NPWS

Codling Fault Zone SAC

(site code: 003015)

Conservation objectives supporting document -

Marine Habitats

Version 1

June 2023

Contents

Please note that this document should be read in conjunction with the following report: NPWS (2023) Conservation Objectives: Codling Fault Zone SAC 003015. Version 1.0. National Parks and Wildlife Service, Department of Housing, Local Government and Heritage.

Introduction

Codling Fault Zone SAC lies within the Kish Bank Basin and is located approximately 24km east of Howth Head, Co. Dublin. Codling Fault Zone SAC is designated for the marine Annex I qualifying interest of Submarine structures made by leaking gases.

Within the Kish Bank Basin, a number of sea mounds were identified which were aligned along the Codling Fault Zone, a major strike-slip fault running in a north-western direction from Cardigan Bay in the eastern Irish Sea to the Kish Bank Basin in the west (Croker *et al*., 2005; Judd *et al*., 2007). A number of sea mounds had been identified from this area and were confirmed to be composed primarily of Methane-derived authigenic carbonate (MDAC) (O'Reilly *et al*., 2010). MDAC is the carbonate precipitate formed within the seabed as a result of anaerobic oxidation of methane and is closely associated with gas seeps. But while their presence is evidence that gassing has occurred in the past it is not, in itself, evidence of the active gassing. In areas were gas is actively seeping, bacterial mats composed of sulphide-oxidising bacteria develop.

In 2013, a survey was undertaken of mounds within this area to determine if these met with the definition of this habitat type as described in the Interpretation Manual of European Habitats (European Commission, 2013) and also to describe the biological communities occurring there (Leahy, 2013). In this survey, a number of active vents were observed, some with an associated bacterial mat. Increased biodiversity was also recorded on the MDAC features associated with these mounds compared to the surrounding sandy substrate. Strong bottom currents were evident with speeds of up to 1.2m/s.

Aspects of the biology and ecology of the Annex I habitat are provided in **Section 1**. The corresponding site-specific conservation objective will facilitate obligations under the EU Habitats Directive (92/43/EEC) (as amended).

Ireland also has an obligation to ensure that consent decisions concerning operations/activities planned for Natura 2000 sites (also known as European sites) are informed by an appropriate assessment of the likelihood that such operations or activities are having a significant effect on the site, or adversely affecting site integrity. Further ancillary information concerning the practical application of the site-specific conservation objective and its associated targets in the completion of such assessments is provided in **Section 2**.

Section 1

Principal Benthic Communities

Marine habitats are frequently composed of a number of different biological communities. The development of a community complex target arises when an area possesses similar abiotic features but records a number of biological communities that are not regarded as being sufficiently stable and/or distinct, temporally or spatially, to become the focus of conservation efforts. The biological communities recorded within Codling Fault Zone SAC exhibit this pattern and have been grouped together into a suitable ecological unit (i.e. community complex) upon which to develop conservation targets.

The EUNIS marine habitat classification of 2007 and the revised 2019 version[1] recognise circalittoral vents and seeps in the Atlantic (A4.73 and MC127, respectively); however, no description of these features or their associated fauna is given.

Codling Fault Zone MDACs Community Complex

The sea mounds in the Codling Fault Zone SAC occur at seafloor depths of between 60m and 80m (Leahy, 2013).Over most of the SAC, the substrate is rippled sand. Nodules, sediment crusts and small outcroppings were observed in the vicinity of the mounds. These increased in number as mounds were approached. Areas of pavement occurred which were either smooth or covered with a veneer of sediment. These concretions or pavements are formed by the metabolic processes of bacteria in anaerobic methane oxidation precipitating calcium carbonate and hydrogen sulphide. On occasion these concretions appeared pitted with anoxic sediment observed within these pits. Overhangs, cliffs and large rocky facies were also a feature of the mounds. Within the vicinity of or on these features, black/dark grey anoxic sediment could sometimes be discerned close to or at the sediment/water interface. Small areas of white bacterial mats were discernible on these sediments; where these mats occurred at the base of rocks or under overhangs, they were thicker and more apparent; thus, indicating the presence of active seeps. Active vents, i.e. visible gassing, were noted at mound features surveyed within this SAC. At some vents, a white bacterial mat occurred around the vent. It was presumed these mats were composed of thiophilic or sulphur oxidising bacteria.

The fauna associated with the MDACs structures is diverse and in stark contrast to the paucity of fauna in the rest of the site. Large rocks and boulders covered in the anemone *Metridium senile* were observed. Dense coverings of hydroids, including *Nemertesia* sp. and *Tubularia* sp., were

[1] https://www.eea.europa.eu/data-and-maps/data/eunis-habitat-classification

widely recorded over hard ground and on pavement areas. A wide variety of anemones were observed, these included the cerianthid *Cerianthus lloydii* on soft ground between the crusts and pavements, as well as *Alcyonium digitatum*, *Sagartia* sp., *Urticina* sp. and *Anthopleura* sp. on harder ground. In some areas of fine sediment, small polychaete tubes were very dense, additionally the polychaete *Sabella* sp. was also observed here.

Among the crevices, overhangs and between rocks, *Cancer pagurus* was very abundant, while squat lobsters *Munida* sp. and *Homarus gammarus* were also observed. A variety of sponges, including the boring sponge *Cliona celata* and the lace sponge *Clathrina coriacea* were recorded. The feather star *Antedon bifida* was commonly seen in crevices and under overhangs. The fish species recorded included bib *Trisopterus luscus* and Yarrell's blenny *Chirolophis ascanii*. **Table 1** below shows the distinguishing species of the Codling Fault Zone MDACs community complex.

Distinguishing species of the Codling Fault Zone MDACs community complex	
Metridium senile	*Nemertesia* sp.
Cancer pagurus	*Urticina* sp.
Sagartia sp.	*Tubularia* sp.
Anthopleura sp.	*Munida* sp.
Cliona celata	*Alcyonium digitatum*
Clathrina coriacea	*Antedon bifida*

Table.1 Distinguishing species of the Codling Fault Zone MDACs community complex

Section 2

Appropriate Assessment Notes

Many plans and projects of a particular nature and/or size require the preparation of an environmental impact assessment of the likely effects of their planned development. While smaller operations/activities (i.e. sub-EIA-threshold developments) may not require an EIA, an appropriate assessment is required of any project that may significantly affect the integrity of a Natura 2000 site. The appropriate assessment is to be used as part of the decision-making process, as to whether the project proceeds or not. The assessment should be recorded in a transparent manner, and should assess, in a reasoned manner, the likely effects on a Natura 2000 site of a proposed plan or project. General guidance on the completion of such assessments has been prepared and is available at www.npws.ie and at https://ec.europa.eu/environment/nature/natura2000/management/guidance_en.htm.

Annex I Habitats

It is worth considering at the outset that the extent and quality of all habitats varies considerably in space and time, and marine habitats are particularly prone to such variation. Habitats which are varying naturally, i.e. biotic and/or abiotic variables are changing within an envelope of natural variation, must be considered to have favourable conservation condition. Anthropogenic disturbance may be considered significant when it causes a change in biotic and/or abiotic variables in excess of what could reasonably be envisaged under natural processes. The capacity of the habitat to recover from this change is obviously an important consideration (i.e. habitat resilience) thereafter.

This Department has adopted a prioritized approach to conservation of structure and function in marine Annex I habitats.

1. Those communities that are key contributors to overall biodiversity at a site by virtue of their structure and/or function (keystone communities) and their low resilience should be afforded the highest degree of protection; any significant anthropogenic disturbance should be avoided.
2. In relation to the remaining constituent communities that are structurally important (e.g. broad sedimentary communities) within an Annex I marine habitat, the following must be considered:
    2.1. Significant anthropogenic disturbance may occur with such intensity and/or frequency as to effectively represent a continuous or ongoing source of disturbance over time and space (e.g. effluent discharge within a given area). Drawing from the principle outlined in the

European Commission's Article 17 reporting framework that disturbance of greater than 25% of the area of an Annex I habitat represents unfavourable conservation status, this Department takes the view that the cumulative area of continuous disturbance of each community type should not exceed an approximate area of 15%. Thereafter, an increasingly cautious approach is advocated. Prior to any consent being granted for any project or activities that would result in more than 15% of any Annexed marine habitat community type within a Natura site being disturbed on a cumulative basis, an inter-Departmental management review (considering *inter alia* robustness of available scientific knowledge, future site requirements, etc.) of the site is recommended.

2.2. Some activities may cause significant disturbance but may not necessarily represent a continuous or ongoing source of disturbance over time and space. This may arise for intermittent or episodic activities for which the receiving environment would have some resilience and may be expected to recover within a reasonable timeframe relative to the six-year reporting cycle (as required under Article 17 of the Directive). This Department is satisfied that such activities could be assessed in a context-specific manner giving due consideration to the proposed nature and scale of activities during the reporting cycle and the particular resilience of the receiving habitat, in combination with other activities within the designated site.

The following technical clarification is provided in relation to specific conservation objectives and targets for the identified Annex I habitat below in order to facilitate the analysis required for the appropriate assessment process and overall site planning and management:

Objective **To maintain the favourable conservation condition of Submarine structures made by leaking gases in Codling Fault Zone SAC, which is defined by the following list of attributes and targets:**

Target 1	The permanent habitat area is stable or increasing, subject to natural processes

- Not all the apparent mound areas within the SAC were surveyed, whether other seafloor anomalies are associated with gassing is as yet unknown. Therefore, the full extent of MDAC structures in this SAC is an approximation (**Figure 1**).
- This target refers to the permanent amount of habitat area within the site. It needs to be considered particularly when assessing the effects of projects, plans, activities or operations that propose to permanently remove habitat from the site, thereby

reducing the permanent amount of habitat area within it. It does not incorporate the consideration of long or short term disturbance of the biology of a site.

- Early consultation or scoping with the Department in advance of a formal application to a consenting authority is advisable for such proposals.

Target 2	The distribution of Submarine structures made by leaking gases is stable or increasing, subject to natural processes

- MDACs structures by virtue of their physical complexity are of considerable importance to the overall ecology and biodiversity of to the areas in which they occur; any significant anthropogenic disturbance to the distribution of these features within the site should be avoided.
- This target is relevant to activities or operations that propose to permanently remove Submarine structures made by leaking gases habitat, thus reducing the range over which this habitat occurs within the site. This target does not consider the long or short term disturbance of the biology of this habitat.
- Early consultation or scoping with the Department in advance of formal application is advisable for such proposals.

Target 3	Maintain the structural integrity of the MDAC features

- Any significant anthropogenic disturbance to the structural integrity of the MDAC features within the SAC should be avoided.
- It also requires the continuing occurrence of large erect epifaunal species on the MDACs features.

Target 4	Conserve the Codling Fault Zone MDACs community complex in a natural condition

- A semi-quantitative description of the community complex has been provided in **Section 1**.
- The Codling Fault Zone MDACs community complex is dependent on the presence of the Submarine structures made by leaking gases.
- An interpolation of their likely distribution is provided in **Figure 1**.
- This target relates to the structure and functions of Submarine structures made by leaking gases and therefore it is of relevance to those activities that may cause disturbance to the ecology of the habitat.
- Any anthropogenic disturbance to the faunal assemblages of Submarine structures made by leaking gases habitat within the SAC should be avoided.

Bibliography

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O'Reilly, S., Szpak, M., Monteys, X. & Kelleher B.P. (2010). RV Celtic Voyager CV10_28 Cruise. Report 2nd June – 7th June 2010 [http://doras.dcu.ie/20025/1/CV10_28_Report_Final_corrected.pdf]

Figure 1. Point locations of mapped Methane-derived authigenic carbonate (MDAC) mounds in Codling Fault Zone SAC