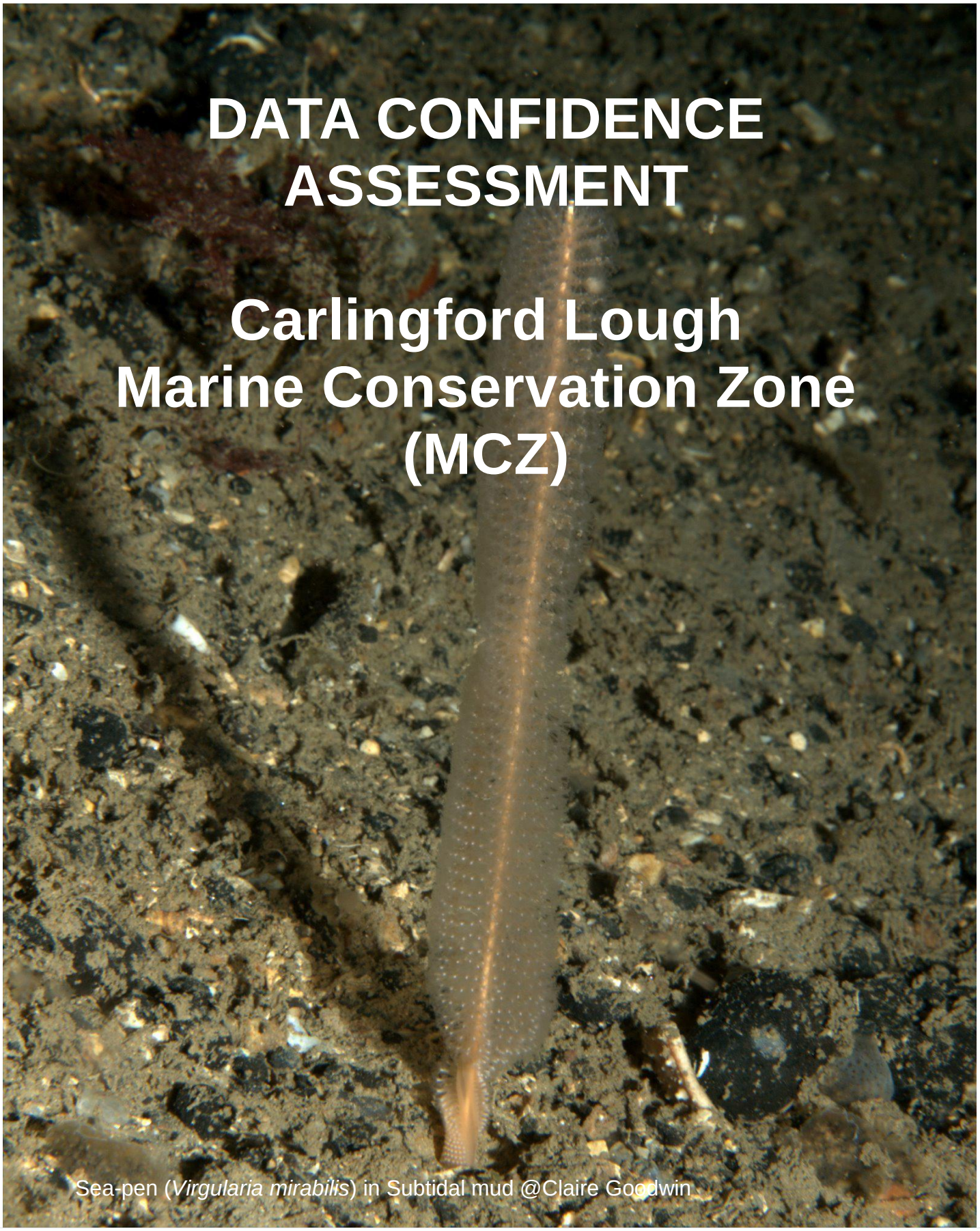
# DATA CONFIDENCE ASSESSMENT

# Carlingford Lough Marine Conservation Zone (MCZ)



Sea-pen (*Virgularia mirabilis*) in Subtidal mud @Claire Goodwin

Department of Agriculture, Environment and Rural Affairs
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| Document version control | | | |
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| Version 0.2 | 19/10/2015 | Joe Breen, Clara Alvarez Alonso, Liz Pothanikat, Stephanie Bennett and Nuala McQuaid | Amendments |
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## Contents



## Figures

## Summary

The Data Confidence Assessment is a document produced as part of the consultation evidence base and, similar to other documents, follows the OSPAR design principles. The assessment details our confidence in the data used to identify Areas of Search (AoS) and determine features for protection within Marine Conservation Zones (MCZs). This includes data type, age, source and coverage.

This document provides details of the Data Confidence Assessment for Carlingford Lough MCZ. Additional information on Carlingford Lough 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 Zone (pMCZ) features
- Guidance on the development of Conservation Objectives and Potential Management Options
- Site Summary Document for Carlingford Lough Marine Conservation Zone (MCZ)
- Conservation Objectives and potential Management Options for Carlingford Lough Marine Conservation Zone (MCZ)
- Assessment against Selection Guidelines for Carlingford Lough Marine Conservation Zone (MCZ)

## Glossary of Terms and Acronyms

**AoS** – Area of Search used to underpin the proposed Marine Conservation Zone

**AFBI** – Agri-food and Biosciences Institute

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

**BGS** – British Geological Survey

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

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

**EMODnet** – The European Marine Observation and Data Network

**EUNIS** – The 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)

**JNCC** – Joint Nature Conservation Committee

**MCZ** – Marine Conservation Zone(s) 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 adjacent to Northern Ireland

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

**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).

**NISS** – Northern Ireland Sublittoral Survey

**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

**PAVM** – *Philine aperta* and *Virgularia mirabilis* in soft stable infralittoral mud

**pMCZ** – Proposed Marine Conservation Zone

**pMCZ Feature** – Proposed Marine Conservation Zone feature

**PSA** – Particle size analysis

**SM** – Subtidal (sublittoral) mud

**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

| MCZ name (Figure 1) | Carlingford Lough | Assessors | CA; CAA; JB; SB, NMcQ; LP. |
|---|---|---|---|

Carlingford Lough MCZ lies on the east coast of Ireland, located north of the navigable channel in the inner part of the Lough, at the border of Northern Ireland and the Republic of Ireland.

Carlingford Lough is designated for protection of the habitat Subtidal mud (SM) (EUNIS Habitat type A5.3) which contains *Philine aperta* (White lobe shell) and *Virgularia mirabilis* (Sea-pen) communities (PAVM) (EUNIS A5.343). The SM is characterised by a high proportion of fine sediment. The biotope for this habitat feature is SS.SMu.IFiMu.PhiVir (*P. aperta* and *V.mirabilis* in soft stable infralittoral mud). The White lobe shell is the key species in this habitat and demonstrates high seasonal variability. The Sea-pen, a Priority Species in Northern Ireland, is not always present in the biotope; however there is a dense population of *V. mirabilis* in the MCZ. This biotope is very similar to Sea-pen and burrowing megafauna communities (biotope SS.SMu.CFiMu.SpnMeg, which is an OSPAR Threatened and/or Declining Habitat (OSPAR, 2010), but occurs shallower, is less stable, and is not characterised by burrowing megafauna (JNCC, 2014a; Hughes, 1998).

This habitat is currently in good condition (Goodwin *et al*., 2011) and is limited to the small area designated as an MCZ. The density of Sea-pens is high (DOE, 2015), with abundances ranging from common (5-9%) to superabundant (20-39%) on the SACFOR scale (JNCC, 2014b). The White lobe shell, *Philine aperta*, also occurs in high densities while the sea cucumber *Ocnus planci* is occasionally present. In the UK and Ireland, these communities are restricted to the most sheltered sea loughs with full salinity conditions. This habitat within the MCZ is the only known example in Northern Ireland and is one of a few records within the UK (a few more records are reported in the South of Ireland, NBN gateway web and JNCC (2015). At present this feature is not on any conservation lists, however, it is rare in terms of the shortened height of the individual *Virgularia* and overall density of the population in Northern Ireland.

The boundary of the MCZ was drawn to encompass the extent of the PAVM communities and to represent the range in diversity of the broad scale habitat SM within the area. A buffer zone of 100m from aquaculture sites in the area was taken into consideration when developing the pMCZ boundary following pre-consultation discussions with industry representatives. This will enable shellfish operations to continue without impacting the conservation objectives. In addition, the administrative mid-line and navigational channel were taken into account for the southern extent of the boundary. Following public consultation the proposed boundary was considered appropriate for designation.

<table>
<tr><th colspan="8">Protected features (Figure 2)</th></tr>
<tr><td>Biodiversity</td><td colspan="3"><ul><li>Subtidal (sublittoral) mud (SM):<ul><li>Philine aperta and Virgularia mirabilis in soft stable infralittoral mud (PAVM) (component habitat)</li></ul></li></ul></td><td>Geodiversity</td><td colspan="3">n/a</td></tr>
<tr><th colspan="8">Data used in assessment</th></tr>
<tr><td>Version of Marine recorder database</td><td>Update Nov2014</td><td>Other datasets used (specify)</td><td colspan="5"><ul><li>[1]Northern Ireland Sublittoral Survey (NISS) Carlingford Lough 1982-1985 (Marine Recorder database).</li><li>[2]Sublittoral Survey Northern Ireland (SSNI) Carlingford Lough 2007 & 2012 (Marine Recorder database).</li><li>[3]DOE Water Framework Directive (WFD) benthos monitoring programme 2013 (MM13- 04). MED-Marine Recorder database, Unicorn database reference: BWFDMB13).</li><li>[4]AFBI Carlingford Lough Survey 2012 - video tows.</li><li>[5]DOE Carlingford Lough pMCZ support Spyball camera survey 2015 – drop-camera underwater video/still images, infaunal grabs samples and particle size analysis (PSA).</li><li>[6]JNCC EU SeaMap: A broad-scale physical habitat map for European Seas 2014 v8.3</li></ul></td></tr>
<tr><th colspan="8">Summary of Data Confidence Assessment</th></tr>
<tr><td colspan="2">Confident in underpinning data</td><td>Yes</td><td>✓</td><td>Partial</td><td></td><td>No</td><td></td></tr>
<tr><td colspan="2" rowspan="2">Confident in presence of identified features?</td><td rowspan="2">✓</td><td colspan="3" rowspan="2">Data suitable to define extent of individual protected features</td><td>✓</td><td>Partial</td><td>✖</td></tr>
<tr><td>SM:PAVM</td><td></td><td></td></tr>
</table>

| Summary | |
|---|---|
| | The Department has high confidence in the presence of the designated features and the supporting evidence in the MCZ.<br><br>The majority of the data for PAVM communities in the AoS, and individual records of the component species *P. aperta* and *V. mirabilis*, were collected during conservation surveys performed by the Department and National Museums Northern Ireland, which was conducted during 1982-1985 (Erwin *et al*., 1986), 2007 (Goodwin *et al*., 2011) and 2012 using diving photography and transects as sampling methods[1&2].<br><br>Additional records were collected in 2008 and 2009 during the DOE WFD benthos monitoring programme 2013[3]. AFBI also provided evidence of high density aggregations of Sea-pens in the AoS through a video tow survey[4] in 2012.<br><br>The survey work undertaken in 2015 by DOE[5] using an underwater drop-camera confirmed the presence of PAVM communities (biotope SS.SMu.IFiMu.PhiVir) with high densities of Sea-pens ranging from abundant (10-19%) to superabundant (20-39%) on the SACFOR scale (JNCC, 2014) and White lobe shell ranging from frequent (1-5%) to superabundant (20-39%). This survey also verified the broad-scale habitat SM for the component biotope and this, combined with the limited distribution of *Virgularia* in the area, justified the boundary extent.<br><br>The broad coverage of grab samples and subsequent particle size analysis (PSA) obtained during the DOE Carlingford Lough pMCZ Spyball camera Survey 2015[5] confirmed the sediment types and presence of SM. The sediment types had been derived from the predictive habitat maps (EU SeaMap[6]). |

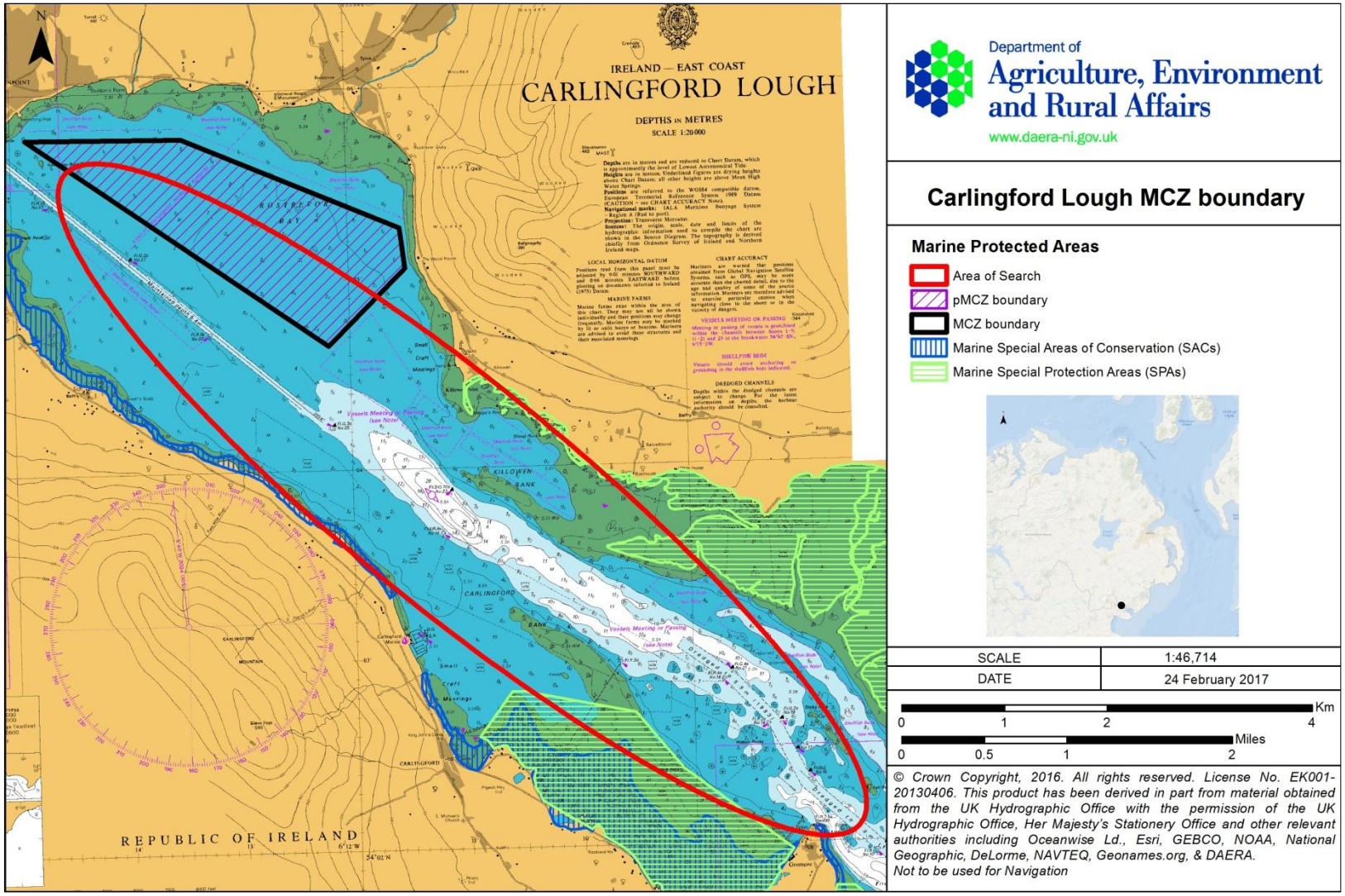


**Figure 1** Location of Area of Search (AoS), initial proposed (p) boundary and designated boundary of Carlingford Lough MCZ

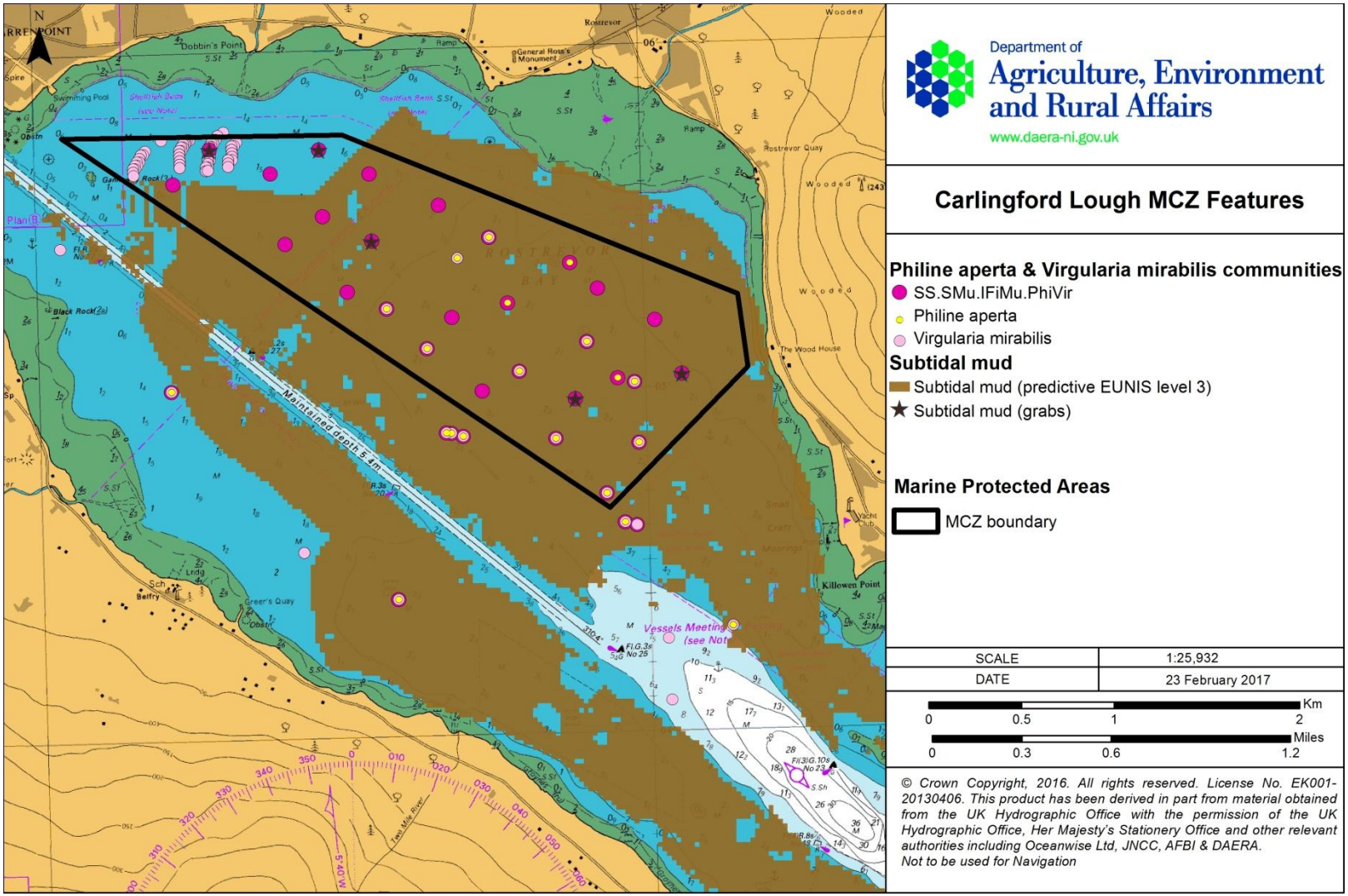


**Figure 2** Distribution of the designated features in Carlingford Lough MCZ

## Data Confidence Assessment

The Department's assessment of data confidence is based on a consideration of the age and source of the data, the type of sampling methodologies used and the coverage across the entire MCZ.

| **Age of data (Figure 3)** | | | | | |
|---|---|---|---|---|---|
| **Multiple records collected within last 10 years** | SM: PAVM | **Multiple records collected 10-25 years ago** | SM: PAVM | **Multiple records >25 years old** | |
| **Comments** | In the AoS, the majority of data for the habitat PAVM communities were collected during diving surveys in 1984[1] (Erwin *et al*., 1986), 2007 and 2012[2]. Additional data were available from the DOE WFD Monitoring programme 2013[3], with grab samples taken during 2008 and 2009.<br><br>Further evidence of the Sea-pen (*V. mirabilis*) in the area was recorded by AFBI in 2012[4].<br><br>Recent data on PAVM communities were recorded in grabs and videos during the DOE pMCZ Spyball camera survey in 2015[5].<br><br>Information on SM was derived from predictive habitat maps (EU SeaMap, JNCC 2014[6]). PSA data confirming SM in the MCZ were acquired from sediment samples collected in 2015[5]. | | | | |

| **Source of data (Figure 4)** | | | | | |
|---|---|---|---|---|---|
| **Targeted data collection for nature conservation purposes** | ✓ | **Statutory monitoring (marine licensing etc.)** | ✓ | **Fisheries survey work** | |
| **Data collection associated with development proposals (EIA etc.)** | | **Recreational / volunteer data collection** | | **Other** (specify) – EUNIS predictive maps, PSA data | ✓ |
| **Comments** | The majority of the feature records have been collected through targeted nature conservation surveys (NISS Carlingford Lough[1], | | | | |

| | |
|---|---|
| | SSNI Carlingford Lough[2], AFBI Carlingford Lough Survey 2012[4] and DOE Carlingford Lough pMCZ Spyball camera survey work 2015[5]).<br><br>Additional data were derived from grab samples collected by DOE during monitoring surveys. In this case the grabs were collected as part of the DOE WFD benthos monitoring programme 2013[3].<br><br>The EU SeaMap predictive habitat map used in this assessment was developed by JNCC and The European Marine Observation and Data Network (EMODnet, 2014)[6]. |

**Sampling methods / resolution**

| Feature | Modelled | Acoustic / remote sensing | Remote video / camera | Infaunal - grab / core | Sediment sampling | Diving | Fisheries sampling |
|---|---|---|---|---|---|---|---|
| SM:PAVM | ✓ | | ✓ | ✓ | ✓ | ✓ | |

**Comments**

A number of sampling methods have been used to collect information on the feature of interest in the MCZ.

The predictive seabed habitat mapping project EU SeaMap2014 was developed by JNCC and The EMODnet[6]; this provides a modelled broad scale subtidal mud habitat in the MCZ (based on validation samples). The predictive mapping also proposes the presence of the biotope SS.SMu.IFiMu.PhiVir within shallow waters in the main body of the Lough.

Remote video and photographic imagery sampling (using a drop-down Spyball camera in RV Capitella), undertaken by DOE across the MCZ, provided an overview of the composition and distribution of the PAVM communities in the area[5].

Additional video tows were recorded by AFBI (2012)[4] using a towed digital video camera in the inner area of the MCZ.

Infaunal grab sampling was targeted as part of the DOE WFD benthos monitoring programme 2013[3]. The PSA data for SM comes from sediment samples collected during the DOE Carlingford Lough pMCZ Spyball camera survey work 2015[5].

SSNI Carlingford Lough 2012 and previous SSNI surveys in the Lough[1&2] were conservation diving surveys that provided photographic and video evidence of various biotopes and key species.

<table>
<tr><th colspan="8">Data coverage (Figures 3 to 6)</th></tr>
<tr><td colspan="8">Across the MCZ</td></tr>
<tr><td>Large numbers of feature records distributed across the MCZ</td><td></td><td>Numerous feature records scattered across the MCZ with some clumping</td><td></td><td>Numerous feature records possibly with some clumping.<br><br>Boundary not defined solely by recorded feature distribution</td><td>✓</td><td>Few or isolated feature records - possibly clumped</td><td></td></tr>
<tr><td colspan="8">For Individual features</td></tr>
<tr><td>Multiple records of individual features providing indication of extent and distribution throughout pMCZ?</td><td>✓<br>SM:<br>PAVM</td><td colspan="2">Few or scattered records of specific features making extent and broad distribution assessment difficult?</td><td></td><td colspan="2">Few or isolated records of specific feature records</td><td></td></tr>
<tr><td>Are acoustic remote sensing data available to facilitate the development of a full coverage predictive seabed habitat map?</td><td colspan="7">No</td></tr>
<tr><td>Comments</td><td colspan="7">Subtidal (sublittoral) mud (SM): Philine aperta and Virgularia mirabilis communities (PAVM) (Figures 5 and 6)<br>• 2014 JNCC EU SeaMap predictive habitat map[6] – This predicts that Subtidal (sublittoral) mud occurs across almost the entire MCZ. Five validation samples in the area indicated the biotope SS.SMu.IFiMu.PhiVir - A5.343 was present.<br>• 2015 DOE Carlingford Lough pMCZ Spyball camera survey[5] – 16 sediment samples were collected by the DOE within the predicted SM sediment in the AoS and</td></tr>
</table>

| | |
|---|---|
| | MCZ. PSA was carried out for 5 of the stations for sediment characterisation and classed according to the EUNIS/BGS (British Geological Survey) modified Folk class provided. The results of the PSA identified all sediment samples as 'slightly gravelly sandy mud' (EUNIS 5.3).<br><br>The 16 stations within the MCZ were also filmed with a drop-camera remotely controlled from RV Capitella in June 2015. The video footage was viewed using freeze-frame, slow motion and standard play speed as necessary. This enabled the identification of as many conspicuous species as possible as well as a determination of broad substrate type. The video footage showed clear presence of sea-pens in 15 of the 16 stations sampled in the MCZ with abundances between common (5-9%) and superabundant (20-39%) on the SACFOR scale (JNCC, 2014b). *P. aperta* was recorded in all the stations sampled from frequent (1-5%) to superabundant (20- 39%; refer to Figure 5).<br><br>• 2012 AFBI Carlingford Lough video tows survey[4] – The three tows deployed in the inner part of the MCZ recorded high densities of the Sea-pen (*V. mirabilis*). The video footage also supported previous records of the broad scale habitat SM as 'soft mud sea floor'.<br><br>• 2014 Marine Recorder[1,2&3] – There are multiple records of PAVM communities, *V. mirabilis* and *P. aperta* in the Marine Recorder database obtained through the NISS (Northern Ireland Sublittoral Survey) and SSNI (Sublittoral Survey Northern Ireland) Carlingford Lough programmes (1982- 2012)[1+2]. PAVM communities were recorded in the diving surveys in 1982-1985, 2007 & 2012. *V. mirabilis* was recorded as abundant, occasional and rare on the SACFOR scale (JNCC, 2014) while *P. aperta* was recorded as abundant, common, frequent and occasional.<br><br>There are also several records for the presence of PAVM communities from the DOE WFD Benthos monitoring programme (2013)[3]. There are three sampling stations within the AoS (station CLBR2 and CLBR8) and MCZ (station CLBR4). PAVM communities were recorded inside the MCZ in 2008 and in the AoS from years 2000, 2002, 2006, 2008-2010. |

## The Evidence Base (Figures)

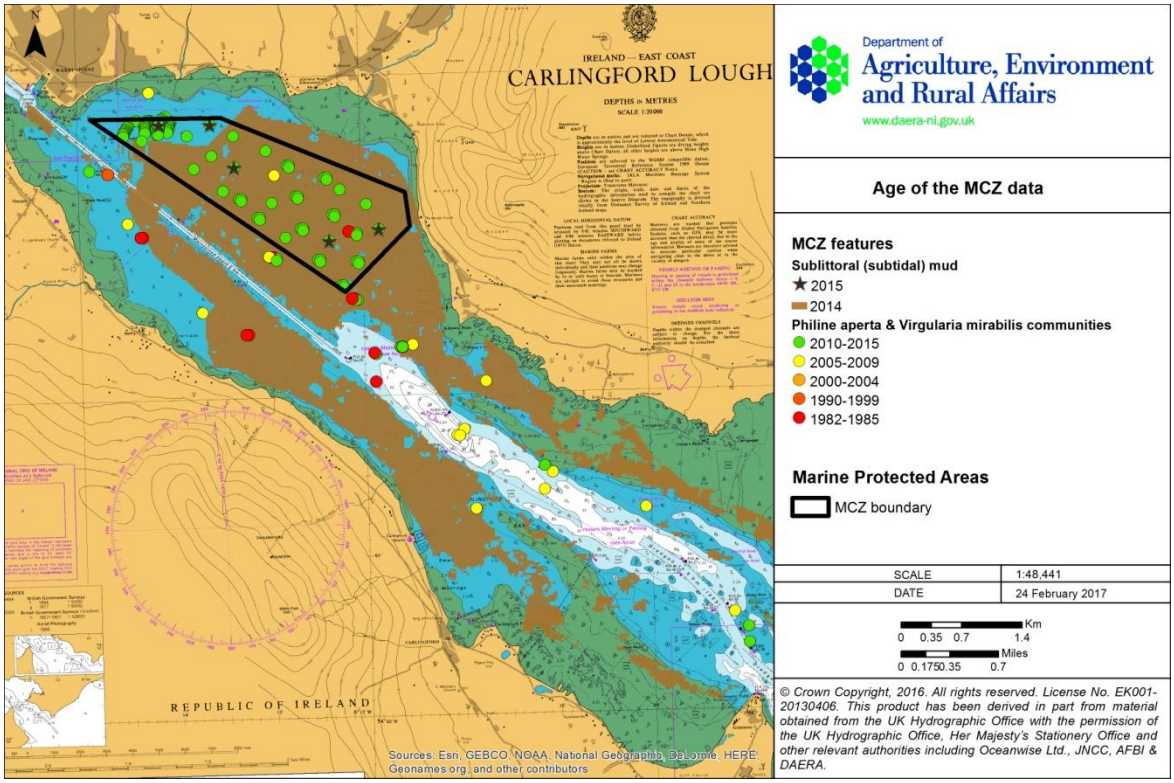


**Figure 3** Age of the feature data collected in Carlingford Lough MCZ

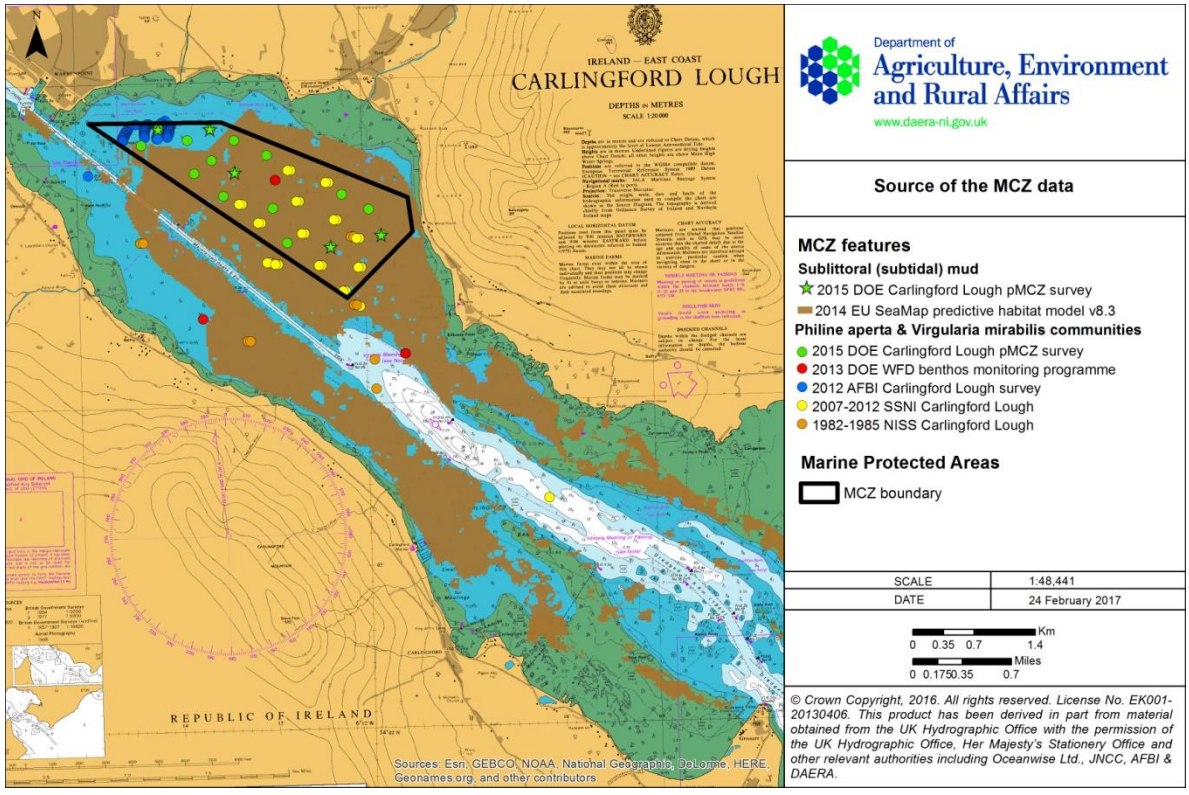


**Figure 4** Source of the feature data collected in Carlingford Lough MCZ

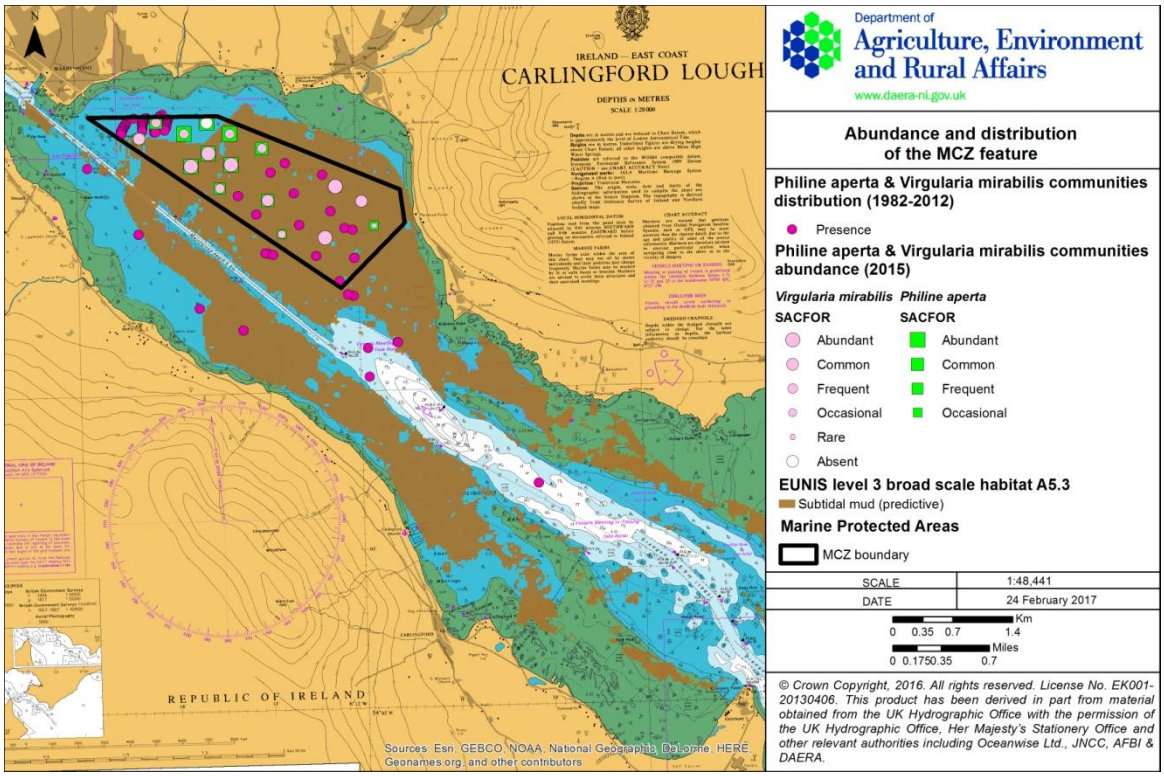


**Figure 5** Abundance and distribution of feature data collected in Carlingford Lough MCZ

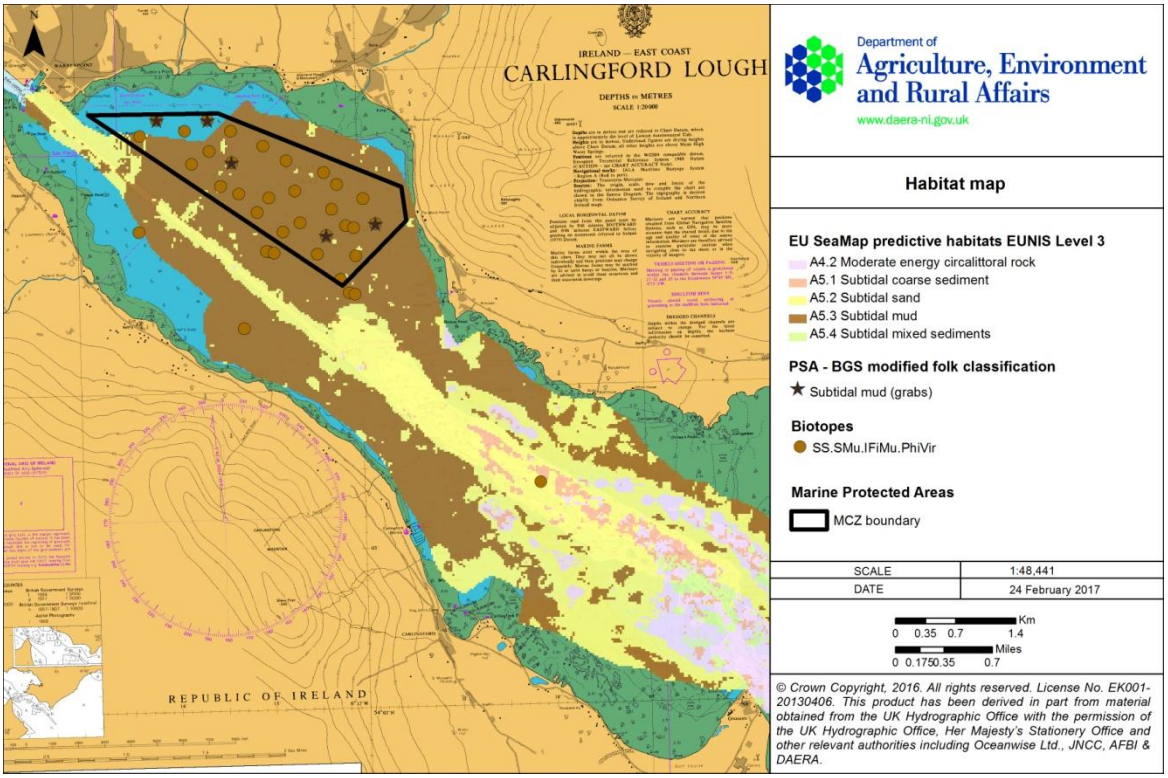


**Figure 6** Habitat Map of Carlingford Lough MCZ and surrounding seabed. The biotope SS.SMu.IFiMu.PhiVir with EUNIS code A5.343 is *Philine aperta* and *Virgularia mirabilis* in soft stable infralittoral mud.

| Data sources and Bibliography | | |
|---|---|---|
| **Data source (used in** | **Reference** | **Features covered** |
| [1]Northern Ireland Sublittoral Survey (NISS), Carlingford Lough 1982-1985 (Marine Recorder database) | Erwin, D.G., Picton, B.E., Connor, D.W., Howson, C.M., Gilleece, P. and Bogues, M.J. 1986. The Northern Ireland Sublittoral Survey. Ulster Museum. | *Virgularia mirabilis* |
| [2]Sublittoral Survey Northern Ireland (SSNI) Carlingford Lough 2007 & 2012* | Goodwin, C., Picton, B., Breen, J., Edwards, H. and Nunn, J. 2011. Sublittoral Survey Northern Ireland (2006 – 2008). Northern Ireland Environment Agency Research and Development Series No 11/01 https://www.daera-ni.gov.uk/publications/sublittoral-survey-northern-ireland-2006-2012 | *Virgularia mirabilis* |
| [3]DOE Water Framework Directive (WFD) benthos monitoring programme 2013. | N/A | SM |
| [4]AFBI Carlingford Lough Survey 2012. | N/A | SM:PAVM |
| [5]DOE Carlingford Lough pMCZ support Spyball camera survey 2015 | N/A | SM:PAVM |
| N/A | Hughes D.J. Sea pens & burrowing megafauna (volume III). 1998. An overview of dynamics and sensitivity characteristics for conservation management of marine SACs. Scottish Association for Marine Science (UK Marine SACs Project). | *Virgularia mirabilis* |

* 2012 data was submitted to Marine Recorder database (no report produced).

| | | |
|---|---|---|
| N/A | JNCC. 2014a. Clarifications on the habitat definitions of two habitat FOCI: Mud habitats in deep water and sea-pen and burrowing megafauna. Peterborough, UK. | SM |
| N/A | JNCC. 2014b. SACFOR scale. http://jncc.defra.gov.uk/page-2684 | PAVM |
| [6]JNCC EU SeaMap: A broad-scale physical habitat map for European Seas 2014c v8.3 | EU SeaMap. A broadscale physical habitat map for European Seas. 2014c. EMODnet. EUSeaMap: A broad-scale physical habitat map for European Seas. | SM |
| N/A | JNCC. 2015. The Marine Habitat Classification for Britain and Ireland Version 15.03. Available from: http://www.jncc.gov.uk/marine/biotopes/biotope.aspx?biotope=jnccmncr00000557 | PAVM |
| N/A | OSPAR Commission. Background Document for Sea-pen and Burrowing megafauna communities. 2010. http://qsr2010.ospar.org/media/assessments/Species/P00481_Seapen_and_burrowing_megafauna.pdf | *Virgularia mirabilis* |
| N/A | National Biodiversity Network (NBN) Gateway. https://data.nbn.org.uk/ | PAVM |

**DAERA Marine and Fisheries Division**

2nd Floor,

Klondyke Building

Cromac Avenue

Malone Lower

Belfast

BT7 2AJ

Telephone: 028 90569262

Email: Marine.InfoRequests@daera-ni.gov.uk

Web: www.daera-ni.gov.uk/topics/marine

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

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