

CONSERVATION OBJECTIVES AND POTENTIAL MANAGEMENT OPTIONS

Outer Belfast Lough Proposed Marine Conservation Zone (pMCZ)

Ocean quahog (*Arctica islandica*)



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Summary

This document provides information on the various uses and activities occurring within Outer Belfast 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 possible 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 along with the features vulnerability assessment and the conservation objectives of the pMCZ feature. The management options will only consider those activities assessed as capable of affecting the features of the pMCZ, based on the risk of damage assessment.

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 Outer Belfast Lough pMCZ and proposed features 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 Outer Belfast Lough proposed Marine Conservation Zone (pMCZ)
- Data Confidence Assessment for Outer Belfast Lough proposed Marine Conservation Zone (pMCZ)
- Site Summary Document for Outer Belfast 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

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

Circalittoral – the subzone of the rocky sublittoral dominated by animals. No lower limit is defined but species composition changes below about 40m to 80m depth

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 – a subzone of the sublittoral in which upward facing rocks are dominated by erect algae, typically kelp species

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 an 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 NI inshore region

pMCZ - Proposed Marine Conservation Zone

pMCZ Feature - proposed Marine Conservation Zone features that will underpin the MCZ designation

RNLI - Royal National Lifeboat Institution

SPA - Special Protection Area, designated under the Birds Directive

SSNI - Sublittoral Survey Northern Ireland

Subtidal (sublittoral) – the zone exposed to air only at its upper limit by the lowest spring tides. The sublittoral extends from the upper limit of the large kelps and includes for practical purposes in nearshore areas, all depths below the littoral

UKHO - United Kingdom Hydrographic Office

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

Belfast Lough is a large sea inlet situated at the mouths of the Lagan, Farset and Blackstaff Rivers on the eastern coast of Northern Ireland. Outer Belfast Lough is an exposed area as it opens into the North Channel and connects Belfast to the Irish Sea. Home to a variety of species, the Outer Lough encompasses a wide range of habitats including subtidal mixed sediment types, sediment dominated bays and rocky shores.

The proposed MCZ (pMCZ), located at the mouth of the Lough, is a small area (5.76km²) positioned close to the southern shore of Belfast Lough (north of Groomsport) (see Figure 1). The pMCZ contains dense populations of the long-lived Ocean quahog (*Arctica islandica*). The subtidal gravelly muddy sand in the area provides an ideal substrate for the low mobility species that live buried in the sediment.

Outer Belfast Lough is impacted by human activity with a rapidly growing commercial sector and booming leisure activities. Belfast Harbour is Northern Ireland's largest port with significant passenger and freight traffic. Fisheries in the area include bottom culture of mussels, scallop dredging, whelk creels and crab/lobster potting. Popular for sailing, the Outer Lough has several yacht clubs, marinas and mooring areas, in addition to unrestricted anchoring of commercial shipping close to the pMCZ. The Lough also hosts national and international sailing events. The Belfast Maritime Rescue Co-ordination Centre is located in the Bangor marina alongside Bangor Royal National Lifeboat Institution (RNLI) Lifeboat Station. Clochan Jetty, on the north shore, is a large deepwater oil reception area and is close to the Irish Salt Mines discharge jetty. Carrickfergus Harbour has in recent years declined in commercial activities, replaced generally by the leisure market. Both sporting and nature enthusiasts use the area for cruising, recreational fishing, SCUBA diving, kayaking, windsurfing, wildfowling and bird watching activities.

Nearby, areas of Outer Belfast Lough are designated as an Area of Special Scientific Interest (ASSI) (intertidal area only), Special Protection Area (SPA) and RAMSAR site.

Further information on the pMCZ can be found in the Site Summary Document.

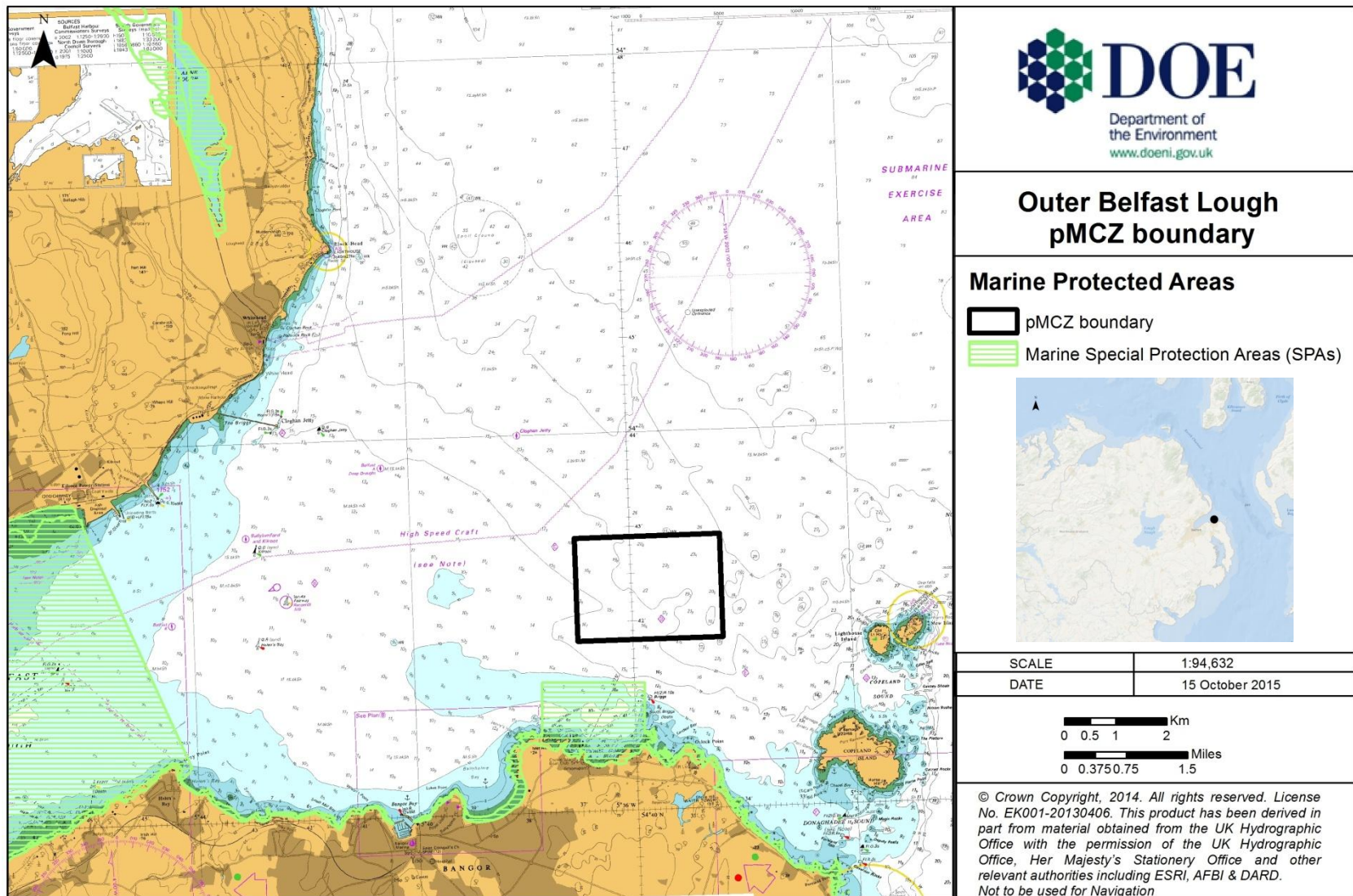


Figure 1 Location of proposed boundary of Outer Belfast Lough pMCZ

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

Outer Belfast Lough has been proposed as a potential MCZ as it supports a well established population of **Ocean quahog (*Arctica islandica*)** (4.5 individuals/m²) and their associated habitat **Subtidal (sublittoral) sand**.

There are also Priority Marine Features (PMFs) present within and adjacent to the pMCZ boundary (such as sea-pens and burrowing megafauna and subtidal mixed sediments). 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.

Habitats

The pMCZ habitat feature, **Subtidal (sublittoral) sand**, is a broad habitat that consists of mixed sediments such as gravels, muds and fine sands on a sandy seabed (the biotope for this habitat is [SS.SMx](#)). This heterogeneous habitat within the pMCZ includes examples of both circalittoral and infralittoral fine sand (EUNIS codes A5.25 and A5.23) and circalittoral and infralittoral muddy sand (A5.26 and A5.24). The varied nature of the seabed within the pMCZ supports a wide range of species, such as hydroids and juvenile King scallops (*Pecten maximus*).

The location and extent of the habitat within the pMCZ boundary is shown in Figure 2. This map shows the predictive habitat model for the area (JNCC, EUNIS code Level 2) as well as

the location of grab sample sites (Department of the Environment (DOE) North Channel Disposal Grounds - Monitoring Programme 2008-2013; Marine and Coastal Access Act (MCAA) survey (grab survey) 2012; and Agri-food and Biosciences Institute (AFBI) video tows and grab cruise reference CO0715, 2015). Survey work carried out in 2015 confirmed the sediment types enabling a boundary to be drawn (DOE Outer Belfast Lough pMCZ spyball and diving survey 2015). The area has also been the subject of research studies by Bangor University, Wales with data published in peer reviewed scientific papers.

As Subtidal (sublittoral) sand in Outer Belfast Lough pMCZ is currently in unfavourable condition, the Department recommends that the **conservation objective is set to recover this feature to favourable condition.**

Low mobility species

The pMCZ species feature, the **Ocean quahog (*Arctica islandica*)**, is a large, slow-growing bivalve mollusc, which lives buried in muddy and sandy sediments usually at around 20m depth. The Outer Belfast Lough population has been found to have high numbers in a very restricted area with specimens up to 220 years old.

Outer Belfast Lough was surveyed by Bangor University during several research cruises (2005, 2008 and 2010); Ocean quahog was only located in the area subsequently selected as a pMCZ. Survey work carried out in 2015 confirmed the presence of Ocean quahog (DOE Outer Belfast Lough pMCZ spyball and diving survey 2015 and AFBI cruise CO0715 – video tows and grab survey 2015). The location and extent of the pMCZ is shown in Figure 2. This map shows individual records of the Ocean quahog collected from different surveys (Sublittoral Survey Northern Ireland; DOE North Channel Disposal Grounds Monitoring Programme 2008-2013; DOE Belfast grab survey 1990-2004 and Bangor University Ocean quahog survey 2008).

Ocean quahog is currently listed on the OSPAR List of Threatened and/or Declining Species and Habitats but is not considered Threatened and/or Declining in the region in which the pMCZ is located, OSPAR Region III, (OSPAR agreement 2008-6; OSPAR, 2009). It is also a Nationally Important Marine Feature (NIMF).

As the Ocean quahog in Outer Belfast Lough pMCZ is currently in unfavourable condition, the Department recommends that the **conservation objective is set to recover this feature to favourable condition.**

Their conservation status has been determined on the basis that damaged individuals show a slow population recovery which may be due to slow growth rates and irregular recruitment.

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 location of various activities in relation to Outer Belfast Lough pMCZ.

The Subtidal (sublittoral) sand habitat is thought to be present across the entirety of the pMCZ, and so for simplicity, this habitat has not been included on Figures 3-9.

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.

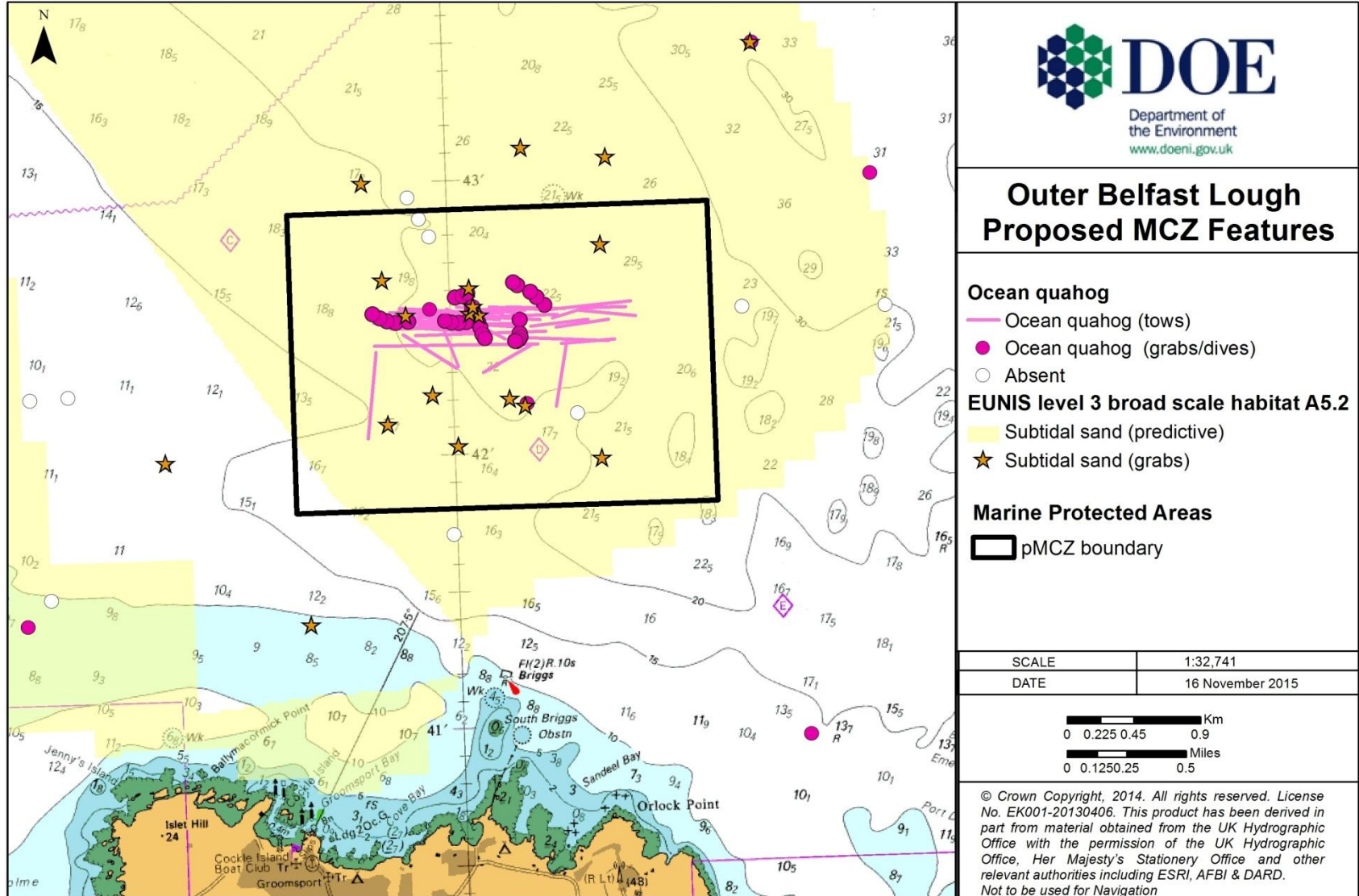


Figure 2 Distribution of the pMCZ features in Outer Belfast Lough

Activities and Potential Management Options in Outer Belfast Lough

Table 1 lists the activities that have the potential to affect Outer Belfast Lough pMCZ. This list has been generated based on activities that are current, historical or 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. 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 Outer Belfast Lough pMCZ features

Type of activity	Activities
Fishing	Creels (static gear) Scallop dredging (mobile gear) Bottom culture of mussels Cockle dredging
Potential Energy production	Tidal resource zone
Infrastructure	Commercial ports Marinas Coastal defence and land claim Submarine cables: telecommunications
Discharges/waste disposal	Waste water treatment works & outfalls Dredge disposal
Marine traffic	Moorings Boat anchoring Ferry routes Shipping/navigation
Tourism and Recreation	SCUBA diving Sailing Wind/kite surfing Kayaking/canoeing Wildfowling Bird watching Recreational fishing Bait-digging
Scientific and Archaeological activities	Research Monitoring Fish stock assessment

Fishing – Creeling and pots, scallop dredging and potential fisheries

Outer Belfast Lough is fished by static gear: pots/creels for lobsters (*Homarus gammarus*), crabs (*Cancer pagurus* and *Necora puber*) and buckie or common whelk (*Buccinus undatus*) and mobile gear: scallop dredging (*P. maximus*). Outer Belfast Lough is considered to be a productive area for crabs while the scallop fishery operating out of Bangor is gaining importance in Northern Ireland with increasing landings in the past few years. Within Inner Belfast Lough there is a significant bottom culture of mussels industry. Although a cockle fishery (using dredges) operated in 2009, landing 66 tonnes, due to a lack of recruitment in Inner Belfast Lough no further fisheries have taken place (AFBI, 2013).

Although currently there is no Ocean quahog exploitation in UK waters, this fishery/industry may be considered in the future. The Ocean quahog is harvested commercially as a food source using a hydraulic clam dredge in United States, Canada, Norway and Iceland. There is also a small market for Ocean quahog as a bait species in these countries.

Figure 3 shows the overlap between commercial fishing in the area and the pMCZ. This map shows fishing interests zones (DARD) and fishing density in Outer Belfast Lough (Vessel Monitoring System, 2011). Until recently VMS was only applied to vessels of 15m and above, however, this size category has now been reduced to 12m.

The Subtidal (sublittoral) sand habitat has a high vulnerability to fishing pressures and is likely to sustain damage as a result fishing activities. It is not currently known what the true fishing effort on the site is. However, evidence from side-scan sonar shows that scallop dredging has occurred on this site at high intensity within the pMCZ boundary (refer to Assessment against the MCZ Selection Guidelines for Outer Belfast Lough pMCZ, guideline 2d). This activity impacts the habitat by **surface abrasion** and **species removal** resulting in a degraded benthic community. In addition, impacts of fishing tend to be greater in areas of muddy sands and sand in deeper water, both of which are considered to have a high sensitivity to some mobile bottom gear. Subtidal sand has been reported to be highly sensitive to hydraulic dredging through **changes in seabed type** or sediment removal.

The main threats to Ocean quahog associated with commercial fisheries are disturbances to its habitat. Moreover, this species is susceptible to **surface abrasion** and **removal of species** (target species in the case of hydraulic dredging and non-target species for the other fishing activities in the area) with low to moderate sensitivities to static gear (creeling and potting), moderate to high to scallop dredging, and moderate to high to quahog hydraulic dredging.

As Ocean quahogs live buried in the sediment, surface abrasion and removal of non-target species are unlikely to adversely affect the pMCZ features.

There is no site specific evidence available on the effects of shellfish dredging. However, the physical effects of dredging on seabed sediments are detrimental. Although Ocean quahog

burrows into the sediment, certain types of fishing have the potential to displace or damage individuals. Dredging in the area will likely remove a large proportion of the population and/or cause damage to the shells and body.

Hydraulic gears penetrate sediments more deeply than other gears and so could be expected to cause a greater mortality, particularly where Ocean quahog is the target species (although there is no known direct exploitation of the species in this country). Currently hydraulic dredging is prohibited throughout Northern Ireland.

Mobile fishing should be avoided within the pMCZ boundary to aid the continued achievement of the conservation objectives.

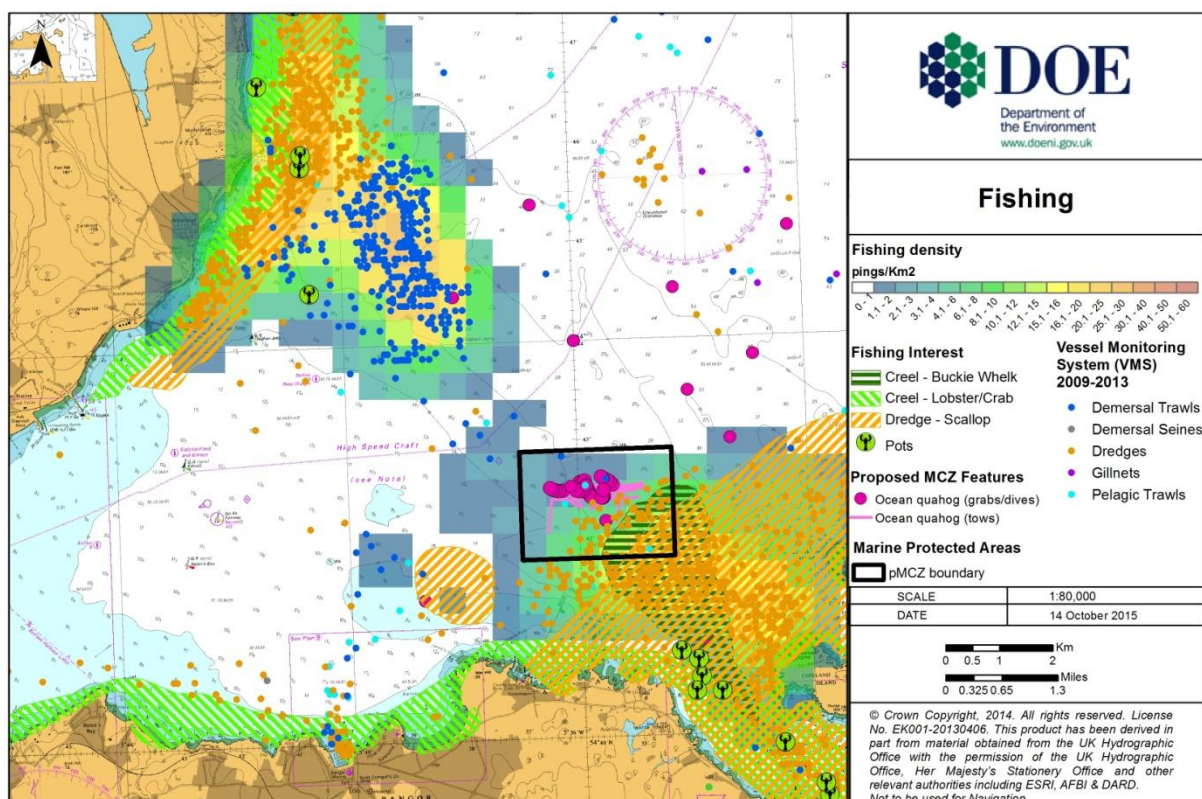


Figure 3 Location of Commercial fisheries in relation to Outer Belfast Lough pMCZ

<p>Possible Management Options</p>	<p>Management measures are recommended to reduce or limit pressures associated with static fishing gear (creels and pots) where they are likely to impact the pMCZ features.</p> <p>Management measures are recommended to remove or avoid pressures associated with mobile fishing gear (scallop dredging) where they are likely to impact the pMCZ features.</p> <p>Management measures are recommended to remove or avoid pressures associated with mobile fishing gear (potential quahog hydraulic dredging) where they are likely to impact the pMCZ features.</p>
<p>Proposed way forward</p>	<p>DARD will be responsible through regulations for the development of fisheries management measures to protect 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>DARD is responsible for fisheries regulations in Outer Belfast Lough. Sea fishing is governed largely by the Reformed Common Fisheries Policy (CFP) 2013.</p>

Energy production – Tidal resource zone

At present there are several renewable energy test site trials within Northern Ireland's waters. In addition, a number of studies have identified new key areas of potential energy resources (resource zones) in Northern Ireland.

A possible small scale Test and Demonstration Tidal Resource Zone was identified around the Copeland Islands. There are currently no tidal development plans in this area.

Figure 4 shows the spatial extension of the Copeland Island tidal resource zone (DETI SEA report) and the pMCZ. Currently there is no overlap with the pMCZ, however the future development of a tidal infrastructure in the proximity of the pMCZ and the pressures associated with the tidal turbine activity, installation and operations, may pose a risk on the achievement of conservation objectives for the proposed site.

The proposed features Subtidal (sublittoral) sand habitat and the Ocean quahog are sensitive to the following pressures that could happen in the area: **structural abrasion, water flow (tidal current) changes, synthetic compound contamination and changes in the seabed.**

Habitats Regulations Assessments (HRA) and the SEA report (Strategic Environmental Assessment, DETI, 2009) show that activities associated with energy production may result in the removal or disturbance of the sediment and these could have significant adverse effects on sensitive benthic habitats and species. Additionally, the highly vulnerable Ocean quahog juveniles and larvae, as well as the food supply along the water column, could be affected by flow changes and increased wave action. However, with mitigating actions taken at the EIA/Projects stage these impacts would be reduced.

On the basis of the location of the Tidal Resource Zone at the Copelands, which is 1.5km from the pMCZ, it is considered that the risk of not achieving the conservation objectives for the proposed features is low.

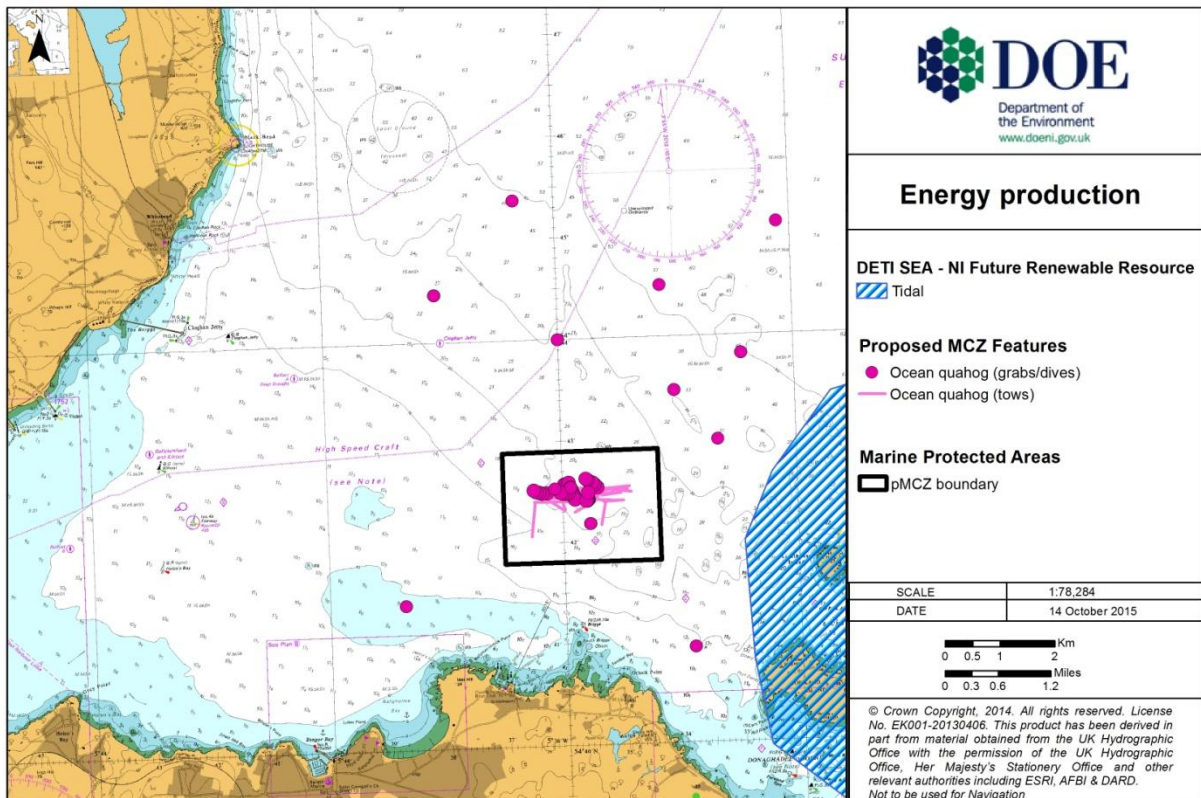


Figure 4 Location of potential Energy production areas in relation to Outer Belfast Lough pMCZ

<p>Possible Management Options</p>	<p>No additional management is required at present; however management measures will be recommended to remove or avoid pressures associated with future development of tidal energy activities where they are likely to impact the pMCZ features.</p>
<p>Proposed way forward</p>	<p>Any new development for renewable energy production will require a licence from The Department who will consider any potential impacts on the pMCZ.</p>
<p>Relationship with existing Management Options</p>	<p>The Department is the marine licensing authority for the NI inshore region.</p> <p>DETI is the consenting authority for the construction and operation of electricity generation installations.</p> <p>The Crown Estate has an interest as the seabed and subsurface owner and leasing authority.</p>

Infrastructure – Commercial ports, harbours and marinas, coastal defence and land claim and submarine telecommunication cables

Belfast Harbour is a major commercial port in Northern Ireland with a growing industry (ship maintenance and a Wind Energy supply facility) and increased shipping movements. The port is also Northern Ireland's leading logistics and distribution hub and is home to several businesses. The port has a large capacity with important infrastructure and consideration has been given to an extension. Additionally, in recent years there has been an increase in cruise ship visits and more regular visits by MoD vessels. Events such as the Tall Ships and other maritime tourism events are also likely to increase into the future.

There are also three marinas in the Lough close to the pMCZ: Groomsport Marina, which is a small harbour, Ballyholme Yacht Club and Bangor Marina. Due to the distance from the Belfast Harbour and the marinas any development to these is unlikely to affect the pMCZ.

Coastal defences and land reclaim are localised management practices used to reduce the impact of coastal erosion. In Outer Belfast Lough there is natural and hard coastal reinforcement on both shores along the mouth of Belfast Lough. The pMCZ is over 3km offshore and unlikely to be impacted by the development of new coastal defences.

Infrastructure within or adjacent to the pMCZ is shown in Figure 5. There are four submarine communication cables present within the wider area, two of which cross Outer Belfast Lough. There is no spatial conflict between the infrastructure in the area and the proposed boundary. However, the construction, operations and maintenance of structures close to the area have the potential to cause damage to the proposed features. Specifically, the operations related with submarine cables (Ardrossan to Carrickfergus telecommunications cable, around 600m distance to the pMCZ) or new installations, could affect the proposed features due to the proximity to the boundary.

The main pressures linked to infrastructure operations in the area to which Ocean quahog and Subtidal (sublittoral) sand have high sensitivity are: **physical change to another seabed type, physical removal** (extraction of substratum), **surface abrasion/penetration, non-synthetic compound contamination** (inc. heavy metals, hydrocarbons, and produced water), **synthetic compound contamination** (inc. pesticides, antifoulants, and pharmaceuticals) and **water flow changes** (due to obstructions).

The main identified risks which can occur as a result of the existing infrastructure operation, are habitat changes and loss, and direct damage to the individuals. In addition, the construction of new infrastructures may affect the local hydrodynamic and sediment transport regimes altering the sandy sediment and leading to a loss of characteristic species.

In the past it may have been common practice to conduct post refit commissioning trials of drill rigs within the sheltered confines of the Lough. Such activity is now regulated through the Department and should be directed away from the pMCZ.

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 or the associated operations were to change in the future.

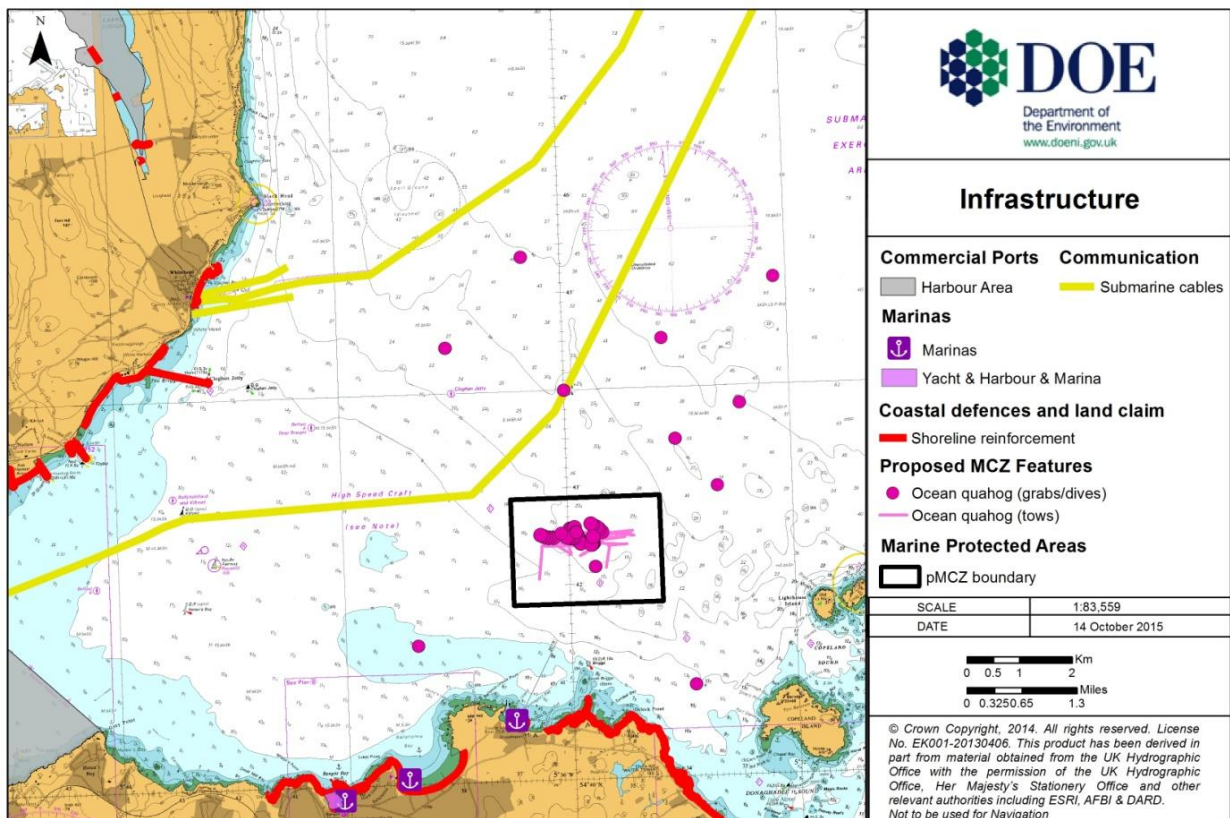


Figure 5 Location of Infrastructure in relation to Outer Belfast Lough pMCZ

<p>Possible Management Options</p>	<p>No additional management is required for Commercial ports, Marinas, Coastal defence and land claim.</p> <p>Management measures are recommended to reduce or limit pressures associated with existing submarine cable operations where they are likely to impact the pMCZ features.</p> <p>Management measures are recommended to remove or avoid pressures associated with new or future submarine cables where they are likely to impact the pMCZ features.</p>
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<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>Port developments are covered by the Department of Regional Development (DRD) and through marine planning and licensing.</p> <p>Belfast Harbour Authority has responsibility for the management of ports and marinas under The Harbours (Northern Ireland) Order 2002.</p> <p>Rivers Agency and Northern Ireland Environment Agency (NIEA) are responsible for sea defences designated under the Drainage (Northern Ireland) Order 1973.</p> <p>Responsibility for subsea telecommunications is a reserved matter. The Department is the marine licensing authority for the Northern Ireland inshore region and the discharge consenting authority while District Councils are responsible for planning.</p>

Discharges/dredge disposal – Waste water treatment works & outfalls and dredge disposal

Treated sewage effluent is discharged from four waste water treatment works (pipelines outfalls) along the Outer Lough. The closest pipeline/discharge to the pMCZ discharges 600m offshore, to the north east of Groomsport (Brigg's Rocks) and is one of the major discharges to Belfast Lough. A new waste water treatment works for the area was completed during 2009. It provides secondary treatment with UV disinfection during the bathing season. The discharge location of the outfall was selected to ensure protection of all of the bathing waters in the area. Although the inner part of the Lough is subject to nutrient enrichment, the mouth of the Lough allows the effluent to disperse and is considered as a less sensitive area.

The disposal of waste generated from vessels is regulated by Belfast Harbour Commissioners and they have produced a Port Waste Management Plan which details available facilities, legal duties, responsibilities and obligations. Other secondary pressures are land-based and marine industrial or commercial sources.

There is a licensed area for the disposal of dredged material just outside Belfast Lough. It is important for the continued commercial success of the harbour to have sites licensed and available for dredge disposal. The location and suitability of disposal sites is regulated by the Department through a fully consultative licensing process.

Although there is no spatial overlapping with the pMCZ, the Briggs Rocks discharge site and disposal grounds are close to the proposed area (see Figure 6).

The Ocean quahog and its associated habitat, subtidal sand, are sensitive to **siltation changes** and **physical change to another seabed type** as a result of sewage effluent and dredging disposal as well as industrial and agricultural discharges. Dredging disposal has a direct impact on the sediment and on sedimentation patterns at the disposal sites. It can also alter circulation, tidal patterns and water chemistry in the surrounding area.

Ocean quahog appear to be quite resilient to pressures associated with sewage, however, the low mobility species is sensitive to **synthetic and non-synthetic contamination** associated with dredged disposal. Although on a smaller scale, industrial and agricultural contamination is another source of pressure.

Due to the open water location and the distance between the different sources of disposal and the pMCZ, 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 disposal activity were to change in the future.

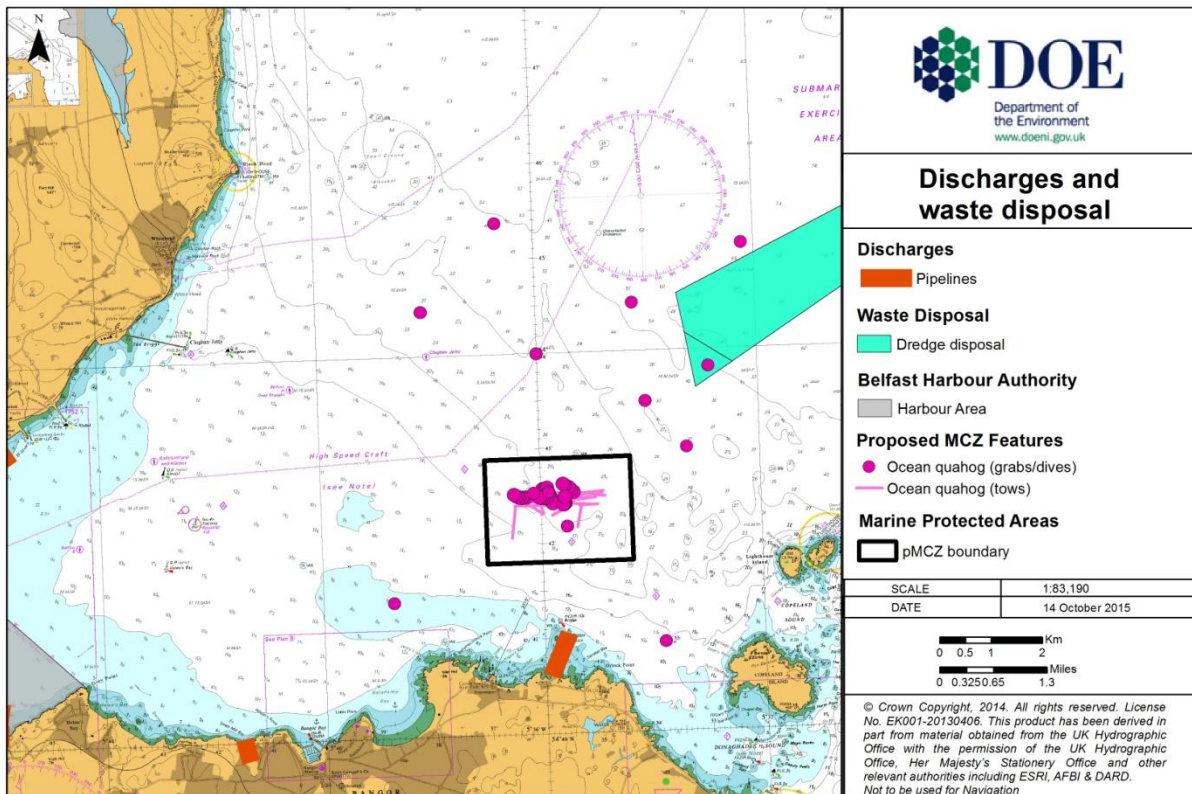


Figure 6 Location of Waste water discharges and Dredge disposal sites in relation to Outer Belfast Lough pMCZ

<p>Possible Management Options</p>	<p>Management measures are recommended to remove or avoid pressures associated with new waste water discharges/dredge material disposal sites or the expansion/relocation 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>

Relationship with existing Management Options

NIW is responsible for wastewater treatment works. Water discharges are governed by requirements in European legislation (The Urban Waste Water Treatment Directive (91/271/EEC) and Nitrates Directive (91/676/EEC).

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.

The Department is responsible for licensing dredging and disposal activities in the Northern Ireland inshore region.

Disposal of dredged materials at sea is regulated internationally under the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972 (London Convention) and the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention 1992). DRD, through the Harbour Works (Environmental Impact Assessment) Regulations (Northern Ireland) 2003 (as amended) can require Harbour Authorities to conduct an Environmental Impact Assessment for certain types of harbour works.

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.

Marine traffic (Commercial and recreational) – Moorings and anchoring, ferry route, shipping/navigation

In the outer part of the Lough there is one mooring point at Bangor Bay and ten boat anchoring points.

There are also several ferry routes crossing the Lough to Heysham (24 crossings weekly), Liverpool (26 crossings weekly), Stranraer (14 crossings daily) and Douglas (2 crossings weekly).

Shipping and navigation in the area, shown in Figure 7, include service crafts, military vessels, passenger vessels, cargo vessels, tankers, fishing vessels, recreational vessels (sailing) and vessels associated with dredging or underwater activities (including diving). Belfast Harbour handles almost 70% of trade for the entire island of Ireland and it is an important gateway for materials and goods. In fact, Belfast is only one of two ports on the island of Ireland to handle a full range of cargos, from freight vehicles to containers, dry, break and liquid bulk. In the order of 12,000 ship movements take place in the Port per annum, which accounts for up to 60% of Northern Ireland's seaborne trade.

It is common practice for cargo vessels entering Belfast Port to anchor in Outer Belfast Lough until a berth is free. Other vessels also anchor in the area awaiting sailing orders or simply to shelter from storms. While the ship's master determines suitable boat anchoring based on depth, seabed holding and weather conditions, identification of the pMCZ will inform the selection of a suitable anchoring. Anchors and cables from ocean going vessels have the potential to cause significant damage to the proposed features.

The main pressure for the proposed features (Ocean quahog and subtidal sand) associated with marine traffic is **physical abrasion** (surface and sub-surface abrasion/penetration), most likely through anchoring. Although Ocean quahog burrows into the sands, the siphon used for feeding and respiration sits on the surface. Despite having a solid shell their large body size makes them more vulnerable to physical damage than smaller species.

Anchoring activity should be avoided within the pMCZ boundary to aid the achievement of the conservation objectives.

The majority of large commercial shipping and recreational boats from Bangor Marina pass through the pMCZ as well as the cross channel ferry operators. Although there is overlap of navigation with the pMCZ due to the deep water in the area, the risk of damage to the pMCZ features is low.

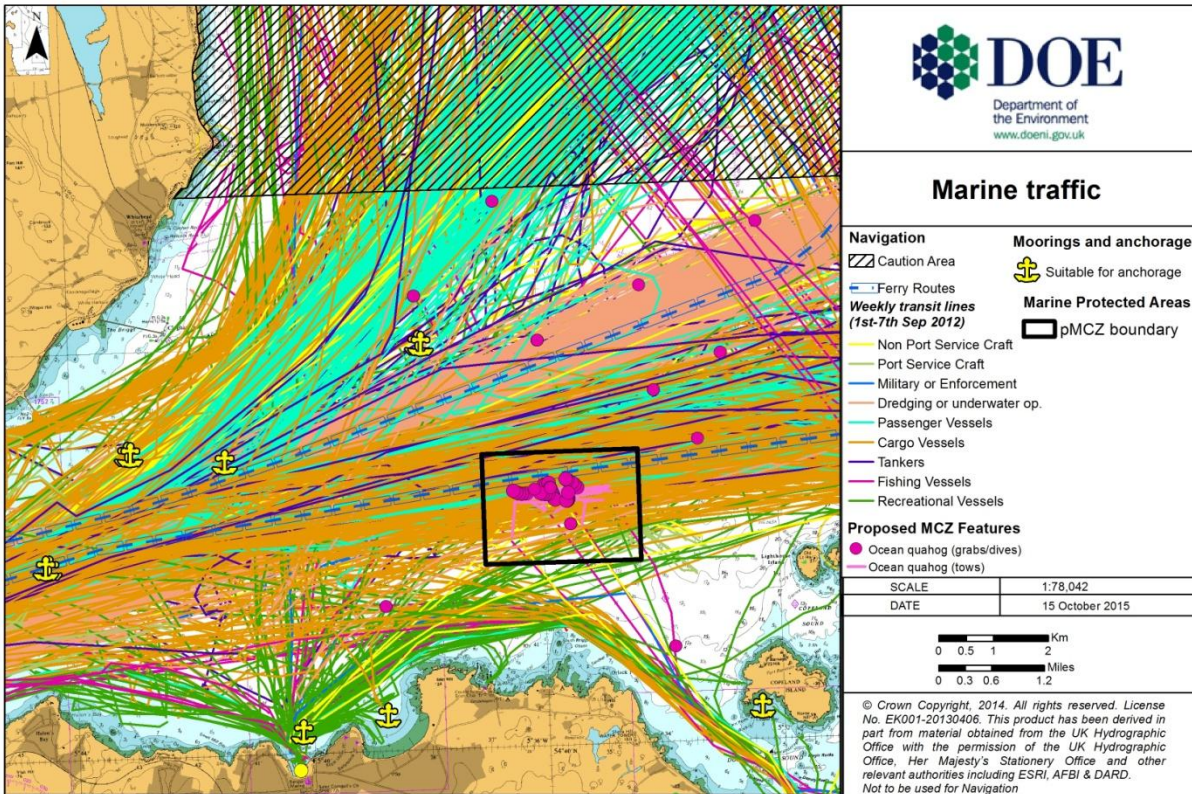


Figure 7 Location of Marine traffic in relation to Outer Belfast Lough pMCZ

<p>Possible Management Options</p>	<p>Management measures are recommended to remove or avoid pressures associated with anchoring and mooring inside the proposed boundary where they are likely to impact the pMCZ features.</p>
<p>Proposed way forward</p>	<p>We will continue discussions with those involved with marine traffic in Outer Belfast Lough to develop appropriate management measures.</p>
<p>Relationship with existing Management Options</p>	<p>Regulations concerning shipping are developed internationally. The 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 are licensed by the Crown Estate as owners of the seabed. 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 – *Sailing, windsurfing, kayaking/canoeing, SCUBA diving, bird watching, wildfowling and recreational fishing*

There are numerous tourist activities taking place along the shores and waters of Outer Belfast Lough, i.e. walking, bathing, yachting, water sports, sea angling, bird watching and wildfowling.

Walking and cycling are leisure activities that have increased in popularity in recent years, especially via the North Down Coastal Path that extends from Holywood along Helen's Bay and Bangor shore. There are also important bathing water beaches in Outer Belfast Lough - Helen's Bay Beach, Crawfordsburn, Ballyholme and Groomsport.

Water sports in the area are quite significant due to the proximity to Belfast and the immediacy to the Irish Sea cruising routes. The East Coastal Canoe Trail runs along both the north and south coasts of the Lough and the Copelands with access points from Whitehead, Carrickfergus, Helen's Bay, Bangor, Groomsport and Lighthouse Island. Bangor Marina is the second largest in Ireland and hosts international yachting events as well as many other attractions, such as the Pickie Fun Park. Bangor Marina is home to Ballyholme and Royal Ulster Yacht Clubs who provide dinghy and keelboat sailing as well as being the location of the HM Coastguard's Maritime Rescue Co-ordination Centre. Windsurfing occurs all along the north Down coast, especially in Ballyholme. SCUBA diving is popular in the area due to the presence of shipwrecks.

North Down (Holywood, Bangor and Groomsport) is considered an important spot for bird watching for the variety of native birds and seasonal migrants. Lighthouse Island is also an important bird observatory. There are bird watching tours and boat charters in the area. Wildfowling, limited to autumn and winter, usually takes place on foot.

Shore fishing and deep sea angling occurs along North Down all-year-round. Charter boats and wildlife watching cruises are available on a daily basis from the Eisenhower Pier, Bangor.

The main pressures associated with tourism and recreation, to which the proposed features are highly sensitive, are **surface abrasion and sub-surface abrasion or penetration**.

Figure 8 shows recreational activities and tourism in the Outer Belfast Lough area. There is no spatial overlap between these activities and the pMCZ and therefore the risk of not achieving the conservation objectives is considered to be low. It is considered that the conservation objectives could be met with no need for management measures.

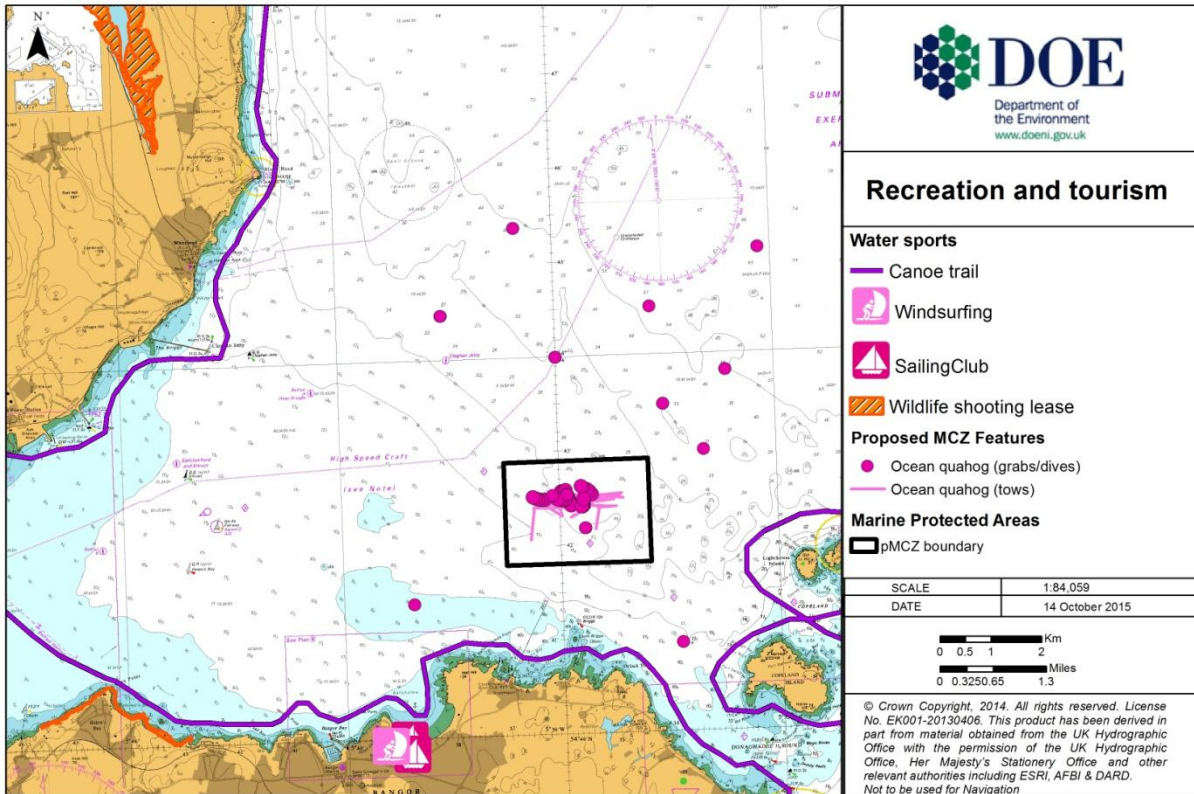


Figure 8 Location of Recreational activities in relation to Outer Belfast Lough pMCZ

Possible Management Options	No additional management is required.
Proposed way forward	The Department will continue discussions with those involved with recreation and tourism in Outer Belfast Lough to develop appropriate management measures.
Relationship with existing Management Options	<p>DETI is responsible for tourism policy while District Councils have a role in promoting local tourism and recreation.</p> <p>DCAL has a responsibility for arts and culture, sport, inland waterways and inland fisheries.</p> <p>The Crown Estate lease areas for wildfowling activities.</p>

Scientific and Archaeological activities – *Research, monitoring and stock assessment*

Outer Belfast Lough is subjected to a variety of environmental monitoring programmes.

The Joint Agency Monitoring Programme (the Department; Agri-food and Biosciences institute (AFBI); Loughs Agency) delivers spatial water quality monitoring throughout Northern Ireland coastal waters. There is a largely automated environmental monitoring system using moored monitoring stations/points (eight in Outer Belfast Lough, see Figure 9).

Additionally, AFBI (on behalf of DARD) carries out fish stock assessment surveys. These scientific surveys determine the amount of resource allowed to be fished each year. Donaghadee Sound is a harvest area for seed mussel and is subject to regular stock assessment surveys (Boyd & Clements, 2014). AFBI also has a station close to the pMCZ where the RV *Corystes* deploys gears as part of different surveys for fish stock assessment, larvae and other research.

AFBI undertakes shore sanitary surveys (Service, 2008) for microbiological and pollution control for shellfish harvesting areas.

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

The Departments' megafauna monitoring sites are located throughout the wider Belfast Lough area and data is collected on a regular basis as part of the Seal and Cetacean Monitoring programme. In addition, ongoing bird surveys are carried out by BTO.

The Department is responsible for periodic grab surveys of historic and current disposal sites surveys as part of the Marine Pollution Monitoring Programme under the Water Framework Directive (WFD).

There is one recorded wreck falling within the Outer Belfast Lough pMCZ boundary, a 49 ton schooner (the *Mary Young*), sunk in 1982, but its location is approximate. Recent archaeological analysis of the United Kingdom Hydrographic Office (UKHO) East Antrim/Belfast Lough multibeam data (Henry, 2015) has identified two potential anthropogenic anomalies falling inside the pMCZ boundary. One of these is low potential (a 3.5m x 3.5m circular depression) but the other is a 46m x 36m low mound (c. 0.7m in height) which might represent the remains of a sunken, and now buried, shipwreck.

The Centre for Maritime Archaeology (CMA), on behalf of the Department, completed an analysis of the UKHO East Antrim/Belfast Lough multibeam data in 2015 in order to identify potential archaeological anomalies. Two such anomalies are located within the pMCZ.

Scientific and Archaeological research and monitoring activities may have the potential to cause the deterioration of the proposed habitat and species 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 and projects 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.

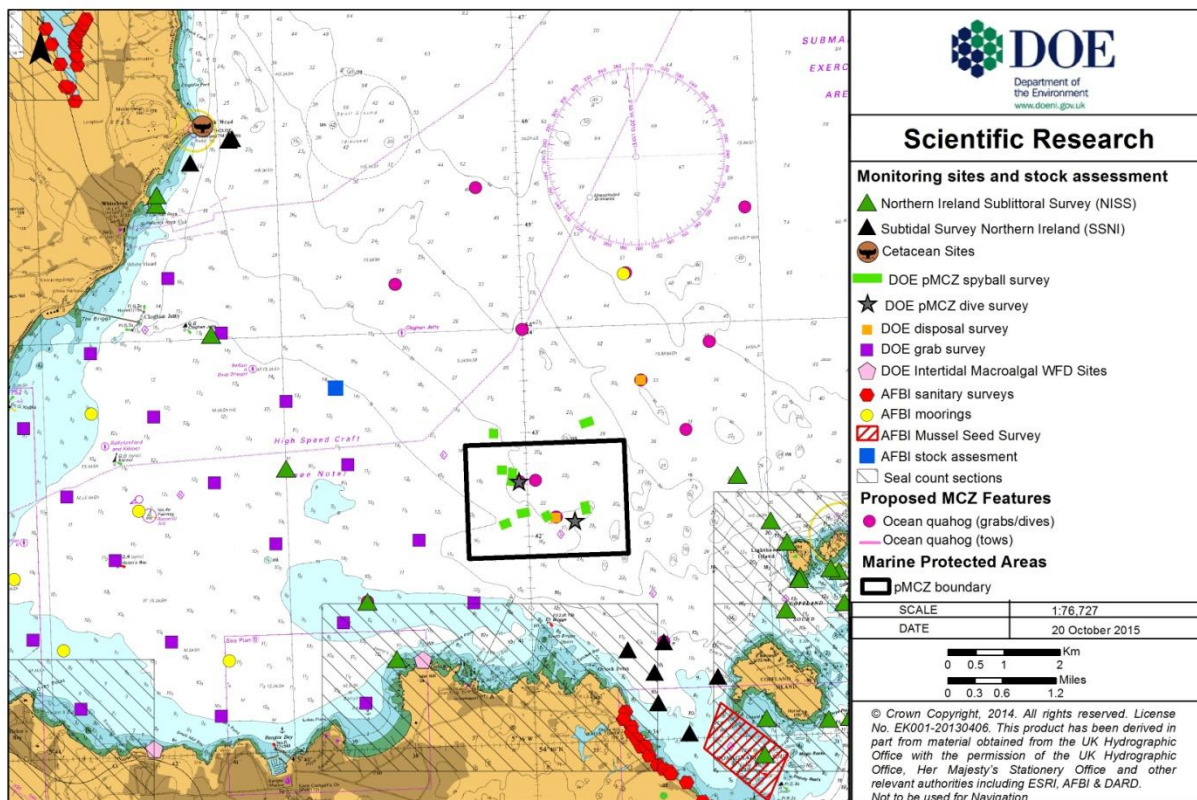


Figure 9 Location of Scientific research/monitoring in relation to Outer Belfast Lough pMCZ

Potential Management Options	No additional management is required as Scientific and Archaeological activities are carried out following strict guidelines enforcing non-destructive sampling methods.
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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>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 and AFBI under international, European and national legislation with marine component (Marine Strategy Framework Directive, Marine and Coastal Access Act 2009 and The Marine Act (Northern Ireland) 2013, OSPAR).</p>

Summary of Potential Management Options

<p>Fishing: <i>Static gear-creeling and pots,</i></p> <p><i>Mobile gear- scallop dredging,</i></p> <p><i>Mobile gear- potential quahog dredging.</i></p>	<p>Management measures are recommended to reduce or limit pressures associated with static fishing gear (creels and pots) where they are likely to impact the pMCZ features.</p> <p>Management measures are recommended to remove or avoid pressures associated with mobile fishing gear (scallop dredging) where they are likely to impact the pMCZ features.</p> <p>Management measures are recommended to remove or avoid pressures associated with mobile fishing gear (potential quahog hydraulic dredging) where they are likely to impact the pMCZ features.</p>
<p>Energy production: <i>Tidal resource zone</i></p>	<p>No additional management is required at present; however management measures will be recommended to remove or avoid pressures associated with future development of tidal energy activities where they are likely to impact the pMCZ features.</p>
<p>Infrastructure: <i>Commercial ports,</i></p> <p><i>Marinas,</i></p> <p><i>Coastal defence and land claim,</i></p> <p><i>Submarine cables</i></p>	<p>No additional management is required.</p> <p>No additional management is required.</p> <p>No additional management is required.</p> <p>Management measures are recommended to reduce or limit pressures associated with existing submarine cable operations where they are likely to impact the pMCZ features.</p> <p>Management measures are recommended to remove or avoid pressures associated with new or future submarine cables where they are likely to impact the pMCZ features.</p>
<p>Discharges/waste disposal: <i>Waste water treatment plant & outfalls and dredge spoil disposal.</i></p>	<p>Management measures are recommended to remove or avoid pressures associated with new waste water discharges/dredge material disposal sites or the expansion/relocation of existing ones where they are likely</p>

	to impact the pMCZ features.
Marine traffic (commercial and recreational): <i>Moorings and Anchoring,</i>	Management measures are recommended to remove or avoid pressures associated with anchoring and mooring inside the proposed boundary where they are likely to impact the pMCZ features.
Tourism and Recreation: <i>SCUBA diving, sailing, windsurfing, kayaking/canoeing, bird watching, recreational fishing.</i>	No additional management is required.
Scientific and Archaeological activities: <i>Research and Monitoring</i> <i>Fish stock assessment</i>	No additional management is required as scientific and archaeological monitoring/research is carried out following strict guidelines enforcing non-destructive sampling methods.

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ANNEX I

Conservation Objectives for Outer Belfast Lough pMCZ

In general the conservation objectives for Outer Belfast 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) sand and Ocean quahog (*Arctica islandica*) 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 recover¹ the Subtidal (sublittoral) sand to *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.

Particular reference is given to:

Mixed sediment communities
Sea-pen and burrowing megafauna communities

Conservation Objective 2

To recover¹ the populations of Ocean quahog to *favourable condition*, taking account of natural change such that:

- The distribution of the species within the site are maintained
- The distribution, extent⁴, structure⁶, function and supporting processes³ of the habitats supporting the species 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 need to be changes made to the way in which it is managed. The aim is to ensure that the interest features remain in (or are 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 Outer Belfast Lough MCZ

Feature	Sub-Feature	Attribute	Measure	Target	Comments
Ocean quahog (<i>Arctica islandica</i>)		Presence of Ocean quahog	Presence of Ocean quahog measured once during the reporting cycle.	Ocean quahog should be present in those areas of the Lough where they currently occur.	Measured against known baseline. Changes in presence may indicate long term changes in the physical conditions at the site.
		Extent and distribution of Ocean quahog	Extent and distribution of Ocean quahog measured once during the reporting cycle.	No decrease in extent or distribution from established baseline, subject to natural change.	Baseline survey required. Changes in extent and distribution may indicate long-term changes in the physical conditions at the site.
Subtidal sand		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 sand/silt/gravel, mean and median grain size, and sorting coefficient used to characterise sediment type. Sediment character to be measured once during the 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 thus reflecting the stability of the feature and the processes supporting it.

Feature	Sub-Feature	Attribute	Measure	Target	Comments
	Subtidal sand and gravel 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.
	Mixed sediment communities				
		Species composition of characteristic biotopes at monitoring sites.	Presence and abundance of composite species, measured once during the 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 2. List of Priority Marine Features recorded within or adjacent (40 m) to the pMCZ.

Habitats	
Sea-pen and burrowing megafauna	
Subtidal (sublittoral) sand	
Subtidal (sublittoral) mixed sediments	
Subtidal chalk	
Low mobility species	
Common name	Latin name
Ocean quahog	<i>Arctica islandica</i>
Red seaweed	<i>Stenogramma interruptum</i>
Hydroid	<i>Tamarisca tamarisca</i>
Nudibranch	<i>Embletonia pulchra (1 record 94)</i>
Sea cucumber	<i>Leptosynapta bergensis</i>
Queen scallop	<i>Aequipecten opercularis</i>
King scallop	<i>Pecten maximus</i>
Highly mobile species	
Harbour porpoise	<i>Phocoena phocoena</i>
Eider duck	<i>Somateria mollissima</i>
European shag	<i>Phalacrocorax aristotelis</i>



Department of the Environment
Marine Division
2nd Floor
Klondyke Building
Gasworks Business Park
Lower Malone
Belfast BT2 7JA

Telephone: 028 90569262

Email:

MarineDivision.InfoRequests@doeni.gov.uk

Photos represent Priority Marine Features found
throughout the Northern Ireland Inshore Region

