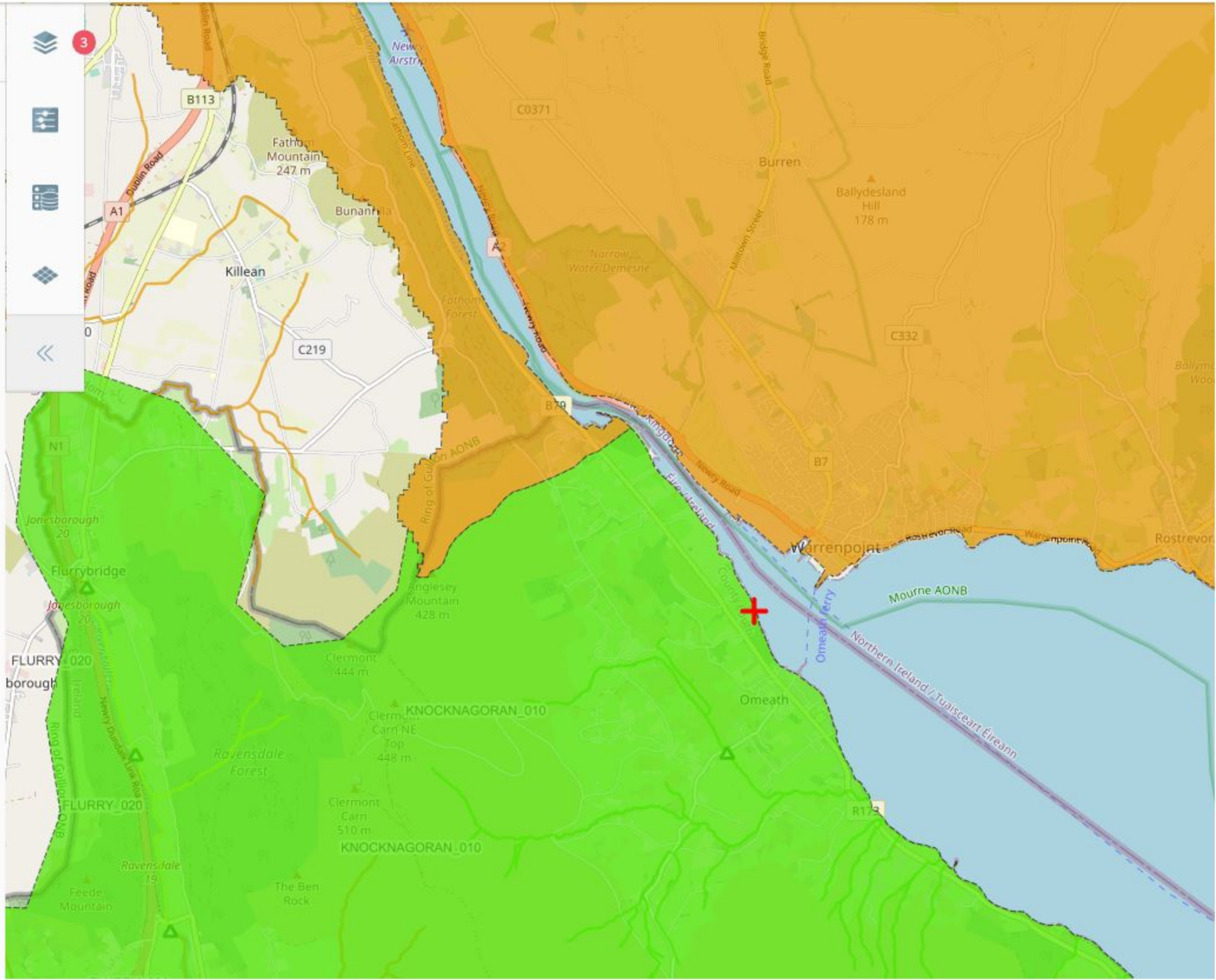
IEGBNI_NB_G_019

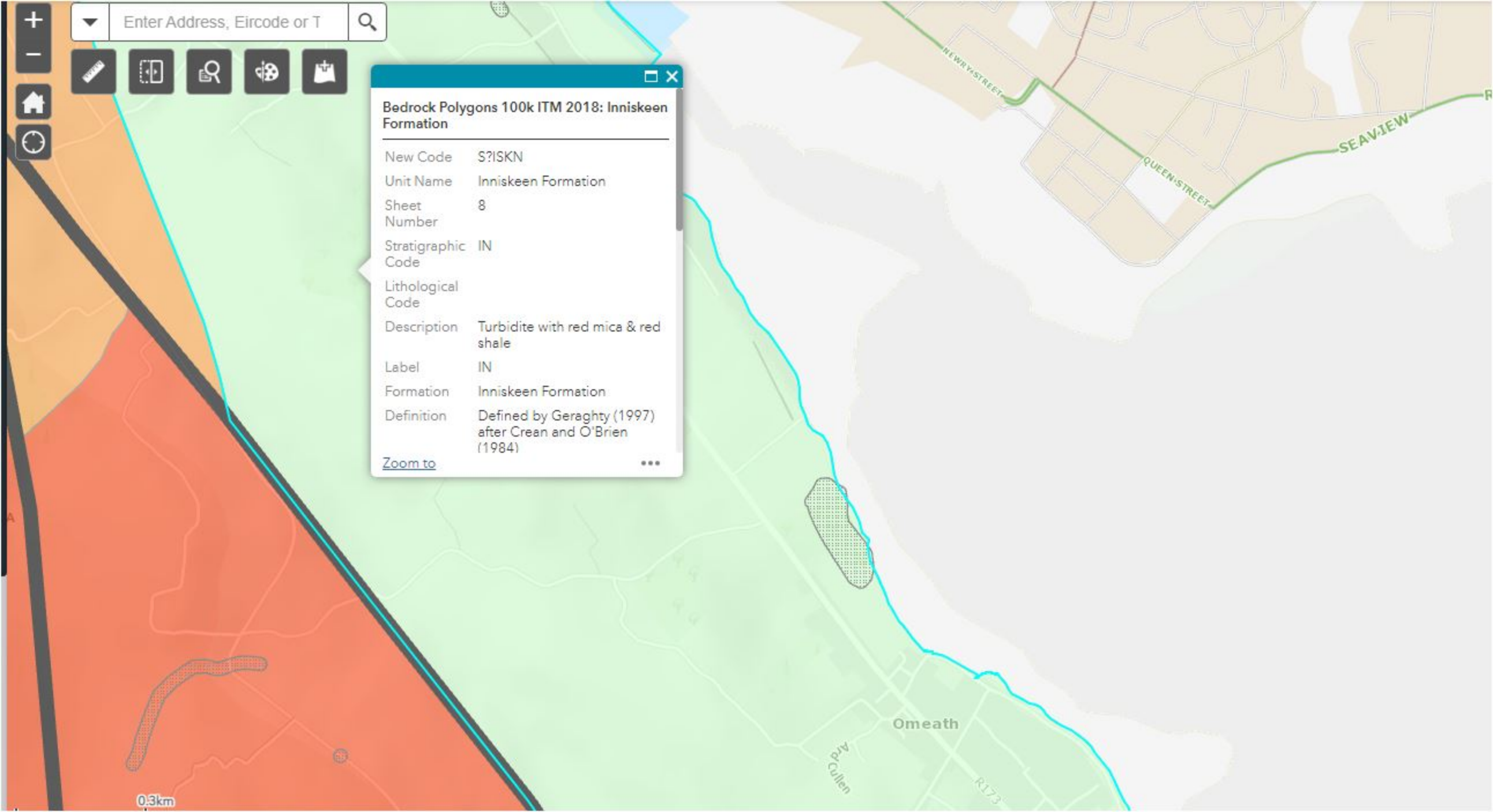


European_Code	IEGBNI_NB_G_019
Name	Louth
Chemical_GW_Status	Good
Overall_GW_Status	Good
Quantitative_GW_Status	Good
Period_for_WFD_Status	GW 2013-2018



EXPORT





Bedrock Polygons 100k ITM 2018: Inniskeen Formation

New Code S?ISKN
Unit Name Inniskeen Formation
Sheet Number 8
Stratigraphic Code IN
Lithological Code
Description Turbidite with red mica & red shale
Label IN
Formation Inniskeen Formation
Definition Defined by Geraghty (1997) after Crean and O'Brien (1984)

[Zoom to](#) ...



Enter Address, Eircode or T



Legend ⤴ ✕

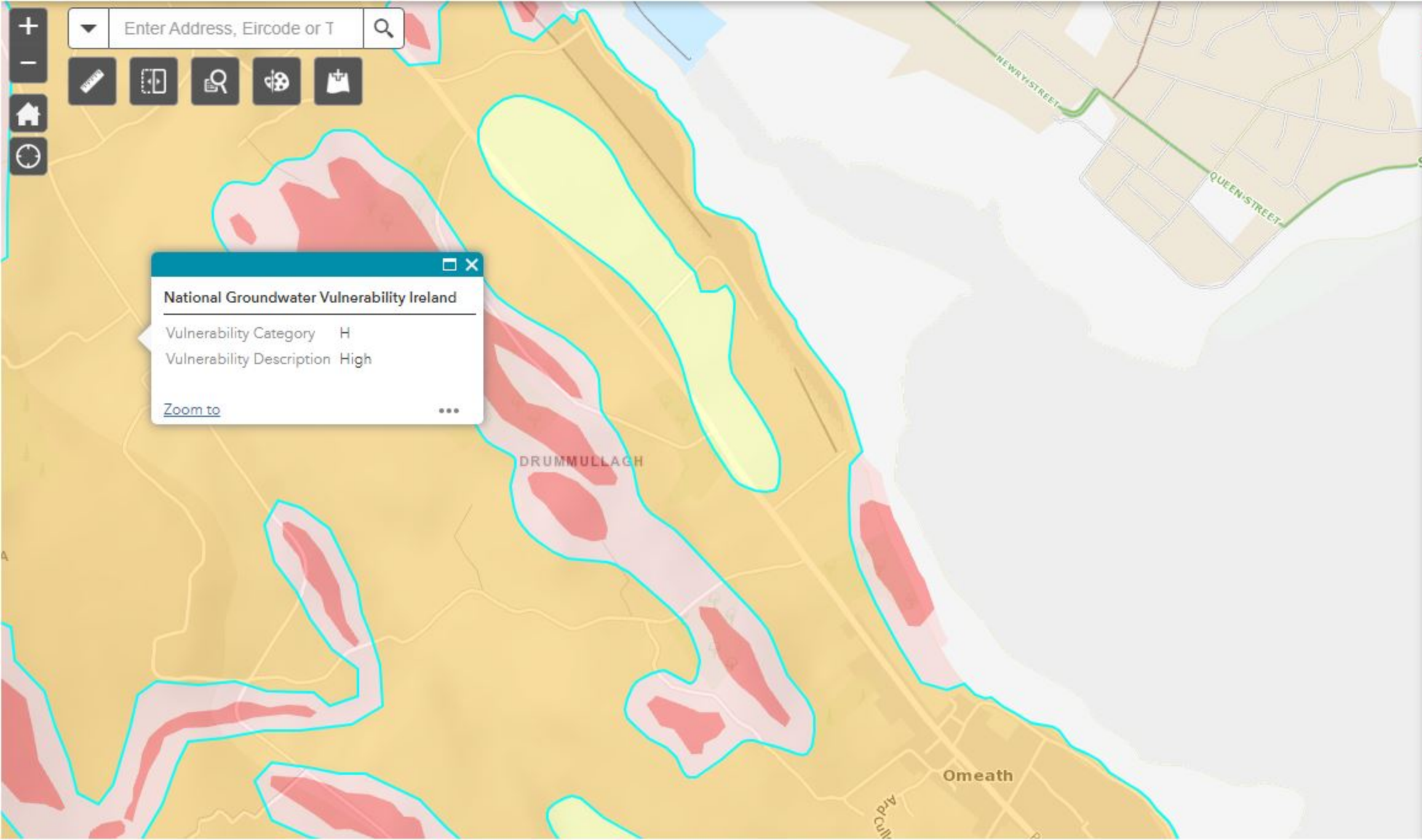
- ### Groundwater Vulnerability
- Groundwater Vulnerability
- Rock at or near Surface or Karst
 - Extreme
 - High
 - Moderate
 - Low
 - Water

National Groundwater Vulnerability Ireland

Vulnerability Category H

Vulnerability Description High

[Zoom to](#) ⋮

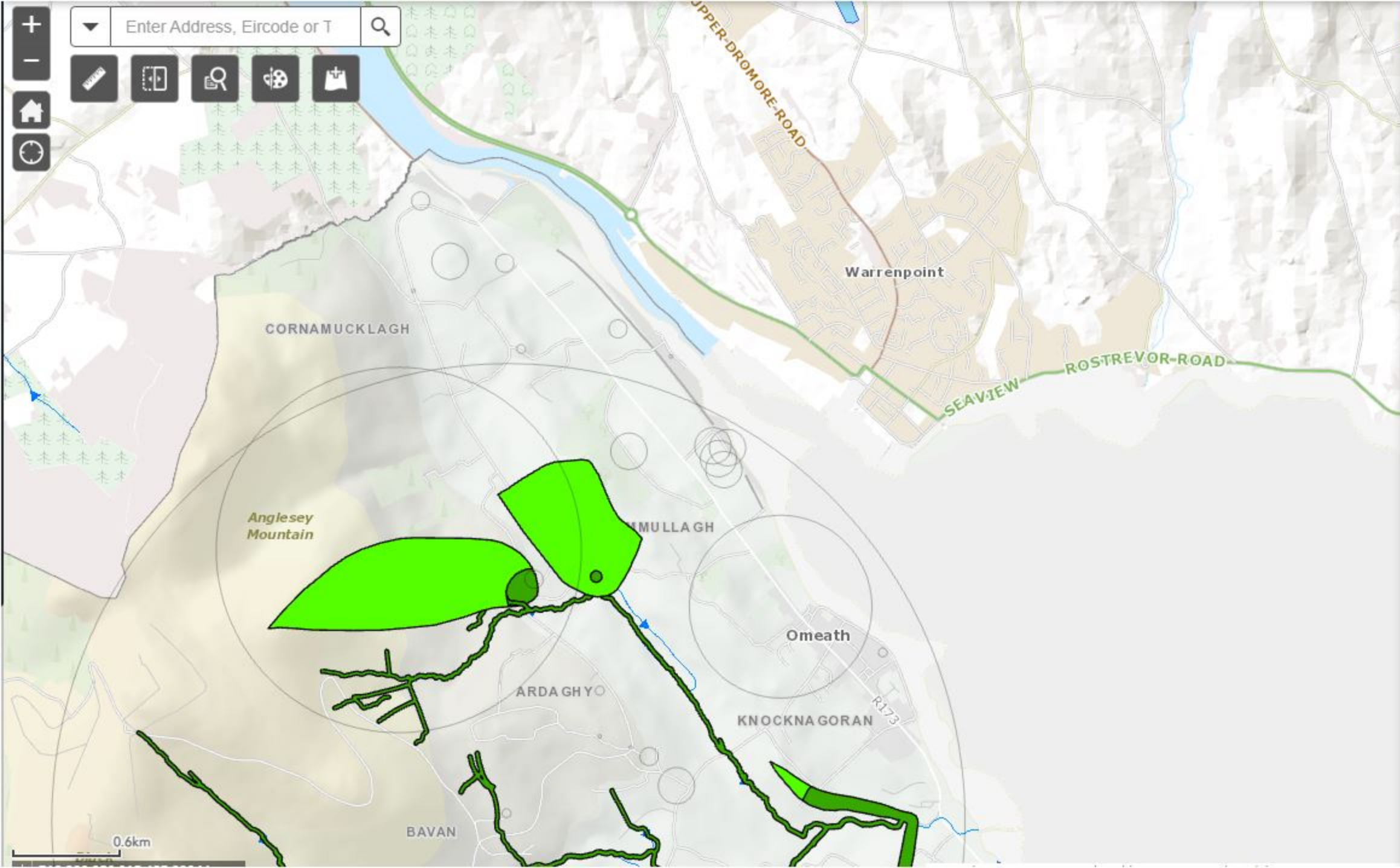


Groundwater Wells and Springs:

GSI Name	2931SEW014
Well Type	Borehole
Original Name	626
Owner Name	
Drill Date	January 28, 1997
Locational Accuracy (meters)	to 200m
Depth of hole (metres)	54.9
Depth to rock (metres)	12
Townland	DRUMMULLAGH
County	Louth
Six Inch Sheet No.	2
Easting	313410
Northing	317820
Source Use	Domestic use only
GSI yield class	Poor
Yield (source) cubic metres per day	13.1
Town	
Daily Abstraction cubic metres per day	
Drawdown Abstraction (m)	
Capacity of the well (cubic m per day per m)	
Casing Diameter (mm)	152

Groundwater Wells and Springs:

GSI Name	2931SEW033
Well Type	Borehole
Original Name	
Owner Name	
Drill Date	September 21, 1998
Locational Accuracy (meters)	to 200m
Depth of hole (metres)	36.6
Depth to rock (metres)	4.6
Townland	DRUMMULLAGH
County	Louth
Six Inch Sheet No.	2
Easting	313460
Northing	317880
Source Use	Domestic use only
GSI yield class	Poor
Yield (source) cubic metres per day	21.8
Town	
Daily Abstraction cubic metres per day	
Drawdown Abstraction (m)	
Capacity of the well (cubic m per day per m)	
Casing Diameter (mm)	152



Legend

- Enclosed Depression
- Estavelle
- Spring
- Superficial Solution Feature
- Swallow Hole
- Turlough

IE_GSI_Traced_Underground_Connections_40K_IE32_ITM

Group Scheme and Public Supply Source Protection Areas

Public Supply Source Protection Areas

- SI-Inner Protection Area
- SO-Outer Protection Area

Group Scheme Preliminary Source Protection Areas

Group Water Scheme Abstraction Points (NFGWS)

National_Federation_Group_Water_Schemes_10K_IE26_I

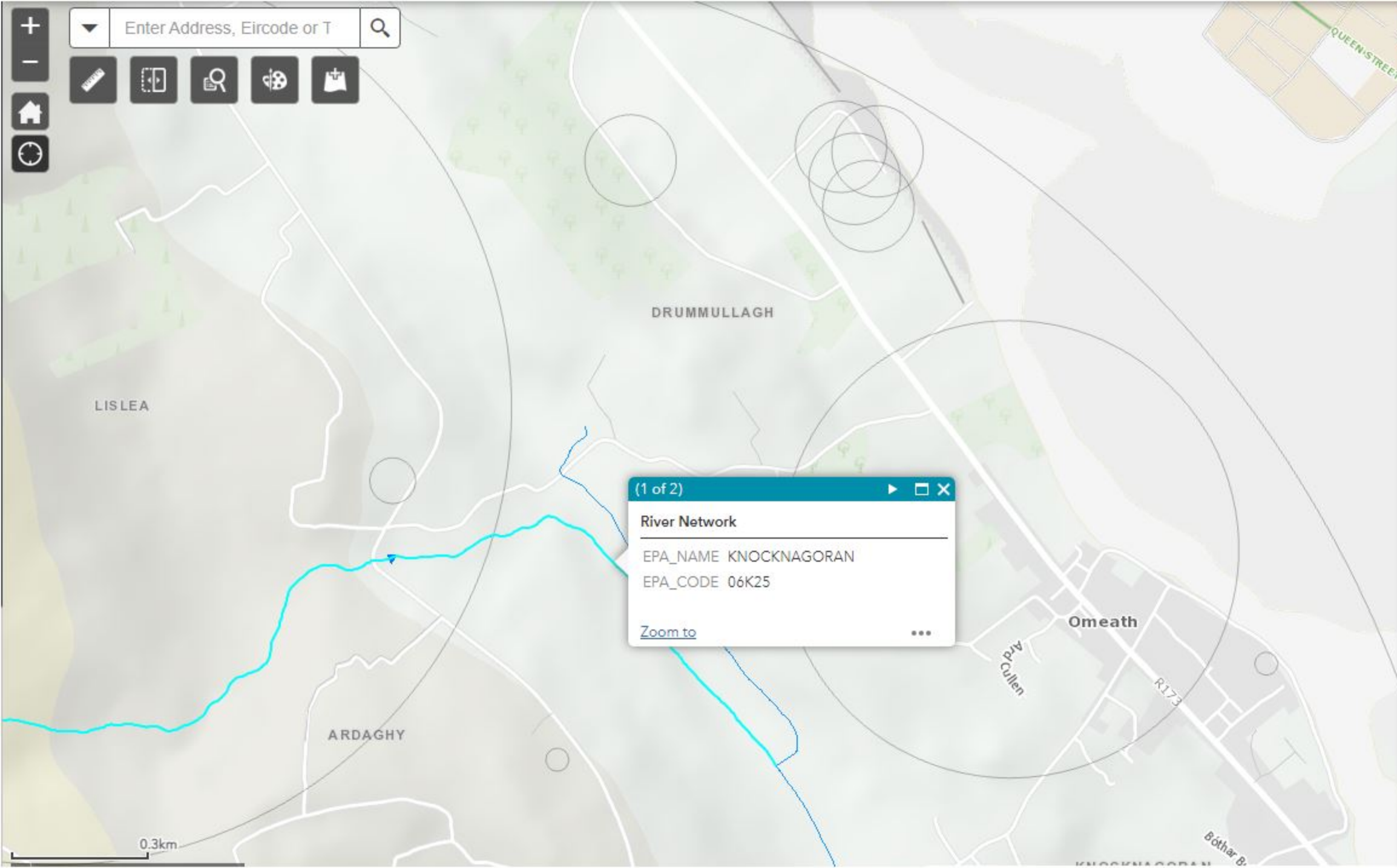
- 2011
- 2012
- 2013
- 2014
- 2015
- 2016

Surface Water Features

EPA Surface Water

River Network and River Flow Direction Arrows

+
 -
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(1 of 2)

River Network

EPA_NAME KNOCKNAGORAN
 EPA_CODE 06K25

[Zoom to](#)

Legend

- Enclosed Depression
- Estavelle
- Spring
- Superficial Solution Feature
- Swallow Hole
- Turlough
- IE_GSI_Traced_Underground_Connections_40K_IE32_L
-

Group Scheme and Public Supply Source Protection Areas

Group Scheme Preliminary Source Protection Areas

-

Group Water Scheme Abstraction Points (NFGWS)

National_Federation_Group_Water_Schemes_10K_IE26

- 2011
- 2012
- 2013
- 2014
- 2015
- 2016

Surface Water Features

EPA Surface Water

- River Network and River Flow Direction Arrows
-
- Lake Segments
-

APPENDIX 3

SPECIAL PROTECTION AREA INFORMATION CARLINGFORD SHORE SAC [002306]

- NPWS. (2013). *CONSERVATION OBJECTIVES: CARLINGFORD SHORE SAC 002306. VERSION 1. NATIONAL PARKS AND WILDLIFE SERVICE, DEPARTMENT OF ARTS, HERITAGE AND THE GAELTACHT.*
- NPWS. (2013). *CARLINGFORD SHORE SAC (SITE CODE 2306): CONSERVATION OBJECTIVES SUPPORTING DOCUMENT-COASTAL HABITATS.*

Site Name: Carlingford Shore SAC

Site Code: 002306

The Carlingford Shore SAC site comprises the entire southern shoreline of Carlingford Lough and continues round the tip of the Cooley Peninsula to just west of Cooley Point. While the principal conservation interests lie in the perennial vegetation of shingle banks and the annual vegetation of drift lines, the site also has intertidal sand and mudflats, patches of saltmarsh, some areas of dry grassland, and an area of mixed deciduous woodland. The site is flanked by Carlingford Mountain to the south-west. The underlying rock within the SAC is mainly carboniferous limestone. This outcrops in places in the form of bedrock shore or reefs. Granite boulders are occasionally found. Intertidal mudflats and sand/gravel banks also occur.

The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive (* = priority; numbers in brackets are Natura 2000 codes):

[1210] Annual Vegetation of Drift Lines [1220] Perennial Vegetation of Stony Banks

In Carlingford Shore SAC the shingle and drift line habitats extend more or less continuously from Greenore to west of Cooley Point. They occur as a strip of varying width, from only a few metres in places, to up to about 50 m. One of the best developed areas is south of Ballagan Point. The substrate varies from stones and cobbles to gravels and coarse sands. The exposure level of this shoreline is high.

The perennial vegetation of the upper beach of these shingle banks is widely ranging, well developed and often stable. In places lichens encrust the stones farther back from the sea. Typical species present throughout the site include oraches (*Atriplex* spp., including *A. prostrata*, *A. glabriuscula* and *A. littoralis*), Sea Beet (*Beta vulgaris* subsp. *maritima*), Wild Carrot (*Daucus carota*), Red Fescue (*Festuca rubra*), Sea-milkwort (*Glaux maritima*), Lyme-grass (*Leymus arenarius*) and Sea Radish (*Raphanus raphanistrum* subsp. *maritimum*). This grades landward mainly into lowland dry grassland, though there are patches of wet grassland.

The vegetation of the stony banks is often interspersed with the vegetation occupying accumulations of drift material and gravels rich in nitrogenous organic matter. The vegetation is sparse. Species seen include Prickly Saltwort (*Salsola kali*), Sea Rocket (*Cakile maritima*), Sea Sandwort (*Honkenya peploides*), Sea Spurge (*Euphorbia paralias*), Sea Mayweed (*Matricaria maritima*) and oraches. The Red Data

Book species Oysterplant (*Mertensia maritima*) is also found. This plant is protected under the Flora (Protection) Order, 1999.

There are small patches of saltmarsh on the drier sections of outcropping reefs and at the landward edge of the site. Species present include Sea Aster (*Aster tripolium*), Sea Purslane (*Halimione portulacoides*), Lax-flowered Sea-lavender (*Limonium humile*), Common Saltmarsh-grass (*Puccinellia maritima*), Sea Arrowgrass (*Triglochin maritima*) and Sea Plantain (*Plantago maritima*). In areas which are more regularly flooded Annual Sea-blite (*Suaeda maritima*) is found. A small brackish lake is present on the landward side of the railway line.

A relatively extensive expanse of intertidal flats (more sand than mud) occur, particularly between Greenore Point and Carlingford Harbour. The flats in this area are broken by outcropping reefs and some shingle deposits and saltmarsh on the drier higher rocks. These flats are very important feeding grounds for wildfowl and waders. Patches of green algae (filamentous, *Ulva* sp. and *Enteromorpha* sp.) and lugworm casts occur in places, while fucoid seaweeds are common on the more stony flats. Abundant barnacle shells and lichens are also present on many of the rocks. Eelgrass (*Zostera* sp.) beds are found on the flats - the main food source for the internationally important population of Pale-bellied Brent Goose at the site. Small tufts of cord-grass (*Spartina* sp.) are also found.

Above the low-lying shoreline dry grassland often occurs, with species such as Red Fescue, Common Bent (*Agrostis stolonifera*), Ribwort Plantain (*Plantago lanceolata*), Common Bird's-foot-trefoil (*Lotus corniculatus*), Yarrow (*Achillea millefolium*) and Common Ragwort (*Senecio jacobaea*). West of Carlingford town the shoreline is backed in places by low cliffs. An area of mixed woodland occurs at Ferry Hill, overlooking the mouth of the Newry River. This has a low canopy dominated by Elder (*Sambucus nigra*) and with some Pedunculate Oak (*Quercus robur*), Beech (*Fagus sylvatica*) and Sycamore (*Acer pseudoplatanus*). The non-native and invasive Rhododendron (*Rhododendron ponticum*) is common.

The threshold for internationally important numbers of birds within the site has been exceeded in single years, by some species such as Pale-bellied Brent Goose in the 1980s and 1994/95. The site is nationally important for a number of species such as Great Crested Grebe, Cormorant, Ringed Plover and Red-Breasted Merganser. This classification is based on species which attained interim all-Ireland importance on the basis of the three year mean maximum counts for the winters 1994/95-96/97. There are a number of bird species recorded, including Golden Plover and Bar-tailed Godwit, which are listed under Annex I of the E.U. Birds Directive. The intertidal flats between Greenore and Carlingford have been designated a Special Protection Area (SPA) under the E.U. Birds Directive. Black Guillemots (6) were recorded in pairs nesting in wooden breakwater in Greenore and 8 birds were seen at the breakwater. A colony of Terns in Northern Ireland feed in the SPA, particularly Sandwich Tern with some Common Tern.

Approximately 25-30 Grey Seals haul out on reefs between Greenore and Carlingford. This species is listed in Annex II under the E.U. Habitats Directive.

The principal activities in the site are recreational usage and shellfish production. Much of the area around the mean low water mark (MLWM) between Carlingford Harbour and Greenore is under production of oyster, and to a lesser extent, clams. The principal threat to the shoreline habitats is further commercial development, either for shellfish or tourism. Coastal defence works is also a threat to the shoreline. Aquaculture occurs in Carlingford Lough and may have negative impacts on the wintering bird populations.

Carlingford Shore has a wide diversity of habitats including very good examples of perennial vegetation of stony banks and drift lines. The presence of Red Data Book species adds to the ecological interest. The wide area of intertidal flats within the site is internationally important for birds and is designated as a Special Protection Area. The presence of Grey Seal, an Annex II species under the E.U. Habitats Directive, adds to the conservation value of the site.

National Parks and Wildlife Service

Conservation Objectives Series

Carlingford Shore SAC 002306



*An Roinn
Ealaíon, Oidhreachta agus Gaeltachta*

*Department of
Arts, Heritage and the Gaeltacht*



**National Parks and Wildlife Service,
Department of Arts, Heritage and the Gaeltacht,
7 Ely Place, Dublin 2, Ireland.
Web: www.npws.ie
E-mail: nature.conservation@ahg.gov.ie**

Citation:

**NPWS (2013) Conservation Objectives: Carlingford Shore SAC 002306. Version
1. National Parks and Wildlife Service, Department of Arts, Heritage and the
Gaeltacht.**

**Series Editor: Rebecca Jeffrey
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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*

002306	Carlingford Shore SAC
1210	Annual vegetation of drift lines
1220	Perennial vegetation of stony banks

Please note that this SAC overlaps with Carlingford Lough SPA (004078). See map 2. The conservation objectives for this site should be used in conjunction with those for the overlapping site as appropriate.

Supporting documents, relevant reports & publications

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

NPWS Documents

Year :	1999
Title :	National Shingle Beach Survey of Ireland 1999
Author :	Moore, D.; Wilson, F.
Series :	Unpublished Report to NPWS
<hr/>	
Year :	2009
Title :	Coastal Monitoring Project 2004-2006
Author :	Ryle, T.; Murray, A.; Connolly, C.; Swann, M.
Series :	Unpublished report to NPWS
<hr/>	
Year :	2013
Title :	Carlingford Shore SAC (site code 2306) Conservation objectives supporting document- coastal habitats V1
Author :	NPWS
Series :	Conservation objectives supporting document
<hr/>	

Other References

Year :	2008
Title :	The phytosociology and conservation value of Irish sand dunes
Author :	Gaynor, K.
Series :	Unpublished PhD thesis, National University of Ireland, Dublin
<hr/>	

Spatial data sources

Year : Revision 2013
Title : National Shingle Beach Survey
GIS Operations : Clipped to SAC boundary. Expert opinion used as necessary to resolve any issues arising
Used For : 1220 (map 3)

1210 Annual vegetation of drift lines

To maintain the favourable conservation condition of Annual vegetation of drift lines in Carlingford Shore SAC, which is defined by the following list of attributes and targets:

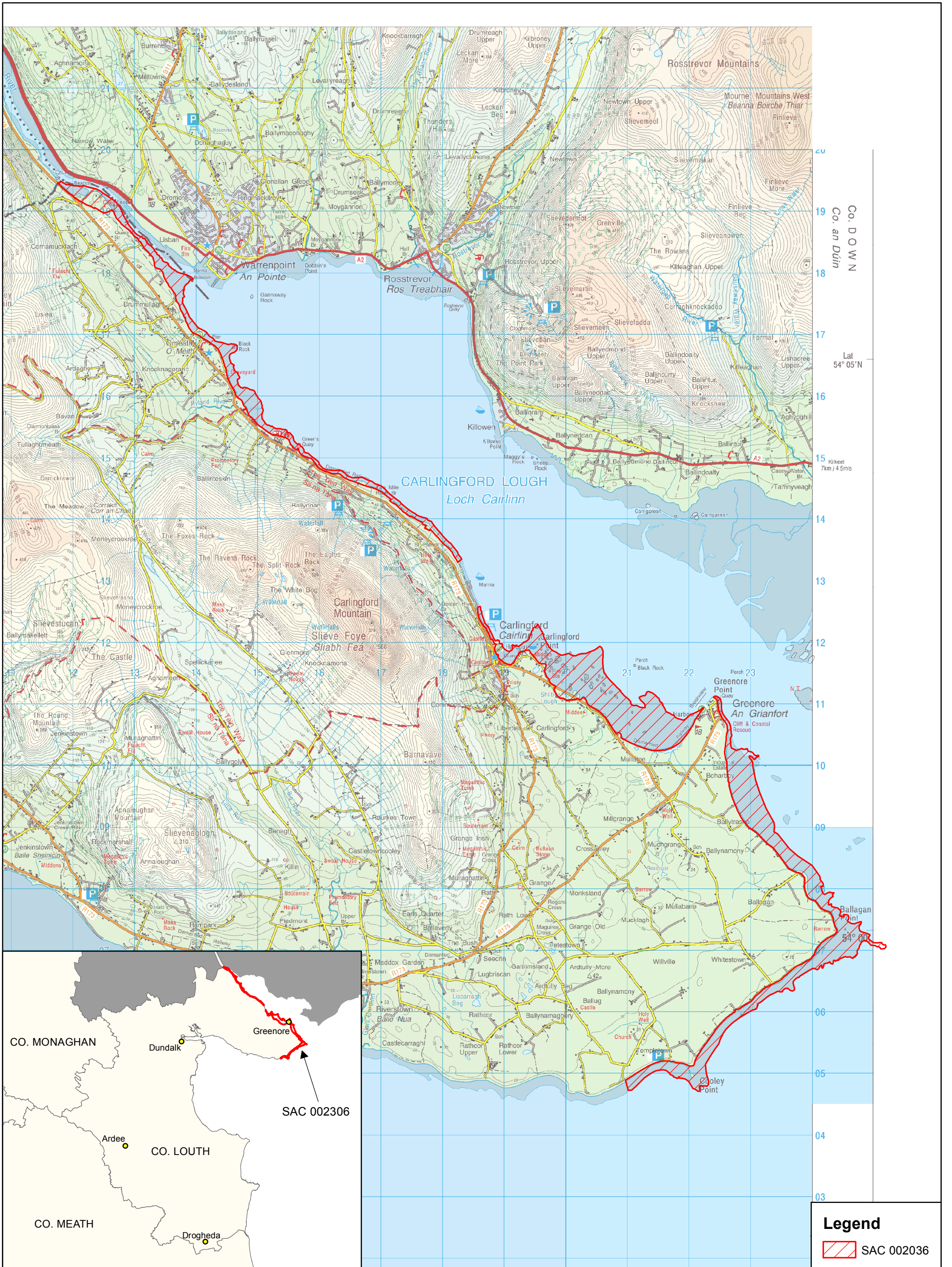
Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession	Current area unknown, but thought to occur in a mosaic with perennial vegetation of stony banks (1220). Habitat is very difficult to measure in view of its dynamic nature, which means that it can appear and disappear within a site from year to year. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes	Current distribution unknown, but thought to occur in a mosaic with perennial vegetation of stony banks (1220). See coastal habitats supporting document for further details
Physical structure: functionality and sediment supply	Presence/ absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions	Accumulation of organic matter in tidal litter is essential for trapping sand. Rock armour is present at Ballagan Point and Greenore. These physical barriers will affect sediment supply. See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain the range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Thought to occur in a mosaic with perennial vegetation of stony banks (1220). See coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative number of monitoring stops	Maintain the presence of species-poor communities with typical species: sea rocket (<i>Cakile maritima</i>), sea sandwort (<i>Honckenya peploides</i>), prickly saltwort (<i>Salsola kali</i>) and orache (<i>Atriplex</i> spp.)	Based on data from the Coastal Monitoring Project (CMP) (Ryle et al., 2009) and Gaynor (2008). See coastal habitats supporting document for further details
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-natives) to represent less than 5% cover	Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. Based on data from Ryle et al. (2009). See coastal habitats supporting document for further details

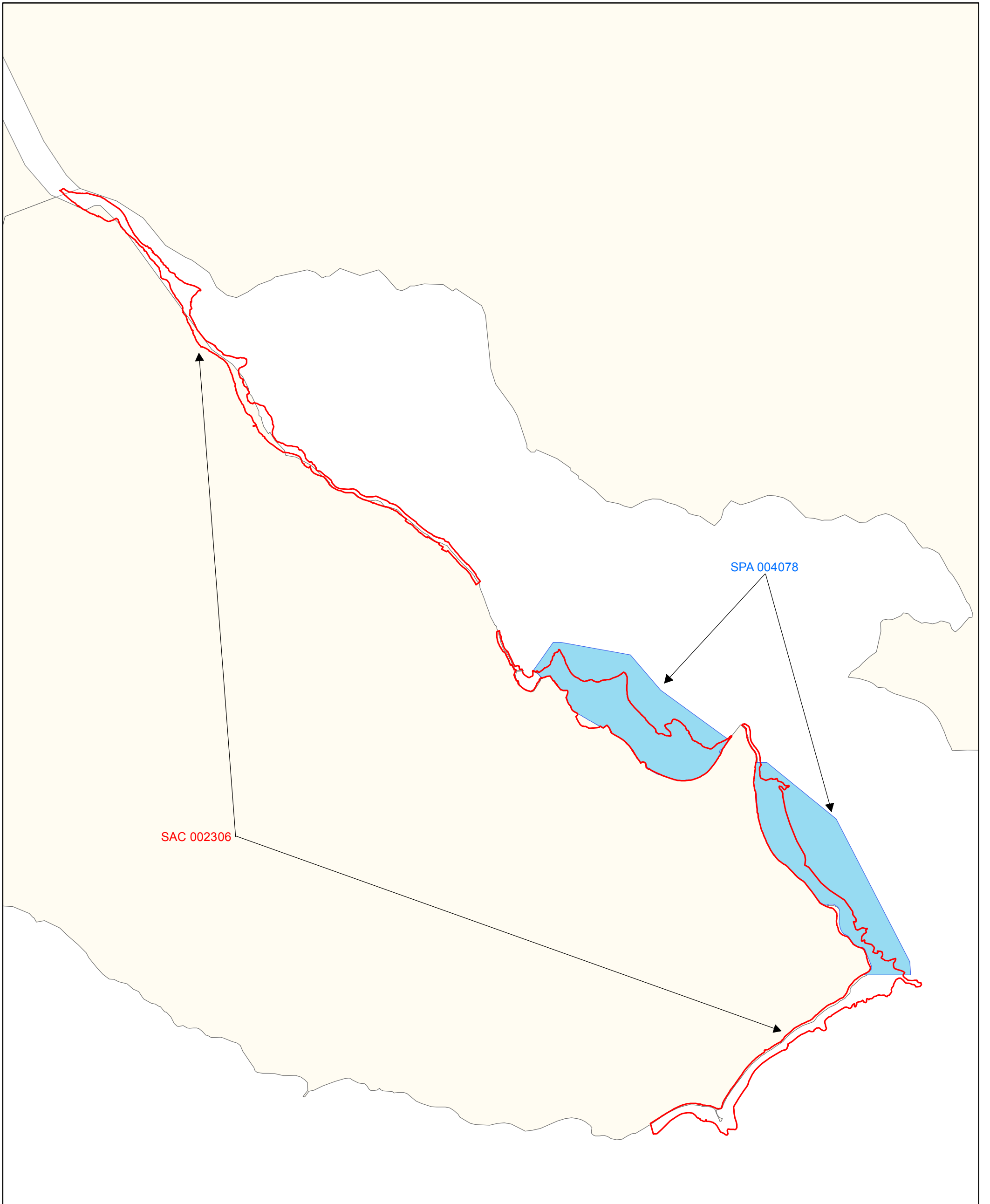
Conservation Objectives for : Carlingford Shore SAC [002306]

1220 Perennial vegetation of stony banks

To maintain the favourable conservation condition of Perennial vegetation of stony banks in Carlingford Shore SAC, which is defined by the following list of attributes and targets:

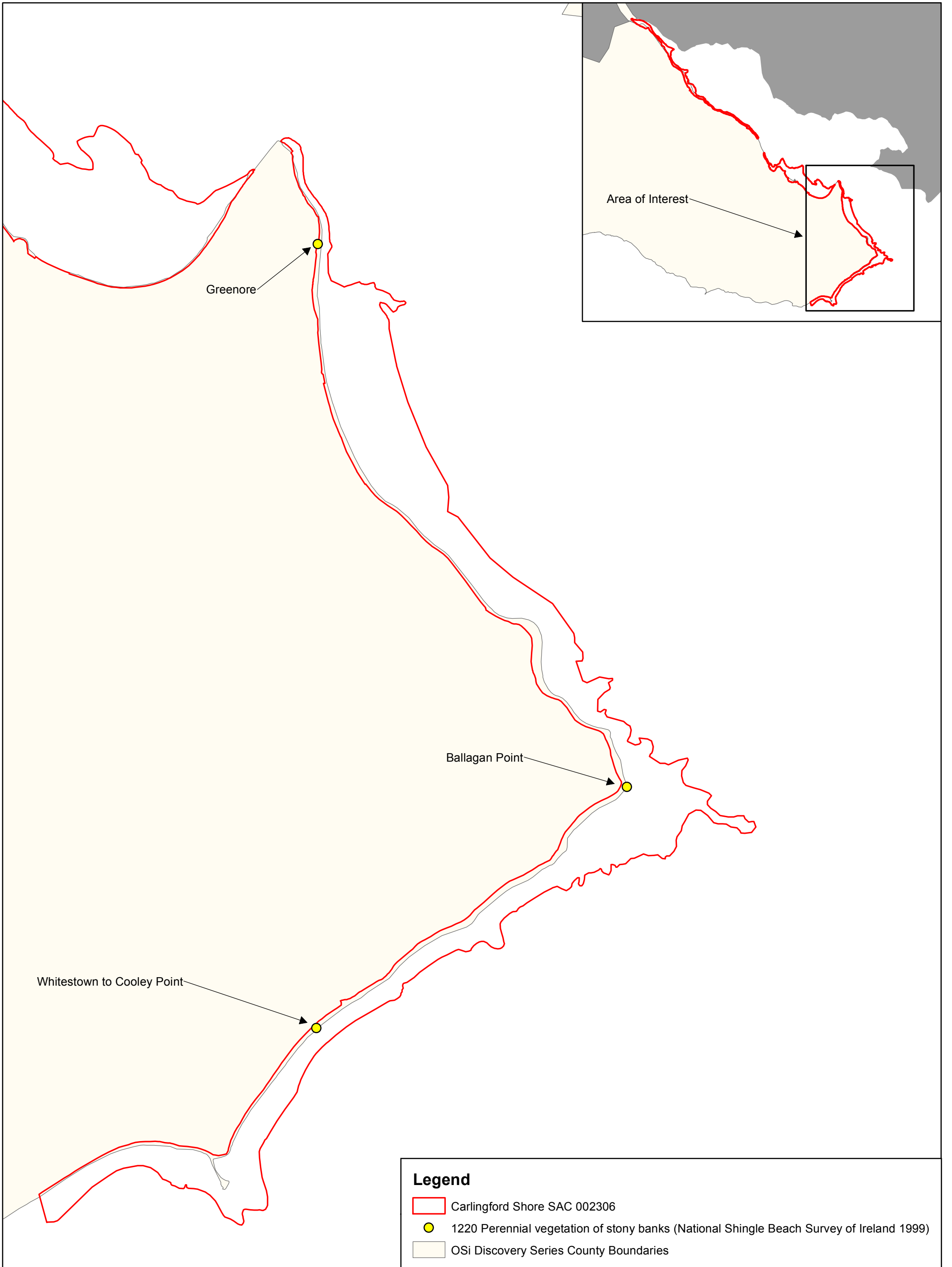
Attribute	Measure	Target	Notes
Habitat area	Hectares	Area stable or increasing, subject to natural processes, including erosion and succession	Current area unknown. Habitat recorded during the National Shingle Beach Survey (NSBS) (Moore and Wilson, 1999) from three sub-sites: Whitestown to Cooley Point, Ballagan Point and Greenore. Although extent was not mapped, these contiguous sites extend for 3.5km along the coastline. Area of vegetated shingle is estimated to cover 130ha. NB Further unsurveyed areas maybe present within the SAC. See coastal habitats supporting document for further details
Habitat distribution	Occurrence	No decline, or change in habitat distribution, subject to natural processes. See map 3 for mapped locations	Based on data from Moore and Wilson (1999). Exact current distribution unknown, although the habitat has been recorded along a 3.5km stretch of coastline from Greenore, extending south to Cooley Point (Moore and Wilson, 1999). See coastal habitats supporting document for further details
Physical structure: functionality and sediment supply	Presence/ absence of physical barriers	Maintain the natural circulation of sediment and organic matter, without any physical obstructions	Based on data from Moore and Wilson (1999). West of Cooley Point there has been a lot of development at Templetown beach, including the installation of a car park. The NSBS noted two areas of coastal defences (rock armour), one in an area south of Ballagan Point and another in an area south of Greenore (approx. 200m in length). A number of tourism-related developments, including a promenade protected with rock armour, have been constructed at Greenore. Shingle features are relatively stable in the long term. See coastal habitats supporting document for further details
Vegetation structure: zonation	Occurrence	Maintain range of coastal habitats including transitional zones, subject to natural processes including erosion and succession	Based on data from Moore and Wilson (1999). At Ballagan Point the shingle vegetation is backed by cobble-based grassland. Elsewhere along the Carlingford shore, gradations to inland habitats are disrupted by a road. Habitat is thought to occur in a mosaic with annual vegetation of drift lines (1210). See coastal habitats supporting document for further details
Vegetation composition: typical species and sub-communities	Percentage cover at a representative sample of monitoring stops	Maintain the typical vegetated shingle flora including the range of sub-communities within the different zones	Based on data from Moore and Wilson (1999). See coastal habitats supporting document for further details
Vegetation composition: negative indicator species	Percentage cover	Negative indicator species (including non-natives) to represent less than 5% cover	Based on data from Moore and Wilson (1999). Negative indicators include non-native species, species indicative of changes in nutrient status and species not considered characteristic of the habitat. See coastal habitats supporting document for further details





Legend

- Carlingford Shore SAC 002306
- Carlingford Lough SPA 004078
- OSi Discovery Series County Boundaries



Legend

- Carlingford Shore SAC 002306
- 1220 Perennial vegetation of stony banks (National Shingle Beach Survey of Ireland 1999)
- OSi Discovery Series County Boundaries

**Carlingford Shore SAC (site code 2306)
Conservation objectives supporting document
-coastal habitats**

NPWS

Version 1

May 2013

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Please note that this document should be read in conjunction with the following report: NPWS (2013). Conservation Objectives: Carlingford Shore SAC 002306. Version 1.0. National Parks and Wildlife Service, Department of Arts, Heritage and the Gaeltacht.

1 Introduction

Achieving Favourable Conservation Status (FCS) is the overall objective to be reached for all Annex I habitat types and Annex II species of European Community interest listed in the Habitats Directive 92/43/EEC (Commission of the European Communities, 2007). It is defined in positive terms, such that a habitat type or species must be prospering and have good prospects of continuing to do so.

Carlingford Shore SAC stretches for approximately 15km along the shoreline to the low water mark (LWM) of Carlingford Lough, which is also the estuary of the Newry River. It is flanked by glacial moraines and mountains - the Mourne Mountains to the north and Carlingford Mountain to the south-west. The underlying rock within the SAC is mainly carboniferous limestone. This outcrops over sections of the SAC in the form of bedrock shore or reefs. Granite boulders are occasionally found. Intertidal mudflats and sand/gravel banks also occur.

Carlingford Shore SAC (site code: 2306) is designated for the following two coastal habitats:

- Perennial vegetation of stony banks (1220)
- Annual vegetation of drift lines (1210)

The first of these habitats is associated with shingle beaches. The second habitat is often associated with sand dune systems. However, as there are no dunes present anywhere at Carlingford, it is assumed that these two habitats occur in close association with each other.

Small areas of potential saltmarsh were identified within the SAC during the Saltmarsh Monitoring Project (SMP) (McCorry, 2007) but there are no saltmarsh habitats listed as qualifying interests for this SAC.

This backing document sets out the conservation objectives for the two coastal habitats listed above in Carlingford Shore SAC, which is defined by a list of parameters, attributes and targets. The main parameters are (a) Range (b) Area and (c) Structure and Functions, the latter of which is broken down into a number of attributes, including physical structure, vegetation structure and vegetation composition.

The targets set for the **shingle** is based primarily on the findings of the National Shingle Beach Survey (NSBS), which was carried out in 1999 on behalf of the National Parks and Wildlife Service (NPWS) (Moore & Wilson, 1999).

The distribution of known shingle sites within Carlingford Shore SAC as identified during the NSBS is presented in Appendix I.

The NSBS visited and assessed the following 3 sub-sites within Carlingford Shore SAC:

1. Greenore
2. Ballagan Point
3. Whitestown to Cooley Point

These three sub-sites are contiguous, forming a continuous band of shingle extending from Greenore southwards to just beyond Cooley Point.

Profiles and transects were recorded from each shingle beach and each site was assigned a High/Medium/Low interest ranking. A 'high interest' ranking denotes a site that is of high conservation value. The site may be of interest botanically or geomorphologically. A 'medium interest' ranking implies the site may be extensive but not of particular interest either botanically or geomorphologically. A 'low interest' ranking is reserved for small sites, highly damaged sites or sites that are of a very common classification. At Carlingford Shore, all three sub-sites were rated 'medium' interest. The habitat was not mapped but the vegetation was recorded, as were the human impacts and alterations at the site, which are useful tools for assessing the Structure & Functions of the site.

The Greenore sub-site consists of a strip of supratidal shingle mixed with sand running south of Greenore Point. This narrow shingle bar supports a diverse flora. Near Greenore Point a promenade has been constructed with rock armouring protection. The coastal defences at this site run for approximately 200m (Moore & Wilson, 1999).

The Ballagan sub-site consists of a vegetated fringe beach running north and south of Ballagan Point. The area of shingle south of the point is more developed and stable. There the supratidal region is wider and a lichen encrusted stable plateau of mixed cobbles is found. It is noted by Moore & Wilson (1999) that this southern section probably merits a rating of 'high interest' Rock armouring is present along a section of this sub-site (Moore & Wilson, 1999).

The Whitestown to Cooley Point sub-site is an area of supratidal shingle which narrows in places to only 1m and lacks significant amounts of stable perennial vegetation. The most developed section of shingle occurs near Cooley Point; however, this has been impacted somewhat by the development of a car park (Moore & Wilson, 1999).

The targets set for the **annual vegetation of drift lines** are based in part on the findings of the Coastal Monitoring Project (CMP) (Ryle *et al.*, 2009) and this document should be read in conjunction with that report. However, as the CMP did not visit this particular site, the conservation objective for the entire SAC is quite generic and may be adjusted in the future in light of new information.

2 Conservation Objectives

The conservation objective aims to define the favourable conservation condition of a habitat or species at a particular site. Implementation of these objectives will help to ensure that the habitat or species achieves favourable conservation status at a national level.

3 Perennial vegetation of stony banks

Perennial vegetation of stony banks is vegetation that is found at or above the mean high water spring tide mark on shingle beaches (i.e., beaches comprised of cobbles and pebbles). It is dominated by perennial species (i.e. plants that continue to grow from year to year). The first species to colonise are annuals or short-lived perennials that are tolerant of periodic displacement or overtopping by high tides and storms. Level, or gently-sloping, high-level mobile beaches, with limited human disturbance, support the best examples of this vegetation. More permanent ridges are formed by storm waves. Several of these storm beaches may be piled against each other to form extensive structures.

3.1 Overall Objective

The overall objective for 'perennial vegetation of stony banks' in Carlingford Shore SAC is to 'maintain the favourable conservation condition'.

This objective is based on an assessment of the current condition of the habitat under a range of attributes and targets. The assessment is divided into three main headings (a) Range, (b) Area and (c) Structure and Functions.

3.2 Area

3.2.1 Habitat extent

Habitat extent is a basic attribute to be assessed when determining the condition of a particular habitat. The target for favourable condition is '*no decrease in extent from the established baseline*'. Bearing in mind that coastal systems are naturally dynamic and subject to change even within a season, this target is assessed subject to natural processes, including erosion and succession.

The exact current extent of this habitat in Carlingford Shore SAC is unknown. The National Shingle Beach Survey recorded vegetated shingle ridge from three sub-sites: Cooley Point to Whitestown, Ballagan Point and Greenore, but did not map the extent (Moore & Wilson, 1999). However, there may be additional areas of shingle within the SAC.

These three sub-sites identified by the NSBS appear to be more or less continuous, extending along an area of approximately 3.5kms. They can vary in width from less than a metre to approximately 50m south of Ballagan Point. Based on an average width of 75m the area of shingle is estimated to cover 262.5ha of which 50% is likely to be vegetated, giving an estimated area of approximately 130ha.

The target is that the area should be stable or increasing, subject to natural processes, including erosion and succession.

3.3 Range

3.3.1 Habitat distribution

The known distribution of vegetated shingle in Carlingford Shore SAC is presented in a map in Appendix I. It occurs along a 3.5km stretch of coastline extending from Greenore in the north to Cooley Point in the south (Moore & Wilson, 1999). There may be additional areas of the habitat elsewhere within the SAC.

The target is that there should be no decline or change in the distribution of this habitat, unless it is the result of natural processes, including erosion and succession.

3.4 Structure and Functions

A fundamental aim of shingle conservation is to facilitate natural mobility. Shingle beaches are naturally dynamic systems, making them of geomorphological interest as well as ecological interest. They are constantly changing and shingle features are rarely stable in the long term.

3.4.1 Functionality and sediment supply

The health and on-going development of this habitat relies on a continuing supply of shingle sediment. This may occur sporadically as a response to storm events rather than continuously. Interference with the natural coastal processes, through offshore extraction or coastal defence structures in particular, can interrupt the supply of sediment and lead to beach starvation.

West of Cooley Point there has been a lot of development at Templetown beach, including the installation of a car park. The NSBS noted two areas of coastal defences (rock armour) in this SAC, one in an area south of Ballagan Point and another in an area south of Greenore (approx. 200m in length). A number of tourism related developments, including a promenade protected with rock armour, have been constructed at Greenore. Much of the area at Ballagan is isolated and relatively undisturbed (Moore & Wilson, 1999).

The target is to maintain, or where necessary restore, the natural circulation of sediment and organic matter, without any physical obstructions.

3.4.2 Vegetation structure: zonation

Ecological variation in this habitat type depends on stability; the amount of fine material accumulating between the pebbles; climatic conditions; width of the foreshore and past management of the site. The ridges and lows also influence the vegetation patterns, resulting in characteristic zonations of vegetated and bare shingle. In the less stable frontal areas of shingle, the vegetation tends to be dominated by annuals and short-lived salt-tolerant perennials. Where the shingle is more stable the vegetation becomes more perennial in nature and may include grassland, heathland and scrub, depending on the exact nature of the site. The presence of lichens indicates long term stability of the shingle structure.

At Ballagan Point, the classic shingle vegetation is backed by cobble-based grassland with ribwort plantain (*Plantago lanceolata*), wild carrot (*Daucus carota*) and yarrow (*Achillea millefolium*). Elsewhere along the Carlingford shore, transitions to inland habitats are mostly disrupted by a road (Moore & Wilson, 1999).

The target is to maintain the range of coastal habitats, including transitional zones, subject to natural processes, including erosion and succession.

3.4.3 Vegetation composition: typical species & sub-communities

The degree of exposure, as well as the coarseness and stability of the substrate determines species diversity. The shingle in Carlingford Shore SAC is known to support a typical flora for this habitat type including sea sandwort (*Honckenya peploides*), sea spurge (*Euphorbia paralias*), sea mayweed (*Tripleurospermum maritimum*) and oraches (*Atriplex* spp.).

The Irish Red Data Book species oysterplant (*Mertensia maritima*) has been recorded within this SAC. This plant is protected under the Flora Protection Order 1999.

At the Greenore sub-site, the NSBS recorded knotweeds (*Polygonum* spp.), spear-leaved orache (*Atriplex prostrata*), grass-leaved orache (*Atriplex littoralis*), sea beet (*Beta maritima*), sea spurge (*Euphorbia paralias*), field bindweed (*Convolvulus arvensis*), sea-milkwort (*Glaux maritima*) and scarlet pimpernel (*Anagallis arvensis*) (Moore & Wilson, 1999).

At the Ballagan Point sub-site, the NSBS recorded spear-leaved orache (*Atriplex prostrata*), sea beet (*Beta maritima*), wild carrot (*Daucus carota*), sea-milkwort (*Glaux maritima*), ribwort plantain (*Plantago lanceolata*) and wild radish (*Raphanus raphanistrum*) (Moore & Wilson, 1999).

At the Whitestown to Cooley Point sub-site, species recorded in the well vegetated shingle by the NSBS include glabrous orache (*Atriplex glabriuscula*), spear-leaved orache (*Atriplex prostrata*), sea beet (*Beta maritima*), common cleavers (*Galium aparine*), wild radish (*Raphanus raphanistrum*) and curled dock (*Rumex crispus*). Lichens are absent (Moore & Wilson, 1999).

The target for this attribute is to ensure that the typical flora of vegetated shingle is maintained, as are the range of sub-communities within the different zones.

3.4.4 Vegetation composition: negative indicator species

Where the shingle becomes more stabilised negative indicator species can become an issue. Negative indicator species can include non-native species (e.g. *Centranthus ruber*, *Lupinus arboreus*); species indicative of changes in nutrient status (e.g. *Urtica dioica*) and species not considered to be typical of the habitat (e.g. *Pteridium aquilinum*).

The target for this attribute is that negative indicator species (including non-native species) should make up less than 5% of the vegetation cover.

4 Annual vegetation of drift lines

Annual vegetation of drift lines, or strandline vegetation, is found on beaches along the high tide mark, where tidal litter accumulates. It is dominated by a small number of annual species (i.e. plants that complete their life-cycle within a single season). Tidal litter contains the remains of marine algal and faunal material, as well as a quantity of seeds. Decaying detritus in the tidal litter releases nutrients into what would otherwise be a nutrient-poor environment. The habitat is often represented as patchy, fragmented stands of vegetation that are short-lived and subject to frequent re-working of the sediment. The vegetation is limited to a small number of highly specialised species that are capable of coping with salinity, wind exposure, an unstable substrate and lack of soil moisture. Typical species include spear-leaved orache (*Atriplex prostrata*), frosted orache (*A. laciniata*), sea rocket (*Cakile maritima*), sea sandwort (*Honckenya peploides*) and prickly saltwort (*Salsola kali*).

4.1 Overall objectives

The overall objective for 'Annual vegetation of drift lines' in Carlingford Shore SAC is to 'maintain the favourable conservation condition'.

This objective is based on a generic assessment of the habitat under a range of attributes and targets. The assessment is divided into three main headings (a) Area (b) Range and (c) Structure and Functions.

4.2 Area

4.2.1 Habitat extent

Habitat extent is a basic attribute to be assessed when determining the condition of a particular habitat. The exact current extent of this habitat in Carlingford Shore is unknown. As there are no dunes at the site, it was not surveyed during the Coastal Monitoring Project (CMP) (Ryle *et al.*, 2009).

The general target for annual drift line vegetation is that it should be stable or increasing. Bearing in mind that coastal systems are naturally dynamic and subject to change, this target is always assessed subject to natural processes, including erosion and succession.

4.3 Range

4.3.1 Habitat distribution

The exact current distribution of this habitat is unknown but it is thought to coincide with that of 'perennial vegetation of stony banks' with which it is likely to occur in a mosaic. The distribution is likely to correspond to the map in Appendix I.

The target is that there should be no decline or change in the distribution of this habitat, unless it is the result of natural processes, including erosion, accretion and succession.

4.4 Structure and Functions

Maintaining the favourable conservation condition of the strandline habitat along Carlingford Shore SAC in terms of structure and functions depends on a range of attributes for which targets have been set as outlined below.

4.4.1 Physical structure: functionality and sediment supply

Coastlines naturally undergo a constant cycle of erosion and accretion. There are two main causes of erosion: (a) those resulting from natural causes and (b) those resulting from human interference. Natural causes include the continual tendency towards a state of equilibrium between coasts and environmental forces, climatic change (particularly an increase in the frequency of storms or a shift

in storm tracks), relative sea level rise and natural changes in the sediment supply. Human interference is usually associated with changes in the sediment budget, either directly, through the removal of beach or inshore sediment, or indirectly, by impeding or altering sediment movement. It is important to recognise that the process of coastal erosion is part of a natural tendency towards equilibrium. Natural shorelines attempt to absorb the energy entering the coastal zone by redistributing sediment.

Sediment supply is especially important in the strandline communities where accumulation of organic matter in tidal litter is essential for trapping sand. The construction of physical barriers such as sea defences can interrupt longshore drift, leading to beach starvation and increased rates of erosion.

West of Cooley Point there has been a lot of development at Templetown beach, including the installation of a car park. The NSBS noted two areas of coastal defences (rock armour) in this SAC, one in an area south of Ballagan Point and another in an area south of Greenore (approx. 200m in length). A number of tourism related developments, including a promenade protected with rock armour, have been constructed at Greenore. Much of the area at Ballagan is isolated and relatively undisturbed (Moore & Wilson, 1999).

The target for this attribute is to maintain the natural circulation of sediment and organic matter throughout the site, without any physical obstructions.

4.4.2 Vegetation structure: zonation

The annual drift line vegetation along Carlingford Shore is thought to occur in a mosaic with 'perennial vegetation of stony banks'.

The target is to maintain the range of coastal habitats, including transitional zones, subject to natural processes, including erosion and succession.

4.4.3 Vegetation composition: typical species & sub-communities

Species diversity and plant distribution in dunes is strongly controlled by a range of factors, including mobility of the substrate, grazing intensities, moisture gradients, nutrient gradients and human disturbance.

The annual vegetation of drift lines is thought to occur interspersed with the perennial vegetation of stony banks, occupying accumulations of drift material and gravels rich in nitrogenous organic matter. The typically sparse vegetation consists of saltwort (*Salsola kali*), sea rocket (*Cakile maritima*), sea sandwort (*Honckenya peploides*), sea spurge (*Euphorbia paralias*) and oraches (*Atriplex* species). The Red Data Book and Flora Protection Order species, oysterplant (*Mertensia*

maritima) is also found in this habitat. While this species is listed in the EU manual as a diagnostic species of drift line vegetation, in Ireland it is generally more associated with shingle and cobble beaches (Curtis & McGough, 1988; Farrell & Randall, 1992).

The target for this attribute is to maintain a typical flora for the strandline habitat.

4.4.4 Vegetation composition: negative indicator species

Negative indicators include non-native species, species indicative of changes in nutrient status (e.g. *Urtica dioica*) and species not considered characteristic of the habitat.

The target is that negative indicators (including non-native species) should represent less than 5% of the vegetation cover.

5 References

Commission of the European Communities (2007). *Interpretation Manual of European Union Habitats – EUR 27*. DG Environment-Nature and Biodiversity, Brussels.

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Appendix I: Distribution map of known shingle sites within Carlingford Shore SAC, as identified during the National Shingle Beach Survey (Moore & Wilson, 1999)

