

CONSERVATION OBJECTIVES AND POTENTIAL MANAGEMENT OPTIONS

Carlingford Lough Proposed Marine Conservation Zone (pMCZ)

Sea-pen (*Virgularia mirabilis*) @ Claire Goodwin



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Summary

This document provides information on the various uses and activities occurring within Carlingford Lough proposed Marine Conservation Zone (pMCZ) and surrounding area. The document has been produced to advise stakeholders about the activities that may cause a threat to the proposed features, the potential management options for these activities and their compatibility with conservation objectives of the features to be protected.

The information is organised by the type of activity, and briefly describes potential impacts on the features and potential management options. The grouping of activities is based on the standardised UK pressures-activity matrix¹, as developed by JNCC, which classes similar activities that exert similar pressures together, for example, anchoring by commercial and recreational vessels. Detailed management plans will be developed post designation based on this document, the features vulnerability assessment and the conservation objectives of the pMCZ feature. The management options will only include activities considered capable of affecting the features of the pMCZ based on the risk of damage assessment. The management options will also need to consider the existing management developed for the SAC/SPA designations to ensure they are harmonised.

This paper has been based on data, evidence from peer-reviewed scientific journals and stakeholder engagement. Due to the high degree of variability within some habitats, the variety of activities under consideration and local variation, it is inevitable that the document is somewhat generalised. Where possible the paper will give comprehensive evidence-based guidance as a starting point for discussions about the development of management options to achieve the conservation objectives for the pMCZ.

This document should be read alongside the document Guidance on the development of Conservation Objectives and potential Management Options.

Additional information on Carlingford Lough pMCZ includes:

- Guidance on selection and designation of Marine Conservation Zones (MCZs) in the Northern Ireland Inshore Region
- Justification report for selection of proposed Marine Conservation Zones (pMCZ) features
- Assessment against the Selection Guidelines for Carlingford Lough proposed Marine Conservation Zone (pMCZ)
- Data Confidence Assessment for Carlingford Lough proposed Marine Conservation Zone (pMCZ)
- Site Summary Document for Carlingford Lough proposed Marine Conservation Zone (pMCZ)

¹ Refer to Paper for HBDSEG Meeting 9-10 October 2013 – Progress towards the development of a standardised UK pressure-activities matrix
http://jncc.defra.gov.uk/pdf/Final_HBDSEG_P-A_Matrix_Paper_28b_Website_edit%5B1%5D.pdf

Glossary of Terms and Acronyms

AFBI - Agri-food and Biosciences Institute

AONB - Area of Outstanding Natural Beauty, designated under the Nature Conservation and Amenity Lands Order (Northern Ireland) 1985

ASSI - Area of Special Scientific Interest are notified under The Environment (Northern Ireland) Order 2002

Biotope – the region of the habitat associated with a particular ecological community

Circalittoral - describes the zone from a depth where 1% light reaches the seabed down to 200m (JNCC)

Conservation objective – A statement of the desired ecological/geological state (quality) of a feature (habitat, species or geological) for which the MCZ is designated

DARD - Department of Agriculture and Rural Development

DCAL - Department of Culture, Arts and Leisure

DETI - Department of Enterprise, Trade and Investment

DOE - Department of the Environment (also referred to as the Department in the text)

DRD - Department for Regional Development

EUNIS – European Nature Information System, is a habitat classification system used throughout Europe and covers all types of natural and artificial habitats, both aquatic and terrestrial

IMO - the International Maritime Organization

Infralittoral - describes the zone from mean low water down to a depth where 1% of light can reach the seabed (JNCC)

JNCC - Joint Nature Conservation Committee, the statutory nature conservation adviser to the Department and the UK Government in the marine environment

MCAA – Marine and Coastal Access Act 2009

MCA - The Maritime and Coastguard Agency

MCZ - Marine Conservation Zone used to refer to MCZs designated under section 13 of the Marine Act (Northern Ireland) 2013 in the Northern Ireland inshore region and in section 116 of the Marine and Coastal Access Act 2009 in the Northern Ireland offshore region

MPA - As a generic term Marine Protected Areas are a clearly defined geographical space, recognised, dedicated and managed, through legal or other means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values. As a specific term it refers to a national designation in Scotland (equivalent to MCZ)

NIEA - Northern Ireland Environment Agency

NIW – Northern Ireland Water

OSPAR - OSPAR is the mechanism by which fifteen Governments of the western coasts and catchments of Europe, together with the European Union, cooperate to protect the marine environment of the North-East Atlantic

OSPAR T&D - OSPAR List of Threatened and/or Declining Species and Habitats

PMF - Priority Marine Feature - collective term for those features (habitats, species and geological/geomorphological features) which are considered to be of conservation importance in the Northern Ireland inshore region

pMCZ - Proposed Marine Conservation Zone

pMCZ Feature - proposed Marine Conservation Zone feature(s) that will underpin the MCZ designation

ROV - Remotely Operated Vehicle

SAC - Special Area of Conservation, designated through the Habitats Directive

Sessile Epifauna – describe organisms which are found attached to, or on top of, substrates in the shallow subtidal area (e.g. mussels, oysters)

SSNI - Sublittoral Survey Northern Ireland

SPA - Special Protection Area, designated under the Birds Directive

VMS – Vessel Monitoring System

Vulnerability Assessment – A feature is vulnerable when it is exposed to a pressure to which it is sensitive. The Vulnerability Assessment is used to assess current pressures, desired conditions and levels of management required

WFD - Water Framework Directive

Introduction

Carlingford Lough is a narrow and shallow sea-lough that lies on the east coast of Ireland located at the border of Northern Ireland and the Republic of Ireland (RoI).

The pMCZ is located off the northern shore and north of the navigable channel in the inner part of the Lough. It extends from Warrenpoint to Rostrevor Quay and encompasses an area of 3.23km² (Figure 1). The pMCZ is an area of shallow Subtidal mud that contains high densities of Sea-pen and white sea slug communities.

Carlingford Lough waters are also important for shellfish aquaculture and pot fishing. Cultivation of Blue (Edible) mussel (*Mytilus edulis*) and the Pacific oyster (*Crassostrea gigas*) is an expanding industry and, along with Edible crab (*Cancer pagurus*) and European lobster (*Homarus gammarus*) potting, these products are exported primarily to the European market. Although industrial activity is minimal along the Lough, Greenore and Warrenpoint are significant commercial ports with considerable shipping traffic. The sheltered waters of the Lough are popular for recreational boating and sailing with three marinas, several anchorage areas, visitors mooring and two sailing clubs. Water sports are popular in the Lough and include windsurfing schools, kayaking, canoeing and scuba diving. Bird watching and recreational fishing also take place at various points. A navigation channel maintained by dredging forms a natural mid-line through the centre of the Lough.

Carlingford Lough pMCZ lies adjacent to an Area of Outstanding Natural Beauty (AONB). Areas of the Lough adjacent to the pMCZ have been designated as a RAMSAR site, Area of Special Scientific Interest (ASSI), Special Protection Area (SPA) and Special Area of Conservation (SAC). To the south of the pMCZ the RoI has proposed a Natural Heritage Area (NHA). Carlingford Lough pMCZ lies entirely within Carlingford Lough Shellfish waters

Further information on the pMCZ can be found in the site summary document.

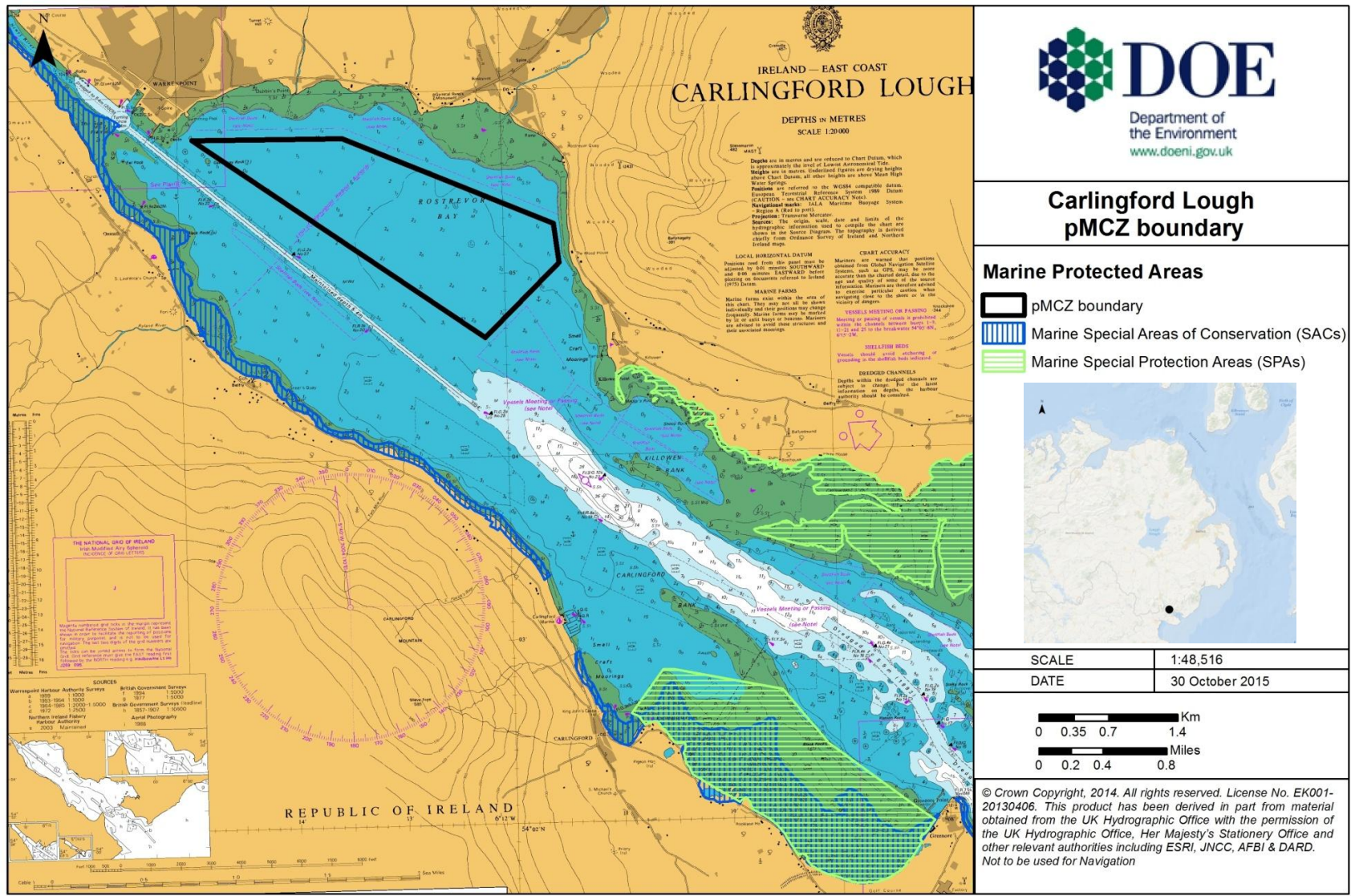


Figure 1 Location of the proposed boundary of Carlingford Lough pMCZ

Conservation Objectives, Vulnerability Assessment and Proposed Features

A conservation objective is a statement of the desired ecological quality of a feature (habitat, species or geological) for which an MCZ is designated. The conservation objective establishes whether the feature condition meets the desired state and should be maintained, or falls below the desired state and should be recovered to favourable condition.

The conservation objectives are the first step towards developing management options and monitoring programmes. The procedure used to establish conservation objectives is described in the document *Guidance on the development of Conservation Objectives and potential Management Options*.

Vulnerability Assessment

A feature is vulnerable when it is exposed to a pressure to which it is sensitive. The vulnerability assessment is used to assess the vulnerability of a feature based on sensitivity, and current exposure to, pressures (e.g. activities including climate change). It aids in the development of conservation objectives to give an indication of feature condition (both current and desired) and potential management options.

Proposed Features

Carlingford Lough pMCZ has been proposed as it supports the habitat **Subtidal (sublittoral) mud containing Sea-pen and white sea slug communities**.

The pMCZ habitat consists of a shallow subtidal area of fine mud with a dense population of the Sea-pen *Virgularia mirabilis*. The White sea slug, *Philine aperta*, also occurs in high densities while the sea cucumber *Ocnus planci* is occasionally present. The biotope for this habitat is [SS.SMu.IFiMu.PhiVir](#). This proposed feature is possibly a temporal variant of other sublittoral cohesive mud and sandy mud communities (SS.SMu), due to *Philine aperta* being highly variable in density from year-to-year. Although this feature is not currently listed on any conservation lists it is rare in terms of the size and density of the *Virgularia* in Northern Ireland.

There are also Priority Marine Features (PMFs) present within and adjacent to the pMCZ boundary. A full list of these features is provided in Annex II. All PMFs within the pMCZ boundary will be afforded a level of protection based on vulnerability and risk assessment.

The location and extent of this pMCZ is shown in Figure 2. The map shows point records of biotope and individual species as components of the habitat (AFBI Carlingford Lough Survey 2012, Sublittoral Survey Northern Ireland (SSNI) 1982-1985, 2007-2012). Survey work

carried out in 2015 confirmed the biotope and sediment types enabling a boundary to be drawn (DOE Carlingford Lough pMCZ spyball survey 2015).

As Subtidal (sublittoral) mud containing Sea-pen and white sea slug communities in Carlingford Lough pMCZ are currently in favourable condition, the Department recommends that the **conservation objectives are set to *maintain* this feature in favourable condition.**

Annex I gives more detail on the conservation objectives and the attributes against which the targets for the features are measured.

Figures 3-9 have been produced using the feature point data shown in Figure 2 to illustrate the location of various activities in relation to Carlingford Lough pMCZ.

Historic and Archaeological Interest

The Department's mechanism to protect underwater cultural heritage is principally the Protection of Wrecks Act 1973 and the Historic Monuments and Archaeological Objects Order 1995 and these will be utilised when and where appropriate. However, the Department will have regard to any historic assets that lie within the pMCZ boundary and these may be afforded incidental protection. It is recognised that management measures to protect pMCZ features could protect historic assets.

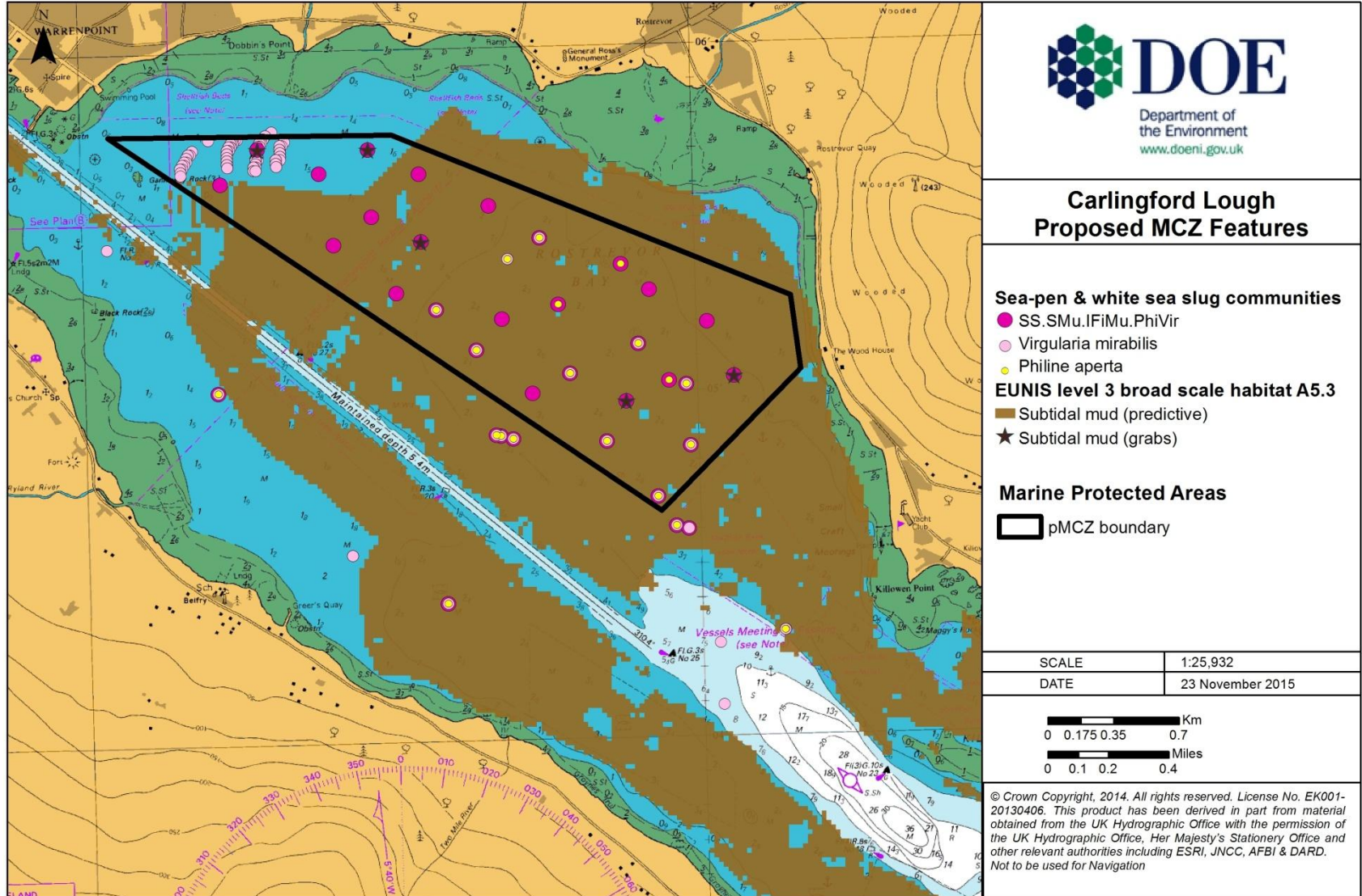


Figure 2 Distribution of the pMCZ features in Carlingford Lough

Activities and Potential Management Options in Carlingford Lough

Table 1 lists the activities that have the potential to affect Carlingford pMCZ. This list has been generated based on activities that are current, historical and already identified as potential future activities. Any activities that have not yet been considered, e.g. new emerging technologies or new fishing techniques will need to be considered as they are developed. This document discusses the various activities and their potential impacts on the proposed features and has been developed from a range of data, scientific literature including peer-reviewed publications and reports and stakeholder comments. Details of the literature used have been provided in a reference section at the end of this document.

All the activities are assessed against the level of impact or risk of damage to the proposed features based on the latter's vulnerability to each activity (vulnerability assessment). Only those activities considered capable of affecting the proposed features (or likely to impact the feature) will be detailed in the management options. The management options considered for each activity include no management required, reduce or limit pressures, or to remove or avoid pressures altogether. Where management is required the options recommended will be implemented as management measures with reporting structures.

The document *Guidance on the development of Conservation Objectives and potential Management Options* fully details the procedure used to develop potential management options.

Advice on management implications

In order to meet the conservation objectives listed above, the relevant and competent authorities are required to manage activities within their remit to avoid significant loss, damage or change to the qualifying features of the site. Activities should be managed so that they do not result in:

- Removal and/or smothering;
- Physical damage resulting from anchoring, siltation, abrasion and/or selective extraction;
- Increased synthetic and/or non-synthetic toxic contamination;
- Nutrient and or organic enrichment, and
- Increases in turbidity.

Table 1 Activities that have the potential to affect Carlingford Lough pMCZ

Type of activity	Activities
Aquaculture	Shellfish farms
Fishing	Creels (static gear) Dredging (mussels)
Infrastructure	Commercial ports NI and RoI Marinas Coastal defence and land claim
Discharges/waste disposal	Waste water treatment Works & outfalls
Extraction	Navigational dredging
Marine traffic	Moorings Boat anchorage Ferry route Shipping/navigation
Tourism and Recreation	SCUBA Diving Sailing Windsurfing Kayaking/canoeing Bird watching Recreation fishing
Scientific and Archaeological activities	Research Monitoring

Aquaculture – Shellfish

The Lough supports a wide variety of aquaculture activities with high productivity, good meat yields and growth rates. Historically, shellfish growth has always been productive in Carlingford Lough.

The main species cultivated are the Pacific oyster and Blue mussel. Oysters are grown in bags on metal trestles usually on the intertidal area (trestle culture). The bottom cultivation of Blue mussels uses seed dredged from naturally settled wild seed mussels beds (from outside the Lough) and re-laid onto licensed aquaculture beds. Harvesting usually involves dredging which can re-suspend sediments and pseudofaeces.

The location of the shellfish farms and the pMCZ feature is shown in Figure 3. Although there is no direct spatial overlap with the pMCZ boundaries there are two mussel sites immediately adjacent to the pMCZ that may be a risk to achieving the conservation objectives. In addition, operations on the perimeter of the aquaculture sites, such as site clearing and mussel predator control, may have an effect inside the pMCZ.

Potential impacts or pressures to the habitat associated with aquaculture include **risk of introduction of aquatic invasive species, physical change to another seabed type, siltation changes, organic enrichment, surface abrasion, non-synthetic contamination and de-oxygenation.**

Collection of shellfish and associated aquaculture operations can mobilise and re-suspend sediments. Sea-pen and white sea slug communities are highly sensitive to **physical change to another seabed type** as they are associated with fine mud sediment. *P. aperta* has fast growth and reproductive rates. However, *V. mirabilis* is slow growing with intermittent recruitment so recovery may take several years. Recovery of mud habitats to their original condition may take years. The modified sediment may not be suitable habitat for Sea-pen and white sea slug colonisation.

Sea-pens and white sea slug communities are moderately tolerant to smothering by sedimentation as most of the species are able to self-clean. *V. mirabilis* is able to withdraw into the sediment so can recover from smothering. However, large depositions can adversely affect this biotope by smothering individuals (leaving them unable to self-clean or dig out) and prevent the substratum from being re-colonised.

There is a low-moderate risk of habitat degradation through aquaculture-derived **organic enrichment**. Nutrient enrichment can lead to eutrophication with detrimental effects to Sea-pens and white sea slug communities. Heavy organic pollution may reduce the population abundance.

There is a moderate risk of habitat degradation and species loss through **abrasion and physical disturbance of the seabed surface**. Mobile fishing gear can damage sessile epifauna and shallow burrowers leading to a reduction in the overall diversity of the area and may alter the seabed habitat.

There is also a moderate risk to the habitat through **non-synthetic contamination** (for example oil spills) that may change faunal composition.

Direct effects on mud communities include **smothering** and increasing the **biological oxygen demand** of the mud. Although Sea-pens are tolerant of a wide range of environmental conditions and can tolerate some nutrient enrichment, *V. mirabilis* communities have been shown to be absent from areas heavily affected by sewage pollution, where sediments were severely deoxygenated.

It is considered that due to the proximity to the pMCZ, aquaculture activities in Carlingford Lough have the potential to cause deterioration of the Sea-pen and white sea slug communities feature. As such, aquaculture activities should be avoided within the pMCZ boundary to aid the continued achievement of the conservation objectives.

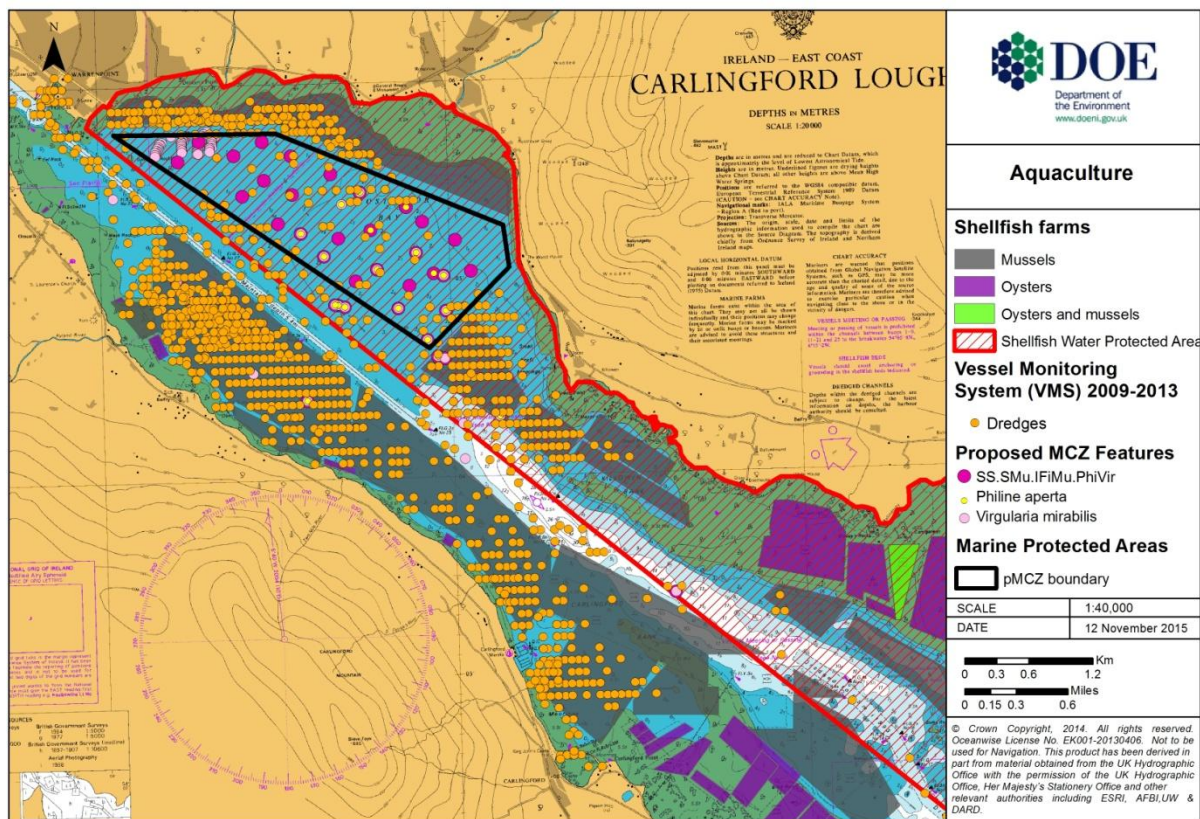


Figure 3 Location of Aquaculture activities in relation to Carlingford Lough pMCZ

<p>Potential Management Options</p>	<p>Management measures are recommended to remove or avoid pressures associated with the development of new shellfish farms or the expansion of existing aquaculture areas where they are likely to impact the pMCZ features.</p> <p>Management measures are recommended to reduce or limit pressures associated with existing shellfish farms where they are likely to impact the pMCZ features. An appropriate buffer zone between the pMCZ features and the two adjacent aquaculture sites was set to reduce the effects of sedimentation and organic enrichment. This buffer zone was considered during the development of the pMCZ boundary.</p>
<p>Proposed way forward</p>	<p>The development of new aquaculture farms or expansion of existing areas will require a licence from DARD in consultation with the Department to determine any impacts on the pMCZ features.</p> <p>The pMCZ features will be monitored within a 6 yearly rolling cycle to assess biotope distributions and species abundances. This will determine whether the conservation objectives are being achieved.</p>
<p>Relationship with existing Management Options</p>	<p>In the Northern side of Carlingford Lough DARD is responsible for granting aquaculture and fishery licences under the Fisheries Act (Northern Ireland) 1966.</p>

Fishing – Creels and mobile gear fishing

Carlingford Lough is fished by pots/creels for European lobsters (*Homarus gammarus*) and Edible crabs (*Cancer pagarus*).

At present there is no evidence of this activity happening within the pMCZ (Figure 4), however, pot landings at Warrenpoint and Greencastle and interviews with fishermen suggest that this activity occurs in the inner part of the Lough (part of ICES rectangle 37E3). In addition, mussel relaying is often accompanied by potting activity to reduce predator density on the mussel beds.

Some sea-pens (*V. mirabilis* and *Pennatula phosphorea*) are more tolerant of pot/creel based fishing due to their ability to bend away from the pressure wave generated by the pot or by withdrawing into the sediment. Other species (e.g. *Funiculina quadrangularis*) are unable to withdraw into the sediment and are more likely to sustain damage. Sea-pens are able to re-burrow or right themselves after pots/creels have been removed. If fishing activity is low, direct impact on habitat is likely to be minimal and seabed structure will likely be maintained. Fishing activity at higher levels could adversely impact the pMCZ feature by **surface abrasion** and **species removal**.

Small vessels (under 10m) are known to prosecute a wild fishery within Carlingford Lough targeting Blue mussels and flatfish using several different gear types. Such gear has the potential to damage the pMCZ features. Information on the intensity and location of this activity was not readily available for this assessment.

It is considered that the risk of not achieving the conservation objectives for the proposed features is low unless the location or intensity of the pot fishing or mobile gear fishing activity were to change in the future.

Potential Management Options	<p>At present no additional management is required. However if, in the future, levels of fishing with pots/creels were to increase management measures would be recommended to reduce or limit pressures where they are likely to impact the pMCZ features.</p> <p>Management measures are recommended remove or avoid pressures associated with mobile gear fishing where this is likely to impact the pMCZ features.</p>
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<p>Proposed way forward</p>	<p>The pMCZ features will be monitored within a 6 yearly rolling cycle to assess biotope distributions and species abundances. This will determine whether the conservation objectives are being achieved.</p>
<p>Relationship with existing Management Options</p>	<p>DARD will be responsible, through regulations, for the development of fisheries management measures to protect the pMCZ features.</p> <p>The Loughs Agency also has strategic and operational functions under the North/South Co-operation (Implementation Bodies) (NI) Order 1999, the British-Irish Agreement Act 1999, the Foyle Fisheries Act (NI) 1952 (as amended) and the Foyle Fisheries Act 1952 (as amended).</p>

Infrastructure – Commercial Ports, marinas, coastal defence and land claim

Industrial activity is limited around Carlingford Lough but there are two local commercial ports: Greenore (Ireland) and Warrenpoint (Northern Ireland). Greenore Port is a relatively small cargo port while Warrenpoint Port is the second largest general cargo port in Northern Ireland and fifth largest on the island of Ireland.

There are also three marinas in the Lough close to the pMCZ: Carlingford Marina (location of Carlingford Sailing Club), Warrenpoint Marina and Killowen point quay (Carlingford Lough Yacht Club).

Coastal defences and land reclaim are localised management practices used to reduce the impact of erosion. In Carlingford Lough there is both natural and hard coastal reinforcement from Killowen Bank to Warrenpoint and there is a large coastal defence off the town of Carlingford.

Infrastructure within or adjacent to the pMCZ is shown in Figure 5. Part of the pMCZ falls within the Warrenpoint Harbour Authority's jurisdiction. The construction and maintenance of structures in the area has the potential to cause direct damage to the pMCZ feature. In addition, the two marinas in the North, the existing coastal defences and associated operations may cause pressures to which the pMCZ feature is sensitive.

The main pressures linked to infrastructure operations in the area are: **non-synthetic compound contamination** (inc. heavy metals, hydrocarbons, and produced water), **physical change** (to another seabed type), **physical removal** (extraction of substratum), **siltation changes** (low), **sub-surface abrasion/penetration**, **synthetic compound contamination** (incl. pesticides, antifoulants, and pharmaceuticals), **water clarity changes**, **water flow** (tidal current) **changes** (locally) and **wave exposure changes** (locally).

Warrenpoint Harbour also engages in navigational channel maintenance programmes such as ploughing the turning circle, maintenance dredging and potentially in the future capital dredging works. The latter two are subject to marine licence but plough dredging within the harbour limits is exempt from marine licensing and has the potential to impact the northwest corner of the pMCZ through re-suspension and smothering.

Similar re-suspension and smothering events can be caused by large ships manoeuvring in the turning circle.

Habitat loss or alteration, and direct damage to individual species are the main risks associated with existing infrastructure operations. In addition, the construction of new infrastructures may affect the local hydrodynamic and sediment transport regimes of

inshore enclosed areas and consequently affect the mud substratum and loss of biodiversity.

It is considered that the risk of not achieving the conservation objectives for the proposed features is low unless the location or intensity of infrastructure operations was to change in the future.

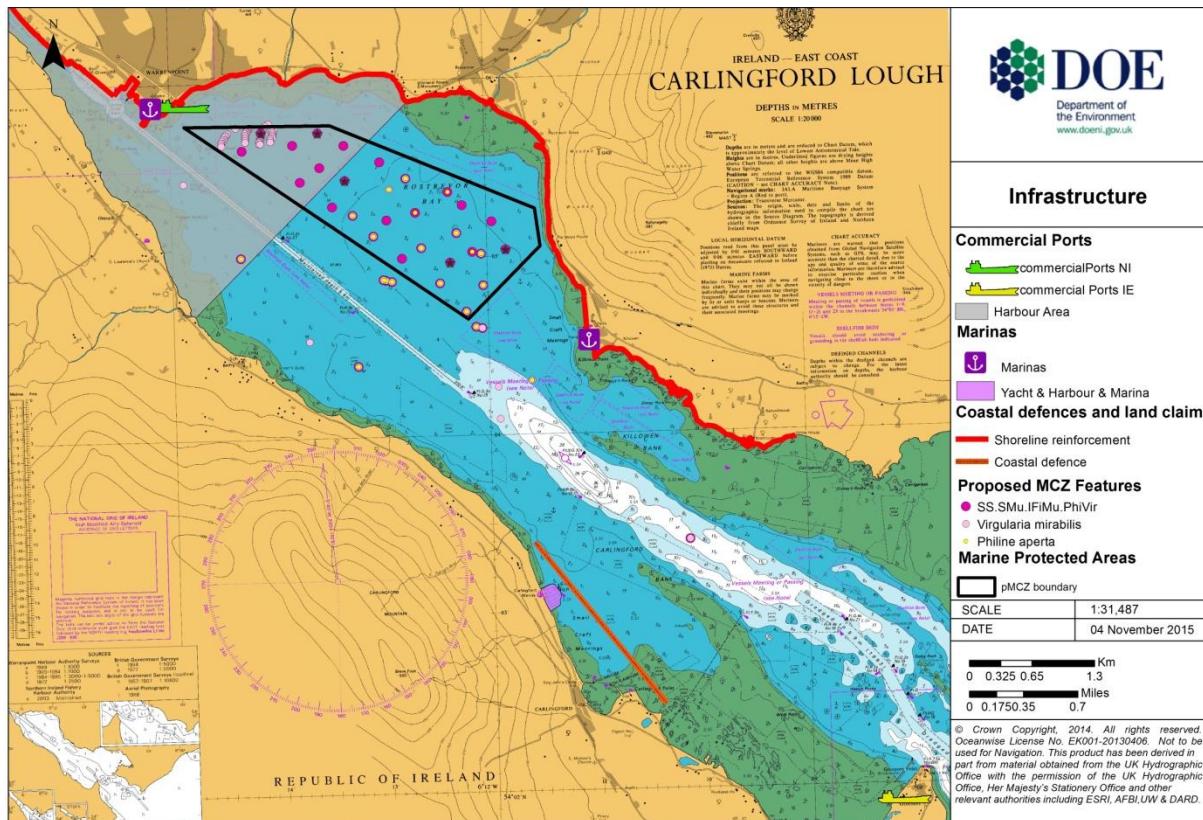


Figure 4 Location of Infrastructure in relation to Carlingford Lough pMCZ

<p>Potential Management Options</p>	<p>Management measures are recommended to reduce or limit pressures associated with Warrenpoint Harbour Authority jurisdiction where they are likely to impact the pMCZ features. This includes both existing and new activities.</p> <p>Management measures are recommended to remove or avoid pressures associated with new developments where they are likely to impact the pMCZ features.</p> <p>Management measures are recommended to reduce or</p>
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	<p>limit pressures associated with new coastal defences or the expansion of existing ones where they are likely to impact the pMCZ features.</p>
<p>Proposed way forward</p>	<p>The Department will continue discussions with those involved with Infrastructure activities and operations within or adjacent to the pMCZ to help us to understand more about the interactions with the pMCZ features.</p>
<p>Relationship with existing Management Options</p>	<p>Rivers Agency is responsible for sea defences designated under the Drainage (Northern Ireland) Order 1973.</p> <p>Warrenpoint Harbour Authority has responsibility for the management of ports and marinas under The Harbours (Northern Ireland) Order 2002.</p> <p>Port developments are covered by the Department for Regional Development (DRD) and through marine licensing and planning.</p>

Discharges/waste disposal – Waste water treatment works & outfalls, dredge disposal

Three main sewage treatment works discharge into Carlingford Lough and these are located at Newry Town (in the Newry River estuary), Warrenpoint and Cranfield. There are sewage discharge points into Carlingford Lough from the Republic of Ireland (Greenore and Omeath) and Carlingford. Although they do not overlap spatially with the pMCZ, four of the discharge sites are located around the pMCZ (Figure 6).

Secondary pressures may include diffuse land-based and accidental spills from marine, industrial or commercial sources. Vessels are not allowed to discharge any materials within Carlingford Lough.

Sea-pen and white sea slug communities have low to moderate sensitivity to **de-oxygenation, organic enrichment and siltation changes** as a result of sewage discharge. It is considered that the risk of not achieving the conservation objectives for the proposed features is low unless the location or intensity of the discharge activity was to change in the future.

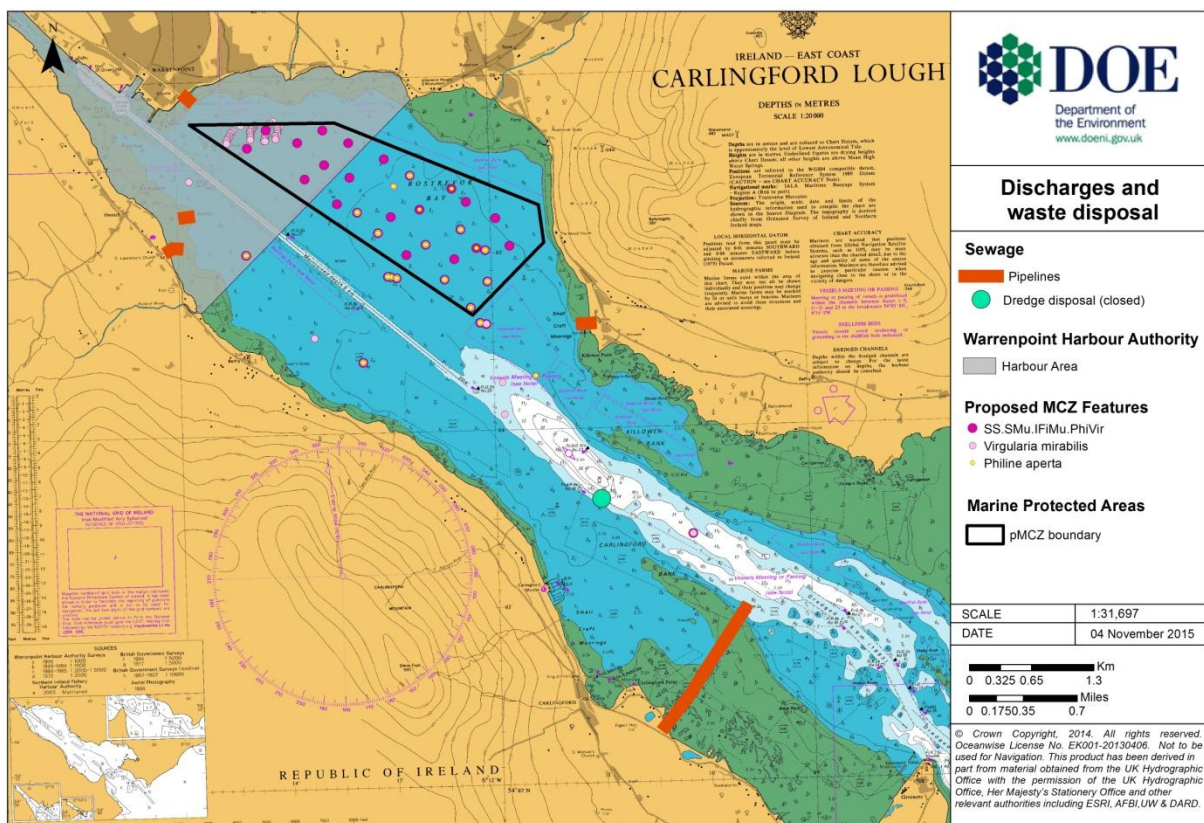


Figure 5 Location of Waste water discharge sites in relation to Carlingford Lough pMCZ

<p>Potential Management Options</p>	<p>Management measures are recommended to remove or avoid pressures associated with new waste water discharges as well as the expansion or relocation of existing waste water sites where they are likely to impact the pMCZ features.</p>
<p>Proposed way forward</p>	<p>Any changes to the current discharge/waste disposal sites will be undertaken by Northern Ireland Water (NIW) in consultation with Warrenpoint Harbour Authority (where applicable) and the Department Marine Division to determine any impacts to the pMCZ.</p>
<p>Relationship with existing Management Options</p>	<p>NIW is responsible for Waste water treatment works. Waste water discharges are governed by requirements in European legislation (The Urban Waste Water Treatment Directive (91/271/EEC) and Nitrates Directive (91/676/EEC).</p> <p>The disposal of ship generated waste (including sewage and bilge water) must comply with the EU Directive 2000/59/EC of the European Parliament and Council on Port Waste Reception Facilities for Ship Generated Waste and Cargo Residues, the Merchant Shipping (Port Waste Reception Facilities) Regulations 1997, the Merchant Shipping and Fishing Vessels (Port Waste Reception Facilities) Regulations 2003.</p>

Extraction – Maintenance dredging

Dredging for maintenance/navigational purposes is a fundamental activity for ports and harbours to ensure operational charted depths are maintained for safe access of vessels which can enhance the economic viability of Northern Ireland. In Carlingford, dredging takes place in a narrow channel running through the centre of the Lough from the mouth up to the Narrow Water inlet.

Navigational dredging in Carlingford Lough is shown in Figure 7. There is no overlap between the channel dredging and the pMCZ. However, the potential environmental effects of maintenance dredging are generally two-fold, firstly as a result of the dredging process itself and secondly as a result of the disposal of the dredged material. Currently there is a disposal area outside the Lough that is unlikely to cause an impact on the pMCZ but there may be a risk if new disposal grounds were to be licensed inside the Lough. The proximity to Warrenpoint Harbour may be a risk if dredging/dredge material disposal activity happens close to or within the pMCZ boundary. Plough dredging and associated risks have been covered in the Infrastructure section.

Sea-pen and white sea slug communities are moderately sensitive to pressures related with navigational dredging (maintenance and dredge disposal). Some of these pressures are: **de-oxygenation**, **non-synthetic compound contamination** (inc. heavy metals, hydrocarbons, produced water), **organic enrichment**, **physical change** (to another seabed type), **siltation changes** (high and low rates) and **synthetic compound contamination** (inc. pesticides, antifoulants, and pharmaceuticals).

It is considered that the risk of not achieving the conservation objectives for the proposed features is moderate unless the location or intensity of the dredging or disposal activity were to change in the future.

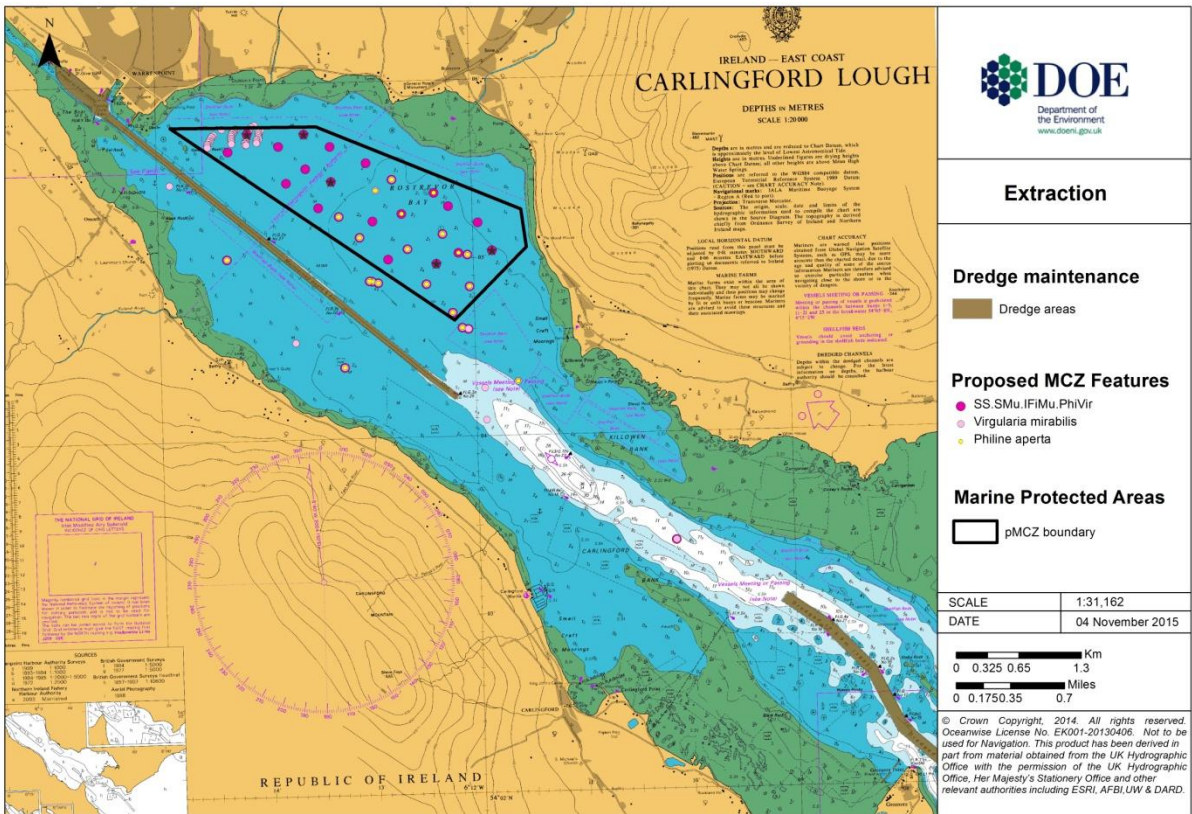


Figure 6 Location of maintenance dredging in relation to Carlingford Lough pMCZ

<p>Potential Management Options</p>	<p>Management measures are recommended to remove or avoid pressures associated with new dredge material disposal sites or the expansion/relocation of existing ones where they are likely to impact the pMCZ features. On-going maintenance dredging can continue within the existing licensed area.</p>
<p>Proposed way forward</p>	<p>The Department will continue discussions with the Harbour Authorities to develop appropriate management measures.</p>
<p>Relationship with existing Management Options</p>	<p>The Department is responsible for licensing dredging and disposal activities in the inshore region and DRD are the responsible authority for the offshore region of Northern Ireland.</p> <p>Ports and harbours with a Harbour Order or Local Act in place may be exempt from the requirement to obtain a marine licence to carry out dredging and/or disposal within the harbour limits.</p>

Marine traffic – Moorings and anchoring, ferry route, shipping/navigation

In Carlingford Lough, there is one mooring point at the south, four small mooring/anchorage areas and four unrestricted boat anchorage points. There is also a freight service ferry route that runs twice daily from Warrenpoint to Heysham (Lancashire); this crosses the Lough following the navigational channel.

Shipping and navigation in the area, shown in Figure 8, include container services (three times a week to Bristol and Cardiff) and other cargo vessels, fishing vessels, recreational vessels (sailing and motorboats) and vessels associated with dredging or underwater activities (including diving). The majority of large commercial shipping passes through the navigational channel to Warrenpoint Harbour. High speed shipping has the potential to generate a large wake which can cause, in shallow waters, sediment destabilisation and displacement of Sea-pens. The Lough has speed limits in place within the navigational channel, but the Department has received reports that these are not always adhered to and may require additional management measures to enforce this restriction.

There is overlap with the pMCZ and navigation of fishing vessels involved in aquaculture operations and sailing (recreation). Certain activities associated with these smaller fishing vessels and recreational boats, particularly during summer season, have the potential to damage Sea-pen and white sea slug communities inside the pMCZ through anchoring.

Sea-pen and white sea slug communities have moderate sensitivity to the following pressures associated with marine traffic: **Salinity changes, Wave exposure changes, Introduction or spread of non-indigenous species and translocations** (competition) and **surface abrasion/penetration** (anchoring or mooring). Another type of pressure associated with marine traffic is the boat maintenance and antifouling use, as it can cause damage to the proposed feature if used carelessly.

Anchoring or mooring activity associated with marine traffic within the pMCZ should be removed or avoided to aid in the continued achievement of the conservation objectives.

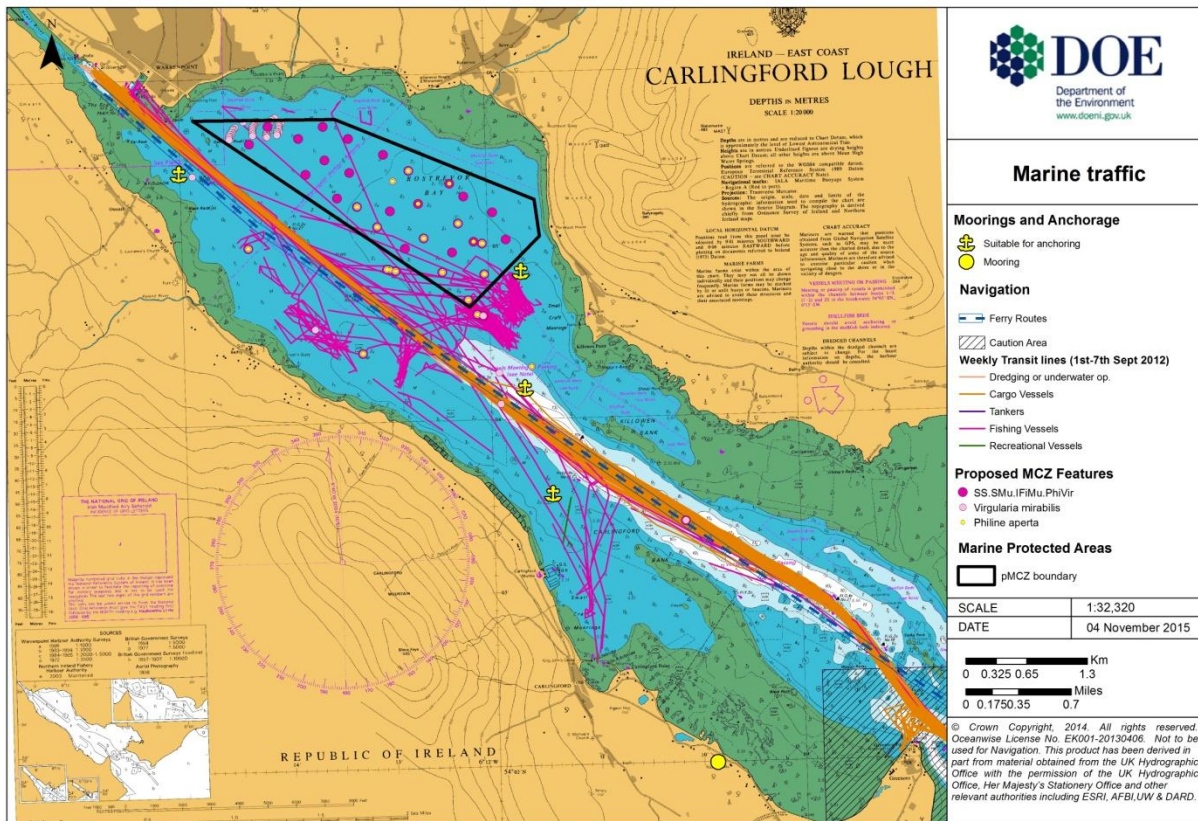


Figure 7 Location of Marine traffic in relation to Carlingford Lough pMCZ

<p>Potential Management Options</p>	<p>Management measures are recommended to remove or avoid pressures associated with current and future anchoring and mooring inside the boundary where they are likely to impact the pMCZ features.</p>
<p>Proposed way forward</p>	<p>The Department will continue discussions with those involved with marine traffic in Carlingford Lough to develop appropriate management measures.</p>
<p>Relationship with existing Management Options</p>	<p>Shipping industry is primarily regulated by the International Maritime Organization (IMO). The Maritime and Coastguard Agency (MCA) works closely with national and international partners in the shipping industry to promote the safe construction, operation and navigation of ships.</p> <p>Permanent moorings north of the dredged channel are usually licensed by the Crown Estate as owners of the seabed. However, unlicensed moorings are probably not known to the Crown Estate. Any new moorings will require a marine licence from the Department, except those within the Harbour limits which are the responsibility of the harbour authority.</p>

Tourism and Recreation – SCUBA diving, sailing, windsurfing, kayaking/canoeing, bird watching, recreational sea angling

There are numerous activities which tourists can partake in along the shores and waters of Carlingford Lough, i.e. walking, beaches/bathing, water sports, adventure centres, yachting, sea angling and bird watching.

An increase in the population of the local area due to tourism and recreational activities may lead to an increase in the quantity of sewage discharged or increased disturbance to natural features and wildlife within the Carlingford Lough area.

Walking is a popular recreational activity and has increased in popularity in recent years. Cranfield West Beach is popular with families and water sport enthusiasts and holds a Blue Flag due to its excellent water quality.

Water sports in the area include a coastal canoe trail (Killowen-Warrenpoint), windsurfing, pier jumping, SCUBA diving and sailing.

Sea angling occurs along the shoreline and from boats. Charter boat services are available from Warrenpoint, Carlingford and Greencastle. Spurdog and Dogfish are commonly caught while tope fishing is popular during the summer months.

Mill Bay and the shoreline between Greenore and Carlingford are prime spots for bird watching.

Waste can enter the Lough from recreational vessels. Carlingford Marina is the only tourism based marina in the Lough and has in place waste disposal arrangements to prevent the contamination of water from vessel waste.

The main pressures associated with tourism and recreation to which the pMCZ features are moderately sensitive are **underwater noise** and **surface abrasion** (from anchoring or mooring).

Figure 9 shows location of recreational activities in relation to the pMCZ. Although there is spatial overlap between some of the activities such as canoeing, they are unlikely to adversely impact the pMCZ due to the small scale of the activity. Any anchoring or mooring activity associated with recreational vessels should be removed or avoided within the pMCZ to aid in the continued achievement of the conservation objectives.

The risk of the conservation objectives not being met is considered to be low, and they could be met without the need to introduce additional management.

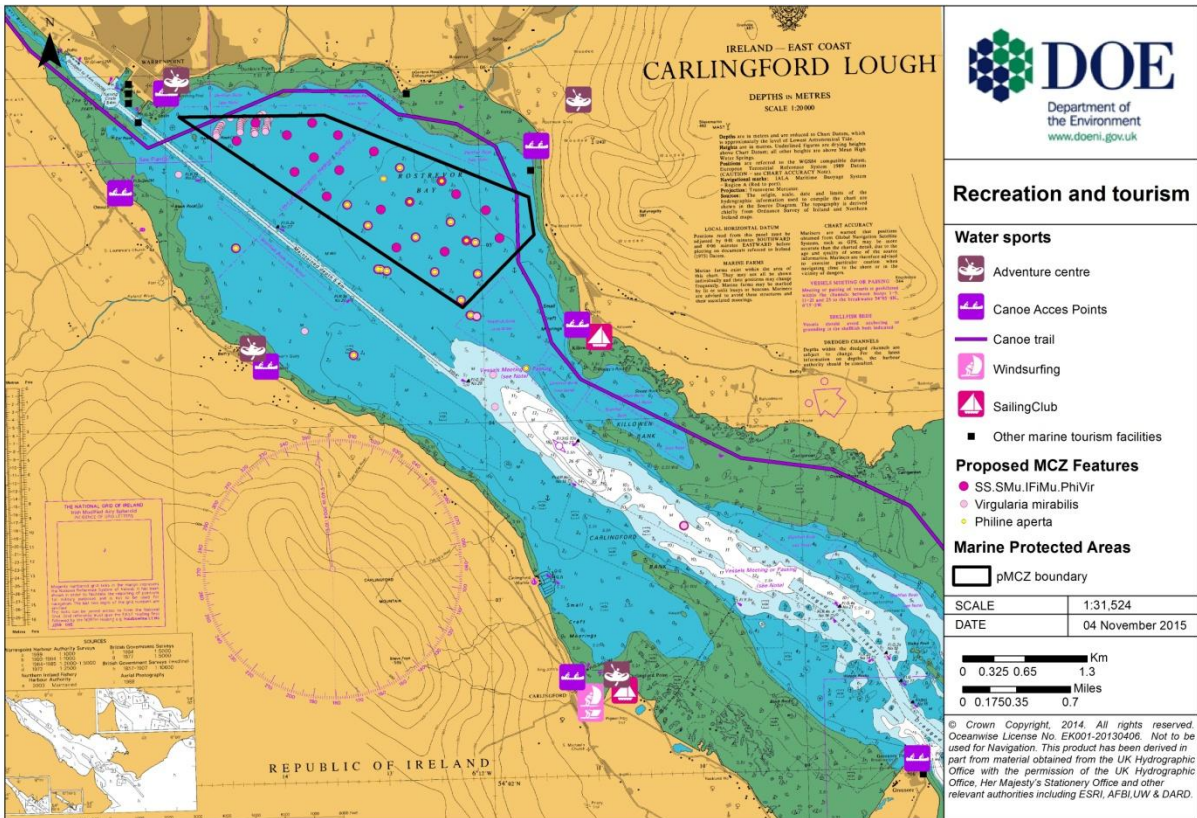


Figure 8 Location of Tourism and Recreation activities in relation to Carlingford Lough pMCZ

<p>Potential Management Options</p>	<p>Management measures are recommended to reduce or limit pressures associated with current and future anchoring or mooring inside the boundary where they are likely to impact the pMCZ features.</p>
<p>Proposed way forward</p>	<p>The Department will continue discussions with those involved with recreation and tourism in Carlingford Lough to develop appropriate management measures.</p>
<p>Relationship with existing Management Options</p>	<p>DETI is responsible for tourism policy while District Councils have a role in promoting local tourism and recreation.</p> <p>Management of fisheries within Carlingford Lough comes under the auspices of the Loughs Agency (British-Irish Agreement Act 1999, the Foyle Fisheries Act (NI) 1952 (as amended) and the Foyle Fisheries Act 1952). DCAL has a responsibility for arts and culture, sport, inland waterways and inland fisheries. Licences for angling (salmon and sea trout) are also issued by the DCAL.</p>

Scientific and Archaeological Activities - *Research and Monitoring*

Carlingford Lough is subjected to a variety of environmental monitoring programmes. The Joint Agency Monitoring Programme (Agri-food and Biosciences Institute (AFBI), Loughs Agency and the Department) deliver spatial water quality monitoring throughout Northern Ireland coastal waters as part of the Water Framework Directive classification programme. This is now a largely automated environmental monitoring system using moored monitoring stations/points (two in Carlingford Lough).

The Department, together with the National Museums of Northern Ireland (NMNI), completed a series of Sublittoral Dive Surveys (SSNI) to collect data on the distribution and condition of Northern Ireland Conservation Priority Species.

There are two recorded wrecks falling within Carlingford pMCZ boundary but their exact location needs to be confirmed. There are further wrecks assigned to the Rostrevor Bay area and, given the approximate nature of their location, they may fall within the MCZ boundary. Carlingford Lough has not been the subject of any concerted sub-tidal archaeological survey despite its archaeological potential.

Scientific and Archaeological activities may have the potential to cause the deterioration of the proposed features through **direct alteration, removal or manipulation of the species associated with the biotope.**

Strict guidelines and practices developed by JNCC for survey work seek to ensure that any impact on features is minimised to the lowest possible levels and that the conservation objectives can be achieved.

It is considered that the risk of not achieving the conservation objectives of the protected features is low since Scientific and Archaeological activities under the above mentioned surveys are performed by trained, qualified staff using non-invasive techniques such as acoustic and video methodologies. The Department will require the provision of detailed methodologies for all Scientific and Archaeological activities prior to these being carried out to assess if any impacts to the proposed features are likely to occur.

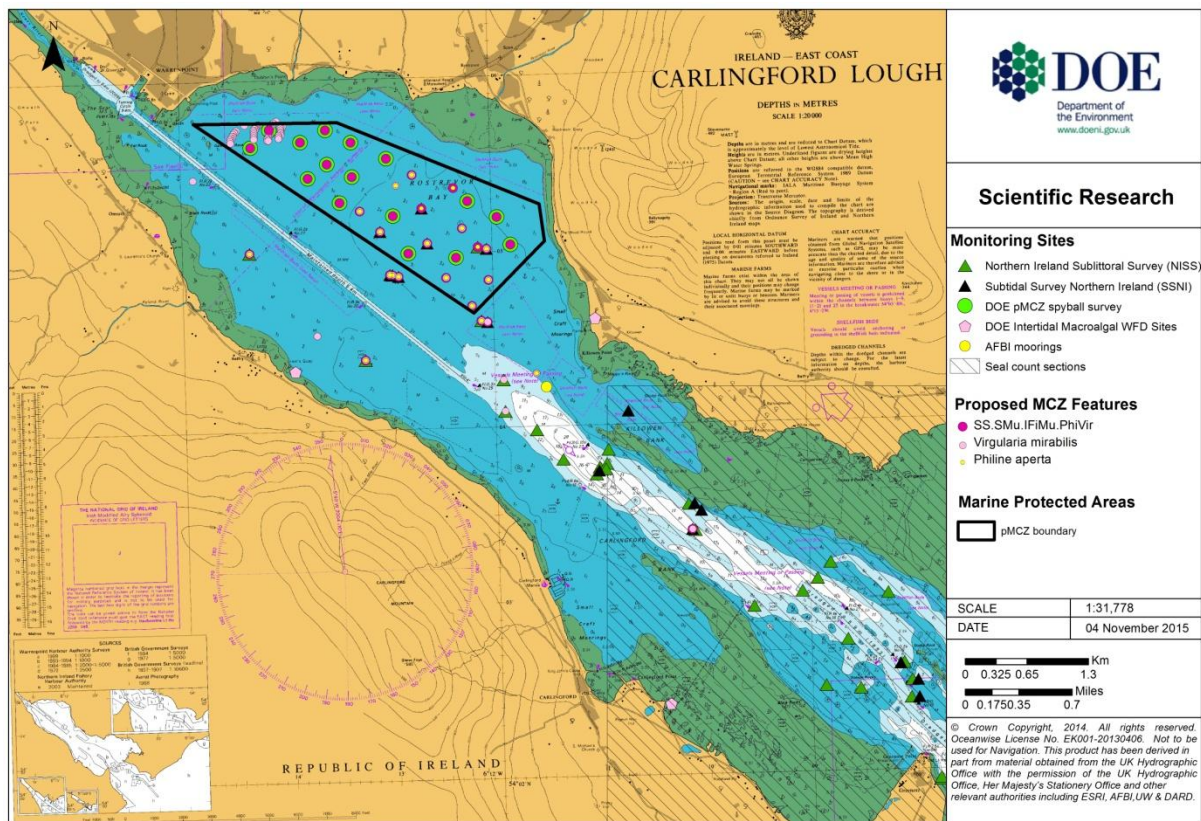


Figure 9 Location of Scientific research/monitoring in relation to Carlingford Lough pMCZ

<p>Potential Management Options</p>	<p>No additional management is required as Scientific and Archaeological activities are carried out following strict guidelines enforcing non-destructive sampling methods.</p>
<p>Proposed way forward</p>	<p>The pMCZ features will be monitored within a 6-yearly rolling cycle to assess biotope distributions and species abundances. This will determine whether the conservation objectives are being achieved.</p> <p>The Department will require the provision of detailed methodologies for all Scientific and Archaeological activities prior to these being carried out to assess if any impacts to the proposed features are likely to occur.</p>
<p>Relationship with existing Management Options</p>	<p>Delivered by the Department, DARD, Loughs Agency and AFBI under international, European and national legislation with marine components (Marine Strategy Framework Directive, Marine and Coastal Access Act (2009), The Marine Act (Northern Ireland) 2013 and OSPAR).</p>

Summary of potential Management Options

<p>Aquaculture: Shellfish.</p>	<p>Management measures are recommended to remove or avoid pressures associated with the development of new shellfish farms or the expansion of existing aquaculture areas where they are likely to impact the pMCZ features.</p> <p>Management measures are recommended to reduce or limit pressures associated with existing shellfish farms where they are likely to impact the pMCZ features. An appropriate buffer zone between the pMCZ features and the two adjacent aquaculture sites was set to reduce the effects of sedimentation and organic enrichment. This buffer zone was considered during the development of the pMCZ boundary.</p>
<p>Fishing: Creels.</p>	<p>At present no additional management is required. However, if in the future, levels of fishing with pots/creels were to increase management measures would be recommended to reduce or limit pressures where they are likely to impact the pMCZ features.</p> <p>Management measures are recommended remove or avoid pressures associated with mobile gear fishing where this is likely to impact the pMCZ features.</p>
<p>Infrastructure: Commercial ports Northern Ireland and the Republic of Ireland,</p> <p><i>Commercial ports, Marinas,</i></p> <p><i>Coastal defence and land claim.</i></p>	<p>Management measures are recommended to reduce or limit pressures associated with Warrenpoint Harbour Authority jurisdiction where they are likely to impact the pMCZ features. This includes both existing and new activities.</p> <p>Management measures are recommended to remove or avoid pressures associated new developments where they are likely to impact the pMCZ features.</p> <p>Management measures are recommended to reduce or limit pressures associated with new coastal defences or the expansion of existing ones where they are likely to impact the pMCZ features.</p>
<p>Discharges/Waste disposal:</p> <p><i>Waste water treatment works & outfalls.</i></p>	<p>Management measures are recommended to remove or avoid pressures associated with new waste water discharges as well as the expansion or relocation of</p>

	existing waste water sites where they are likely to impact the pMCZ features.
Extraction: Navigational dredging.	Management measures are recommended to remove or avoid pressures associated with new dredge material disposal sites or the expansion/relocation of existing ones where they are likely to impact the pMCZ features. On-going maintenance dredging can continue within the existing licensed area.
Marine traffic: <i>Moorings and Anchoring,</i> <i>Shipping/Navigation,</i> <i>Ferry route.</i>	Management measures are recommended to remove or avoid pressures associated with current and future anchoring and mooring inside the boundary where they are likely to impact the pMCZ features. No additional management is required. No additional management is required.
Tourism and Recreation: <i>SCUBA Diving, sailing, windsurfing, kayaking/canoeing, bird watching, recreation fishing.</i>	Management measures are recommended to reduce or limit pressures associated with current and future anchoring or mooring inside the boundary where they are likely to impact the pMCZ features.
Scientific and Archaeological Activities: <i>Monitoring and Research.</i>	No additional management is required as Scientific and Archaeological activities are carried out following strict guidelines enforcing non-destructive sampling methods.

Data Sources and Bibliography

Aish, A., Johnston, C., Turnbull, C. 2008. Identifying OSPAR Threatened and/or Declining species and habitats for which are abased protection may be appropriate in the UK and the contribution that Natura sites make to their protection. MASH 05/5/Info.2-E. Agenda item 5.

Ambroso, S., Dominguez-Carrio, C., Grinyo, J., Lopez-Gonzalez, P.J., Gili, JM., Purroy, A., Requena, S. And Mardurell, T. 2013. In situ observations on withdrawal behaviour of the sea pen *Virgularia mirabilis*. Mar Biodiversity DOI 10.1007/s12526-013-0172-5. Senckenberg.

Anon. 1992. An experimental study on the impact of clam dredging on soft sediment macroinvertebrates. (Contractor: Southern Science, Hampshire Laboratory, Otterbourne, Hants.). Unpublished report to English Nature. (English Nature Research Report, No. 13), Peterborough.

Bell, E., Brennan, R., Nickell, T., Potts, T., Valcic, B., Wilson, H. 2011. Making the case for the sound management of Marine Protected Areas by Scottish Association for Marine Science. Published by Scottish Environment LINK.

Boyd, A. and Service, M. 2013. Cumulative impact assessment: Aquaculture activities within and adjacent to Natura 2000 designated sites in Carlingford Lough. AFBI Fisheries and Aquatic Ecosystems Branch for DARD Fisheries and Environment Division.

Brennan, A. Revised / Updated - Carlingford Lough Pollution Reduction Programme. Characterisation Report Number IV.

Cronin, M., McGovern, E., McMahon, T. & Boelens, R. Guidelines for the assessment of dredge material for disposal in Irish waters. 2006. Marine Environment and Health Series, No. 24, 2006. ISSN NO: 1649-0053

Edwards, E. 1997. Molluscan fisheries in Britain. In The History, Present Condition, and Future of the Molluscan Fisheries of North and Central American and Europe, vol. 3, Europe, (ed. C.L. MacKenzie, Jr., V.G. Burrell, Jr., Rosenfield, A. & W.L. Hobart). National Oceanic and Atmospheric Administration, NOAA Technical Report NMFS 129.

Eno, N.C., MacDonald, D. and Amos, S.C. 1996. A study on the effects of fish (Crustacea/Molluscs) traps on benthic habitats and species. Final report to the European Commission. Study Contract, no. 94/076.

FEAST website (Feature Activity Sensitivity Tool)

<http://www.marine.scotland.gov.uk/FEAST/Index.aspx>

Greathead, C., Donnan, D. W. And Mair, J.M. 2005. Impact of *Nephrops* trawling on the distribution of the sea pens *Vigularia mirabilis*, *Pennantula phosphorea* and *Funiculina quadrangularis* in Scottish waters. Fisheries Research Services internal report M0 02/05.

Greathead, C., Gonzalez-Irusta, C., Boulcott, P., Blackadder, L. Weetmean, A., and Wright, P. J. 2014. Environmental requirements for three Sea-pen species: relevance to distribution and conservation. – ICES Journal of Marine Science, doi:10.1093/icesjms/fsu129.

Hiddink, J.G. 2003. Effects of suction-dredging for cockles on non-target fauna in the Wadden Sea. Journal of Sea Research, 50: 315–323.

Hoare, R., Wilson, E.H. 1977. Observations on the behaviour and distribution of *Virgularia mirabilis* O.F. Müller (Coelenterata: Pennatulacea) in Holyhead Harbour, Anglesey, in: Keegan, B.F. et al. (Ed.) (1977). Biology of Benthic Organisms: 11th European Symposium on Marine Biology, Galway, October 1976. pp. 329-337.

Hughes, D.J. 1998. Sea pens and burrowing megafauna (vol. III): an overview of dynamics and sensitivity characteristics for conservation management of Marine SACs. Scottish Association of Marine Science (UK Marine SAC's Project), 105 pp.

Kaiser M.J., Clarke, K.R., Hinz, H., Austen, M.C.V., Somerfield P.J. and Karakassis, I. 2006. Global analysis of response and recovery of benthic biota to fishing. Marine Ecology Progress Series, 311: 1–14.

Kinnear, J.A.M., Barkel, P.J., Mojeiwicz, W.R., Chapman, C.J., Holbrow, A.J., Barnes, C. and Greathead, C.F. 1996. Effects of *Nephrops* creels on the environment. Fisheries Research Services Report No. 2/96. Available from <http://www.scotland.gov.uk/Uploads/Documents/frsr296.pdf>

McGonigle, C., Mclean, S. and Santiago, R. 2012. Carlingford Lough Status Report 2011. The Loughs Agency (Foyle Carlingford and Irish Lights Commission) Report Reference LA/ESR/002/11.

OSPAR Commission. 2010. Background document for Sea-pen and Burrowing megafauna communities. Biodiversity series.

Sewell, J. and Hiscock, K. 2005. Effects of fishing within UK European Marine Sites: guidance for nature conservation agencies. Report to the Countryside Council for Wales, English Nature and Scottish Natural Heritage from the Marine Biological Association. CCW Contract FC 73-03-214A. 195 pp.

Taylor, J., Charlesworth, M. and Service, M. 1999. Nutrient Inputs and Trophic Status of Carlingford Lough. The Queen's University of Belfast and DARD

ANNEX I

Conservation Objectives for Carlingford Lough pMCZ

In general the conservation objectives for Carlingford Lough pMCZ are that the protected features:

- where they are already in *favourable condition*, remain so, and
- where they are not in *favourable condition*, are brought into such condition and remain so.

Favourable Condition is defined as ‘the target condition for an interest feature in terms of the abundance, distribution and/or quality of that feature within the site. With respect to a marine habitat, *favourable condition* means that its extent is stable or increasing and its structures and functions, quality and the composition of its characteristic biological communities are in a condition which is healthy and not deteriorating. Characteristic biological communities include reference to the diversity and abundance of marine species (both flora and fauna) forming part of, or inhabiting that habitat. Any temporary deterioration in condition is to be disregarded if the marine habitat is sufficiently healthy and resilient to enable its recovery from such deterioration.

The conservation objectives have been drafted for the pMCZ features of Subtidal (sublittoral) mud and Sea-pen and white sea slug communities but particular reference is given to associated community features to which the conservation objective also applies. The purpose of this is to provide some reference points, against which the success of the conservation objectives and the management plan can be measured.

By monitoring attributes of these features and sub-features, which have been identified to provide an indication of the condition of the feature, it should be possible to identify trends or changes in these habitats and whether or not these changes are natural or caused by human activities. This monitoring is essential in order to ensure that these habitats are being kept in (or restored to) favourable condition, the condition in which the habitat or species is capable of sustaining itself on a long-term basis.

Conservation Objective 1

To maintain¹ the Subtidal mud in *favourable condition*, taking account of natural change such that:

- The natural environmental quality² is maintained
- The natural environmental processes³ are maintained
- The extent⁴, diversity⁵, community structure⁶ and typical species⁷ representative of the habitat are maintained.

Conservation Objective 2

To maintain¹ the Sea-pen and white sea slug communities in *favourable condition*, taking account of natural change such that:

- The natural environmental quality² is maintained
- The natural environmental processes³ are maintained
- The extent⁴, diversity⁵, community structure⁶ and typical species⁷ representative of the habitat are maintained.

Explanation of terms used in the Conservation Objectives

1. *Maintain or Recover/restore*

Maintain implies that the feature is in favourable condition and will, subject to natural change, remain at its condition at designation. Any existing activities are deemed to be sustainable and will not adversely affect the condition of the feature *if current practices are continued at current levels*.

Recover/restore implies that the feature is degraded to some degree and that activities will have to be managed to reduce or eliminate negative impact(s). Restoration in the marine environment can refer to natural recovery through the removal of unsustainable physical, chemical and biological pressures, as well as intervention.

2. *Natural environmental quality*

e.g. chemical quality parameters of water, suspended sediment levels, radionuclide levels etc. should not deviate from baseline at designation (if available) or reference conditions.

3. *Natural environmental processes*

e.g. circulation, sediment deposition and erosion etc. should not deviate from baseline at designation (if available) or reference conditions.

4. *Extent*

The area covered by the habitat and communities

5. *Diversity*

The number of different biological species and communities

6. *Community structure*

e.g. age classes, sex ratios, distribution of species, abundance, biomass, reproductive capacity, recruitment, range and mobility.

7. *Typical species*

See Annex II

Monitoring Priorities

Monitoring will add to the existing baseline of information and where appropriate, existing survey work will be repeated in order to ensure that it conforms to the agreed monitoring methods.

The following table (Table 1) outlines the various types of monitoring that the Department considers are necessary in order to be able to assess the 'condition' of the MCZ's interest features (habitats and species). By monitoring various aspects or attributes of these features, it is possible to build up a picture of what is happening to the site and whether or not there needs to be changes made to the ways in which it is managed. The aim is to ensure that the interest features remain in (or restored to) a favourable condition which can be said to occur when the target for each attribute is reached.

Table 1 Favourable condition table for Carlingford Lough pMCZ

Feature	Sub-Feature	Attribute	Measure	Target	Comments
Subtidal mud		Extent	Area (ha) measured periodically (frequency to be determined).	No decrease in extent from an established baseline subject to natural change.	Extent of feature provides a long-term integrated measure of environmental conditions. Reduction in extent may indicate long term changes in the physical conditions influencing the feature.
		Sediment character	Particle size analysis (PSA). Parameters include percentage mud/silt/gravel, mean and median grain size, and sorting coefficient used to characterise sediment type. Sediment character to be measured during summer, once per reporting cycle.	Average PSA parameters should not deviate significantly from an established baseline, subject to natural change.	Sediment character defined by particle size analysis is key to the structure of the feature and reflects all of the physical processes acting on it. Particle size composition varies across the feature and can be used to indicate spatial distribution of sediment types this reflecting the stability of the feature and the processes supporting it.
	Sea-pen and white sea slug communities	Distribution of Sea-pen and white sea slug communities habitat	Distribution of the biotope SS.SMu.IFiMu.PhiVir measured once during the reporting cycle.	This habitat should be present in those areas of the Lough where they currently occur.	Baseline survey required. The density of <i>Philine aperta</i> can be highly variable and this should be considered when carrying out the survey. Changes in presence may indicate long term changes in the physical conditions at the site.

Feature	Sub-Feature	Attribute	Measure	Target	Comments
		Extent and percentage cover of Sea-pen and white sea slug communities habitat.	Extent and percentage cover occupied by the biotope SS.SMu.FiMu.PhiVir measured once during the reporting cycle.	No decrease in extent or percentage cover from an established baseline, subject to natural change.	Baseline survey required. Changes in extent and percentage cover may indicate long term changes in the physical conditions at the site.
	Subtidal mud communities	Characteristic biotopes at sites chosen so as to provide some indication of the distribution and extent of the sub-feature.	Presence of selected biotopes at selected sites measured once during the reporting cycle.	Presence of selected biotopes should not deviate significantly from an established baseline, subject to natural change.	Species composition is an important contributor to the structure of the biotopes within the sub-feature. The presence and relative abundance of characterising species gives an indication of the quality of the biotopes and change in composition may indicate cyclic change/trend or long-term changes in the physical conditions at the site.
		Species composition of characteristic biotopes at monitoring sites.	Presence and abundance of composite species, measured during summer, once per reporting cycle.	Presence and abundance of composite species should not deviate significantly from an established baseline, subject to natural change.	Species composition is an important contributor to the structure of the biotopes within the sub-feature. The presence and relative abundance of characterising species gives an indication of the quality of the biotopes and change in composition may indicate cyclic change/trend or long-term changes in the physical conditions at the site.

ANNEX II

Priority Marine Features (PMFs)

Table 1 List of Priority Marine Features recorded within or adjacent (40 m) to the pMCZ.

Habitats
Subtidal mud
Sea-pen and white sea slug communities



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Photos represent PMF features found
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