Marine Management Organisation

MMO Stage 3 Site Assessment: West of Copeland MPA (DRAFT)






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Title: MMO Stage 3 Site Assessment: West of Copeland MPA (DRAFT)

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Executive Summary

This assessment analyses the impact of anchored nets and lines, bottom towed gear, and traps on the designated features subtidal coarse sediment, subtidal mixed sediments and subtidal sand in West of Copeland Marine Protected Area (MPA) to determine whether a significant risk of hindering the conservation objectives of the site can be excluded. The assessment sets out the evidence considered and analyses the quality of that evidence. **The assessment finds that fishing activities by bottom towed gear occurring in the site pose a significant risk of hindering the achievement of the conservation objectives of West of Copeland MPA. As such Marine Management Organisation (MMO) concludes that management measures are required**.

1 Introduction

This assessment considers whether fishing activities are compatible with the conservation objectives of West of Copeland MPA.

This site is designated as a marine conservation zone (MCZ). This assessment uses the best available evidence to review site characteristics and fishing activity and determine if there is a significant risk of fishing activities hindering the conservation objectives of the site. If so, the Marine Management Organisation (MMO) will develop and introduce suitable management measures, such as MMO byelaws. If MMO byelaws are required, then these will be subject to public consultation and will require confirmation from the Secretary of State to come into effect.

2 Site information

2.1 Overview

The following Joint Nature Conservation Committee (JNCC) site information and Department for Environment, Food and Rural Affairs (Defra) factsheet were used for background on site geography, designations, features and conservation objectives and general management approaches in this assessment:

- JNCC Site Information – West of Copeland MCZ[1]; and
- Defra Factsheet – West of Copeland MCZ[2].

West of Copeland MPA is situated in the eastern region of the Irish Sea, east of the Isle of Man. The site ranges from a depth of 5 to 100 m and is approximately 158 km^2 in area (**Figure 1**).

West of Copeland MPA was designated as a MCZ in 2019 for the protection of the broad-scale habitat features 'subtidal coarse sediment', 'subtidal mixed sediments' and 'subtidal sand'. The features create a mixed seabed type throughout the site, from fine sands to coarse sediment which support a wide variety of species including bivalve molluscs, worms, sea urchins, anemones, starfish, crabs and sea mats.

The distribution of designated features within West of Copeland MPA is presented in **Figure 1** and their conservation objectives set out in **Table 1**.

Table 1: Designated features and general management approach.

Designated feature	General Management Approach
Subtidal coarse sediment	Recover to favourable condition.
Subtidal sand	
Subtidal mixed sediments	Maintain in favourable condition.

JNCC conducted a qualitative condition assessment in 2022 based on evidence of activities and likely impact on features, which reported the condition of subtidal sand and subtidal coarse sediment as unfavourable, and subtidal mixed sediments as favourable. Subsequently the general management approach (GMA) for the site, outlined in **Table 1**, is 'recover to favourable condition' for both subtidal coarse sediment

[1] West of Copeland Site Information Centre jncc.gov.uk/our-work/west-of-copeland-mpa/ (Last accessed 2 May 2023)
[2] Defra factsheet: West of Copeland www.gov.uk/government/publications/marine-conservation-zones-west-of-copeland (Last accessed 2 May 2023)

and subtidal sand. For more information see the Conservation Objective for West of Copeland MPA[3].

2.2 Scope of this assessment

The scope of this assessment covers fishing activities alone, and relevant activities in combination with fishing. The assessment covers the whole of West of Copeland MPA (**Figure 1**).

[3] JNCC Conservation Objectives West of Copeland MPA, jncc.gov.uk/our-work/west-of-copeland-mpa/ (Last accessed 18 August 2023)

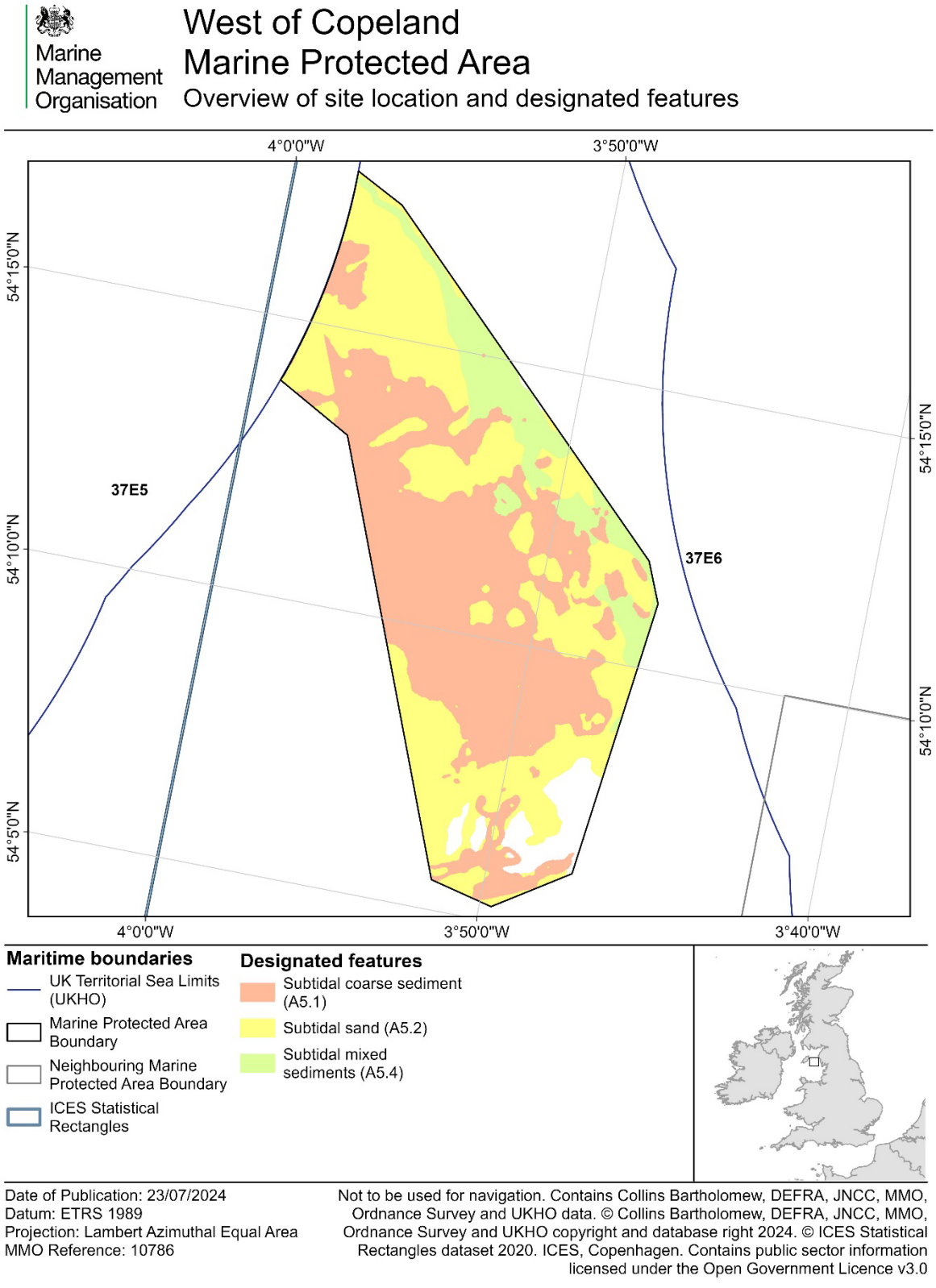

Figure 1: West of Copeland MPA location overview.

3 Part A - Identified pressures on the MPA

Part A of this assessment was carried out in a manner that is consistent with the 'capable of affecting (other than insignificantly)' test for MCZs, required by section 126 of the Marine and Coastal Access Act 2009[4].

Part A assesses the interactions between pressures from fishing gears on the designated features of this site, screening for interactions that require further consideration. Assessment of interactions not screened out in Part A will form Part B of the assessment. For each activity assessed in Part A, there are two possible outcomes for each identified pressure-feature interaction:

1. The pressure-feature interactions **are not** included for assessment in Part B and screened out:
    a. if the feature is not exposed to the pressure, and is not likely to be in the future;
    b. if the pressure is not capable of affecting the feature, other than insignificantly; or
    c. if MMO has information that the activity or pressure is not occurring in the site and/or does not need to be considered further.

2. The pressure-feature interactions **are** included for assessment in Part B:
    a. if the feature is exposed to the pressure, or is likely to be in the future;
    b. if the pressure is capable of affecting the feature, other than insignificantly;
    c. if it is not possible to determine whether the pressure is capable of affecting the feature, other than insignificantly; or
    d. if MMO has information that the activity or pressure is occurring in the site and/or does need to be considered further.

Consideration of a pressure on a protected feature in an MPA includes consideration of the pressure's exposure to, or effect on, any ecological or geomorphological process on which the conservation of the protected feature is wholly or in part dependent.

3.1 Activities taking place

Table 2 lists all commercial fishing gears included for assessment. All other gears have been screened out of further assessment as they do not take place and are not likely to take place in the future, as there are no vessel monitoring system (VMS) records present within the site linked to these gear codes, nor do they appear in landings data for International Council for the Exploration of the Sea (ICES) statistical rectangles that overlap the site.

[4] For more information: Marine and Coastal Access Act 2009 www.legislation.gov.uk/ukpga/2009/23/section/126

To determine fishing activity occurring within the site, the following evidence sources were used:

- VMS data;
- fisheries landings data (logbooks and sales records);
- ICES rectangle level fishing effort data in days (reference: MMO1264); and
- swept area ratio (SAR) calculations.

For more information about the above evidence sources, please see the MPA Site Assessment Methodology document[5], which describes each type of fishing activity evidence and summarises the strengths and limitations of each source.

Table 2: Fishing activities covered by this assessment present in VMS records (2016 to 2021) and landings data (2016 to 2020) for West of Copeland MPA.

Gear type	Gear name	Gear code	Justification
Anchored nets and lines	Gill nets (not specified)	GN	Present in under 12 m landings data for ICES statistical rectangle that overlaps the site.
	Longline (unspecified)	LL	
	Set gillnet (anchored)	GNS	
	Trammel net	GTR	
Bottom towed gear	Beam trawl	TBB	Present in VMS records and under 12 m landings data for ICES statistical rectangle that overlaps the site.
	Bottom otter trawl	OTB	
	Nephrops trawl	TBN	
	Otter trawls (unspecified)	OT	
	Towed dredge	DRB	
	Twin bottom otter trawl	OTT	
Midwater gear	Hook and line (unspecified)	LX	Present in under 12 m landings data for ICES statistical rectangle that overlaps the site.
	Mechanised pole-and-line	LHM	
Traps	Pot/creel	FPO	Present in VMS records and under 12 m landings data for ICES statistical rectangle that overlaps the site.

[5] MPA Site Assessment Methodology document: www.gov.uk/government/publications/stage-3-site-assessments (Last accessed 13 August 2024).

3.2 Activities screened out

This section identifies activities that are **occurring but do not need to be considered** for West of Copeland MPA.

The gear types screened out on this basis are listed below with justification:

- **Midwater gear:** although the use of midwater gear does occur within West of Copeland MPA, there is no feasible pathway for gears of this type to interact with benthic designated features, not considering gear failure or net loss. These gear types are not designed to operate on or near the seabed and are deployed entirely within the water column. Therefore, the use of midwater gear within West of Copeland MPA is not considered to be capable of affecting the designated features other than insignificantly and is not considered further within this assessment.
- **Shore based activities:** although landings data shows that fishing activity using hand mechanised dredge and beach seine occurs within the site, this is based on all activity occurring within the ICES rectangle 37E6 overlapping the site. The ICES rectangle encompasses the entirety of West of Copeland MPA, but also covers a large area of coast where shore based activities occur. As the area of the site being assessed lies beyond the 6 nautical mile (nm) limit, it is not possible that shore-based activities would be capable of affecting the designated feature due to distance; shore based activities are therefore not considered further within this assessment.

3.3 Pressures to be taken forward to Part B

The Stage 3 Fishing Gear MPA Impacts Evidence documents detail all pressures created by fishing activity on features of interest. to the documents justify which pressures should be taken forward for consideration for each feature. This is documented in Table A1.2 in each of the Impacts Evidence documents[6].

- Stage 3 Fishing Gear MPA Impacts Evidence Anchored Nets and Lines[7]
- Stage 3 Fishing Gear MPA Impacts Evidence Bottom Towed Gear[8]; and

[6] Stage 3 MPA Impacts Evidence documents: www.gov.uk/government/publications/marine-protected-areas-stage-3-impacts-evidence (Last accessed 08/01/2024)
[7] Stage 3 Fishing Gear MPA Impacts Evidence Anchored Nets and Lines www.gov.uk/government/publications/marine-protected-areas-stage-3-impacts-evidence (Last accessed 13 August 2024)
[8] Stage 3 Fishing Gear MPA Impacts Evidence Bottom Towed Gears www.gov.uk/government/publications/marine-protected-areas-stage-3-impacts-evidence (Last accessed 13 August 2024)

- Stage 3 Fishing Gear MPA Impacts Evidence Traps[9].

To determine whether a pressure should be taken forward for this particular site, **Table 3** uses the information from the Impacts Evidence documents, alongside site level information, including sensitivity assessments and risk profiling of pressures from conservation advice packages, and JNCC advice to assess the sensitivities of pressures on the designated features of the site.

Table 3 details the pressures for each gear type - anchored nets and lines (A), bottom towed gear (B) and traps (T) - to be assessed in Part B.

Key	
	Dark blue highlighting indicates that the feature is sensitive to this pressure from the gear type in this site, and that the interaction should be taken forward for consideration.
	Light blue highlighting indicates that feature is sensitive to the pressure in general, but the gear type is unlikely to exert this pressure to an extent where impacts are of concern in the site.
	Grey highlighting indicates that there is insufficient evidence to make sensitivity conclusions, or that a sensitivity assessment has not been made for this feature to this pressure from the gear type.
	If there is no highlighting within a cell, this indicates that the pressure from the gear type is not relevant to the feature, or that the feature is not sensitive to the pressure.

[9] Stage 3 Fishing Gear MPA Impacts Evidence Traps www.gov.uk/government/publications/marine-protected-areas-stage-3-impacts-evidence (Last accessed 13 August 2024)

Table 3: Summary of pressures on designated features of West of Copeland MPA to be taken forward to Part B.

Potential pressures	Designated features								
	Subtidal coarse sediment			Subtidal mixed sediments			Subtidal sand		
	A	B	T	A	B	T	A	B	T
Abrasion or disturbance of the substrate on the surface of the seabed									
Changes in suspended solids (water clarity)									
Deoxygenation									
Hydrocarbon and polycyclic aromatic hydrocarbon (PAH) contamination									
Introduction of light									
Introduction of microbial pathogens									
Introduction or spread of invasive non-indigenous species									
Litter									
Organic enrichment									
Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion									
Physical change (to another seabed type)									
Physical change (to another sediment type)									
Removal of non-target species									
Removal of target species									
Smothering and siltation rate changes (light)									
Synthetic compound contamination									
Transition elements and organo-metal contamination									

4 Part B – Fishing activity assessment

Part B of this assessment was carried out in a manner that is consistent with the 'significant risk of hindering the achievement of the conservation objectives' test for MCZs, required by Section 126 of the Marine and Coastal Access Act 2009.

Table 3 shows the fishing activities and pressures identified in Part A which have been included for assessment in Part B. The most relevant attributes of the designated features that could be compromised by fishing pressures were identified using the West of Copeland MPA conservation advice package and are shown in **Table 4**.

Table 4. Relevant favourable condition targets for identified pressures (*pressures important only for bottom towed gear.)

<table>
<tr><th>Feature(s)</th><th>Attribute</th><th>Target</th><th>Relevant pressures</th></tr>
<tr><td>Subtidal coarse sediment

Subtidal sand</td><td rowspan="2">Extent and distribution

Structure and function

Supporting processes</td><td>Recover</td><td rowspan="2">Following pressures important for all gear types and have potential to impact attribute:
- abrasion/disturbance
- removal of non-target species
- removal of target species
- change in suspended solids*
- penetration/disturbance*
- smothering/siltation light*</td></tr>
<tr><td>Subtidal mixed sediments</td><td>Maintain</td></tr>
</table>

4.1 Fisheries access and existing management

Non-UK vessels can operate within West of Copeland MPA, provided that they have a licence issued by the UK to do so. Nationalities of vessels which fished within the MPA from 2016 to 2021 include vessels from the UK, Belgium and Ireland.

No MPA management measures for fishing are currently in place in West of Copeland MPA. West of the site lies the jurisdiction of the Isle of Man government (6 to 12 nm).

More information on non-UK vessel access to UK waters can be found on MMO's Single Issuing Authority page[10].

[10] The UK Single Issuing Authority: www.gov.uk/guidance/united-kingdom-single-issuing-authority-uksia (Last accessed 26 July 2023).

4.2 Fishing activity summary

Table A1. 1 to Table A1. 8 in Annex 1 display a detailed breakdown of fishing activity within West of Copeland MPA. Of the fishing activities not screened out in Part A of this assessment, the most prevalent gear operating within the site is the bottom towed gear, demersal trawl and the static gear, traps.

Demersal trawls accounted for approximately 57 % of the under 12 m vessel fishing effort for the site between 2016 and 2020, and 89 % of the over 12 m records from VMS and 60 % of the combined UK and EU tonnage for over 12 m vessel live weight landings.

Between 2016 and 2021 there were 34 VMS records in total for demersal trawls, an average of 6 per year. Two VMS records were recorded for bottom otter trawls and three VMS counts for beam trawls on average per year. SAR and VMS analysis showed very little effort within the site, primary activity occurring to the north-east outside of the site and the footprint of trawling activity with the MPA falling mainly in the central and north-eastern section of the site with the most intense activity occurring in the southern and north-eastern tips. Activity occurs over all of the sediment features but at low levels.

Surface SAR values for C-squares intersecting West of Copeland MPA for demersal trawl, dredges and bottom towed gear range from 0.001 to 0.25, and subsurface values 0.001 to 0.19. A SAR value of 1 means that each area C-square experiences a pass of fishing gear on average once a year. The values for West of Copeland mean less than one pass of fishing gear per year over a C-square.

Traps accounted for 57 % of tonnage for under 12 m live weight landings. The total combined over and under 12 m landings for traps was also 36.8 tonnes in comparison to 28.6 tonnes from demersal trawls. Traps accounted for approximately 36 % of the total under 12 m fishing effort for the site, and 41 % of the tonnage for under 12 m live weight landings and 8 % of VMS records for over 12 m vessels, with only three VMS records between 2016 and 2021, occurring in the north of the site over all of the sediment features.

Beyond traps and demersal trawls, the remaining 8% of fishing effort for under 12 m vessels between 2016 and 2021 was mainly accounted for by anchored nets and lines. VMS shows that dredging was extremely limited, accounting for 3 % of total records and only one VMS count between 2016 and 2021 to the north-west of the site. SAR showed the footprint of this activity to fall mainly in the north of the site, with the most intense activity occurring in the north-eastern and western points. There was also some activity in the south-western section of the site. Anchored nets and line records, in UK under 12 m vessels, had a total live weight of 1.43 tonnes between 2016 and 2020, an average per year of 0.29 tonnes.

No demersal seine activity was evident from the data, the webmap has one record on the south-eastern boundary overlapping the boundary of the site, but as there are no records from VMS tables and landings, it is considered that activity lies outside of the site.

The majority of fishing within the MPA is from UK vessels at 65 % from 2016 to 2020 compared to 35 % of records from non-UK vessels, namely 15 % by Belgian vessels and 20 % by Irish vessels.

4.3 Pressures by gear type

The Stage 3 Fishing Gear MPA Impacts Evidence documents for anchored nets and lines[7], bottom towed gear[8] and traps[9] collate and analyse the best available evidence on the impacts of different fishing gears on MPA features. This section summarises the analyses and conclusions of those documents, and considers these alongside site level information, including the nature and condition of the habitats and species present, the general management approach, intensity of fishing activity taking place and exposure to natural disturbance.

As the designated features subtidal coarse sediment, mixed sediments and subtidal sand have similar sensitivities to the pressures identified for different gear types, these designated features have been considered together. Where there are differences between the features, or the potential impacts of different gears within each grouping, this has been highlighted.

In the context of MPA assessment, the pressures removal of target and non-target species, refer to any damage, loss, or removal of species defined as a designated feature, or integral to the integrity of a designated feature (for example key structural or influential species). This may occur through intentional or unintentional catch associated with the act of commercial fishing. For the purposes of benthic feature assessments, the physical effects of fishing gears on seabed communities are best addressed through the assessment of abrasion and penetration pressures. As there are no designated species features associated with West of Copeland MPA, and the detail of key structural and influential species is yet to be fully defined, we conclude that impacts from target and non-target removal can be scoped out from further assessment of this site. These pressures may require consideration as a result of any future evidence review, in conjunction with updated conservation advice from JNCC and Natural England.

There is limited survey information available for this site so available information on biotopes of the features present in the site have been assessed at the Irish Sea sub-region level. West of Copeland MPA's location in terms of sub-region and information about the biotopes was taken from evidence from 'Assigning the EUNIS classifications to UK's Offshore Regional Seas 2020' (Tillin *et al.*, 2020) which lists those European Nature Information System (EUNIS) biotopes that were present,

likely to be present ('possible'), or absent from each UK offshore sub-region based on survey data, environmental information, species records, literature and expert judgement. Sensitivity information was extracted from Marlin[11].

Using this information biotopes were screened out if:

- they were not located in the same bioregion as West of Copeland MPA;
- if they were only found in the inshore area; and
- if they were not sensitive or had low sensitivity to the relevant pressures in **Table 4**.

The resulting screened in biotopes are listed in **Table 5**.

[11] Sensitivity information from Marlin. www.marlin.ac.uk/ (last accessed 23 June 2023)

Table 5: Biotopes in Irish Sea sub-region 5a to be considered. (* Indicates biotopes that are identified as 'possible')

Feature	Biotope name	Sensitivity
Subtidal coarse sediment	*Halcampa chrysanthellum* and *Edwardsia timida* on sublittoral clean stone gravel* (Readman and Hiscock, 2016)	Penetration: medium
	Hesionura elongata and *Microphthalmus similis* with other interstitial polychaetes in infralittoral mobile coarse sand* (Marshall, Ashley and Watson, 2023)	
	Neopentadactyla mixta in circalittoral shell gravel or coarse sand* (Tyler-Walters, Durkin and Watson, 2023)	Penetration: medium Change in suspended solids: medium
Subtidal sand	Semi-permanent tube-building amphipods and polychaetes in sublittoral sand* (De-Bastos, Rayment, *et al.*, 2023)	Penetration: medium
	Abra alba and *Nucula nitidosa* in circalittoral muddy sand or slightly mixed sediment* (Tillin and Budd, 2023)	
	Fabulina fabula and *Magelona mirabilis* with venerid bivalves and amphipods in infralittoral compacted fine muddy sand (Tillin and Rayment, 2022)	
	Spisula subtruncata and *Nephtys hombergii* in shallow muddy sand (Tillin, Lloyd and Watson, 2023)	
	Echinocyamus pusillus, *Ophelia borealis* and *Abra prismatica* in circalittoral fine sand (Tillin, 2022b)	
	Abra prismatica, *Bathyporeia elegans* and polychaetes in circalittoral fine sand (Tillin, 2022a)	
	Echinocardium cordatum and *Ensis* spp. in lower shore and shallow sublittoral slightly muddy fine sand (De-Bastos, Hill, Lloyd, *et al.*, 2023)	Abrasion: medium Penetration: medium
	Maldanid polychaetes and *Eudorellopsis deformis* in deep circalittoral sand or muddy sand (Ashley, 2016)	Medium sensitivity to abrasion, penetration and smothering (heavy)
	Owenia fusiformis and *Amphiura filiformis* in deep circalittoral sand or muddy sand (De-Bastos, 2023)	

Feature	Biotope name	Sensitivity
	Acrocnida brachiata with *Astropecten irregularis* and other echinoderms in circalittoral muddy sand (De-Bastos, Lloyd and Watson, 2023)	
Subtidal mixed sediments	*Flustra foliacea* and *Hydrallmania falcata* on tide-swept circalittoral mixed sediment (Readman and Watson, 2024)	Abrasion: medium Penetration: medium
	Sabella pavonina with sponges and anemones on infralittoral mixed sediment* (Perry, 2016)	Abrasion: medium Penetration: medium Smothering (light): medium
	Cerianthus lloydii and other burrowing anemones in circalittoral muddy mixed sediment* (Perry and Watson, 2024)	
	Cerianthus lloydii with *Nemertesia* spp. and other hydroids in circalittoral muddy mixed sediment* (Perry and Watson, 2023)	
	Ophiothrix fragilis and/or *Ophiocomina nigra* brittlestar beds on sublittoral mixed sediment (De-Bastos, Hill, Garrard, *et al.*, 2023)	
	Limaria hians beds in tide-swept sublittoral muddy mixed sediment (Tyler-Walters, Perry and Trigg, 2023)	Abrasion: high Penetration: high Changes in suspended solids: medium Smothering (light): medium

4.3.1 Anchored nets and lines

The relevant pressures on subtidal sediment features of West of Copeland MPA from anchored nets and lines were identified in **Table 4** and are:

- abrasion or disturbance of the substrate on the surface of the seabed;
- removal of non-target species; and
- removal of target species.

As noted, impacts from target and non-target removal pressures have been scoped out of this assessment, as they are assessed more completely within the abrasion and penetration pressures.

Impacts on sediment features relating to abrasion or disturbance of the substrate on the surface of the seabed occur primarily from the footrope and anchors during the hauling of gear, and during movement along the seabed due to tides, currents or storms. The static nature of the gear type means it is unlikely to affect the physical structure of the features but there is some potential for damage to the biological communities present in intensively fished areas.

Table 5 lists those biotopes which may exist in West of Copeland MPA which have a medium or high (or unknown) sensitivity to relevant pressures. Out of 19 possible biotopes, one of the biotopes for subtidal sand, and 5 of the biotopes for subtidal mixed sediments have a medium sensitivity to abrasion. One biotope for subtidal mixed sediment has high sensitivity to abrasion. None of the subtidal coarse sediment biotopes have medium or high sensitivity to abrasion.

Abrasion impacts are considered likely to be greatest on subtidal mixed and coarse sediments compared to subtidal sand as the coarser habitats often contain populations of sessile epifauna. However, as per section 9.3 of the anchored nets and lines Impacts Evidence document[7], abrasion impacts from this gear type are unlikely to negatively impact the extent or distribution of any sediment feature, or structure and function of the ecosystem in a significant manner. This is due to subtidal sediment habitats being considered as resilient to all but intense fishing activity using anchored nets and lines, on species rich sediment habitats, or those with long-lived bivalves.

Section 4.3 describes fishing activity within West of Copeland MPA, and notes that there are extremely low levels of anchored nets and lines use within the site. There are no VMS records for anchored nets and lines within the site, and anchored nets and lines make up only 2 % of the weight of estimated live landings from under 12 m vessels and an annual average of 0.29 tonnes between 2016 and 2020.

Overall, there is currently little interaction occurring between anchored net and line activity and the designated features. The risk of abrasion and disturbance is limited, and smallest for subtidal sand.

Therefore, **MMO concludes that at the activity levels described, the use of anchored nets and lines does not pose a significant risk of hindering the achievement of the conservation objectives of the MPA.**

4.3.2 Bottom towed gear

The relevant pressures on subtidal sediment features of West of Copeland MPA from bottom towed gear were identified in **Table 4** and are:

- abrasion or disturbance of the substrate on the surface of the seabed$^{\Delta}$;
- penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion$^{\Delta}$;
- removal of non-target species;
- removal of target species;
- smothering and siltation rate changes*; and
- changes in suspended solids (water clarity)*.

As noted previously, impacts from target and non-target removal pressures have been scoped out of this assessment, as they are assessed more completely within the abrasion and penetration pressures. Pressures marked with matching superscript symbols (Δ and *) have been consolidated due to the similar nature of their impacts on the sediment features.

'Abrasion or disturbance of the substrate on the surface of the seabed' and 'Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion'.

As outlined in section 8.5 of the Impacts Evidence document bottom towed gear[8], the abrasion and penetration pressures caused by bottom towed gears have both biological and physical impacts to sediment features, varying based on levels of activity and fishing intensity. Physical impacts range from the creation of furrows and berms in the sediment, to the flattening of bottom features such as ripples and the homogenisation of sediments. These impacts are unlikely to significantly affect the large-scale topography of sediment features, and the small-scale impacts to topographic features, such as ribbons and waves made by fishing gear in the sediment, are unlikely to have a significant effect on the habitat. Biological impacts include damage and mortality to flora and fauna on the seabed via surface and subsurface abrasion and penetration, as well as long term shifts in biological communities towards smaller, short-lived, opportunistic species that exhibit greater resilience to anthropogenic activity. Biological impacts are of greater concern, such as damage and direct and indirect mortality of flora and fauna, particularly of benthic invertebrates, via crushing and collision with the gear, which causes reductions in species richness, and diversity. These changes can alter the community structure of sediment habitats by removing sensitive species and allowing more resilient opportunistic species which are less susceptible to damage to remain.

‘Changes in suspended solids (water clarity)’ and ‘Smothering and siltation rate changes (light)’

Smothering, siltation rate and suspended solid changes occur when bottom towed gear connect with the seabed, causing the top layer of the sediment to mix with the surrounding water. This can affect the ability of some organisms to feed or breathe. The subsequent settling rate of different sediment types, and entrainment in prevailing currents, can result in a change in the structure and function of the feature in finer scale topography, sediment quality and sediment composition. The degree of impact will vary according to the amount of fishing activity, the gear used and the sediment type. Sediments and faunal communities react differently to these pressures depending on grain size, the degree of sediment impaction and frequency or severity of the pressure upon them.

As per section 8.4 of the bottom towed gear Impacts Evidence document[8], these pressures can impact biological communities in sediment habitats through the disruption of biogeochemical processes, increasing oxygen demand, clogging the organs of filter feeding species and infilling the burrows of infaunal species.

All pressures

Table 5 lists those biotopes which may exist in West of Copeland MPA which have a medium or high (or unknown) sensitivity to relevant pressures. Out of 19 possible biotopes 3 of the biotopes for subtidal coarse sediment have a medium sensitivity to abrasion. For subtidal sand this is 9 biotopes and subtidal mixed sediments 5 biotopes. For subtidal mixed sediments there is also one biotope which has high sensitivity.

Out of 19 possible biotopes one of the biotopes for subtidal coarse sediment has a medium sensitivity to change in suspended. For subtidal mixed sediments this is 5 biotopes, with one biotope having high sensitivity. None of the subtidal sand biotopes have a medium or high sensitivity to smothering (light).

As described in **section 4.3**, most of the fishing activity in the vicinity is occurring outside, with very low levels occurring within the MPA. Activity that predominates within West of Copeland MPA is bottom towed fishing. Within bottom towed gear, demersal trawling is the highest, with activity spread throughout the site between 2016 and 2021, recorded in every year aside from 2018, overlapping each of the designated features. Dredge activity is minimal with only one record on the north-western boundary of the site overlapping only subtidal sand.

Given the low levels of bottom towed gear activity in the years analysed bottom towed gears will not result in a significant risk of hindering the achievement of the conservation objectives.

However, fishing activity patterns may change due to a wider range of drivers, including changes in target species and/or changes in the spatial distribution of target species, or the discovery of novel stocks, in response to climate change and fisheries displacement, and competition with other activities and conservation measures for space. The first pass of a demersal trawl has proportionately more impact than subsequent passes (Hiddink *et al.*, 2006) so even relatively small increases bottom towed gear fishing may be of concern, particularly with biotopes present that have a medium sensitivity to pressures created by bottom towed gear, as listed in **Table 5**. The potential for increases in the levels of bottom towed fishing, and resulting abrasion, penetration, suspended solids and smothering and siltation pressures, and presence of more sensitive biotopes within the designated subtidal sediments, means that a significant risk of hindering the achievement of the conservation objectives cannot be excluded.

Considering the above, **MMO concludes that at the activity levels described, the use of bottom towed gear does not pose a significant risk of hindering the achievement of the conservation objectives of West of Copeland MPA. However, the potential for changes in bottom towed gear fishing levels, in combination with the presence of sensitive biotopes in the designated subtidal sand, subtidal coarse sediment and subtidal mixed sediments features may result in a significant risk of hindering the achievement of the conservation objectives of the MPA.**

4.3.3 Traps

The main pressures on subtidal sediment features of West of Copeland MPA from traps were identified in **Table 4** and are:

- abrasion or disturbance of the substrate on the surface of the seabed;
- removal of non-target species; and
- removal of target species.

As noted previously, impacts from target and non-target removal pressures have been scoped out of this assessment, as they are assessed more completely within the abrasion and penetration pressures.

Table 5 lists those biotopes which may exist in West of Copeland MPA which have a medium or high (or unknown) sensitivity to relevant pressures. Out of 19 possible biotopes, one of the biotopes for subtidal sand, and 5 of the biotopes for subtidal mixed sediments have a medium sensitivity to abrasion. One biotope for subtidal mixed sediment has high sensitivity to abrasion. None of the subtidal coarse sediment biotopes have medium or high sensitivity to abrasion.

The impact of abrasion or disturbance of the substrate on the surface of the seabed by traps is considered to be relatively low given the small footprint of gear, though

the different sizes, materials and number of traps will mean the impact varies. There is also little primary evidence on the physical impact of traps on subtidal sediments, however the evidence that is available indicates that traps are not likely to be a concern unless used at particularly high levels of intensity, or if particularly sensitive species are present.

Section 4.3 describes the fishing activity within West of Copeland MPA and estimates that an annual combined average for both over and under 12 m vessels of approximately 7.37 tonnes were landed from within the MPA using traps. Traps were the second most prevalent gear type in the site between 2016 and 2021, scattered over the northern section of the site and overlapping each designated feature.

With regards to the discussion above, the assessed activity levels and the evidence available for the impact of traps, **MMO concludes that at the activity levels described, the use of traps does not pose a significant risk of hindering the achievement of the conservation objectives of the MPA.**

4.4 Part B conclusion

The assessment of anchored nets and lines, and traps on subtidal coarse sediment, subtidal mixed sediments and subtidal sand in West of Copeland MPA has concluded that these fishing activities will not result in a significant risk of hindering the achievement of the conservation objectives. As such MMO concludes that management measures to restrict fishing activities at the levels described using anchored nets and lines, and traps are not required in West of Copeland MPA.

The assessment of bottom towed gear on the designated features in West of Copeland MPA has revealed activities may result in a significant risk of hindering the achievement of the conservation objectives of the MPA on the subtidal sand, subtidal coarse sediment and subtidal mixed sediments features. Management measures will therefore be implemented for bottom towed gear to ensure that there is no significant risk of hindering the conservation objectives of the MPA.

Section 6 contains further details of these measures.

5 Part C – In-combination assessment

This section assesses the impacts of fishing activities in-combination with relevant activities taking place. This includes the following:

- fishing interactions assessed in Part B but which were not considered, alone, to have an adverse effect on the site integrity; and
- other activities: such as marine development infrastructure plans and projects that occur in the MPA.

ArcGIS software has been used to check relevant activities that occur within, or adjacent to, the assessed site where there could be a pathway for impact. To determine relevant activities to be included in this part of the assessment, a distance of 5 km was selected as suitable to capture any potential source receptor pathways that could impact the benthic features of the site in-combination with effects of the fishing activities assessed. A 5 km buffer was therefore applied to the site boundary to identify relevant activities. This assessment considers the in-combination impacts of marine licensable activities that are ongoing or upcoming, and with medium to high-risk pressure impact pathways as permitted fishing activity. As the models were run using ArcGIS in August 2023, any licences that ended before this date were screened out of the assessment.

The North Sea Transition Authority (NSTA) is responsible for regulating the oil, gas and carbon storage industries, and as such these activities fall outside of MMO's marine licensing remit. Oil, gas and carbon storage industry activities are not currently considered in this draft assessment, as information on the potential pressures exerted by associated activities is currently under review, and the likelihood of these activities resulting in an in-combination adverse effect on site integrity with fishing is expected to be very low. Following formal consultation, relevant oil, gas and carbon storage industry activities that could impact the site in-combination with the effects of assessed fishing activities will be included before finalising this assessment, alongside marine licence applications submitted after August 2023.

There may also be operational submarine cables within the MPA, these cables are already in-situ and are unlikely to have any residual abrasion/removal pressure in-combination with the assessed fishing activity. Any abrasion/removal pressure from submarine cable operation and maintenance activity will be temporary with limited seabed impacts and is therefore unlikely to have significant in-combination effects with assessed fishing.

There may be operational submarine cables within the MPA, these cables are already in-situ and are unlikely to have any residual abrasion/removal pressure in-combination with the assessed fishing activity. Any abrasion/removal pressure from submarine cable operation and maintenance activity will be temporary with limited seabed impacts and is therefore unlikely to have significant in-combination effects with assessed fishing.

Bottom towed gear were identified in Part B as requiring management to avoid adverse effects to site integrity. Anchored nets and lines, and traps, are the only remaining fishing activities occurring within West of Copeland MPA that interact with the seabed. In-combination effects of these fishing activities as well as these activities in-combination with other relevant activities will be assessed in this section.

In accordance with the methodology detailed above, ArcGIS identified five licences within the 5 km buffer applied, four for operation and maintenance of power cables and one for a defence activity by the Ministry of Defence (MOD).
Table 6 shows the activities and the relevant categories from the JNCC Pressures-Activities Database (PAD)[12].

Table 6: summary of marine licensable activities and associated PAD categories.

Marine licence case reference number[13]	PAD Category	Justification
Licence submitted for maintenance works for Walney offshore-wind-farm (OWF) extension (MLA/2023/00259).	Power cable: operation and maintenance	Installation of aerodynamic blade tip boosters above water from vessels, no impact to seabed. **No in-combination effect possible.**
Licence approved for maintenance of existing works for array cable stabilisation at Walney	Power cable: operation	Placement of rock and/or rock bag berms on seabed, primarily on existing scour pad at base of turbines to prevent more impactful cable replacement work. Licence end date

[12] JNCC Pressures-Activities Database (PAD): hub.jncc.gov.uk/assets/97447f16-9f38-49ff-a3af-56d437fd1951

[13] Details on the marine licence activities can be viewed on the public register of marine licence applications and decisions, searching by the marine licence case reference numbers: marinelicensing.marinemanagement.org.uk/mmofox5/fox/live/MMO_PUBLIC_REGISTER (Last accessed 27 August 2024)

Marine licence case reference number[13]	PAD Category	Justification
extension OWF (MLA/2021/00251).	and maintenance	1st Sep 2023. **No in-combination effect possible.**
Licence approved for maintenance of existing works on the array at Walney extension OWF (MLA/2023/00035).	Power cable: operation and maintenance	Blade work campaign using jack-up vessel within the confines of the array site. Licence end date March 31st, 2024. **Possible in-combination effect.**
Licence approved for maintenance of existing works on transmission assets for operation and maintenance of Walney extension OWF (MLA/2019/00514/1).	Offshore wind: operation and maintenance Power cable: operation and maintenance	Activities with potential impact to seabed and in-combination effects with regards to the abrasion pressure: Cable replacement, jetting, cable reburial by vessel, divers, AUVs, ROVs, potential disturbance area of 51,150 m^2. Also includes structural repairs to foundations, removal of marine growth from infrastructure and replacement of external components. **Possible in-combination effect.**
Licence submitted for other deposits by MOD at Eskmeals artillery (MLA/2023/00203).	Water column military activity	Artillery projectile firing trial, 13-20th Sep 2023, firing of guns from land to sea. Activity is usually exempt from marine licensing; it is only subject to licensing due to the commercial nature of the project. No potential for abrasion pressure. **No in-combination effect possible.**

The PAD and **Table 3** from section 3.3, were used to identify medium-high risk pressures exerted by fishing and non-fishing activities to identify those which require in-combination assessment (**Table 7**).

Table 7 summarises the pressures exerted by fishing and non-fishing activities and identifies those exerted by both (Y: pressure exerted). Activity-pressure interactions are highlighted dark blue to illustrate an in-combination effect. Only fishing activity with no proposed or current fisheries management in place are considered.

Table 7: Pressures exerted by fishing and non-fishing activities.

	Marine licensable activities		Fishing activities	
Potential pressures	**Offshore wind: Operation and maintenance**	**Power cable: Operation and maintenance**	**Anchored nets and lines**	**Traps**
Abrasion or disturbance of the substrate on the surface of the seabed	Y	Y	Y	Y
Removal of non-target species			Y	Y
Removal of target species			Y	Y

5.1 In-combination pressures section

Fisheries vs fisheries in-combination pressures will be considered in this section. The pressures exerted by the non-fishing activity will also be considered in-combination with the anchored nets and lines and traps fishing pressures.

5.2 Fishing vs Fishing in-combination pressures

5.2.1 Abrasion and disturbance of the substrate on the surface of the seabed and removal of target and non-target species

As noted in Part B (**Section 4.3.1** nets and lines and **Section 4.3.3** traps), impacts from the removal of target and non-target species pressure is not being considered in detail in this assessment. In-combination impacts from the removal of target and non-target species pressures are more fully assessed under the pressure abrasion, as the detail of key structural and influential species is yet to be fully defined. Therefore, the removal pressures are not considered further in this in-combination assessment. The pressures may require further consideration as future evidence becomes available, in conjunction with updated conservation advice from JNCC and Natural England.

The annual average VMS records for over 12 m vessels within the MPA totalled 1 count (0 counts for anchored nets and lines, and 1 count for traps). For under 12 m vessels, between 2016 and 2021, the annual average fishing effort (2016-2020) estimated to have been derived from the MPA via traps and anchored nets and lines was 19 days (2.16 days for anchored nets and lines, and 16.36 days for traps, Annex 1). For the same period (2016-2020), the total fishing effort (under 12s) estimated to have been derived from the MPA were 111 days (12.94 days for anchored nets and

lines, and 98.14 days for traps). The fishing effort data is further supported by the estimated live weight landings for under 12 m vessels (UK only) that equal an annual average of 7.51 tonnes (0.29 tonnes for anchored nets and lines, and 7.22 tonnes for traps), between 2016 and 2020.

The combined impacts from anchored nets and lines and traps could potentially increase the risk of negative effects from the pressure abrasion and disturbance of the substrate on the surface of the seabed. However, there is no over 12m activity for anchored nets and lines and annual average effort for under 12 m vessels is low (2.16 days), with minimal average landings of 0.29 tonnes per year. The described levels of trap activity have been assessed alone as not posing a significant risk to the conservation objectives. As such with the addition of such low anchored nets and lines activity, any in-combination impact is considered insignificant.

Therefore, the MMO concludes that the combined pressures from anchored nets and lines and traps will not cause a significant risk of hindering the achievement of the conservation objectives of West of Copeland MPA at the levels described.

5.3 Fishing vs non-fishing activities in-combination pressures

5.3.1 Abrasion and disturbance of the substrate on the surface of the seabed

The designated features of West of Copeland MPA are sensitive to physical damage through surface abrasion and disturbance of the substrate from anchored nets and lines, and trap, during gear deployment, movement of the gear on the seabed due to tidal movements and storm activity, and as the gear is dragged along the seabed during retrieval.

The licences associated with Walney Extension OWF cable stabilisation work (MLA/2021/00251) and blade improvement campaign (MLA/2023/00035), although generating abrasion pressures and therefore potential for in-combination, expire in September 2023, and March 2024, and as such no further consideration is necessary. The Walney Extension OWF operation and maintenance (O&M) licence (MLA/2019/00514/1) might cause abrasion or disturbance of the seabed in relation to cable repair, jetting and reburial, structural repairs and maintenance of wind farm infrastructure. Activities relating to cable repair works, are estimated to disturb a maximum of 0.051 km^2 of the 158km^2 MPA area, taking place over a period of up to 3 months. Maintenance of the offshore wind farm infrastructure includes structural repairs to the foundation and substructure, component replacements and removal of marine growth via brushing and water jets. These works will occur over 3 visits per year totalling 75 visits over the lifetime of the project and result in limited disturbance to the seabed as these structures are already in situ.

As detailed in section 3.3, at current activity levels, anchored nets and lines and traps are not considered to be causing significant pressure through abrasion and disturbance. It is possible that activities linked to the Walney Extension OWF operation and maintenance (O&M) licence (MLA/2019/00514/1), in-combination with anchored nets and lines and traps may increase the potential for this pressure to have negative cumulative effects on the designated features of the MPA. Though this licence only impacts a very limited proportion of the southern portion of the site, meaning limited overlap with fishing activities, the addition of impacts over a greater area of the MPA in relation to non-fishing and fishing activity together, could mean features are subjected to a greater spread of pressures. However, maintenance and repair activities will be temporary and over a very small area. Therefore, the scale of the in-combination impacts from abrasion and disturbance of the substrate on the surface of the seabed between anchored nets and lines and traps and non-fishing activity is considered insignificant.

Therefore, MMO concludes that the combined pressures from anchored nets and lines and traps and other relevant activities will not result in a significant risk of hindering the achievement of the conservation objectives of West of Copeland MPA.

5.4 Part C conclusion

MMO concludes that different fishing gear types in combination and fishing in-combination with other relevant activities will not result in significant risk of hindering the achievement of the conservation objectives for West of Copeland MPA.

Further management measures will not therefore be implemented for anchored nets and lines, and traps activities currently occurring within the MPA.

6 Conclusion and proposed management

Part A of this assessment concluded that bottom towed gear, anchored nets and lines, and traps are capable of affecting (other than insignificantly) the designated features of West of Copeland MPA.

Part B of this assessment concluded that, at the activity levels described, use of bottom towed gear, alone, on the sedimentary features of West of Copeland MPA may result in a significant risk of hindering the achievement of the conservation objectives of the MPA as a result of the impacts of abrasion or disturbance, penetration and smothering, siltation rate and suspended solid changes, whilst anchored nets and lines, and traps will not.

Part C of this assessment concluded that at the activity levels described, use of anchored nets and lines and traps, in combination with each other and with other relevant activities, does not pose a significant risk of hindering the achievement of the conservation objectives of the MPA.

To ensure that fishing activities do not result in a significant risk of hindering the conservation objectives of the MPA, MMO will implement a byelaw to prohibit the use of bottom towed gear throughout West of Copeland MPA.

Figure 2 shows the proposed management area in line with the conclusions set out above.

The boundaries of the proposed management area include an appropriate buffer zone to prevent direct damaging physical interactions between fishing activities and the designated features to be protected. The rationale for determining buffer size can be found in in Annex 2 of the Stage 3 MPA Site Assessment Methodology document[5].

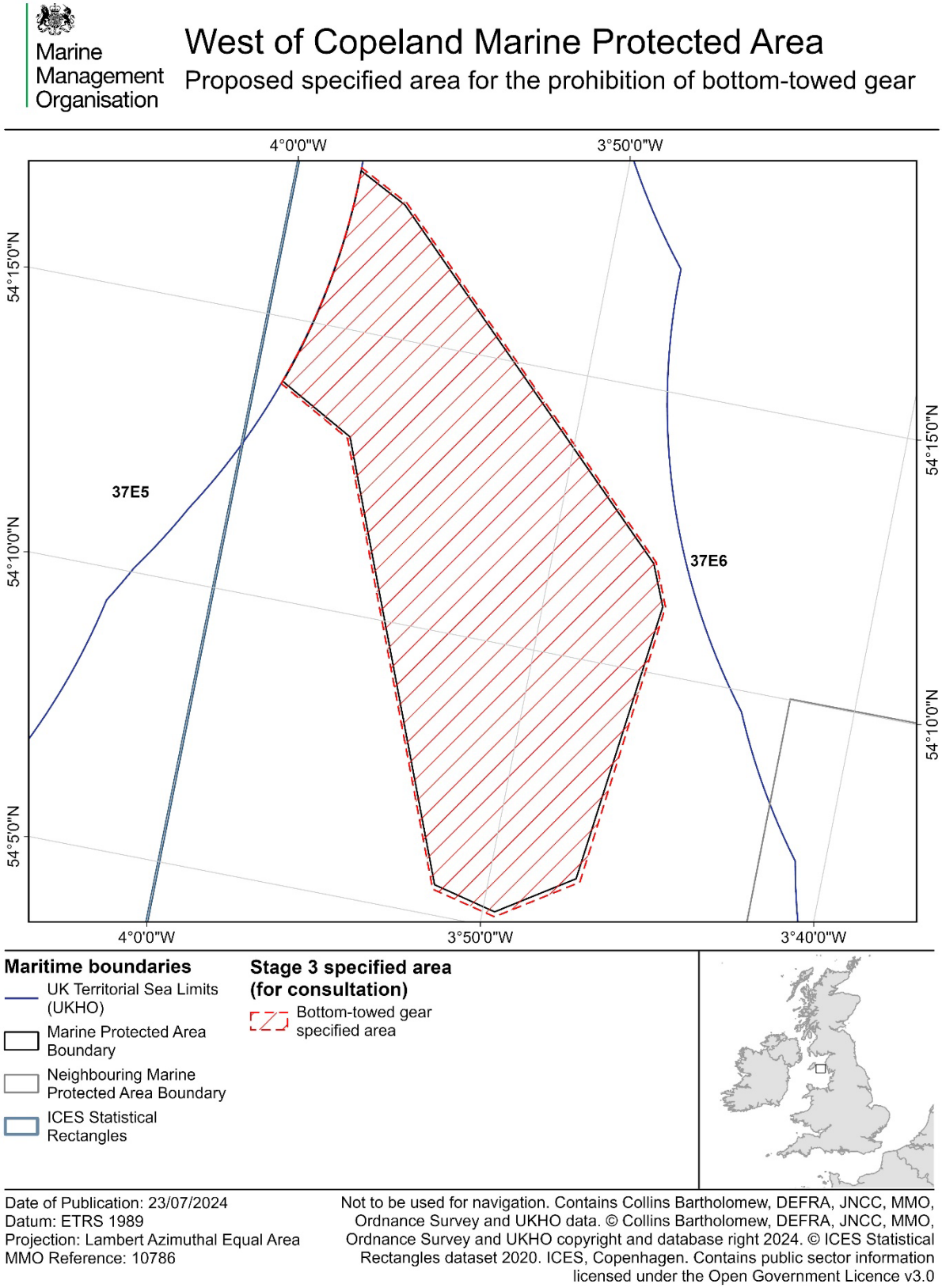

Figure 2: Map of proposed management.

7 Review of this assessment

MMO will review this assessment every five years, or earlier if significant new information is received. Such information could include:

- updated conservation advice
- updated advice on the condition of the site's feature(s)
- significant increase in activity levels.

To coordinate the collection and analysis of information regarding activity levels, and to ensure that any required management is implemented in a timely manner, a monitoring and control plan will be implemented for this site. This plan will be developed in line with MMO's Monitoring and Control Plan framework.

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Annex – Fishing activity data

Table A1. 1: VMS record count and per nation group (UK and EU Member State) and proportional activity (%), per gear, per gear group, and per year (2016 to 2021), totals and annual average 2016 to 2021 for West of Copeland MPA.

			2016		2017		2018		2019		2020		2021		Total (2016 to 2021)		Annual average (2016 to 2021)
Gear group	**Gear code**	**Nation group**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**
Demersal trawl	OTB	EU	1	25	0	0	0	0	0	0	3	100	0	0	4	29	1
	OTB	UK	3	75	4	100	0	0	1	100	0	0	2	100	10	71	2
	OTB total		**4**	**100**	**4**	**100**	**0**	**0**	**1**	**100**	**3**	**43**	**2**	**11**	**14**	**41**	**2**
	TBB	EU	0	0	0	0	0	0	0	0	3	75	0	0	3	16	1
	TBB	UK	0	0	0	0	0	0	0	0	1	25	15	100	16	84	3
	TBB total		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**57**	**15**	**83**	**19**	**56**	**3**
	TBN	UK	0	0	0	0	0	0	0	0	0	0	1	100	1	100	0
	TBN total		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**6**	**1**	**3**	**0**
Demersal trawl total			**4**	**80**	**4**	**80**	**0**	**0**	**1**	**100**	**7**	**78**	**18**	**100**	**34**	**89**	**6**
Dredge	DRB	UK	1	100	0	0	0	0	0	0	0	0	0	0	1	100	0
	DRB total		**1**	**100**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**100**	**0**
Dredge total			**1**	**20**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**3**	**0**
Traps	FPO	UK	0	0	1	100	0	0	0	0	2	100	0	0	3	100	1
	FPO total		**0**	**0**	**1**	**100**	**0**	**0**	**0**	**0**	**2**	**100**	**0**	**0**	**3**	**100**	**1**
Traps total			**0**	**0**	**1**	**20**	**0**	**0**	**0**	**0**	**2**	**22**	**0**	**0**	**3**	**8**	**1**
Grand total			**5**	**0**	**5**	**0**	**0**	**0**	**1**	**0**	**9**	**0**	**18**	**0**	**38**	**0**	**7**

Table A1. 2: UK live weight landings tonnage (t) estimates by gear from vessels over 12 m in length (2016 to 2020).

Gear group	Gear code	2016	2017	2018	2019	2020	Total (2016 to 2020)	Average (2016 to 2020)
Demersal trawl	OTB	0.25	1.11	0	0.39	0	1.75	0.35
Demersal trawl	TBB	0	0	0	0	0.32	0.32	0.06
Demersal trawl total		**0.25**	**1.11**	**0**	**0.39**	**0.32**	**2.07**	**0.41**
Dredge	DRB	1.01	0	0	0	0	1.01	0.2
Dredge	HMD	0	0	0	0	0	0	0
Dredge total		**1.01**	**0**	**0**	**0**	**0**	**1.01**	**0.2**
Traps	FPO	0	0.65	0	0	0.1	0.75	0.15
Traps total		**0**	**0.65**	**0**	**0**	**0.1**	**0.75**	**0.15**
Grand total		**1.26**	**1.76**	**0**	**0.39**	**0.42**	**3.83**	**0.77**

Table A1. 3: EU27 live weight landings tonnage (t) estimates by gear from vessels over 12 m in length (2016 to 2020).

Gear group	Gear code	2016	2017	2018	2019	2020	Total (2016 to 2020)	Average (2016 to 2020)
Demersal trawl	OTB	0	0	0	0	0.16	0.16	0.03
Demersal trawl	TBB	0	0	0	0	0.4	0.4	0.08
Demersal trawl total		**0**	**0**	**0**	**0**	**0.56**	**0.56**	**0.11**
Grand total		**0**	**0**	**0**	**0**	**0.56**	**0.56**	**0.11**

Table A1. 4: Combined UK and EU live weight landings tonnage (t) estimates by gear from vessels over 12 m in length (2016 to 2020).

Gear group	Gear code	2016	2017	2018	2019	2020	Total (2016 to 2020)	Average (2016 to 2020)
Demersal trawl	OTB	0.25	1.11	0	0.39	0.16	1.91	0.38
Demersal trawl	TBB	0	0	0	0	0.72	0.72	0.14
Demersal trawl total		**0.25**	**1.11**	**0**	**0.39**	**0.88**	**2.63**	**0.53**
Dredge	DRB	1.01	0	0	0	0	1.01	0.2
Dredge	HMD	0	0	0	0	0	0	0
Dredge total		**1.01**	**0**	**0**	**0**	**0**	**1.01**	**0.2**
Traps	FPO	0	0.65	0	0	0.1	0.75	0.15
Traps total		**0**	**0.65**	**0**	**0**	**0.1**	**0.75**	**0.15**
Grand total		**1.26**	**1.76**	**0**	**0.39**	**0.98**	**4.39**	**0.88**

Table A1. 5: Percentage of ICES rectangle intersected by West of Copeland MPA.

ICES rectangle	Percentage overlap (%)
37E6	6.30

Table A1. 6: Total UK live weight landings tonnage (t) estimates by gear from vessels under 12 m in (2016 to 2020).

Gear group	Gear code	2016	2017	2018	2019	2020	Total (2016 to 2020)	Average (2016 to 2020)
Anchored net/line	GN	0.28	0.52	0.29	0.09	0.03	1.21	0.24
Anchored net/line	GNS	0	0.01	0	0	0.01	0.03	0.01
Anchored net/line	GTR	0.01	0.12	0.02	0.04	0	0.18	0.04
Anchored net/line	LL	0	0.01	0	0	0	0.01	0
Anchored net/line total		**0.29**	**0.66**	**0.31**	**0.13**	**0.05**	**1.43**	**0.29**
Demersal trawl	OT	0.83	1.05	0	0	0	1.87	0.37
Demersal trawl	OTB	0.03	1.16	2.87	1.6	0.52	6.19	1.24
Demersal trawl	OTT	0	0	0	0.01	0	0.01	0
Demersal trawl	TBB	0.07	0.31	0.17	0	0	0.56	0.11
Demersal trawl	TBN	5.61	2.7	3.51	2.96	2.58	17.37	3.47
Demersal trawl total		**6.54**	**5.23**	**6.55**	**4.57**	**3.1**	**26**	**5.2**
Dredge	DRB	0	0	0	0	0	0	0
Dredge total		**0**	**0**	**0**	**0**	**0**	**0**	**0**
Midwater hook/lines	LX	0	0	0	0	0.16	0.16	0.03
Midwater hook/lines total		**0**	**0**	**0**	**0**	**0.16**	**0.16**	**0.03**
Traps	FPO	9.91	12.94	5.2	5.26	2.78	36.09	7.22
Traps total		**9.91**	**12.94**	**5.2**	**5.26**	**2.78**	**36.09**	**7.22**
Grand total		**16.75**	**18.82**	**12.06**	**9.96**	**6.1**	**63.68**	**12.74**

Table A1. 7: Mean annual surface and subsurface SAR values for C-squares intersecting West of Copeland MPA (2016 to 2020).

Gear group	SAR category	2016	2017	2018	2019	2020
Demersal trawls	Surface	0.04	0.05	0.05	0.12	0.1
	Subsurface	0.02	0.01	0.02	0.08	0.09
Dredges	Surface	<0.01	<0.01	0	<0.01	<0.01
	Subsurface	<0.01	<0.01	<0.01	<0.01	<0.01
Bottom towed gear	Surface	0.04	0.05	0.05	0.13	0.1
	Subsurface	0.02	0.01	0.02	0.08	0.09

Table A1. 8: Fishing effort (days) recorded by UK vessels under 12 m in length, separated by gear type for the area of West of Copeland MPA that intersects the marine portion of ICES rectangle (2016 to 2021). ICES rectangle 37E6 level data has been apportioned to the MPA based on the percentage area of the ICES rectangle that intersects the MPA (Table A1. 5).

Gear group	Fishing effort (days at sea)							
	2016	2017	2018	2019	2020	2021	Total (2016 to 2021)	Annual average (2016 to 2021)
Bottom towed gear	17.68	13.44	16.05	9.08	6.88	12.26	75.39	12.56
Midwater hooks and lines	0	0	0	0	1.26	1.57	2.83	0.47
Midwater gear total	**0**	**0**	**0**	**0**	**1.26**	**1.57**	**2.83**	**0.47**
Traps	20.76	16.55	16.05	19.16	14.82	10.80	98.14	16.36
Anchored nets and lines	4.87	3.23	2.70	1.07	0.94	0.13	12.94	2.16
Static gear total	**25.63**	**19.79**	**18.75**	**20.22**	**15.77**	**10.93**	**111.08**	**18.51**
MPA total	**43.31**	**33.23**	**34.80**	**29.30**	**23.90**	**24.76**	**189.29**	**31.55**