

# CONSERVATION OBJECTIVES AND POTENTIAL MANAGEMENT OPTIONS

## Waterfoot Marine Conservation Zone (MCZ)

Subtidal seagrass (*Zostera marina*) bed



Department of  
**Agriculture, Environment  
and Rural Affairs**

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## Contents

<b>Summary</b> .....	<b>4</b>
<b>Glossary of Terms and Acronyms</b> .....	<b>6</b>
<b>Introduction</b> .....	<b>8</b>
<b>Conservation Objectives, Vulnerability Assessment and MCZ Features</b> .....	<b>10</b>
Vulnerability Assessment .....	10
MCZ Features .....	10
<b>Historic or Archaeological Interest</b> .....	<b>11</b>
<b>Activities and Potential Management Options in Waterfoot MCZ</b> .....	<b>13</b>
Advice on management implications .....	14
Production of living resources: <i>Aquaculture – finfish</i> .....	16
Extraction of living resources: Fishing – dredging, and traps (potting/creeling).....	18
Energy generation (potential): Renewable Energy – Tidal resource zone and Marine Hydrocarbon Extraction – Oil and Gas exploration .....	20
Coastal infrastructure: Coastal docks, ports & marinas and Coastal defence & land claim.....	23
Extraction of non-living resources: Navigational dredging (capital & maintenance) .	25
Waste management activities: Sewage disposal (Waste water treatment works & outfalls).....	27
Transport: Shipping – general at sea (moorings, anchorage & vessel movements) and Shipping – port operations within the Harbour Authority limits (mooring, beaching, launching, ferry route etc) .....	29
Recreation and leisure: Recreational activities – SCUBA diving, sailing, windsurfing, kayaking/canoeing, bird watching, recreational sea angling, recreational fishing and Coastal tourist sites (public beaches & resorts) .....	31
Marine research: Scientific and Archaeological.....	34
Other man-made structures: Submarine cable & pipeline operations .....	36
<b>Summary of Potential Management Options</b> .....	<b>38</b>
<b>Data Sources and Bibliography</b> .....	<b>40</b>
<b>Annex I</b> .....	<b>43</b>
Conservation Objectives for Waterfoot MCZ .....	43
Monitoring Priorities.....	46
<b>Annex II</b> .....	<b>50</b>
Priority Marine Features (PMFs).....	50
<b>Annex III</b> .....	<b>51</b>

Sensitivity, exposure and vulnerability Matrix for Waterfoot MCZ .....	51
Risk of Damage Assessment for Waterfoot MCZ .....	64

## Tables

<b>Table 1</b> Activities that have the potential to affect Waterfoot MCZ.....	13
<b>Table 2</b> Potential Management Options for production of living resources .....	17
<b>Table 3</b> Potential Management Options for extraction of living resources .....	19
<b>Table 4</b> Potential Management Options for energy generation.....	22
<b>Table 5</b> Potential Management Options for coastal infrastructure .....	24
<b>Table 6</b> Potential Management Options for extraction of non-living resources .....	26
<b>Table 7</b> Potential Management Options for waste management .....	28
<b>Table 8</b> Potential Management Options for transport .....	30
<b>Table 9</b> Potential Management Options for recreation and leisure .....	32
<b>Table 10</b> Potential Management Options for marine research.....	35
<b>Table 11</b> Potential Management Options for other man-made structures.....	37
<b>Table 12</b> Potential Management Options for Waterfoot MCZ .....	38

## Figures

<b>Figure 1</b> Location of boundary of Waterfoot MCZ.....	9
<b>Figure 2</b> Distribution of the MCZ features in Waterfoot.....	12
<b>Figure 3</b> Location of the licensed area for finfish cultivation in relation to Waterfoot MCZ .....	17
<b>Figure 4</b> Location of commercial fisheries in relation to Waterfoot MCZ.....	19
<b>Figure 5</b> Location of potential renewable energy generation area in relation to Waterfoot MCZ.....	21
<b>Figure 6</b> Location of coastal infrastructure in relation to Waterfoot MCZ.....	24
<b>Figure 7</b> Location of potential dredging sites in relation to Waterfoot MCZ .....	25
<b>Figure 8</b> Location of sewage disposal sites in relation to Waterfoot MCZ .....	28
<b>Figure 9</b> Location of transport activities in relation to Waterfoot MCZ .....	30
<b>Figure 10</b> Location of recreation and leisure activities in relation to Waterfoot MCZ.....	32
<b>Figure 11</b> Location of marine research activities in relation to Waterfoot MCZ.....	35
<b>Figure 12</b> Location of other man-made structures in relation to Waterfoot MCZ .....	36

## Summary

This document provides information on the uses and activities occurring within Waterfoot Marine Conservation Zone (MCZ) and surrounding area. The document has been produced to advise stakeholders about the activities that may pose a threat to the designated features, the potential management options for these activities and their compatibility with conservation objectives of the protected feature.

The information is organised by the type of activity, and briefly describes potential impacts on the feature and management options. The grouping of activities was initially based on the standardised UK pressures-activity matrix<sup>1</sup> as developed by JNCC (2013), which classed similar activities that exerted similar pressures together, for example, anchoring by commercial and recreational vessels. Since the public consultation, a new [Pressures-Activities Database \(PAD\)](#) has been developed by Cefas and APBmer (2015). This database and the list of activities are currently under review by JNCC in conjunction with each country agency. The Department has used this database and the improved activities list along with a revised methodology ([Marine Evidence based Sensitivity Assessment, MarESA](#), developed by JNCC and Natural England) to review the vulnerability assessments for the MCZs. Detailed management plans will be developed post designation based on this document along with the feature vulnerability assessment and the conservation objectives of the MCZ feature. The management options will only consider those activities assessed as capable of affecting the feature of the MCZ based on the risk of damage assessment.

This document 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 document will give comprehensive evidence-based guidance as a starting point for discussions about the development of management options to achieve the conservation objectives in the MCZ.

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

Additional information on Waterfoot MCZ and the MCZ process 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 Waterfoot Marine

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<sup>1</sup> 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](http://jncc.defra.gov.uk/pdf/Final_HBDSEG_P-A_Matrix_Paper_28b_Website_edit%5B1%5D.pdf)

Conservation Zone (MCZ)

- Data Confidence Assessment for Waterfoot Marine Conservation Zone (MCZ)
- Site Summary Document for Waterfoot Marine Conservation Zone

## 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

**Biotope** – The region of habitat associated with a particular ecological community

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

**[DAERA](#)** – [Department of Agriculture, Environment and Rural Affairs](#) (also referred to as the Department in the text)

**[DfC](#)** – [Department for Communities](#)

**[DfE](#)** – [Department for the Economy](#)

**[DfI](#)** – [Department for Infrastructure](#)

**DOE** – Department of the Environment (now lies within DAERA)

**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

**Infralittoral** – Describes the zone from mean low water down to a depth where 1% of light can reach the seabed (JNCC). This zone is 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

**MCZ Feature** – Marine Conservation Zone feature that will underpin the MCZ designation

**MMO** – Marine Management Organisation

**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 NI inshore region

**RNLI** – Royal National Lifeboat Institution

**ROV** – Remotely Operated Vehicle

**SAC** – Special Area of Conservation, designated under the Habitats Directive

**SPA** – Special Protection Area, designated under the Birds Directive

**Spyball** – Underwater drop camera operated by crew aboard a vessel to study submerged habitats and species.

**SSNI** – Sublittoral Survey Northern Ireland

**VMS** – Vessel Monitoring System

**WFD** – Water Framework Directive



## Introduction

Waterfoot Marine Conservation Zone (MCZ) is located in a small embayment offshore from the village of Waterfoot (within the wider Red Bay area) on the east coast of County Antrim, Northern Ireland. It lies inshore of the North Channel. The seabed in the MCZ encompasses mainly sand and gravel sediments.

The MCZ, located at the inner part of the bay, is a small area of 0.811km<sup>2</sup> (Figure 1). This area contains a large Subtidal seagrass bed (*Zostera marina*) on infralittoral sand that may be the largest in Northern Ireland, and is considered to be in good condition. This MCZ was nominated by Seasearch Northern Ireland (NI). Volunteers from Seasearch NI first surveyed this site in 2008 and then again in 2009 and 2012, recording seagrass presence on all occasions. This site was submitted to the Department for consideration as a possible MCZ in September 2014.

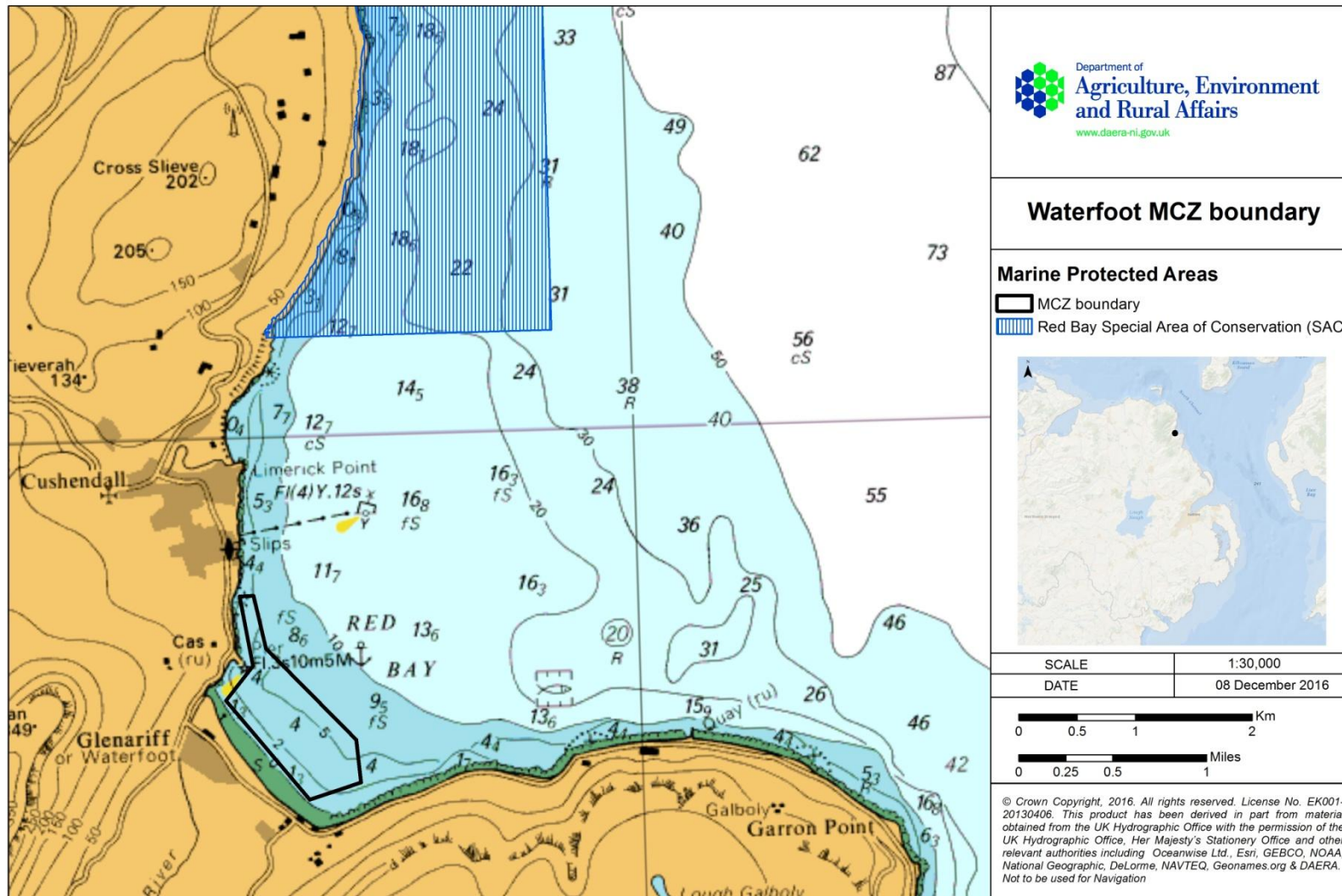
The waters around the Red Bay area are important for finfish aquaculture (organic Atlantic salmon, *Salmo salar*). Fishing activity in the area includes scallop dredging and potting for Edible crab (*Cancer pagurus*) and European lobster (*Homarus gammarus*). Although there is no significant industrial activity in Red Bay, the increasing popularity of the area for leisure and recreational activities may be a threat for the sustainability of Subtidal seagrass beds. The area is popular for power boating and associated water-based activities. There are two areas with a mixture of private and commercial swinging moorings. There is also an RYA powerboat training centre in Cushendall and a sailing club; these are adjacent to Cushendall Sailing club and Waterfoot/Red Bay Pier.

Red Bay pier was formally used for the importation of coal and goods as well as the ferry service to Scotland.

Both sporting and nature enthusiasts use the area for recreational fishing, SCUBA diving, kayaking and other activities.

An area to the north of Waterfoot MCZ has been designated as a Special Area of Conservation (SAC) while the MCZ lies within the wider Antrim Coast and Glens Area of Outstanding Natural Beauty (AONB).

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



**Figure 1** Location of boundary of Waterfoot MCZ

## Conservation Objectives, Vulnerability Assessment and MCZ 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 develop conservation objectives is described in the document *Guidance on the development of Conservation Objectives and potential Management Options*.

### Vulnerability Assessment

The level of vulnerability is based on a feature's sensitivity, and current exposure to pressures associated with human activities. It aids in the development of potential management options.

### MCZ Features

Waterfoot has been designated as a MCZ for the habitat **Seagrass beds (*Zostera marina*) on Subtidal (sublittoral) sand**.

The MCZ habitat consists of a shallow subtidal area of fine sand and gravelly sand with patchy seagrass meadows (*Zostera marina*) which together make up the larger bed. The biotope for this habitat is [SS.SMp.SSgr.Zmar](#). Seagrass density is declining in UK waters, and although present throughout Northern Ireland, the subtidal bed in Waterfoot MCZ is extensive and in good condition. The Waterfoot Seagrass bed, though patchy, is currently thought to be the largest subtidal example of its kind in Northern Ireland.

There are also Priority Marine Features (PMFs) present within the MCZ boundary. While the PMFs identified within the MCZ boundary did not meet the criteria for consideration as a feature in their own right, they are afforded a level of protection based on vulnerability and risk assessment. A full list of these features is provided in Annex II.

The location and extent of this MCZ feature is shown in Figure 2. The map shows point records of the biotope (Northern Ireland Sublittoral Survey (NISS) 1982; Sublittoral Survey Northern Ireland (SSNI) 2006; Seasearch NI volunteer dives 2008-2012). Survey work carried out in 2015 and 2016 confirmed the biotope extent and sediment types enabling a boundary to be drawn around the Subtidal seagrass bed (DOE Waterfoot pMCZ support spyball and diving surveys 2015 and DAERA Waterfoot pMCZ support spyball survey 2016).

As the Subtidal seagrass bed in Waterfoot MCZ is currently in favourable condition, the Department recommends that the **conservation objectives are set to *maintain* this feature in favourable condition.**

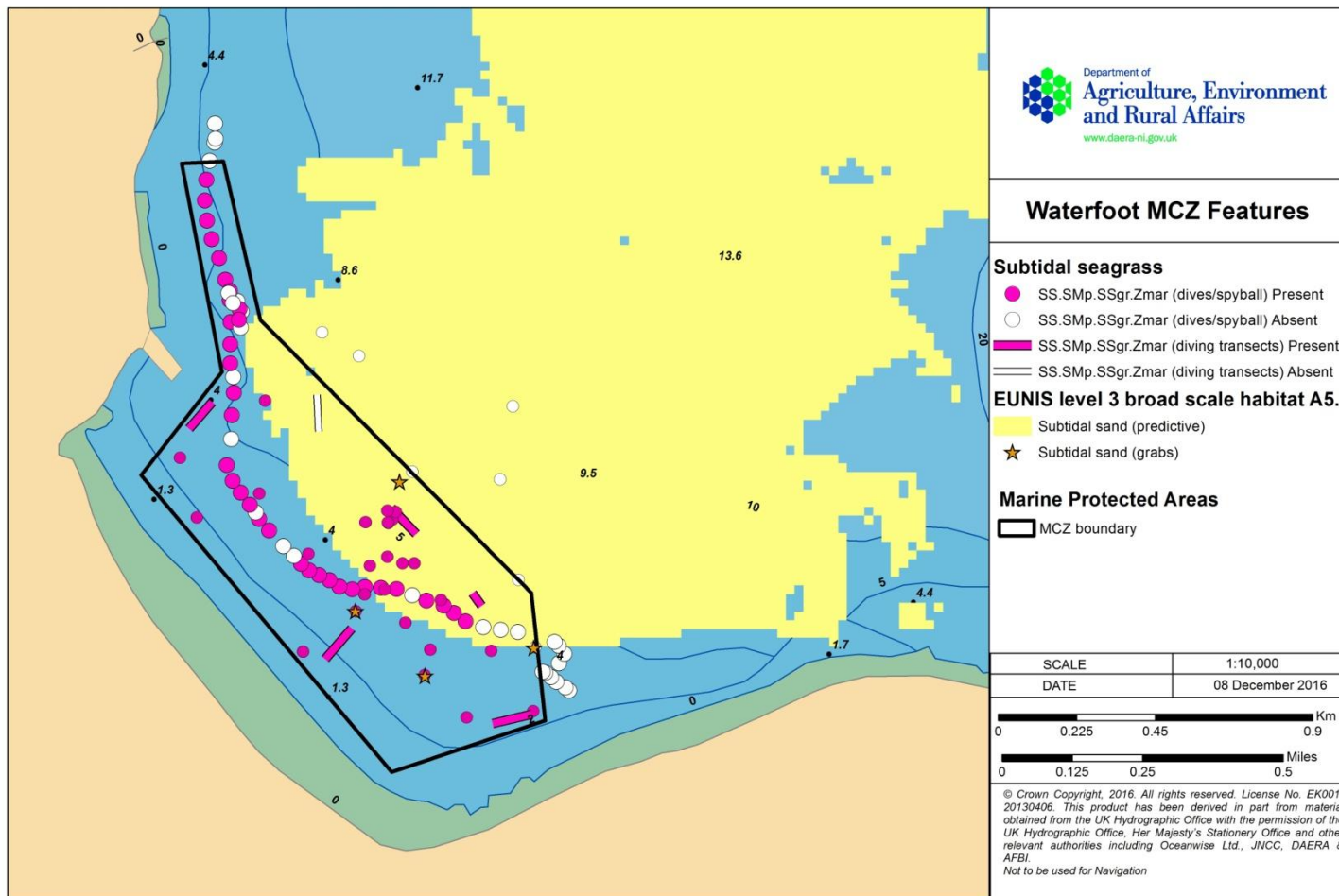
Seagrass beds are currently listed as a Priority Habitat under the Northern Ireland Habitat Action Plan and under the UK Biodiversity Habitat Action Plan (BAP). They are also listed on the OSPAR List of Threatened and/or Declining Species and Habitats (declining in Region II – North Sea and Region III – Celtic Sea, and threatened in Region V – Wider Atlantic, OSPAR agreement 2008-6). They are a sub-feature of Annex I habitats under the Habitats Directive and are an important feature in estuarine Sites of Special Scientific Interest, under the UK Wildlife and Countryside Act 1981.

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

Figures 3 – 12 have been produced using the MCZ feature point data shown in Figure 2 to illustrate the location of various activities in relation to Waterfoot MCZ. The Subtidal (sublittoral) sand habitat is thought to be present across the entirety of the MCZ, and so for simplicity, this habitat has not been included in Figures 3 – 12.

### **Historic or 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 MCZ boundary and these may be afforded incidental protection. It is recognised that management measures to protect MCZ features could protect historic assets.



**Figure 2** Distribution of the MCZ features in Waterfoot

## Activities and Potential Management Options in Waterfoot MCZ

Table 1 lists the activities that have the potential to affect Waterfoot MCZ. 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 designated feature 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.

**Table 1** Activities that have the potential to affect Waterfoot MCZ

<b>Type of activity</b>	<b>Activities</b>
<b>Production of living resources</b>	<i>Aquaculture – finfish (Salmon)</i>
<b>Extraction of living resources</b>	<i>Fishing – dredging (scallops) Fishing – traps (potting/creeling)</i>
<b>Energy generation (potential)</b>	<i>Renewable energy – Tidal Resource Zone Marine hydrocarbon extraction - Oil and Gas Exploration</i>
<b>Coastal infrastructure</b>	<i>Coastal docks, ports &amp; marinas Coastal defence &amp; land claim</i>
<b>Extraction of non-living resources</b>	<i>Navigational dredging (capital &amp; maintenance)</i>
<b>Waste management activities</b>	<i>Sewage disposal (Waste water treatment works &amp; outfalls)</i>
<b>Transport</b>	<i>Shipping – general at sea (Moorings, Anchorage &amp; Vessel movements) Shipping – port operations within the Harbour Authority limits (mooring, beaching, launching, etc.)</i>
<b>Recreation and leisure</b>	<i>Recreational activities (SCUBA Diving, Sailing, Windsurfing, Kayaking/canoeing, Bird watching Recreational fishing) Coastal tourist sites (public beaches &amp; resorts)</i>
<b>Marine research</b>	<i>Scientific and Archaeological activities</i>
<b>Other man-made structures</b>	<i>Submarine cable &amp; pipeline operations</i>

All the activities are assessed against the level of impact or risk of damage to the MCZ feature based on the latter's vulnerability to each activity. Only those activities considered capable of affecting the designated feature (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 full vulnerability and risk of damage assessments are provided in Annex III.

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

### **Advice on management implications**

In order to meet the conservation objectives listed above, all public authorities are required to manage activities within their remit to avoid significant loss, damage or change to the qualifying feature of the site. Within Waterfoot the biotope is vulnerable to the following pressures – activities should be managed so they do not result in these pressures:

- Temperature changes
- Salinity changes
- Water flow (tidal current) changes (including sediment transport considerations)
- Emergence regime changes (includes tidal level change considerations)
- Wave exposure changes
- Nutrient enrichment
- Organic enrichment
- Physical loss (to land or freshwater habitat)
- Physical change (to another seabed type)
- Habitat structure changes
- Penetration and/or disturbance of the substrate below the surface of the seabed - (Overall abrasion)
- Abrasion/disturbance of the surface of the substratum or seabed
- Changes in suspended solids (water clarity)
- Siltation rate changes (including smothering)

- Introduction of light
- Introduction or spread of non-indigenous species
- Introduction of microbial pathogens
- Removal of target species
- Removal of non-target species



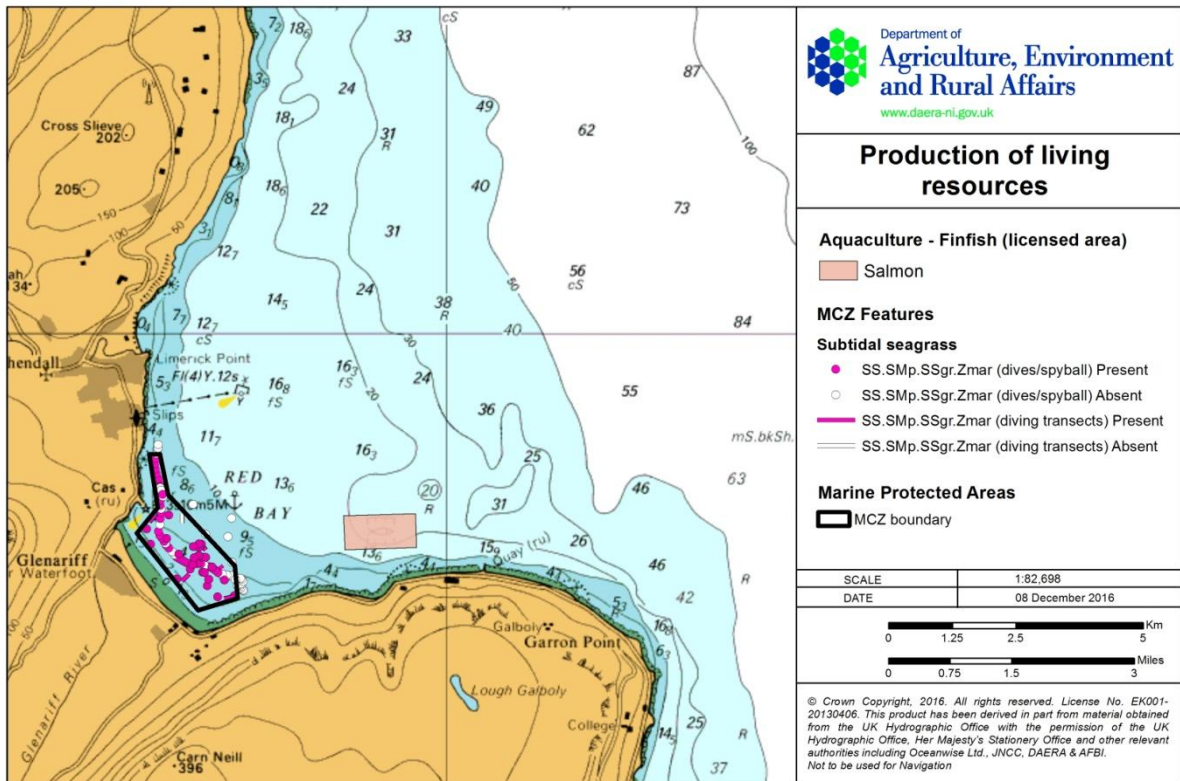
### **Production of living resources: Aquaculture – finfish**

There is one licensed salmon (*Salmo salar*) farm with sites in Red Bay and Glenarm Bay (Figure 3). The fish are produced organically and are stocked at approximately half the capacity of the cages. The cages are located in a high energy site with rapid dispersal of organic matter. A fish culture licence has been granted for each site and a discharge consent was granted under the Water (Northern Ireland) Order 1999. The boats servicing the farm moor on Waterfoot/Red Bay Pier.

The cages are rotated throughout the licensed areas in order to reduce long-term impacts on the seabed. The organic salmon company that manages the farms employs a diving company to check the structure of nets, anchorage to the seabed and integrity of the site on a monthly basis. In addition, periodic diving monitoring, Remotely Operated Vehicle (ROV) surveys and water quality analysis is carried out by the Department to check compliance with consent conditions. The Department's Fisheries Inspectorate branch also operates an inspection programme at the cage sites to ensure retention of farmed fish.

The Seagrass bed in Waterfoot have a low vulnerability to **water flow** (tidal current) **changes** (including sediment transport considerations), **nutrient enrichment**, **organic enrichment** and **abrasion/disturbance of the surface of the substratum or seabed** and high vulnerability to **habitat structure changes**, **overall abrasion** (surface and subsurface), **changes in suspended solids** (water clarity), **siltation rate changes** (including smothering), **introduction of light**, **introduction or spread of non- indigenous species**, **introduction of microbial pathogens** and **removal of non-target species**.

It is unlikely that the future extension for sea cages would be located in the vicinity of the MCZ as its sheltered, shallow location would be unsuitable for farming fish. It is considered therefore that **there is no risk** to the conservation objectives for the feature unless the location or intensity of the fish farm activity was to change in the future.



**Figure 3** Location of the licensed area for finfish cultivation in relation to Waterfoot MCZ

**Table 2** Potential Management Options for production of living resources

<b>Potential Management Options</b>	<b>No additional management is required.</b>
<b>Proposed way forward</b>	<p>The Department is responsible, through regulations, for the development of fisheries management measures to protect the MCZ feature.</p> <p>The Seagrass bed 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>
<b>Relationship with existing Management Options</b>	<p>The Department is responsible for licensing fish farms under the provisions of the Fisheries Act (NI) 1966.</p> <p>Discharge consent is issued by the Department which is also responsible for site environmental quality monitoring.</p>

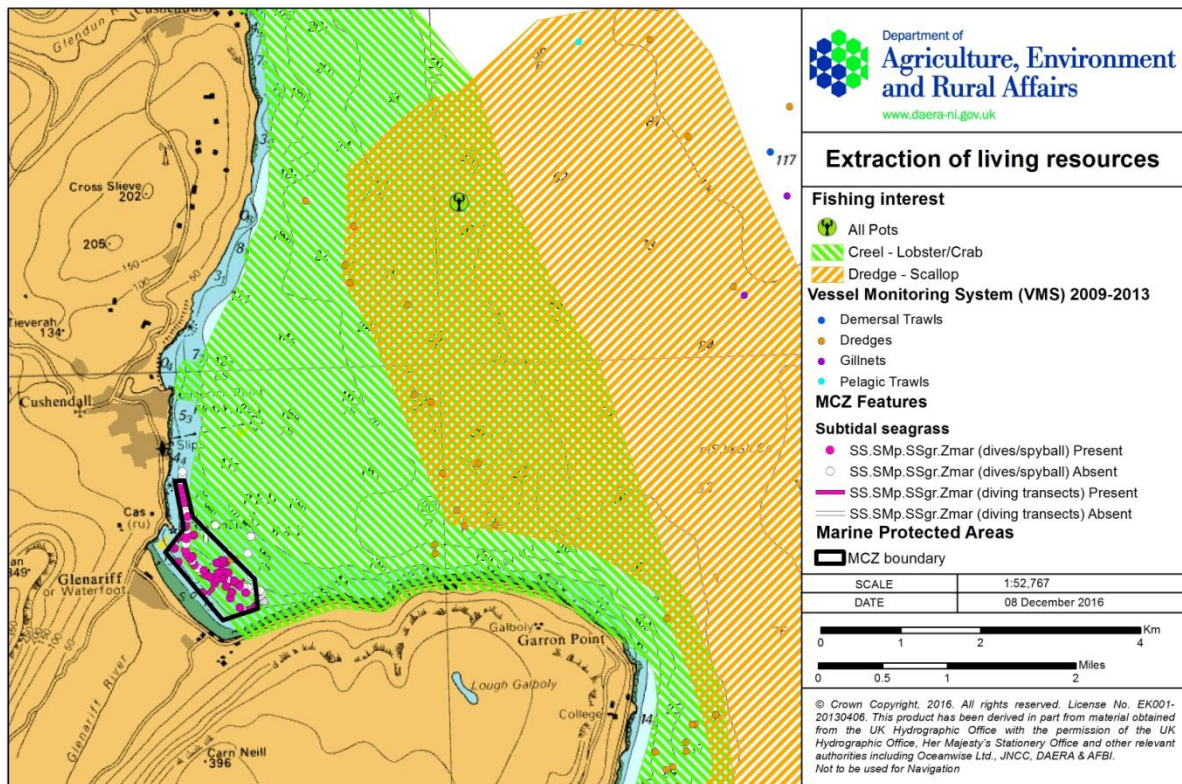
## **Extraction of living resources: Fishing – dredging, and traps (potting/creeling)**

The Red Bay area is fished mainly using traps (pots and creels) for lobsters (*Homarus gammarus*) and crabs (*Cancer pagurus* and *Necora puber*) with some dredging for scallops (*Pecten maximus*). Low-level dredging occurs across the wider Red Bay area. Figure 4 shows the overlap between commercial fishing in the area (fishing interest zones) and the MCZ. Vessel Monitoring System (VMS) evidence shows that a small area of the MCZ was recently dredged. Coincidentally, the VMS track corresponds with areas in the MCZ which are devoid of seagrass; the absence of seagrass in the area could be due to the effects of dredging in the area as this is a pressure to which the feature is sensitive. Prior to 2015 VMS data only related to vessel sizes above 15m; this has now been reduced to include vessels of 12m and above.

Empirical evidence for impact of dredge fishing on Seagrass is extensive (Fonseca *et al.*, 1984, De Jonge and Jong, 1992, Neckles *et al.*, 2005, Bishop *et al.*, 2005, Erftemeijer & Robin, 2006). Dredging gears have major impacts on Seagrass beds as they can cause **physical changes** (to another seabed type), **overall abrasion** (surface and subsurface) (uprooting plants or damaging leaves). They can also cause **changes in suspended solids** (water clarity), **siltation rate changes** (including smothering), **introduction of light, and removal of target and non-target species**. The Marine Management Organisation (MMO) [Matrix of fisheries gear types and European marine site protected features](#) also assess the dredging as a high risk activity on Seagrass. **Dredging should be avoided within the MCZ boundary to aid the achievement of the conservation objectives.**

The Department is aware of an artisanal herring fishery using seine nets within the wider Red Bay area. Due to the type of gear deployed and the seasonal nature of the fishery, the Department does not consider that this activity will have a significant adverse impact on the Seagrass beds.

Fishing using traps (pots and creels) can also impact Seagrass beds through the **removal of species (target and non-target species)** (moderate risk of impact). Damage can be caused in deploying and retrieving traps and associated lines and anchors, by their movement over the seabed during rough weather. Plants may be uprooted and leaves sheared or smothered. There is a strong correlation between the amount of damage caused, the number of pots and hauling frequency ([JNCC and NE, 2011](#)). During survey work carried out by the Department and Seasearch NI there was no evidence of fishing with traps within the MCZ, although traps were observed in the wider Red Bay area. Species normally targeted by traps were not recorded in any of the dive or drop camera footage within the MCZ which would suggest that the Subtidal sand habitat is not suitable for the trap fishery in this area. **Fishing with traps (pots/creels) should be avoided within the MCZ boundary to aid the continued achievement of the conservation objectives.**



**Figure 4** Location of commercial fisheries in relation to Waterfoot MCZ

**Table 3** Potential Management Options for extraction of living resources

<p><b>Potential Management Options</b></p>	<p><b>Management measures are recommended to remove or avoid pressures associated with scallop dredging within the MCZ.</b></p> <p><b>Management measures are recommended to remove or avoid pressures associated with fishing with traps (creels and pots) within the MCZ.</b></p>
<p><b>Proposed way forward</b></p>	<p>The Department is responsible, through regulations, for the development of fisheries management measures to protect the MCZ feature.</p> <p>The Seagrass bed 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><b>Relationship with existing Management Options</b></p>	<p>The Department is responsible for fisheries regulations in the Red Bay area. Sea fishing is regulated through the Fisheries Act (Northern Ireland) 1966.</p>

## Energy generation (potential): Renewable Energy – Tidal resource zone and Marine Hydrocarbon Extraction – Oil and Gas exploration

The [Strategic Environmental Assessment \(SEA\) of Offshore Wind and Marine Renewable Energy by the Department of Energy, Trade and Investment, \(DETI, 2009\)](#) assessed the potential for commercial and test/demonstration tidal stream sites in NI waters. This assessment identified potential impacts of such developments and related mitigating actions to be considered at the project developments stage.

A possible commercial scale Tidal Resource Zone was identified off the North Coast within which The Crown Estate, as managers of the seabed, has offered development rights to two consortia, Tidal Ventures Ltd and Fair Head Tidal. These companies, through the EIA process, are investigating the potential to develop two tidal stream projects which will generate 100 MW at Torr Head and Fair Head respectively.

Waterfoot MCZ lies 5.2km outside the southern tip of the Tidal Resource Zone and more than 18km away from the two tidal development sites at Torr Head and Fair Head.

Figure 5 shows the spatial extent of the Tidal Resource Zone (southern tip) and the MCZ.

Seagrass beds are sensitive\* to the following pressures associated with tidal energy generation: **temperature changes, salinity changes, water flow changes** (tidal current), **emergence regime changes, wave exposure, physical changes** (to another seabed type), **habitat structure changes, overall abrasion** (surface and subsurface), **changes in suspended solids** (water clarity), **siltation rate changes** (including smothering), **introduction of light, introduction or spread of non-indigenous species, and introduction of microbial pathogens.**

There are no tidal energy developments in this area at present, and the Department is engaging with the developers in considering their respective marine licence applications. The potential location of these renewable energy sites is as previously discussed is a considerable distance from the MCZ and for this reason **it is considered that the risk of not meeting the conservation objectives for the MCZ feature is low.**

The UK's Department of Business, Energy and Industrial Strategy UK (BEIS) administers marine environmental regulations associated with oil and gas exploration and production and the decommissioning of marine installations, wells, pipelines and associated infrastructure in the UK marine area (excluding internal waters). This is not a devolved matter. The Oil and Gas Authority, a Government company, is the UK licensing authority for oil and gas exploration, development and production (excluding internal waters). At present there is no oil or gas exploration licence for the 5 offshore blocks in the Antrim Coast (Waterfoot MCZ

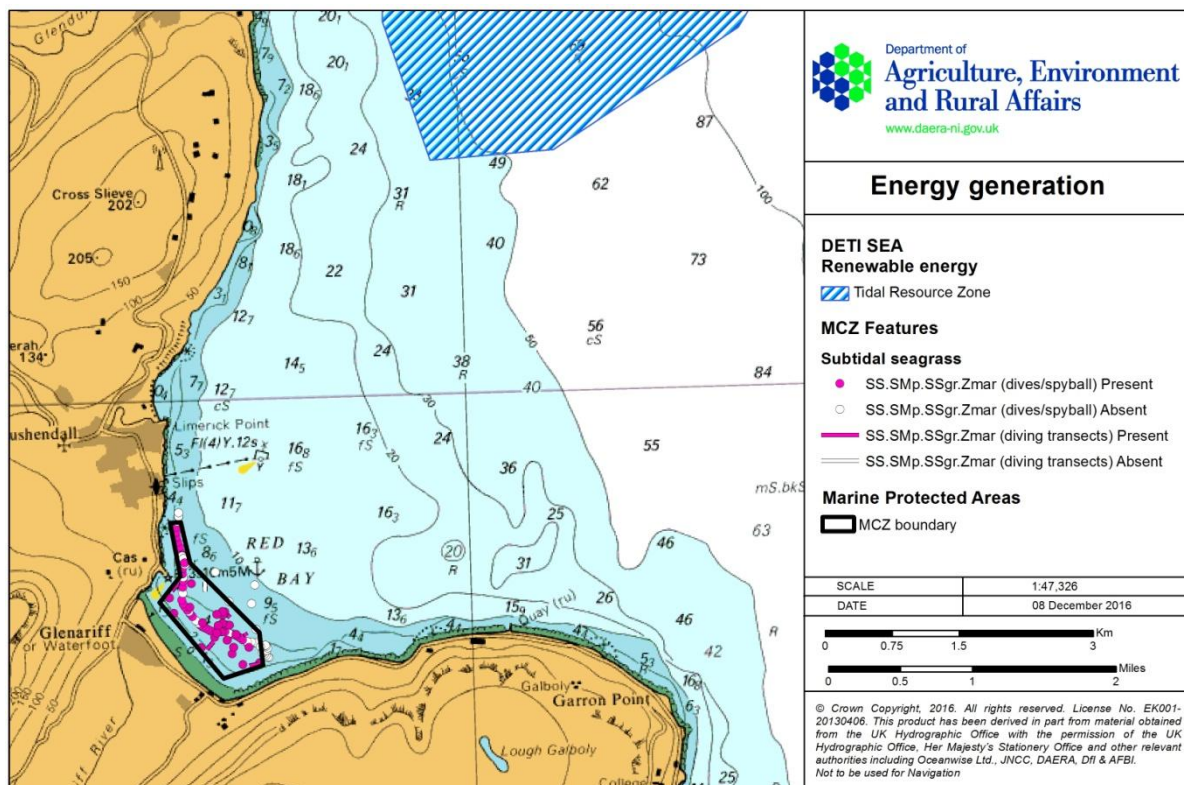
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\* Currently there are no energy generation licences in Waterfoot/Red Bay area so the feature is not exposed to the pressures normally associated with this activity. As such, vulnerability assessments cannot be carried out. Instead, the sensitivity of the features to pressures is referred to here.

lies within this area). A licence was granted in 2013 but the licensed blocks around the MCZ were relinquished in 2016. The Oil and Gas Authority may release these blocks in a future licensing round which is why the sensitivity of the MCZ feature to this activity are included below.

Subtidal seagrass has moderate to high sensitivities\* to the following pressures associated with marine hydrocarbon extraction: **physical change** (to another seabed type), **habitat structure changes**, **overall abrasion** (surface and subsurface), **changes in suspended solids** (water clarity), **siltation rate changes** (including smothering), **introduction of light**, **introduction or spread of non-indigenous species**, and **introduction of microbial pathogens**.

The SEA report (DETI, 2009) show that activities associated with energy production may result in the removal or disturbance of the substratum and these could have significant adverse effects on sensitive benthic habitats and species. However, with mitigating measures taken at the EIA/Projects stage these impacts could be reduced. **At present, with no exploratory licence in place there is no risk to the achievement of conservation objectives for the MCZ feature.**



**Figure 5** Location of potential renewable energy generation area in relation to Waterfoot MCZ

\* See previous

**Table 4** Potential Management Options for energy generation

<p><b>Potential Management Options</b></p>	<p><b>No additional management is required.</b></p>
<p><b>Proposed way forward</b></p>	<p>Any new development for renewable energy production will require a licence from the Department who will consider any potential impacts on the MCZ.</p>
<p><b>Relationship with existing Management Options</b></p> <p><b>Tidal</b></p> <p><b>Oil and Gas</b></p>	<p>The Department is the marine licensing authority for the NI inshore region.</p> <p>The Department for the Economy is the consenting authority for the construction and operation of electricity generation installations.</p> <p>The UK’s Department of Business, Energy and Industrial Strategy UK (BEIS) administers marine environmental regulations associated with oil and gas exploration and production and the decommissioning of marine installations, wells, pipelines and associated infrastructure in the UK marine area (excluding internal waters). The Oil and Gas Authority, a Government Company, is the UK licensing authority for oil and gas exploration, development and production (excluding internal waters).</p> <p>The Crown Estate has an interest as the seabed and subsurface owner and leasing authority.</p>

## **Coastal infrastructure: Coastal docks, ports & marinas and Coastal defence & land claim**

In Red Bay there are two mooring areas close to the MCZ: Cushendall (including Cushendall Yacht Club), known locally as the Waterfoot Slipway, and Waterfoot/Red Bay Pier. There are no permanent visitor moorings at present although in the past there were moorings owned by the local council which were managed by Red Bay Boats. Fishing vessels and fish farm service vessels tend to moor alongside the pier.

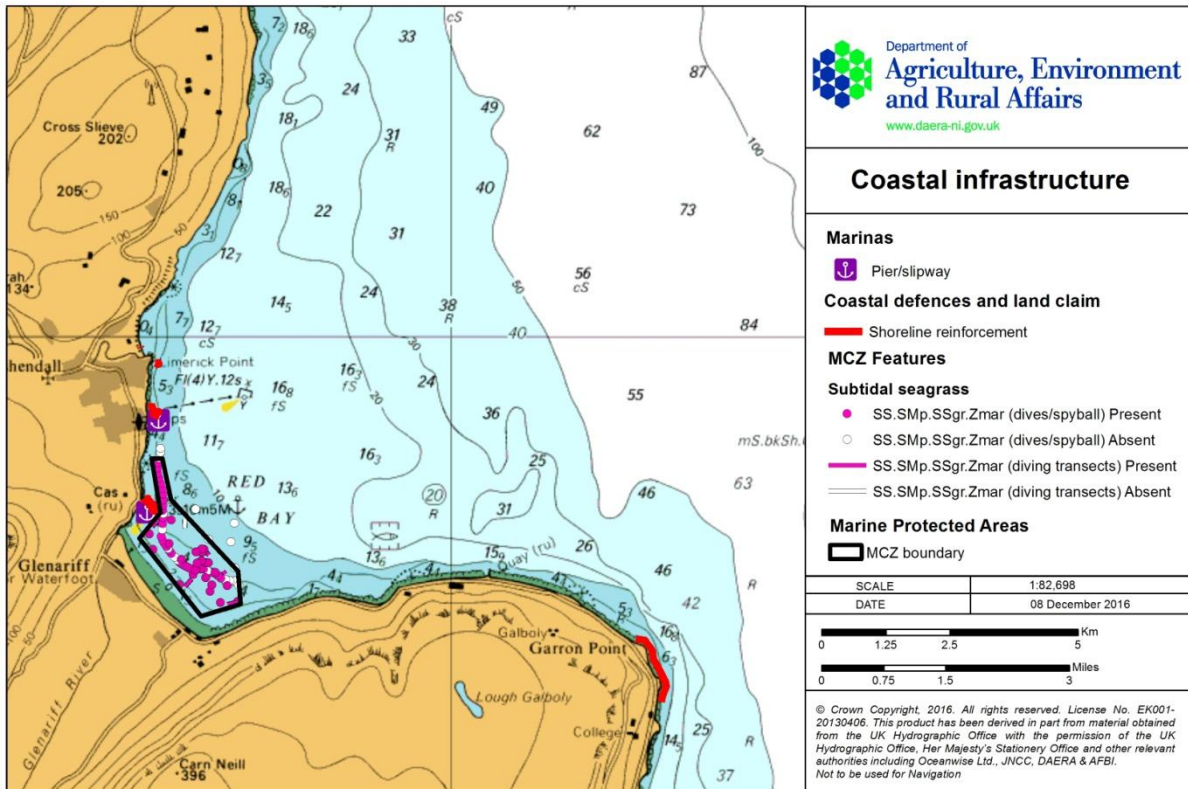
Coastal defences and land reclaim are localised management practices used to reduce the impact of erosion. The Red Bay area has hard coastal reinforcement close to the pier and Limerick point.

Infrastructure within or adjacent to the MCZ is shown in Figure 6. There is no spatial overlap of any infrastructure with the MCZ boundary. However, the construction, operations and maintenance of structures adjacent to the MCZ have the potential to cause damage to the Seagrass bed. Specifically, the operations and expansion of existing infrastructure at Waterfoot Pier could affect the MCZ feature.

The main pressures linked to infrastructure operations in the area to which Subtidal seagrass beds have low to moderate vulnerability are: **water flow** (increase or decrease in tidal current) **changes** (including sediment transport considerations), **emergence regime changes** (includes tidal level change considerations), **wave exposure changes**, **nutrient enrichment**, **organic enrichment**, **physical loss** (to land or freshwater habitat), **physical change** (to another seabed type), **habitat structure changes**, **overall abrasion** (surface and subsurface), **changes in suspended solids** (water clarity), **siltation rate changes** (including smothering), **introduction of light**, **introduction or spread of non-indigenous species** and **introduction of microbial pathogens**.

Habitat loss or alteration and direct damage to individual species are the main risks associated with development of new infrastructure operations. In addition, the construction of new infrastructure may affect the local hydrodynamic and sediment transport regimes; consequently, this may affect the sand substratum leading to a loss of associated species. However, it is considered, at present, that **there is no risk to the achievement of the conservation objectives for the MCZ features** unless the location or intensity of Coastal infrastructure or associated operations was to change in the future.





**Figure 6** Location of coastal infrastructure in relation to Waterfoot MCZ

**Table 5** Potential Management Options for coastal infrastructure

<b>Potential Management Options</b>	<b>No additional management is required.</b>
<b>Proposed way forward</b>	The Department will continue discussions with those involved with Coastal infrastructure activities and operations within or adjacent to the MCZ to help us to understand more about the interactions with the MCZ feature.
<b>Relationship with existing Management Options</b>	<p>Any development of the marina will require a licence from the Department while planning decisions will be made by the local councils.</p> <p>The Rivers Agency (within the Department for Infrastructure, DfI) is responsible for sea defences designated under the Drainage (Northern Ireland) Order 1973.</p>

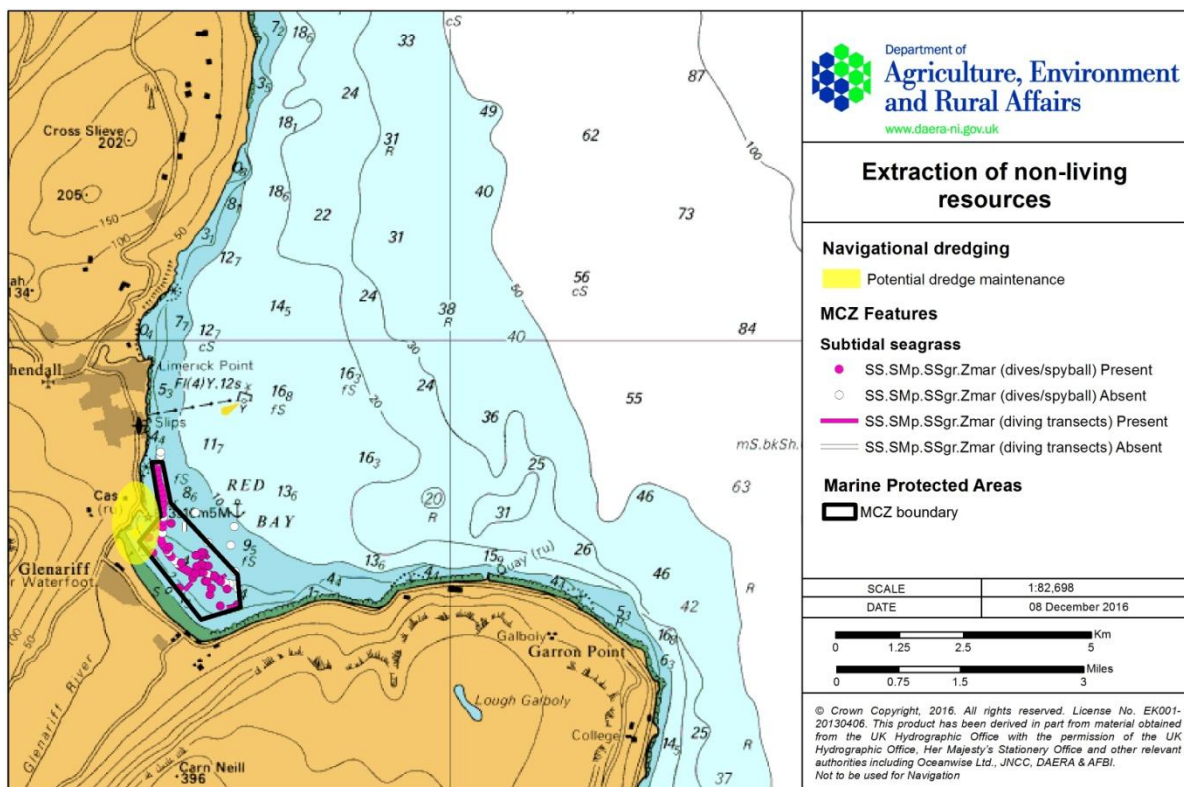
## Extraction of non-living resources: Navigational dredging (capital & maintenance)

Dredging for maintenance purposes is a fundamental activity for ports, harbours and piers to ensure operational charted depths are maintained for safe access of vessels.

Potential dredging areas are shown in Figure 7. The potential environmental effects of maintenance dredging are generally two-fold, firstly as a result of the dredging process itself (removal of species/habitat) and secondly as a result of the disposal of the dredged material (smothering/siltation; this is covered in the section on Waste management). Due to the proximity of Waterfoot Pier to the MCZ boundary there is a risk that this activity may adversely affect the MCZ feature.

Dredging gears have major impacts on Seagrass beds as they can **remove non-target species, introduce microbial pathogens, and non-indigenous species, overall abrasion** (surface and subsurface) (uproot plants or damage leaves) or can alter the sediment regime leading to **habitat structure changes**. They can also result in **nutrient and organic enrichment, water flow** (increase or decrease in tidal current) **changes** (including sediment transport considerations), **changes in suspended solids** (water clarity) and **siltation rate changes** (including smothering).

The Department has held discussions with the Royal National Lifeboat Institution (RNLI) regarding the submission of a marine licence application for capital dredge works within the area highlighted in Figure 7. It is considered that, at present, **there is no risk to the achievement of the conservation objectives for the MCZ feature.**



**Figure 7** Location of potential dredging sites in relation to Waterfoot MCZ

**Table 6** Potential Management Options for extraction of non-living resources

<p><b>Potential Management Options</b></p>	<p><b>No additional management is required.</b></p>
<p><b>Proposed way forward</b></p>	<p>The Department will continue discussions with the Harbour Authorities and relevant stakeholders to develop appropriate management measures.</p>
<p><b>Relationship with existing Management Options</b></p>	<p>The Department is responsible for licensing dredging and disposal activities in the Northern Ireland inshore region. The potential impact to the MCZ feature will be considered during the assessment process.</p> <p>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.</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>

## **Waste management activities: Sewage disposal (Waste water treatment works & outfalls)**

Waste water effluent is discharged from two sewage treatment works (outfalls) in the Red Bay area. Most sewage from the Waterfoot area is pumped to Cushendall Waste Water Treatment Works. The screened effluent is discharged via a long sea outfall more than 2km to the north east of the Waterfoot area. Although there is no secondary treatment for the discharge, the remote offshore location of the outfall pipe into the Bay and the North Channel allows the effluent to disperse and the Waterfoot Bathing Water Quality for 2016 was classified as Good ([Bathing Water Profile Waterfoot May 2016](#)).

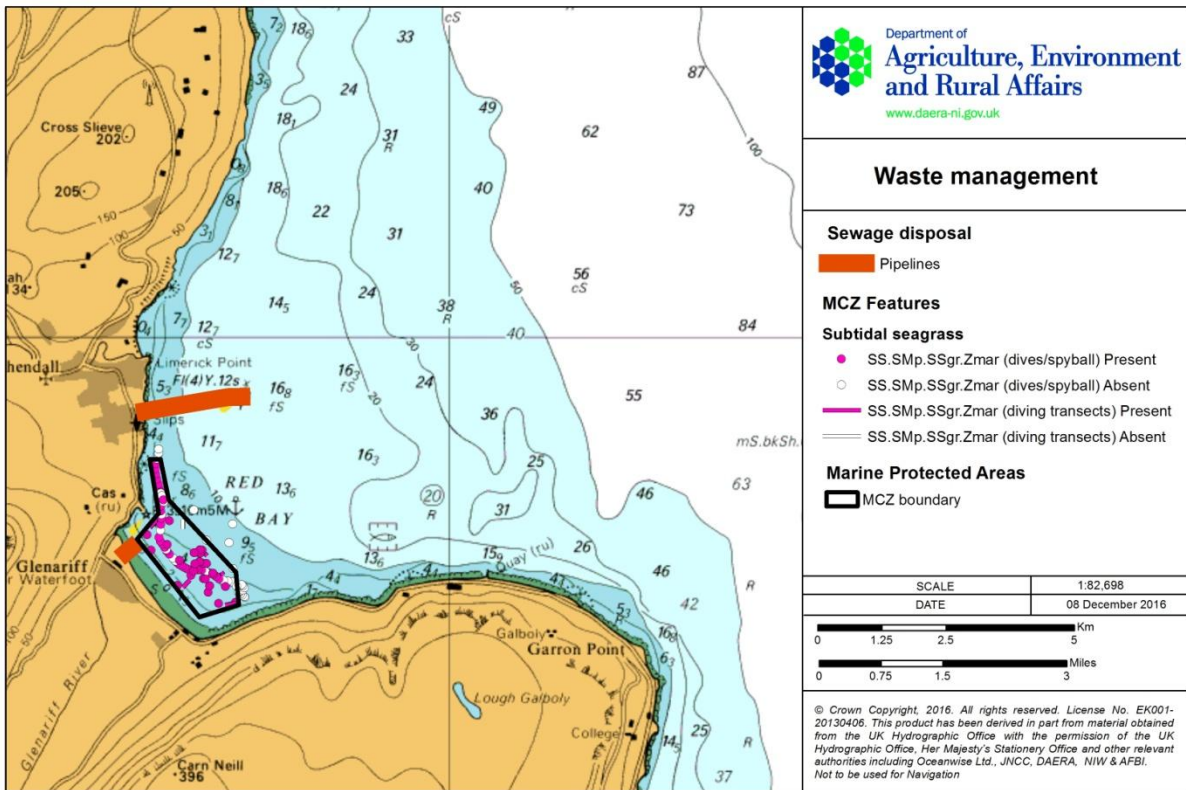
Another significant source of nutrients into the Red Bay area is via the Glenariff River which may contain diffuse agricultural pollution.

Seagrass beds have a moderate vulnerability to **temperature** and **salinity changes** and **organic and nutrient enrichment**. The feature has a high vulnerability to **changes in suspended solids** (water clarity), **siltation changes** (including smothering), **introduction of light**, **introduction or spread of non-indigenous species** and **microbial pathogens**.

An increase in organic particulate matter, leading to a reduction in light penetration, increased smothering and subsequent reduction of the water flow around seagrass leaves, can adversely damage seagrass and the associated community structure. Similarly, an increase in localised eutrophication could result in the dominance of opportunistic algal species such as *Ulva* sp. which could overgrow the seagrass plants resulting in seagrass die-back. Subtidal seagrass has a low tolerance and slow recovery to the above mentioned pressures.

There is no direct spatial overlap with the MCZ. Although the outfalls are close to this site the activity is regulated (see Table 7) and therefore **there is no risk to the achievement of the conservation objectives** for the designated feature.

At present, there are no licensed dredge disposal sites within the vicinity of the MCZ; this may change with future submissions of capital dredge licence applications. Seagrass beds have a moderate vulnerability to **organic and nutrient enrichment** and a high vulnerability to **changes in suspended solids** (water clarity), **siltation changes** (including smothering) and **introduction of light** associated with dredge disposal. **It is considered that the risk of not achieving the conservation objectives for the feature is negligible unless the location of the dredge disposal activity was to change in the future. At present no additional management is required.**



**Figure 8** Location of sewage disposal sites in relation to Waterfoot MCZ

**Table 7** Potential Management Options for waste management

<b>Potential Management Options</b>	<p><b>No additional management is required.</b></p> <p>New applications for sewage or dredge disposal will be subject to the marine licensing and Water Order discharge consent processes which will take the MCZ feature into consideration.</p>
<b>Proposed way forward</b>	<p>Any changes to the current discharge sites will be managed by Northern Ireland Water (NIW) in consultation with the Department to determine any impacts to the MCZ.</p>
<b>Relationship with existing Management Options</b>	<p>NIW is responsible for waste water treatment. Water discharges are governed by requirements in European legislation (The Urban Waste Water Treatment Directive (91/271/EEC), Water Framework Directive (WFD) and Nitrates Directive and Water (Northern Ireland) Order 1999.</p>

**Transport: Shipping – general at sea (moorings, anchorage & vessel movements) and Shipping – port operations within the Harbour Authority limits (mooring, beaching, launching, ferry route etc)**

The Red Bay area is popular for yachting, with frequent visits from Scotland or marine vessels looking for anchorage in a sheltered spot on the passage through the North Channel. Although there is a licensed mooring area and one unrestricted boat anchorage point in the inner part of the Bay (facing Red Bay Castle), anchoring occurs all along Red Bay from Waterfoot to Cushendall. Occasionally, small recreational vessels are observed anchoring in the shallows just off Waterfoot beach. This is normally on calm days and in very shallow water to enable occupants to wade or swim to the beach. This activity may adversely affect the Seagrass feature, either through direct damage or by preventing expansion, if the vessels anchor within the MCZ.

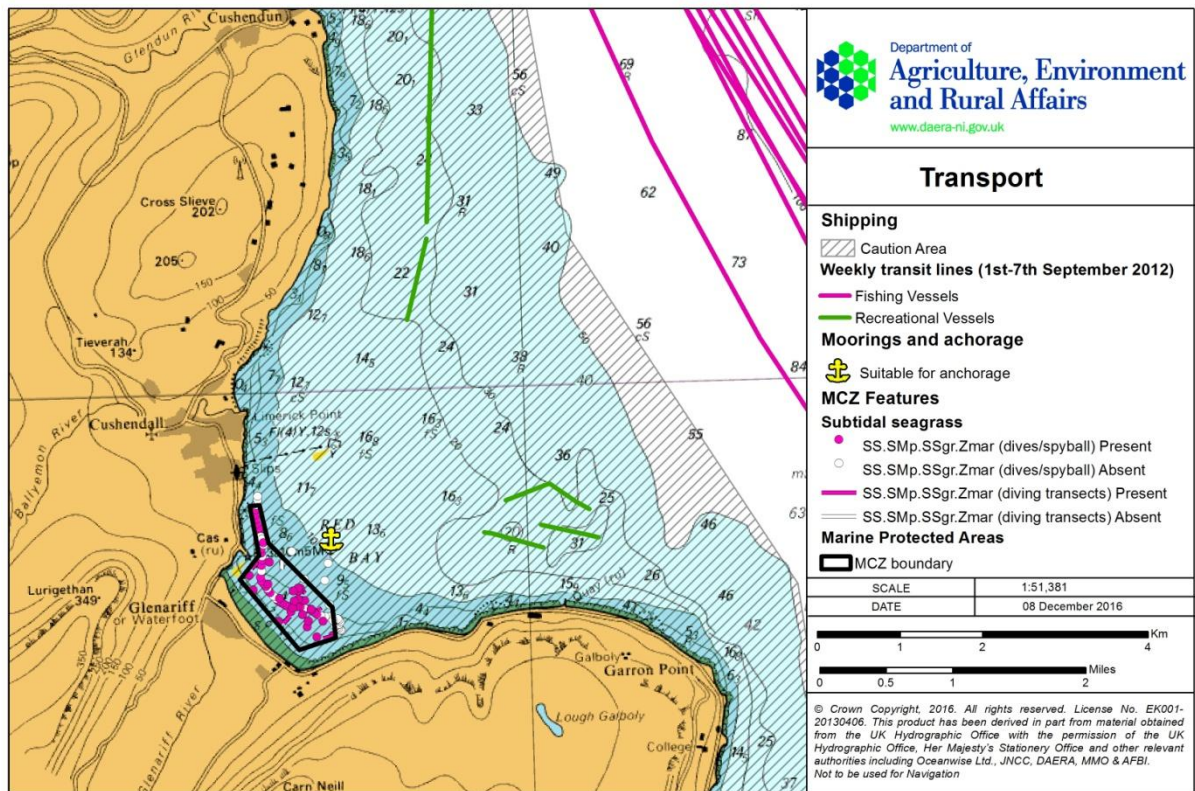
Shipping and navigation records in the area, shown in Figure 9, include fishing vessels and recreational vessels (sailing). The anchor symbol on the map indicates that the whole bay is suitable for anchoring depending on prevailing winds, depth and presence of other vessels or obstructions. Anchoring can therefore occur within the MCZ boundary so it is considered that the risk of damage to the Seagrass bed is high. Larger ships such as coasters and large offshore foreign flagged fishing vessels are known to anchor within the Red Bay anchorage. These vessels require deeper water for safe anchoring and as such are not considered a threat to the MCZ.

The main pressure associated with shipping is **physical abrasion** associated with anchoring/mooring (**surface and sub-surface abrasion/penetration**). Anchoring and mooring can damage vegetation and rhizomes and bury seeds preventing their germination. This leads to increased patchiness and destabilisation of the Seagrass bed. There are also other pressures to which the Seagrass beds have a high vulnerability: **changes in suspended solids** (water clarity), **siltation rate changes** (including smothering), **introduction of light, introduction or spread of non-indigenous species or introduction of microbial pathogens**. Shipping in ports can also cause **wave exposure changes**.

**Anchoring or mooring activity associated with shipping within the MCZ should be removed or avoided to aid in the continued achievement of the conservation objectives.**

**Anchoring in emergency situations will not be restricted.**

Any activity associated with port operations within the Harbour Authority limits is likely to be regulated therefore the Department considers that no additional management is required for this activity.



**Figure 9** Location of transport activities in relation to Waterfoot MCZ

**Table 8** Potential Management Options for transport

<p><b>Potential Management Options</b></p>	<p>Management measures are recommended to remove or avoid pressures associated with shipping – general at sea (anchoring and mooring) where these are likely to impact the MCZ.</p> <p>Anchoring in emergency situations will not be restricted.</p> <p>No additional management is required for shipping – port operations within the Harbour Authority limits.</p>
<p><b>Proposed way forward</b></p>	<p>The Department will continue to engage with those stakeholders involved in marine traffic in the Red Bay area to develop appropriate management measures.</p>
<p><b>Relationship with existing Management Options</b></p>	<p>Permanent moorings are leased by the Crown Estate, as owners of the seabed. Any new moorings will require a marine licence from the Department.</p>

**Recreation and leisure: Recreational activities – SCUBA diving, sailing, windsurfing, kayaking/canoeing, bird watching, recreational sea angling, recreational fishing and Coastal tourist sites (public beaches & resorts)**

The Red Bay area lies in the heart of the Glens of Antrim and is part of the Causeway Coastal Route. The area is popular with tourists, with walkers and campers frequenting Glenariff Forest Park while bathers are common on Waterfoot and Cushendall beaches. Waterfoot is a formally identified Bathing Water Beach and the Bathing Water Quality for 2016 was classified as Good ([Bathing Water Profile Waterfoot May 2016](#)).

Increase in the population of the local area may lead to an increase in the quantity of sewage discharged or increased disturbance to natural features and wildlife within the Red Bay area.

Water sports in the area are significant. A coastal canoe trail runs from Ballycastle to Larne with access points at Cushendall and Waterfoot. There is a history of jet-ski use in the area with jet-skis being launched off the beach and operating at speed within shallow areas. There is also an outdoor adventure centre in Cushendall organising activities such as coasteering and kayaking. Cushendall harbour hosts the Red Bay Sub-Aqua Diving Club, The Royal National Lifeboat Institution Red Bay (RNLI), Red Bay Boats (a powerboat manufacturing business) and Cushendall Sailing and Boating Club (CSBC). CSBC organises races and regattas in Red Bay for cruising yachts and sailing dinghies and also holds provincial and national events.

The Red Bay area is popular for shore (piers and beaches) and boat angling with peak times between August and September. Cod, plaice and dogfish are commonly landed here. The salmon cages to the south east of the bay attract coalfish and mackerel most of the year.

Charter boats in the area offer fishing, sightseeing and marine wildlife observer trips along the Antrim Coast.

Figure 10 shows some of the recreation activities and tourism in the Red Bay area. There is spatial overlap between kayaking and the MCZ. As sailing, yachting and power-boating may also occur within the MCZ there is a risk that these activities may impact or damage the designated feature.

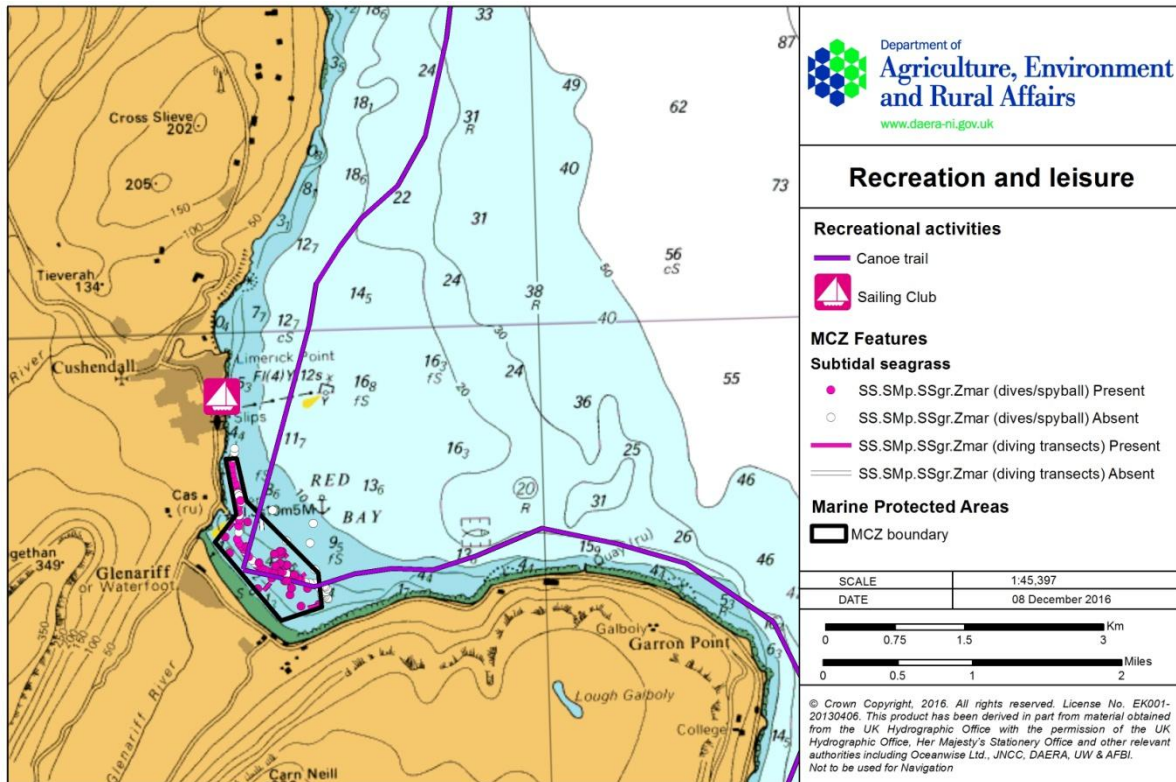
Seagrass beds have low to moderate vulnerabilities to the following pressures associated with recreation and leisure: **overall abrasion** (surface and subsurface), **changes in suspended solids, siltation rate changes** (including smothering), **introduction of light, introduction of non-indigenous species and microbial pathogens and removal of target and non-target species.**

Power boats, motor boats and yachts could cause abrasive damage to vegetation and rhizomes and increase turbidity through sediment suspension which buries seeds, affecting the structure and distribution of shallow Seagrass beds. The Department does not consider the transit of vessels within the MCZ to require active management; however, the use of anchors, moorings or buoys should be avoided in order to aid the continued achievement of the conservation objectives. It is considered that the **pressures associated with recreation and leisure activities (e.g. anchoring/mooring) should be removed or avoided within the MCZ.**



**Anchoring in emergency situations will not be restricted.**

The Department considers that shore based activities associated with Waterfoot beach, such as sunbathing, walking or bird watching are unlikely to impact the MCZ and the seagrass beds are subtidal .



**Figure 10** Location of recreation and leisure activities in relation to Waterfoot MCZ

**Table 9** Potential Management Options for recreation and leisure

<p><b>Potential Management Options</b></p>	<p><b>Management measures are recommended to remove or avoid pressures associated with recreation and leisure (e.g. anchoring and mooring) where they are likely to impact the MCZ feature.</b></p> <p><b>Anchoring in emergency situations will not be restricted.</b></p> <p><b>No additional management required for Coastal tourist sites.</b></p>
<p><b>Proposed way forward</b></p>	<p>The Department will continue discussions with those involved with recreation and leisure activities in the Red Bay area to develop appropriate management measures.</p>

**Relationship with existing Management Options**

DfE is responsible for tourism policy while District Councils have a role in promoting local tourism and recreation.

The Department is responsible for inland fisheries while DfC has responsibility for arts, culture and sport and DfI is responsible for inland waterways. Licences for angling (salmon and sea trout) are also issued by the Department.

The Crown Estate and The Department are responsible for the licensing of any proposed moorings within the MCZ.

## Marine research: Scientific and Archaeological

The Red Bay area is subjected to a variety of environmental monitoring programmes (refer to Figure 11).

The Department, together with National Museums of Northern Ireland (NMNI), completed a series of Sublittoral Dive Surveys (SSNI 2006, 2009 & 2011) to collect data on the distribution and condition of Northern Ireland Conservation Priority Species. Drop-camera and grab surveys were also carried out by the Department within the MCZ area to assess the condition and extent of the MCZ features.

There is also a DAERA sampling site for macroalgal monitoring of intertidal rocky shores under the Water Framework Directive (WFD).

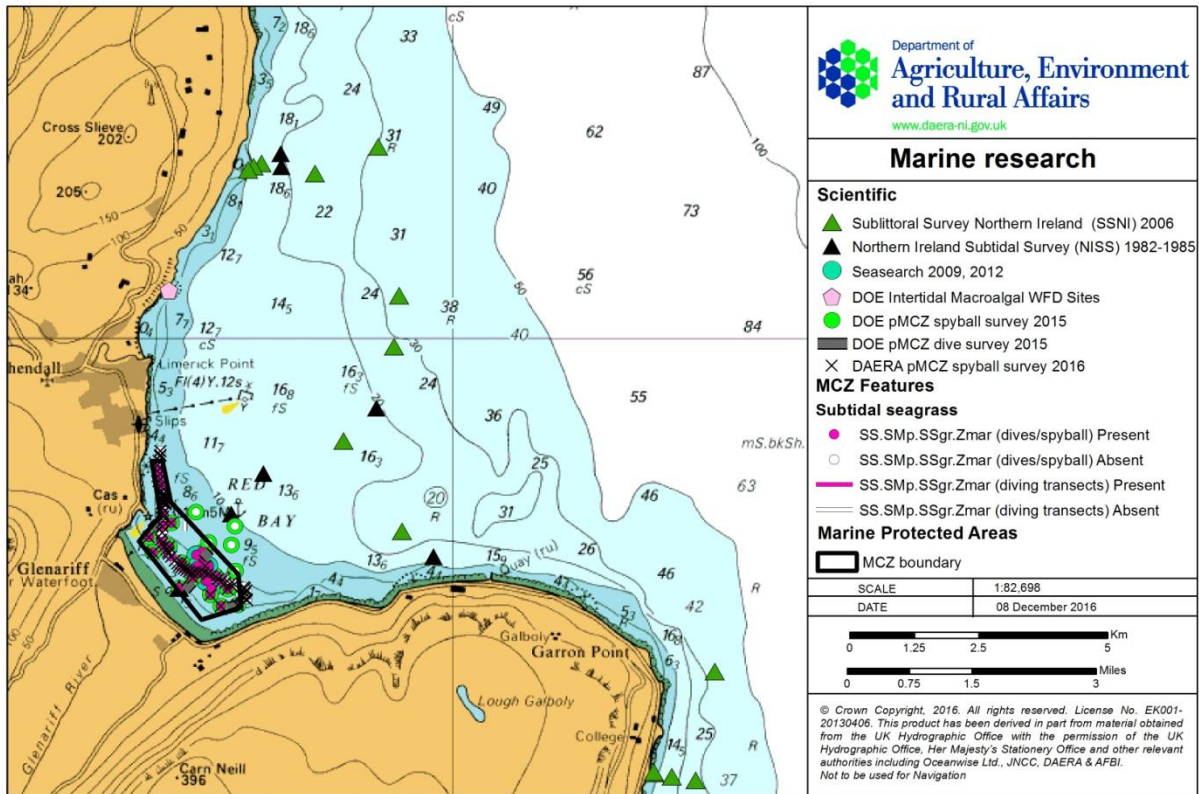
Additionally, the Department carries out diving/monitoring of the seabed under Glenarm Salmon sea-cages to check compliance with consent conditions. The seabed is also monitored at a distance of 1km from the cages to provide reference conditions.

There are no recorded archaeological features falling within the boundaries of the Waterfoot MCZ. However, there are a number of historic wrecks located within the wider Red Bay area (although the location of these wrecks is not yet confirmed). Given locational discrepancies, the possibility of wrecks lying inside the MCZ cannot be discounted but these features are likely to be buried and/or fragmentary.

Marine research may have the potential to cause **habitat structure changes**, **overall abrasion** (surface and subsurface), **changes in suspended solids** (water clarity), **siltation rate changes** (including smothering), **introduction of light**, **introduction or spread of non-indigenous species** and **introduction of microbial pathogens**.

Strict guidelines and practices developed by the Joint Nature Conservation Committee (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 feature is low since marine research activities under the above mentioned surveys are performed by trained, qualified staff using non-invasive techniques (where possible) such as acoustic and video methodologies. In addition, the Department must be notified before any activities within the MCZ take place and will require the provision of detailed methodologies for all marine research to assess if any impacts to the MCZ feature are likely to occur.**



**Figure 11** Location of marine research activities in relation to Waterfoot MCZ

**Table 10** Potential Management Options for marine research

<p><b>Potential Management Options</b></p>	<p><b>No additional management required.</b></p> <p><b>Anchoring in emergency situations will not be restricted.</b></p>
<p><b>Proposed way forward</b></p>	<p>The Seagrass bed 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 marine research activities prior to these being carried out to assess if any impacts to the MCZ feature are likely to occur.</p>
<p><b>Relationship with existing Management Options</b></p>	<p>Delivered by the Department under international, European and national legislation with marine component (Marine Strategy Framework Directive; Marine and Coastal Access Act 2009; The Marine Act (Northern Ireland) 2013; OSPAR).</p>

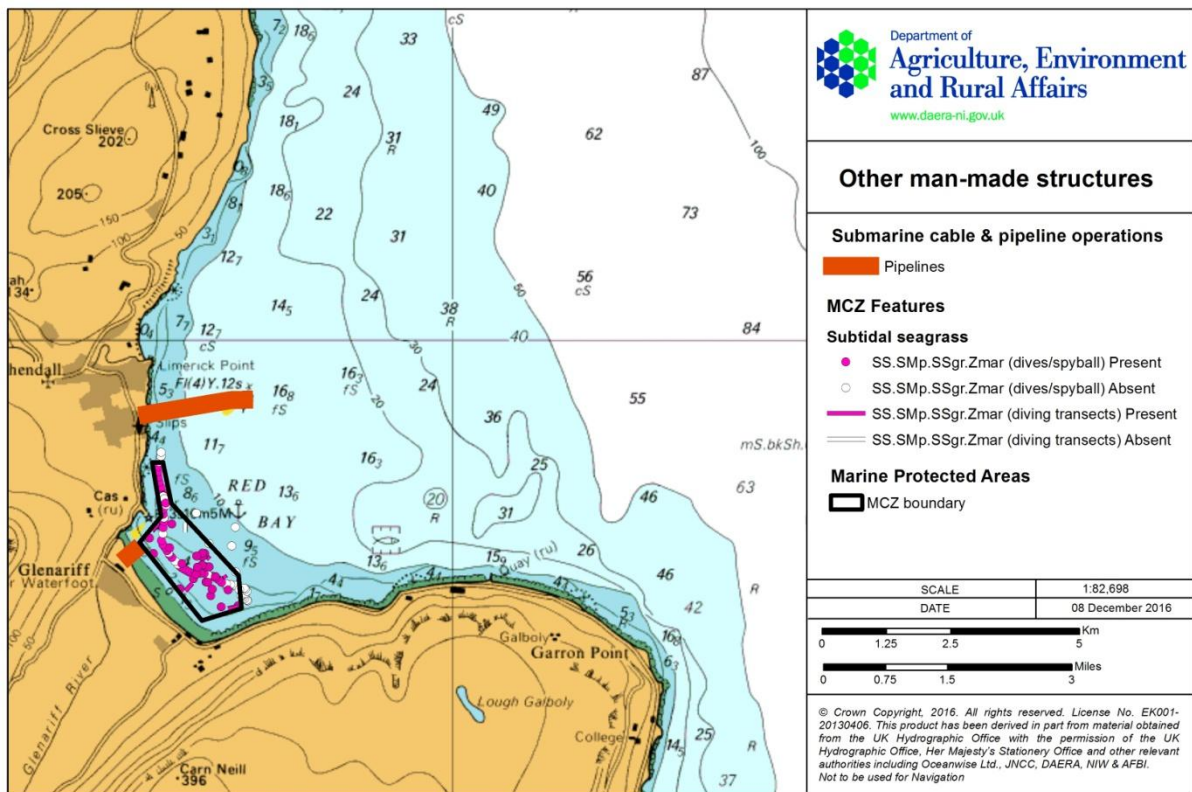
## Other man-made structures: Submarine cable & pipeline operations

There are no known submarine cables in the vicinity of the MCZ.

There are two outfall pipes in the Red Bay area; one to the north of the MCZ and one which extends to the boundary of the MCZ (see Figure 12). Both of these pipelines are discharge pipes for sewage treatment works and the pressures associated with waste disposal have already been covered in the Waste management section.

Construction or maintenance activities of the outfall pipe have the potential to cause physical damage to habitats. Seagrass beds have low to moderate vulnerability to **temperature changes, physical changes** (to another seabed type), **habitat structure changes, overall abrasion** (surface and subsurface), **changes in suspended solids** (water clarity), **siltation rate changes (including smothering)**, **introduction of light, introduction or spread of non-indigenous species** and **introduction of microbial pathogens**.

It is considered that the risk of not achieving the conservation objectives of the designated feature is low since any construction or maintenance activities associated with the pipeline may require a marine licence.



**Figure 12** Location of other man-made structures in relation to Waterfoot MCZ

**Table 11** Potential Management Options for other man-made structures

<p><b>Potential Management Options</b></p>	<p><b>No additional management is required.</b> <b>Emergency operations will not be restricted.</b></p>
<p><b>Proposed way forward</b></p>	<p>Any proposed maintenance works (including construction) to the pipeline may require a marine licence from the Department. The potential impact to the MCZ feature will be considered during the assessment process.</p>
<p><b>Relationship with existing Management Options</b></p>	<p>NIW is responsible for waste water treatment and the construction, operation and maintenance of sewage outfalls. Water discharges are governed by requirements in European legislation (The Urban Waste Water Treatment Directive (91/271/EEC), Water Framework Directive (WFD) and Nitrates Directive and Water (Northern Ireland) Order 1999.</p>

## Summary of Potential Management Options

**Table 12** Potential Management Options for Waterfoot MCZ

<p><b>Production of living resources:</b> <i>Aquaculture – finfish</i></p>	<p><b>No additional management is required.</b></p>
<p><b>Extraction of living resources:</b> <i>Fishing – dredging</i></p> <p><i>Fishing – traps (creeling/potting)</i></p>	<p><b>Management measures are recommended to remove or avoid pressures associated with scallop dredging within the MCZ.</b></p> <p><b>Management measures are recommended to remove or avoid pressures associated with fishing with traps (creels and pots) within the MCZ.</b></p>
<p><b>Energy generation (potential):</b> <i>Renewable Energy and Marine Hydrocarbon Extraction</i></p>	<p><b>No additional management is required.</b></p>
<p><b>Coastal infrastructure:</b> <i>Coastal docks, ports &amp; marinas and Coastal defence &amp; land claim</i></p>	<p><b>No additional management is required.</b></p>
<p><b>Extraction of non-living resources:</b> <i>Navigational dredging (capital &amp; maintenance)</i></p>	<p><b>No additional management is required.</b></p>
<p><b>Waste management:</b> <i>Sewage disposal</i></p>	<p><b>No additional management is required.</b></p>
<p><b>Transport:</b> <i>Shipping – general at sea (mooring, anchorage &amp; vessel movements)</i></p> <p><i>Shipping – port operations within the Harbour Authority limits (mooring, beaching, launching etc)</i></p>	<p><b>Management measures are recommended to remove or avoid pressures associated with shipping – general at sea (anchoring and mooring) where these are likely to impact the MCZ.</b></p> <p><b>Anchoring in emergency situations will not be restricted.</b></p> <p><b>No additional management is required.</b></p>

<p><b>Recreation and leisure:</b> <i>Recreational activities – SCUBA Diving, sailing, windsurfing, kayaking/canoeing, bird watching, recreational fishing</i></p> <p><i>Coastal tourist sites (public beaches &amp; resorts)</i></p>	<p><b>Management measures are recommended to remove or avoid pressures associated with recreation and leisure (anchoring and mooring) where they are likely to impact the MCZ feature.</b></p> <p><b>Anchoring in emergency situations will not be restricted.</b></p> <p><b>No additional management is required.</b></p>
<p><b>Marine research:</b> <i>Scientific and Archaeological</i></p>	<p><b>No additional management is required.</b></p> <p><b>Anchoring in emergency situations will not be restricted.</b></p>
<p><b>Other man-made structures:</b> <i>Submarine cable &amp; pipeline operations</i></p>	<p><b>No additional management is required.</b></p> <p><b>Emergency operations will not be restricted.</b></p>



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## Annex I

### Conservation Objectives for Waterfoot MCZ

In general the conservation objectives for Waterfoot MCZ 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 the habitat's extent is stable or increasing and its structures, functions, quality and the composition of its characteristic biological communities (including diversity and abundance) are such that it remains in a healthy condition, which is not deteriorating. 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.

'Favourable condition' in relation to marine species, means that the quality and quantity of the species habitat and the composition of its population in terms of number, age and sex ratio ensures that the population is maintained in numbers that enable it to thrive.

The conservation objective has been drafted for the MCZ feature of Seagrass beds but reference is also 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 favourable condition, i.e. the condition in which the habitat or species is capable of sustaining itself on a long-term basis.

## Conservation Objective

To *maintain*<sup>1</sup> the Seagrass beds in *favourable condition*, taking account of natural change such that:

- The natural environmental quality<sup>2</sup> is maintained
- The natural environmental processes<sup>3</sup> are maintained
- The extent<sup>4</sup>, diversity<sup>5</sup>, community structure<sup>6</sup> and typical species<sup>7</sup> representative of the habitat are maintained.

Reference is also given to:

Gravel and sand communities and Mixed sediment communities

### *Explanation of terms used in the Conservation Objectives*

#### *1. Maintain or Restore/recover*

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*.

Restore/recover 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.

For Seagrass beds a survey of its distribution and species counts in sample areas will provide sufficient information.

The following table (Table 13) 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 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 Waterfoot MCZ

To effectively describe, monitor and manage the defined habitat feature it has been necessary to include associated habitats, named here as sub-features. Sub-features are distinct biological communities (e.g. sand and gravel communities, mixed sediment communities) or particular structural or geographical elements of the feature. It has often proved helpful, both in the development of conservation objectives and of monitoring programs, to separate the feature in to a number of constituent sub-features, and then to identify attributes and targets for the sub-features.

Feature	Sub-Feature	Attribute	Measure	Target	Comments
<b>Subtidal (sublittoral) sand</b>		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.



Feature	Sub-Feature	Attribute	Measure	Target	Comments
	<b>Seagrass beds</b>	Extent	Area (ha) of Seagrass beds measured during peak growth period twice during reporting cycle.	No decrease in extent from an established baseline subject to natural change.	The extent and distribution of the Seagrass beds provides a long-term integrated measure of environmental conditions.
		Characteristic epiphytic species – density of <i>Zostera marina</i>	Average density, measured during peak growth period twice during reporting cycle.	Average density should not deviate significantly from an established baseline, subject to natural change.	An early indicator of seagrass under stress is a reduction in biomass, i.e. the number and length of leaves. Density is preferred as a surrogate for biomass, being less destructive, based on baseline survey to establish the relationship between density and biomass at a site.
		Characteristic species – epiphyte community	Presence and abundance of epiphytic species measured during August/September twice during reporting cycle	Presence and abundance of epiphytic species should not deviate significantly from the established baseline, subject to natural change.	The occurrence and frequency of epiphytes is indicative of the structure of the seagrass bed communities. It gives an indication of their quality and changes in epiphytic composition may indicate cyclic change/trend in the host biotope or the Subtidal sandbank communities as a whole.

Feature	Sub-Feature	Attribute	Measure	Target	Comments
		Nutrient status – green algal mat	Extent across whole or parts of the site, measured during peak growth period every 3 years during the reporting cycle.	No increase in extent of green algal mats from an established baseline, subject to natural change.	Nutrient status is a key functional factor that influences the sub- feature as opportunistic macroalgae compete with seagrass and affect the associated species. Increase in filamentous green algae may be a related natural phenomenon or may indicate eutrophication.
	Gravel and sand communities	Species composition of characteristic biotopes	Presence and abundance of composite species from some or all of the biotopes. Measured once during reporting cycle.	Presence and abundance of composite species should not deviate significantly from an established baseline, subject to natural	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
				change.	biotopes and change in composition may indicate cyclic change/trend in Subtidal sandbank communities.
	Mixed sediment communities	Species composition of characteristic biotopes	Frequency and occurrence of composite species from some or all of the biotopes. Measured once during reporting cycle.	Presence and abundance of composite species from some or all of the biotopes. Measured once during reporting cycle.	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

## Annex II

### Priority Marine Features (PMFs)

**Table 1** List of Priority Marine Features recorded as present within the MCZ

Habitats	
Subtidal (sublittoral) sand	
Subtidal (sublittoral) seagrass beds	
Low mobility species	
Common name	Latin name
Masked crab	<i>Corystes cassivelanus</i>
European lobster	<i>Homarus gamarus</i>
Ocean quahog	<i>Arctica islandica</i>
Highly mobile species	
Common name	Latin name
Lesser spotted dogfish	<i>Scyliorhinus canicula</i>
Cod	<i>Gadus morhua</i>
Plaice	<i>Pleuronectes platessa</i>
Sand eel	<i>Ammodytes tobianus</i>

## Annex III

### Sensitivity, exposure and vulnerability Matrix for Waterfoot MCZ

**Vulnerability Key:** ■ High vulnerability ■ Moderate vulnerability ■ Low vulnerability □ No vulnerability ■ Unknown

**Table 1** Subtidal (sublittoral) sand (SS): Seagrass (*Zostera marina*) beds (SG) Vulnerability Assessment

The vulnerability to each pressure is derived from the sensitivity of the feature to the activity combined with its current exposure to that activity (i.e. to what degree the activity is occurring). The vulnerability rating/score provides a ‘snapshot’ of what is occurring at the time of the assessment – when considering new activities the exposure will be reassessed to give a new vulnerability rating.

Pressure category	Pressures	Activities associated in the area	SS: SG		
			Sensitivity	Exposure	Vulnerability
Hydrological pressures	Temperature changes - local	Waste management: <i>Sewage disposal</i>	●●	●●	Moderate
		Other man-made structures: <i>Submarine cable &amp; pipeline</i>	●●	●	Low
	Salinity changes - local	Waste management: <i>Sewage disposal</i>	●●	●●	Moderate
	Water flow (tidal current) changes (including sediment transport considerations)	Production of living resources: <i>Aquaculture – finfish</i>	●●	●	Low
		Coastal infrastructure: <i>Coastal docks, ports &amp; marinas. Coastal defence &amp; land claim</i>	●●	●	Low
		Extraction of non-living resources: <i>Navigational dredging (capital &amp; maintenance)</i>	●●	●●	Moderate

		Recreation and leisure: <i>Coastal tourist sites (public beaches &amp; resorts)</i>		•	Low
	<b>Emergence regime changes (includes tidal level change considerations)</b>	Coastal infrastructure: <i>Coastal docks, ports &amp; marinas. Coastal defence &amp; land claim</i>	••	•	Low
	<b>Wave exposure changes</b>	Coastal infrastructure: <i>Coastal docks, ports &amp; marinas. Coastal defence &amp; land claim</i>		•	Low
		Transport: <i>Shipping – port operations (mooring, beaching, launching, ferry route etc.)</i>	••	••	Moderate
		Recreation and leisure: <i>Coastal tourist sites (public beaches &amp; resorts)</i>		•	Low
<b>Pollution and other Chemical pressures</b>	<b>Non-synthetic compound contamination - Transition elements &amp; organo-metals</b>		○		No
	<b>Non-synthetic compound contamination - Hydrocarbon &amp; PAH Contamination</b>		○		No
	<b>Synthetic compound contamination</b>		○		No
	<b>Radionuclide contamination</b>		?		Unknown

	<b>Introduction of other substances (solid, liquid or gas)</b>		○		<b>No</b>
	<b>De-oxygenation</b>		○		<b>No</b>
	<b>Nutrient enrichment</b>	Production of living resources: <i>Aquaculture – finfish</i>	••	•	<b>Low</b>
		Coastal infrastructure: <i>Coastal docks, ports &amp; marinas. Coastal defence &amp; land claim</i>		•	<b>Low</b>
		Extraction of non-living resources: <i>Navigational dredging (capital &amp; maintenance)</i>		••	<b>Moderate</b>
		Waste management: <i>Sewage disposal</i>		••	<b>Moderate</b>
	<b>Organic enrichment</b>	Production of living resources: <i>Aquaculture – finfish</i>	••	•	<b>Low</b>
		Coastal infrastructure: <i>Coastal docks, ports &amp; marinas. Coastal defence &amp; land claim</i>		•	<b>Low</b>
		Extraction of non-living resources: <i>Navigational dredging (capital &amp; maintenance)</i>		••	<b>Moderate</b>
		Waste management: <i>Sewage disposal</i>		••	<b>Moderate</b>

<b>Physical loss</b>	<b>Physical loss (to land or freshwater habitat)</b>	Coastal infrastructure: <i>Coastal docks, ports &amp; marinas. Coastal defence &amp; land claim</i>	•••	•	<b>Moderate</b>
	<b>Physical change (to another seabed type)</b>	Extraction of living resources: <i>Fishing – dredging</i>	•••	••	<b>High</b>
		Coastal infrastructure: <i>Coastal docks, ports &amp; marinas. Coastal defence &amp; land claim</i>		•	<b>Moderate</b>
		Recreation and leisure: <i>Coastal tourist sites (public beaches &amp; resorts)</i>		•	<b>Moderate</b>
		Other man-made structures: <i>Submarine cable &amp; pipeline operations</i>		•	<b>Moderate</b>
		Production of living resources: <i>Aquaculture – finfish</i>		•	<b>Moderate</b>
<b>Physical damage</b>	<b>Habitat structure changes</b>	Extraction of living resources: <i>Fishing – dredging</i>	••	<b>High</b>	
		Coastal infrastructure: <i>Coastal docks, ports &amp; marinas. Coastal defence &amp; land claim</i>	•	<b>Moderate</b>	
		Extraction of non-living resources: <i>Navigational dredging (capital &amp; maintenance)</i>	••	<b>High</b>	

		Recreation and leisure: <i>Coastal tourist sites (public beaches &amp; resorts)</i>		•	Moderate	
		Marine research: <i>Scientific and Archaeological</i>		•	Moderate	
		Other man-made structures: <i>Submarine cable &amp; pipeline operations</i>		•	Moderate	
	<b>Penetration and/or disturbance of the substrate below the surface of the seabed - (Overall abrasion)</b>	Production of living resources: <i>Aquaculture – finfish</i>	•••		•	Moderate
		Extraction of living resources: <i>Fishing – dredging</i>			••	High
		Coastal infrastructure: <i>Coastal docks, ports &amp; marinas. Coastal defence &amp; land claim</i>			•	Moderate
		Extraction of non-living resources: <i>Navigational dredging (capital &amp; maintenance)</i>			••	High
		Transport: <i>Shipping – general at sea (moorings, anchorage &amp; vessel movements)</i>			••	High
		Transport: <i>Shipping – port operations (mooring, beaching, launching, ferry route etc.)</i>			••	High
		Recreation and leisure: <i>Recreational activities</i>			•	Moderate



		Recreation and leisure: <i>Coastal tourist sites (public beaches &amp; resorts)</i>		•	Moderate	
		Marine research: <i>Scientific and Archaeological</i>		•	Moderate	
		Other man-made structures: <i>Submarine cable &amp; pipeline operations</i>		•	Moderate	
	<b>Abrasion/disturbance of the surface of the substratum or seabed</b>	Production of living resources: <i>Aquaculture – finfish</i>	••		•	Low
		Extraction of living resources: <i>Fishing – dredging</i>			••	Moderate
		Coastal infrastructure: <i>Coastal docks, ports &amp; marinas. Coastal defence &amp; land claim</i>			•	Low
		Extraction of non-living resources: <i>Navigational dredging (capital &amp; maintenance)</i>			••	Moderate
		Transport: <i>Shipping – general at sea (moorings, anchorage &amp; vessel movements)</i>			••	Moderate
		Transport: <i>Shipping – port operations (mooring, beaching, launching, ferry route etc.)</i>			••	Moderate
		Recreation and leisure: <i>Recreational activities</i>			•	Low

		Recreation and leisure: <i>Coastal tourist sites (public beaches &amp; resorts)</i>	•••	•	Low
		Marine research: <i>Scientific and Archaeological</i>		•	Low
		Other man-made structures: <i>Submarine cable &amp; pipeline operations</i>		•	Low
	<b>Changes in suspended solids (water clarity)</b>	Production of living resources: <i>Aquaculture – finfish</i>		•	Moderate
		Extraction of living resources: <i>Fishing – dredging</i>		••	High
		Coastal infrastructure: <i>Coastal docks, ports &amp; marinas. Coastal defence &amp; land claim</i>		•	Moderate
		Extraction of non-living resources: <i>Navigational dredging (capital &amp; maintenance)</i>		••	High
		Waste management: <i>Sewage disposal</i>		••	High
		Transport: <i>Shipping – general at sea (moorings, anchorage &amp; vessel movements)</i>		••	High
		Transport: <i>Shipping – port operations (mooring, beaching, launching, ferry route etc.)</i>		••	High

		Recreation and leisure: <i>Recreational activities</i>	•	Moderate
		Recreation and leisure: <i>Coastal tourist sites (public beaches &amp; resorts)</i>	•	Moderate
		Marine research: <i>Scientific and Archaeological</i>	•	Moderate
		Other man-made structures: <i>Submarine cable &amp; pipeline operations</i>	•	Moderate
	<b>Siltation rate changes, including smothering</b>	Production of living resources: <i>Aquaculture – finfish</i>	•	Moderate
		Extraction of living resources: <i>Fishing – dredging</i>	••	High
		Coastal infrastructure: <i>Coastal docks, ports &amp; marinas. Coastal defence &amp; land claim</i>	•	Moderate
		Extraction of non-living resources: <i>Navigational dredging (capital &amp; maintenance)</i>	••	High
		Waste management: <i>Sewage disposal</i>	••	High
		Transport: <i>Shipping – general at sea (moorings, anchorage &amp; vessel movements)</i>	••	High

•••

		Transport: <i>Shipping – port operations (mooring, beaching, launching, ferry route etc.)</i>		••	<b>High</b>	
		Recreation and leisure: <i>Recreational activities</i>		•	<b>Moderate</b>	
		Recreation and leisure: <i>Coastal tourist sites (public beaches &amp; resorts)</i>		•	<b>Moderate</b>	
		Marine research: <i>Scientific and Archaeological</i>		•	<b>Moderate</b>	
		Other man-made structures: <i>Submarine cable &amp; pipeline operations</i>		•	<b>Moderate</b>	
<b>Other physical pressures</b>	<b>Litter</b>		?		<b>Unknown</b>	
	<b>Electromagnetic changes</b>		?		<b>Unknown</b>	
	<b>Underwater noise changes</b>		?		<b>Unknown</b>	
	<b>Introduction of light</b>	Production of living resources: <i>Aquaculture – finfish</i>			•	<b>Moderate</b>
		Extraction of living resources: <i>Fishing – dredging</i>			••	<b>High</b>
		Coastal infrastructure: <i>Coastal docks, ports &amp; marinas. Coastal defence &amp; land claim</i>	•••		•	<b>Moderate</b>
		Waste management: <i>Sewage disposal</i>			••	<b>High</b>

		Transport: <i>Shipping – general at sea (moorings, anchorage &amp; vessel movements)</i>		••	High
		Transport: <i>Shipping – port operations (mooring, beaching, launching, ferry route etc.)</i>		••	High
		Recreation and leisure: <i>Recreational activities</i>		•	Moderate
		Recreation and leisure: <i>Coastal tourist sites (public beaches &amp; resorts)</i>		•	Moderate
		Marine research: <i>Scientific and Archaeological</i>		•	Moderate
		Other man-made structures: <i>Submarine cable &amp; pipeline operations</i>		•	Moderate
		<b>Barrier to species movement</b>		○	No
		<b>Death or injury by collision</b>		○	No
		<b>Visual disturbance (behaviour)</b>		○	No
	<b>Biological pressures</b>	<b>Genetic modification &amp; translocation of indigenous species</b>		○	
<b>Introduction or spread of</b>		Production of living resources: <i>Aquaculture – finfish</i>	•••	•	Moderate

<b>non- indigenous species</b>	Coastal infrastructure: <i>Coastal docks, ports &amp; marinas. Coastal defence &amp; land claim</i>		•	Moderate
	Extraction of non-living resources: <i>Navigational dredging (capital &amp; maintenance)</i>		••	High
	Waste management: <i>Sewage disposal</i>		••	High
	Transport: <i>Shipping – general at sea (moorings, anchorage &amp; vessel movements)</i>		••	High
	Transport: <i>Shipping – port operations (mooring, beaching, launching, ferry route etc.)</i>		••	High
	Recreation and leisure: <i>Recreational activities</i>		•	Moderate
	Recreation and leisure: <i>Coastal tourist sites (public beaches &amp; resorts)</i>		•	Moderate
	Marine research: <i>Scientific and Archaeological</i>		•	Moderate
	Other man-made structures: <i>Submarine cable &amp; pipeline operations</i>		•	Moderate
	<b>Introduction of microbial</b>	Production of living resources: <i>Aquaculture – finfish</i>	•••	•

pathogens	Coastal infrastructure: <i>Coastal docks, ports &amp; marinas. Coastal defence &amp; land claim</i>		•	Moderate
	Extraction of non-living resources: <i>Navigational dredging (capital &amp; maintenance)</i>		••	High
	Waste management: <i>Sewage disposal</i>		••	High
	Transport: <i>Shipping – general at sea (moorings, anchorage &amp; vessel movements)</i>		••	High
	Transport: <i>Shipping – port operations (mooring, beaching, launching, ferry route etc.)</i>		••	High
	Recreation and leisure: <i>Recreational activities</i>		•	Moderate
	Recreation and leisure: <i>Coastal tourist sites (public beaches &amp; resorts)</i>		•	Moderate
	Marine research: <i>Scientific and Archaeological</i>		•	Moderate
	Other man-made structures: <i>Submarine cable &amp; pipeline operations</i>		•	Moderate
	<b>Removal of target species</b>	Extraction of living resources: <i>Fishing – dredging</i>	••	••

		Extraction of living resources: <i>Fishing – traps (potting/creeling)</i>		•	Low
		Recreation and leisure: <i>Recreational activities</i>		•	Low
		Recreation and leisure: <i>Coastal tourist sites (public beaches &amp; resorts)</i>		•	Low
	<b>Removal of non- target species</b>	Production of living resources: <i>Aquaculture – finfish</i>	•••	•	Moderate
		Extraction of living resources: <i>Fishing – dredging</i>		••	High
		Extraction of living resources: <i>Fishing – traps (potting/creeling)</i>		•	Moderate
		Extraction of non-living resources: <i>Navigational dredging (capital &amp; maintenance)</i>		••	High
		Recreation and leisure: <i>Recreational activities</i>		•	Moderate
		Recreation and leisure: <i>Coastal tourist sites (public beaches &amp; resorts)</i>		•	Moderate



## Risk of Damage Assessment for Waterfoot MCZ

Level of risk Key: ■ High risk ■ Medium risk ■ Low risk

**Table 2** Subtidal (sublittoral) sand (SS): Seagrass (*Zostera marina*) beds (SG) Risk of Damage Matrix

This is based on the feature Vulnerability identified in Table 1 and takes into consideration any current management measures in place which may reduce the risk of damage being incurred. This table does not cover new activities as these will not have been taken into account in the Vulnerability assessment.

SS: SG						
Activity	Pressures associated with activity	Vulnerability	Is the current management adequate? <sup>†</sup>	Comments	Level of Risk	Action Advised
Production of living resources: <i>Aquaculture – finfish</i>	Water flow (tidal current) changes (including sediment transport considerations)	Low	Yes	There is one licensed site outside the MCZ, however, new developments, expansion or relocation applications require future management	Low	- No additional management is required
	Nutrient enrichment	Low			Low	
	Organic enrichment	Low			Low	
	Habitat structure changes	Moderate			Low	

<sup>†</sup> This does not refer to any future activities or situations where active management is not required.

	Penetration and/or disturbance of the substrate below the surface of the seabed - (Overall abrasion)	Moderate		action (licensing/permits).	Low	
	Abrasion/disturbance of the surface of the substratum or seabed	Low			Low	
	Changes in suspended solids (water clarity)	Moderate			Low	
	Siltation rate changes, including smothering	Moderate			Low	
	Introduction of light	Moderate			Low	
	Introduction or spread of non-indigenous species	Moderate			Low	
	Introduction of microbial pathogens	Moderate			Low	
	Removal of non-target species	Moderate			Low	
Extraction of living resources: <i>Fishing –</i>	Physical change (to another seabed type)	High	No	No site specific management of this activity in place.	High	- Remove or avoid pressures associated with dredging within the MCZ
	Habitat structure changes	High			High	

<b>Dredging (scallops)</b>	Penetration and/or disturbance of the substrate below the surface of the seabed - (Overall abrasion)	High			High	
	Abrasion/disturbance of the surface of the substratum or seabed	Moderate			Moderate	
	Changes in suspended solids (water clarity)	High			High	
	Siltation rate changes, including smothering	High			High	
	Introduction of light	High			High	
	Removal of target species	Moderate			Moderate	
	Removal of non-target species	High			High	
<b>Extraction of living resources: Fishing – traps (creeling/potting)</b>	Removal of target species	Low	No	No site specific management of this activity in place.	Moderate	- Remove or avoid creeling and potting activities within the MCZ
	Removal of non-target species	Moderate			Moderate	

<b>Coastal infrastructure: Coastal docks, ports &amp; marinas</b>	<b>Water flow (tidal current) changes (including sediment transport considerations)</b>	<b>Low</b>	<b>Yes</b>	<b>New developments require future management action (licensing/permits).</b>	<b>Low</b>	<b>- No additional management is required</b>
	<b>Emergence regime changes (includes tidal level change considerations)</b>	<b>Low</b>			<b>Low</b>	
	<b>Wave exposure changes</b>	<b>Low</b>			<b>Low</b>	
	<b>Nutrient enrichment</b>	<b>Low</b>			<b>Low</b>	
	<b>Organic enrichment</b>	<b>Low</b>			<b>Low</b>	
	<b>Physical loss (to land or freshwater habitat)</b>	<b>Moderate</b>			<b>Low</b>	
	<b>Physical change (to another seabed type)</b>	<b>Moderate</b>			<b>Low</b>	
	<b>Habitat structure changes</b>	<b>Moderate</b>			<b>Low</b>	
	<b>Penetration and/or disturbance of the substrate below the surface of the seabed - (Overall abrasion)</b>	<b>Moderate</b>			<b>Low</b>	
	<b>Abrasion/disturbance of the surface of the substratum or seabed</b>	<b>Low</b>			<b>Low</b>	

	Changes in suspended solids (water clarity)	Moderate			Low	
	Siltation rate changes, including smothering	Moderate			Low	
	Introduction of light	Moderate			Low	
	Introduction or spread of non-indigenous species	Moderate			Low	
	Introduction of microbial pathogens	Moderate			Low	
<b>Coastal infrastructure: Coastal defence &amp; land claim</b>	Water flow (tidal current) changes (including sediment transport considerations)	Low	Yes	New developments require future management action (licensing/permits).	Low	- No additional management is required
	Emergence regime changes (includes tidal level change considerations)	Low			Low	
	Wave exposure changes	Low			Low	
	Nutrient enrichment	Low			Low	
	Organic enrichment	Low			Low	
	Physical loss (to land or freshwater habitat)	Moderate			Low	

	Physical change (to another seabed type)	Moderate	Low
	Habitat structure changes	Moderate	Low
	Penetration and/or disturbance of the substrate below the surface of the seabed - (Overall abrasion)	Moderate	Low
	Abrasion/disturbance of the surface of the substratum or seabed	Low	Low
	Changes in suspended solids (water clarity)	Moderate	Low
	Siltation rate changes, including smothering	Moderate	Low
	Introduction of light	Moderate	Low
	Introduction or spread of non-indigenous species	Moderate	Low
	Introduction of microbial pathogens	Moderate	Low

<b>Extraction of non-living resources: Navigational dredging (capital &amp; maintenance)</b>	<b>Water flow (tidal current) changes (including sediment transport considerations)</b>	<b>Moderate</b>	<b>Yes</b>	New applications require future management action (licensing/permits).	<b>Low</b>	<b>- No additional management is required</b>
	<b>Nutrient enrichment</b>	<b>Moderate</b>			<b>Low</b>	
	<b>Organic enrichment</b>	<b>Moderate</b>			<b>Low</b>	
	<b>Habitat structure changes</b>	<b>High</b>			<b>Low</b>	
	<b>Penetration and/or disturbance of the substrate below the surface of the seabed - (Overall abrasion)</b>	<b>High</b>			<b>Low</b>	
	<b>Abrasion/disturbance of the surface of the substratum or seabed</b>	<b>Moderate</b>			<b>Low</b>	
	<b>Changes in suspended solids (water clarity)</b>	<b>High</b>			<b>Low</b>	
	<b>Siltation rate changes, including smothering</b>	<b>High</b>			<b>Low</b>	
	<b>Introduction or spread of non-indigenous species</b>	<b>High</b>			<b>Low</b>	

	Introduction of microbial pathogens	High			Low	
	Removal of non-target species	High			Low	
<b>Waste management: Sewage disposal</b>	Temperature changes - local	Moderate	Yes	New developments require future management action (licensing/permits).	Low	- No additional management is required
	Salinity changes - local	Moderate			Low	
	Nutrient enrichment	Moderate			Low	
	Organic enrichment	Moderate			Low	
	Changes in suspended solids (water clarity)	High			Low	
	Siltation rate changes, including smothering	High			Low	
	Introduction of light	High			Low	
	Introduction or spread of non-indigenous species	High			Low	
	Introduction of microbial pathogens	High			Low	



<b>Transport: Shipping – general at sea (moorings, anchorage &amp; vessel movements)</b>	Penetration and/or disturbance of the substrate below the surface of the seabed - (Overall abrasion)	High	No	No management of this activity in place.	High	- Remove or avoid shipping – general at sea (anchoring and moorings) within the MCZ  Anchoring in emergency situations will not be restricted
	Abrasion/disturbance of the surface of the substratum or seabed	Moderate			Moderate	
	Changes in suspended solids (water clarity)	High			High	
	Siltation rate changes, including smothering	High			High	
	Introduction of light	High			High	
	Introduction or spread of non-indigenous species	High			High	
	Introduction of microbial pathogens	High			High	
<b>Transport: Shipping – port operations (mooring, beaching, launching,</b>	Wave exposure changes	Low	Yes	New activities inside the MCZ require future management action (licensing/permits).	Low	- No additional management is required  Anchoring in emergency situations will not be restricted
	Penetration and/or disturbance of the substrate below the surface of the seabed - (Overall abrasion)	High			Low	

<i>ferry route etc.)</i>	Abrasion/disturbance of the surface of the substratum or seabed	Moderate			Low	
	Changes in suspended solids (water clarity)	High			Low	
	Siltation rate changes, including smothering	High			Low	
	Introduction of light	High			Low	
	Introduction or spread of non-indigenous species	High			Low	
	Introduction of microbial pathogens	High			Low	
<b>Recreation and leisure: <i>Recreational activities</i></b>	Penetration and/or disturbance of the substrate below the surface of the seabed - (Overall abrasion)	Moderate	No	No management of this activity in place.	Moderate	- Remove or avoid recreation and leisure pressures within the MCZ
	Abrasion/disturbance of the surface of the substratum or seabed	Low			Moderate	Anchoring in emergency situations will not be restricted
	Changes in suspended solids (water clarity)	Moderate			Moderate	

	Siltation rate changes, including smothering	Moderate			Moderate	
	Introduction of light	Moderate			Moderate	
	Introduction or spread of non-indigenous species	Moderate			Moderate	
	Introduction of microbial pathogens	Moderate			Moderate	
	Removal of target species	Moderate			Moderate	
	Removal of non-target species	Moderate			Moderate	
Recreation and leisure: <i>Coastal tourist sites (public beaches &amp; resorts)</i>	Water flow (tidal current) changes (including sediment transport considerations)	Low	Yes	New activities inside the MCZ require future management action (licensing/permits).	Low	- No additional management is required
	Wave exposure changes	Low			Low	
	Physical change (to another seabed type)	Moderate			Low	
	Habitat structure changes	Moderate			Low	

	Penetration and/or disturbance of the substrate below the surface of the seabed - (Overall abrasion)	Moderate			Low	
	Abrasion/disturbance of the surface of the substratum or seabed	Low			Low	
	Changes in suspended solids (water clarity)	Moderate			Low	
	Siltation rate changes, including smothering	Moderate			Low	
	Introduction of light	Moderate			Low	
	Introduction or spread of non-indigenous species	Moderate			Low	
	Introduction of microbial pathogens	Moderate			Low	
	Removal of target species	Moderate			Low	
	Removal of non-target species	Moderate			Low	
Marine research:	Habitat structure changes	Moderate	Yes	New activities inside the MCZ	Low	- No additional

<b>Scientific and Archaeological</b>	Penetration and/or disturbance of the substrate below the surface of the seabed - (Overall abrasion)	Moderate		require future management action (licensing/permits).	Low	management is required
	Abrasion/disturbance of the surface of the substratum or seabed	Low			Low	
	Changes in suspended solids (water clarity)	Moderate			Low	
	Siltation rate changes, including smothering	Moderate			Low	
	Introduction of light	Moderate			Low	
	Introduction or spread of non-indigenous species	Moderate			Low	
	Introduction of microbial pathogens	Moderate			Low	
<b>Other man-made structures: Submarine cables &amp; pipelines</b>	Temperature changes - local	Low	Yes	New developments require future management action (licensing/permits).	Low	- No additional management is required
	Physical change (to another seabed type)	Moderate			Low	
	Habitat structure changes	Moderate			Low	

<b>operations</b>	<b>Penetration and/or disturbance of the substrate below the surface of the seabed - (Overall abrasion)</b>	<b>Moderate</b>		<b>Low</b>
	<b>Abrasion/disturbance of the surface of the substratum or seabed</b>	<b>Low</b>		<b>Low</b>
	<b>Changes in suspended solids (water clarity)</b>	<b>Moderate</b>		<b>Low</b>
	<b>Siltation rate changes, including smothering</b>	<b>Moderate</b>		<b>Low</b>
	<b>Introduction of light</b>	<b>Moderate</b>		<b>Low</b>
	<b>Introduction or spread of non-indigenous species</b>	<b>Moderate</b>		<b>Low</b>
	<b>Introduction of microbial pathogens</b>	<b>Moderate</b>		<b>Low</b>



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