Marine Management Organisation

MMO Stage 3 Site Assessment: Offshore Overfalls MPA (DRAFT)






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Title: MMO Stage 3 Site Assessment: Offshore Overfalls MPA DRAFT

Contents

Executive Summary

This assessment analyses the impact of anchored nets and lines, bottom towed gears and traps on the designated features subtidal coarse sediment, subtidal mixed sediments, and subtidal sand in Offshore Overfalls 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 the ongoing use of bottom towed gears occurring in the site on the designated features subtidal coarse sediment, subtidal mixed sediment and subtidal sand pose a significant risk of hindering the achievement of the conservation objectives of the Offshore Overfalls MPA.

1 Introduction

This assessment considers whether fishing activities are compatible with the conservation objectives of Offshore Overfalls 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, 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 force.

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, conservation objectives and general management approaches:

- JNCC Site Information - Offshore Overfalls MCZ[1]
- Defra Factsheet - Offshore Overfalls MCZ[2]

Offshore Overfalls MPA is situated in the eastern English Channel, approximately 18 kilometres (km) south-east of the Isle of Wight. The site straddles the 6 and 12 nautical mile (nm) limits and covers an area of approximately 593 square kilometres (km^2) (**Figure 1**). Most of the site is located between the 6 and 12 nm boundaries, with a very small area of the north-east corner of the site inshore of 6 nm. Fishing activity in the site is regulated by Marine Management Organisation (MMO). Natural England (0 to 12 nm) and JNCC (beyond 12 nm) are the relevant Statutory Nature Conservation Bodies for the site.

[1] https://jncc.gov.uk/our-work/offshore-overfalls-mpa/ (last accessed 02 October 2023)

[2] https://www.gov.uk/government/publications/marine-conservation-zones-offshore-overfalls (last accessed 02 October 2023)

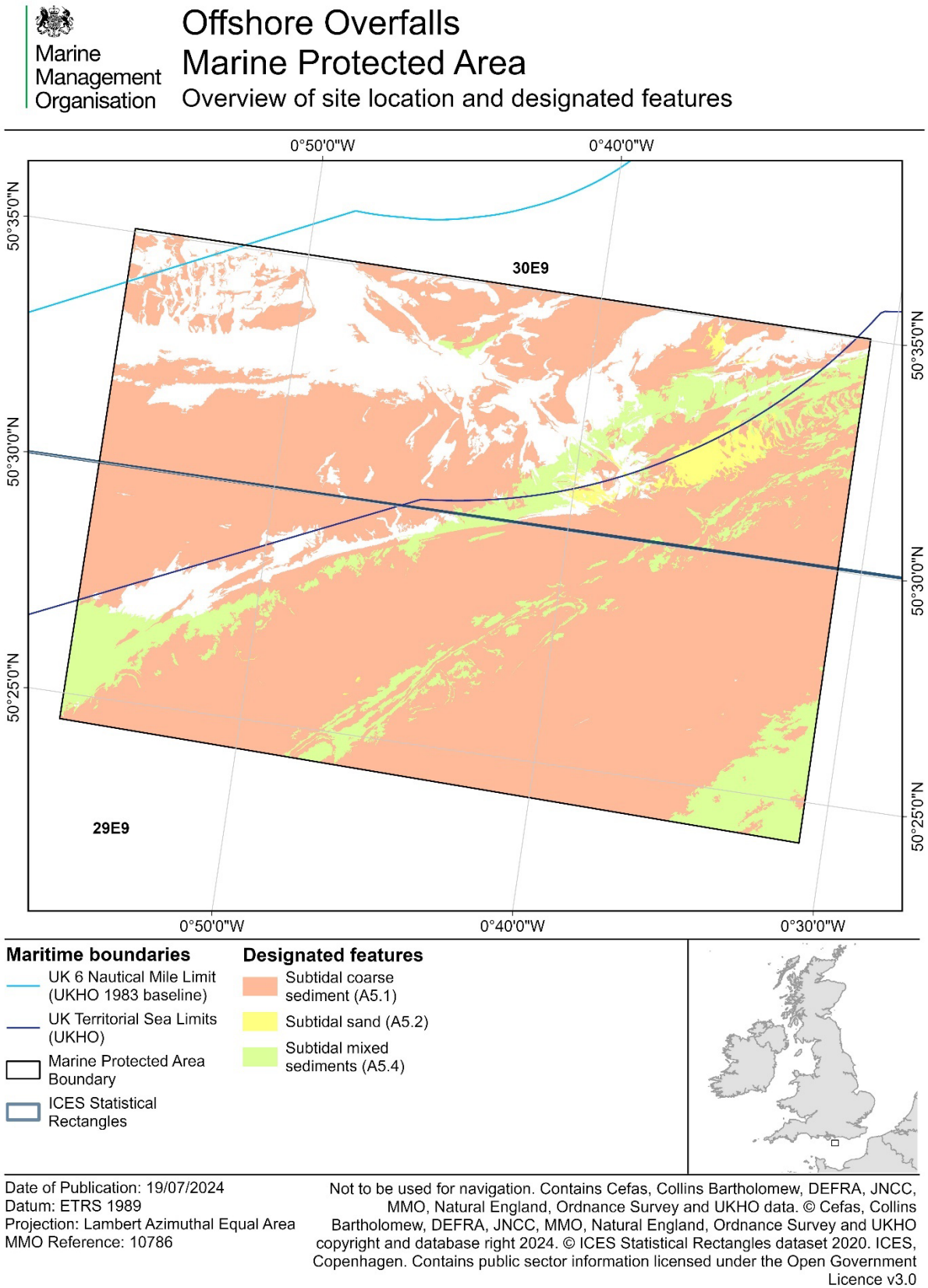

Figure 1: Site overview map.

Offshore Overfalls MPA was designated as a marine conservation zone in 2016. The designated features and their general management approaches are set out below in **Table 1**.

The site consists of a mixture of designated broad scale feature habitats: subtidal coarse sediment, subtidal mixed sediments and subtidal sand which creates a dynamic seabed environment and hosts a diverse ecosystem. The site also contains moderate energy circalittoral rock, although this is not a designated feature. The site depth ranges from 20 m to 70 m, the deeper areas coinciding with a valley system running through the site from the south to the north-east. This valley is part of the English Channel Outburst Flood Features (Quaternary fluvio-glacial erosion features) which is a designated feature and is protected within the site for their geomorphological importance.

Subtidal coarse sediment forms much of the seabed found in the site, interspersed with isolated patches of subtidal sand and associated with marine bedforms that form a collection of sediment ripples and waves. These marine bedforms are predominantly comprised of sandy sediment although some coarse or mixed sediments may be present in the troughs of the sediment waves. Subtidal mixed sediments are confined to the northeast of the site. Evidence from surveys undertaken in 2012 show sporadic bedrock structures along the southeast of the site and in an area to the north-west, covered with a thin veneer of mixed sediments.

The site is diverse with 278 infauna species and 45 epifauna species identified from the 2012 survey, supporting high numbers of the bristle worm (*Notomastus latericeus*) and the pea urchin (*Echinocyamus pusillus*). Infauna communities are dominated by a diverse range of burrowing polychaetes, bivalves such as the Queen scallop (*Aequipecten opercularis*), the long-clawed porcelain crab (*Pisidia longicornis*) and the common brittlestar (*Ophiothrix fragilis*). Epifaunal communities are dominated by hydroids, bryozoans, sponges, sea anemones and sea stars, including the common starfish (*Asterias rubens*) and the common sun star (*Crossaster papposus*). The site also supports a number of fish species, most notably thornback ray (*Raja clavata*), red gurnard (*Chelidonichthys cuculus*), small-spotted catshark (*Scyliorhinus canicula*), and bib (*Trisopterus luscus*).

Natural England and JNCC are currently in the process of developing a conservation advice package for Offshore Overfalls MPA. Since there is no package currently available, Natural England and JNCC has advised using two proxy sites from within the same bioregion. Therefore, the Dover to Folkestone MPA and Offshore Brighton MPA conservation advice packages have been used to help identify pressures, sensitivities and attributes of relevance to the features within Offshore Overfalls MPA.

A proxy package cannot be used as a substitute for condition assessment, nor for attribute target information. MMO has therefore sought advice from Natural England and JNCC when writing this assessment, as well as referring to the vulnerability assessment produced at the time of site designation.

Table 1: Designated features, including supporting habitats, and general management approaches.

Designated feature	General management approach
Subtidal coarse sediments	**Recover to favourable condition** Favourable condition in this context means the: • extent is stable or increasing; and • structures and functions, its quality, and the composition of its characteristic biological communities are such as to ensure that it is in a condition which is healthy and not deteriorating.
Subtidal mixed sediments	
Subtidal sand	
English Channel outburst flood features (Quaternary fluvio-glacial erosion features)	**Maintain in favourable condition** Favourable condition in this context means the: • extent, component elements and integrity are maintained; • structure and functioning are unimpaired; and • surface remains sufficiently unobscured for the purposes of determining whether the conditions in the points above are satisfied.

2.2 Scope of this assessment

The scope of this assessment covers fishing activities alone, and relevant activities in combination with fishing, including the portion inshore of 6 nautical miles (nm) as agreed with Southern and Sussex Inshore Fisheries and Conservation Authorities (IFCAs).

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 required by section 126 of the Marine and Coastal Access Act 2009[3].

Part A assesses the interactions between pressures from fishing gears and 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. 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. 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 a 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.

[3] 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);
- MMO catch recording project data;
- ICES rectangle level fishing effort data in days (reference: MMO1264);
- swept area ratio (SAR) data.

For more information about the above evidence sources, please see the Stage 3 MPA Site Assessment Methodology document[4], 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 and landings data for Offshore Overfalls MPA, 2016-2021.

Gear type	Gear name	Gear code	Justification
Anchored nets and lines	Trammel net	GTR	Present in under 12 m vessel landings data for ICES statistical rectangles that overlap the site.
	Set gillnet (anchored)	GNS	
	Longlines (demersal)	LLS	
	Longline (unspecified)	LL	
	Gill nets (not specified)	GN	
	Combined gillnet-trammel net	GTN	
Bottom towed gear	Otter trawls (unspecified)	OT	Present in under 12 m vessel landings data for ICES statistical rectangles that overlap the site.
	Danish / anchor seine	SDN	Present in VMS data.
	Scottish / fly seine	SSC	Present in VMS records and in under 12 m vessel landings data for ICES statistical rectangles that overlap the site.
	Twin bottom otter trawl	OTT	
	Towed dredge	DRB	
	Bottom pair trawl	PTB	
	Bottom otter trawl	OTB	
	Beam trawl	TBB	
Midwater gear	Midwater pair trawl	PTM	Present in VMS data.
	Midwater otter trawl	OTM	

[4] Stage 3 MPA Site Assessment Methodology document: www.gov.uk/government/publications/stage-3-site-assessments (last accessed 19 September 2024)

Gear type	Gear name	Gear code	Justification
	Jigging or trolling line	LTL	Present in under 12 m vessel landings data for ICES statistical rectangles that overlap the site.
	Hook and line (unspecified)	LX	
	Hand-operated pole-and-line	LHP	
	Hand fishing	HF	
	Drift gillnet	GND	
Traps	Trap	FIX	Present in under 12 m vessel landings data for ICES statistical rectangles that overlap the site.
	Pot/Creel	FPO	Present in VMS records and in under 12 m vessel landings data for ICES statistical rectangles that overlap the site.
Miscellaneous	Not known	NK	Present in VMS data.

3.2 Pressures, features and activities screened out

This section identifies activities or pressures that are **occurring but do not need to be considered** for Offshore Overfalls MPA.

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

- **Midwater gears:** although the use of midwater gears does occur within Offshore Overfalls MPA, there is no feasible pathway for gears of this type to interact with benthic designated features as part of normal operation (not considering gear failure or net loss). These gears 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 Offshore Overfalls MPA is not considered to be capable of affecting the designated features other than insignificantly and is not considered further within this assessment.
- **Unknown gear:** ‘other gear’ or 'miscellaneous gear' has been declared as having been used to land fish from this ICES statistical rectangle. The gear code used to report these landings does not provide any further information relating to the fishing method used. It is therefore not possible to assess the likelihood of this fishing method interacting with the seabed and it is not considered further within this assessment.

Geological or geomorphological designated features are out of scope for this assessment as fishing activities are considered incapable of significantly impacting

these features. Therefore, the English Channel Outburst Flood Features are not considered further in 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. The documents justify which pressures should be taken forward for consideration for each feature. This is documented in Table A1.2 in the anchored nets and lines, bottom towed gear and traps Impacts Evidence documents:

- Stage 3 Fishing Gear MPA Impacts Evidence Anchored Nets and Lines[5];
- Stage 3 Fishing Gear MPA Impacts Evidence Bottom Towed Gear[6]; and
- Stage 3 Fishing Gear MPA Impacts Evidence Traps[7].

As previously noted, there is currently no advice on operations available for Offshore Overfalls MPA, JNCC and Natural England have therefore advised the use of the conservation advice packages for Dover to Folkestone MPA and Offshore Brighton MPA, due to the similarity between site features and location within the same bioregion.

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, risk profiling of pressures from conservation advice packages, and JNCC and Natural England 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, taking into account the pressures screened in and out in **sections 3.1** and **3.2**.

[5] Stage 3 Fishing Gear MPA Impacts Evidence Anchored Nets and Lines: www.gov.uk/government/publications/stage-3-impacts-evidence (last accessed 18 September 2024)

[6] Stage 3 Fishing Gear MPA Impacts Evidence Bottom Towed Gear: www.gov.uk/government/publications/stage-3-impacts-evidence (last accessed 18 September 2024)

[7] Stage 3 Fishing Gear MPA Impacts Evidence Traps: www.gov.uk/government/publications/stage-3-impacts-evidence (last accessed 18 September 2024)

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.

Table 3: Sensitivity to potential pressures from fishing activities on designated features.

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									
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 required by section 126 of the Marine and Coastal Access Act 2009[8].

Table 3 shows the fishing activities and pressures identified in Part A which have been included for assessment in Part B. As previously noted, there is currently no advice on operations available for Offshore Overfalls MPA, JNCC and Natural England have therefore advised the use of the conservation advice packages for Dover to Folkestone MPA and Offshore Brighton MPA, due to the similarity between site features and location within the same bioregion. The general management approach for the designated features within this site are shown in **Table 4.**

Table 4: Relevant favourable condition targets for identified pressures.

Feature	View of condition and General Management Approach (GMA)	Relevant pressures
Subtidal coarse sediment Subtidal mixed sediments Subtidal sand	Subject to natural change, the broad scale habitats in this site are to remain in, or be brought into favourable condition. The GMA is to recover the feature to favourable condition.	• Abrasion or disturbance of the substrate on the surface of the seabed • Changes in suspended solids (water clarity) • Smothering and siltation rate changes • Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion • Removal of non-target species • Removal of target species

[8] www.legislation.gov.uk/ukpga/2009/23/section/126

4.1 Fisheries access and existing management

Non-UK vessels can operate within Offshore Overfalls MPA, provided that they have a licence issued by the UK to do so. Nationalities which fished within the MPA include vessels from 2016 to 2021 include UK, Belgium, Germany, Finland, France, Ireland, Lithuania, the Netherlands and Norway. VMS records indicate that French vessels are most prevalent.

4.2 Fishing activity summary

Table A1.1 to **Table A1. 8** in **Annex 1** display a detailed breakdown of fishing activity within Offshore Overfalls MPA. When discussing weights from landings in this section, figures used are a total of weights from UK and EU member states.

Of the fishing activities not screened out in Part A of this assessment, VMS data show that the most prevalent gear type operated by over 12 m vessels within the site is demersal trawls followed by dredges. Landings data show that the most prevalent gears operated by under 12 m vessels within the site are traps - pots and creels, followed by anchored nets and lines.

Anchored nets and lines

The only anchored nets and lines activity in the MPA was from under 12 m vessels, which landed an annual average of 35.37 tonnes (t) and recorded an annual average of 416 UK fishing effort days between 2016 and 2021. Landings data and UK fishing effort days are derived from logbooks and are collected at ICES rectangle level and then apportioned to the MPA according to the area of overlap between ICES rectangles and the MPA.

Bottom Towed Gear

The majority of over 12 m bottom towed gear activity in the MPA was from bottom otter trawls (annual average: 1,594 VMS records, 2016 to 2021) with some twin bottom otter trawl, bottom pair trawls and beam trawls (combined annual average: 171 VMS records) and took place across the extent of the site, with particularly high activity recorded in the central and southeast portions of the site with little or no variation in the amount of effort applied to the designated features of the site. In total, demersal trawls landed on average 146 tonnes (over 12 m vessels landed 133 tonnes, under 12 m vessels landed 13 tonnes). Under 12 m vessels using bottom towed gear recorded an annual average of 73 fishing effort days between 2016 and 2021. Mean annual surface SAR values for demersal trawl activity for C-squares intersecting Offshore Overfalls MPA decreased from a peak of 2.97 in 2016 to 0.84 in 2019, then increased to 1.48 in 2020. Mean annual subsurface SAR values decreased from 0.29 in 2016 to 0.17 in 2020. A SAR value of 1 would mean that on average these C-squares were passed over completely by demersal trawls once every year.

Vessels over 12 m using dredges recorded an annual average of 275 VMS records and approximately 14 tonnes of landings and took place predominantly in the central and southeast portions of the site, however records indicate that lower levels of activity occur in all other areas of the site. Vessels under 12 m using dredges landed approximately 7.8 tonnes per year. Mean annual surface and subsurface SAR values for dredge activity for C-squares intersecting Offshore Overfalls MPA decreased from a peak of 0.01 in 2016 to 0.005 in 2020.

Vessels over 12 m using demersal seines recorded an annual average of nine VMS records and approximately 1.14 tonnes of landings and took place predominantly in the central portion of the site. Vessels under 12 m using demersal seines recorded 0.49 tonnes per year. No effort data was recorded for demersal seining. Mean annual surface SAR values for demersal seine activity for C-squares intersecting Offshore Overfalls MPA decreased from 0.12 in 2016 to 0 in 2020. Mean annual subsurface SAR values were 0 between 2016 and 2020.

Traps

Trap fishing occurs in the southeast and northeast corners of the site with little or no variation in the amount of effort applied to the designated features located in those areas of the site. Vessels over 12 m using traps recorded an annual average of 13 VMS records and approximately 3 tonnes of landings. Vessels under 12 m using traps recorded an annual average of 358 fishing effort days and approximately 160 tonnes of landings per year.

4.3 Pressures by gear type

The Stage 3 Fishing Gear MPA Impacts Evidence documents for anchored nets and lines, bottom towed gear and traps 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 approaches for designated features, intensity of fishing activity taking place and exposure to natural disturbance.

As the designated features subtidal coarse sediment, subtidal mixed sediments and subtidal sand have similar sensitivities to the pressures identified for different gear types, these 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 Offshore Overfalls 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 pressures 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.

4.3.1 Anchored nets and lines

The following features of Offshore Overfalls MPA have been considered in relation to pressures from anchored nets and lines.

Subtidal coarse sediment, subtidal mixed sediments and subtidal sand

The relevant pressure on the subtidal sediment features of Offshore Overfalls MPA from anchored nets and lines was identified in **Table 4** and is:

- abrasion or disturbance of the substrate on the surface of the seabed.

As noted above, impacts from removal of target/non-target species pressures are not being considered in detail in this assessment, as they are assessed more completely within the abrasion pressure.

Impacts on these features relating to abrasion or disturbance of the substrate on the surface of the seabed occur primarily during setting and retrieval of nets and the associated ground lines and anchors, as well as by their movements over the seabed during rough weather.

The list of the biotopes that may be found within the subtidal sediment features of the site and relevant sensitivities is available within Natural England's Advice on Operations for Dover to Folkestone MPA, which has been used as a proxy site for Offshore Overfalls MPA in the absence of a Conservation Advice Package. Biotope sensitivity data was then extracted from MarLIN to outline biotope sensitivity for the relevant pressure.

Table A2.1 to **Table A2.3** of **Annex 2** details the list of the biotopes that may be found within the sediment features which may be sensitive to the abrasion pressure. Four biotopes were identified as potentially being present in the subtidal coarse sediment feature, two of which were identified as having low sensitivity to abrasion pressures and two as not being sensitive.

Table A2.2 of **Annex 2** shows the seven biotopes identified as potentially being present in the subtidal mixed sediments feature. **Table 5** demonstrates the five subtidal mixed sediments biotopes with medium sensitivity to abrasion pressures and that are likely to be present due to general depth preferences and the similarity in substrates between the proxy site used and Offshore Overfalls MPA.

Table A2.3 of **Annex 2** shows the four biotopes identified as potentially being present in the subtidal sand feature. **Table 5** shows the one subtidal sand biotope with medium sensitivity to abrasion pressures.

Table 5: Subtidal mixed sediments and subtidal sand biotopes that may be found within Offshore Overfalls MPA with medium sensitivity to the abrasion/disturbance and penetration of the substrate on the surface of the seabed.

Biotope	Sensitivity
Subtidal mixed sediments	
Sabella pavonina with sponges and anemones on infralittoral mixed sediment (Perry and Watson, 2023)	Abrasion: Medium Penetration: Medium
Cerianthus lloydii and other burrowing anemones in circalittora muddy mixed sediment (Perry and Watson, 2024)	Abrasion: Medium Penetration: Medium
Cerianthus lloydii with *Nemertesia spp*. and other hydroids in circalittoral muddy mixed sediment (Perry and Watson, 2023a	Abrasion: Medium Penetration: Medium
Flustra foliacea and *Hydrallmania falcata* on tide-swept circalittoral mixed sediment (Readman and Watson, 2024)	Abrasion: Medium Penetration: Medium
Ophiothrix fragilis and/or *Ophiocomina nigra* brittlestar beds o sublittoral mixed sediment (De-Bastos, Hill, Garrard, *et al.*, 2023)	Abrasion: Medium Penetration: Medium
Subtidal sand	
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

As per section 9.3 of the anchored nets and lines Impacts Evidence document[5], abrasion impacts from anchored nets and lines are unlikely to negatively impact the extent or distribution of any sediment feature or structure and function of the ecosystem in a significant manner, as subtidal sediment habitats are considered

resilient to all but intense fishing activity. In comparison to towed gears, static gears such as anchored nets and lines, and traps are likely to be of limited concern to subtidal sediment habitats.

Equally, these fishing methods are unlikely to negatively impact the extent or distribution of any sediment feature or structure and function of the ecosystem in a significant manner due to the static nature and relatively small footprint of the gear. Abrasion of the seabed is particularly apparent during hauling of gear or the movement of gear along the seabed when subject to strong tides, currents or storm activity. However, interaction of lines and associated anchors with the seabed is likely to be minimal.

The overarching conclusion from the literature available is that subtidal sediments are estimated to have no or low sensitivity to all but heavy levels of fishing intensity from static fishing on stable species rich sediment habitats or those with long-lived bivalves, however the potential for impact will be dependent on the intensity of fishing activity taking place. Increasing levels of activity increase the likelihood of weights and ropes associated with nets and lines damaging, entangling or removing epifaunal species, in particular those species which are upright and protrude from the sediment and in the case of this site, the presence of *Cerianthus lloydii* which has a low recovery rate following physical disturbance based on long-lifespan and slow growth rate. The fishing effort recorded by UK vessels under 12 m using anchored nets and lines for the area of Offshore Overfalls MPA that intersects ICES rectangles 30E9 and 29E9 was an annual average of 416 days. However, the majority of the under 12 m anchored nets and lines fishing in ICES rectangle 30E9 is likely to take place inshore of the 6nm boundary and therefore mostly not within Offshore Overfalls MPA, this has been confirmed through correspondence with MMO coastal officers for this region (pers. comms).

Given the level of anchored nets and lines fishing activity currently occurring within the site on these sediment features, coupled with the limited abrasive impacts of anchored nets and lines, it is unlikely that the ongoing use of anchored nets and lines over the subtidal sediment features will pose a significant risk of hindering the achievement of the conservation objective of Offshore Overfalls MPA.

Therefore, MMO conclude that the ongoing use of anchored nets and lines, at the levels described, does not pose a significant risk of hindering the achievement of the conservation objectives of Offshore Overfalls MPA.

4.3.2 Bottom towed gear

The following features of Offshore Overfalls MPA have been considered in relation to pressures from bottom towed gear.

Subtidal coarse sediment, subtidal mixed sediments and subtidal sand

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

- abrasion or disturbance of the substrate on the surface of the seabed*;
- penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion*;
- changes in suspended solids (water clarity) ^;
- smothering and siltation rate changes^.

As noted above, impacts from removal of target/non-target species pressures are not being considered in detail in this assessment, as they are assessed more completely within the abrasion pressure.

Pressures marked with matching superscript symbols (* and ^) have been consolidated in this review to avoid repetition, due to the similar nature of their impacts on sediment habitats.

Abrasion or disturbance and penetration of the substrate on the surface of the seabed

In addition to the biotopes identified in **Table A2.1** to **Table A2.3** of **Annex 2** in the anchored nets and lines section as having high or medium sensitivity to abrasion, and those biotopes identified as having high or medium sensitivity to both abrasion and penetration pressures (shown in **Table 5**), no additional biotopes were identified as having high or medium sensitivity to penetration pressures.

As described in section 8.4.1 of the bottom towed gear Impacts Evidence document[6], abrasion and penetration pressures from bottom towed gear can result in both physical and biological impacts on subtidal sediment features. Physical impacts include the creation of furrows and berms in the sediment from the trawl doors associated with bottom otter trawls; and the flattening of bottom features such as ripples and irregular topography by beam trawls. Physical impacts are unlikely, however, to significantly impact the large-scale topography of sediment features. Of more concern are the impacts to the biological structure of sediment habitats. Impacts to biological communities through damage and mortality of flora and fauna via surface and subsurface abrasion and penetration varies based on the levels of fishing activity and intensity, however the first pass of bottom towed gear over the seabed will remove the most sensitive components of the feature. This can lead to long term shifts in biological communities towards smaller, short-lived, opportunistic species that exhibit greater resilience to anthropogenic activity. VMS data identified that bottom otter trawls are the most prevalent type of bottom towed fishing gear deployed in Offshore Overfalls MPA with 1,594 VMS records on average of this gear type per year, followed by dredges and beam trawls with 275 and 166 VMS records respectively. The annual average fishing effort recorded by UK vessels under 12 m in using dredges and demersal trawls in the area of Offshore Overfalls MPA that

intersects ICES rectangles 29E9 and 30E9 was approximately 41 days and 33 days respectively.

Demersal trawls can cause collision, crushing and uprooting as animals encounter or pass under the gear. Initial reductions in biomass, species richness and diversity, as well as changes in community structure are considered likely to be greatest on subtidal coarse sediments compared to subtidal sand. As outlined in section 8.5.1 of the bottom towed gear Impacts Evidence document[6], the first pass of a trawl has the largest initial impact on biomass and production of sediments whereas in areas of high trawling intensity, further increasing trawling intensity can have smaller additional effects on biomass and production (Hiddink *et al.*, 2006). Otter trawls have been found to remove an average of around 6 % of faunal biomass per pass with the first trawl pass having the most significant impact. Large sessile fauna (for example erect sponges, fan corals, hydroids, erect bryozoans) are particularly susceptible to damage, with otter trawling in coarse sediments resulting in considerably reduced abundances of these fauna. Abrasion from dredges can result in direct mortality of species on the seabed, whereas abrasion from demersal trawls can reduce the habitat complexity and can permanently alter the biological community and state of the habitat following periods of high intensity trawling.

Communities in subtidal coarse sediment and gravel habitats are particularly sensitive to bottom towed gear activity because they generally contain large proportions of long-lived and more sessile epifauna which are easily damaged or removed by the pass of bottom towed gears leading to reduced diversity, abundance and occurrences (Rijnsdorp *et al.*, 2018; Pikesley *et al.*, 2021). Recovery may be slow with some research showing that two years after bottom towed gear fishing, the benthic community composition of a mixed coarse substratum area impacted by towed gear was approaching but still not matching the composition of an adjacent area where only static gears were permitted.

Research has shown that, compared with disturbed sites, subtidal coarse sediments undisturbed by bottom towed fishing gears were characterised by an abundance of bushy epifaunal taxa (bryozoans, hydroids, worm tubes) providing complex habitat for shrimp, polychaetes, brittle stars, mussels and small fish and as such had higher numbers of organisms, biomass, species richness and species diversity. Similarly, there is evidence to suggest the recovery of subtidal coarse sediments to disturbance may be longer than softer sediments, with studies demonstrating fragile species as showing no discernible recovery after four months of trawling taking place.

Very little evidence is available regarding the impact of bottom towed gears on subtidal mixed sediments; however, the biological communities are likely vulnerable and more susceptible to surface and subsurface penetration than subtidal sand and subtidal coarse sediments. There is limited information on the impacts of bottom towed gear on subtidal sand but ‘clean’ sand and ‘well sorted’ sediments generally

appear to have greater resilience to and recovery from, fishing disturbance. As the mud fraction of sand increases (for example muddy sand vs coarse sand) recovery times also increase, making muddy sediments more sensitive.

Given the level of bottom towed gear fishing activity currently occurring within the site on these sediment features, coupled with the sensitivity of *Cerianthus lloydii* and other biotopes, in particular those which include sessile or protruding upright species, abrasion and penetration pressures exerted by bottom towed gears operating within Offshore Overfalls MPA have the potential to impact biological communities and the overall ecosystem function of the subtidal sediment features found in the site. It is therefore likely that the ongoing use of bottom towed gear will pose a significant risk of hindering the achievement of the conservation objective of 'recover to favourable condition' of the sediment features of Offshore Overfalls MPA.

Changes in suspended solids (water clarity) and smothering and siltation rate changes (light)

Table A2.1 to **Table A2.3** of **Annex 2** details the list of biotopes that may be found within the sediment features which may be sensitive to the changes in suspended solids (water clarity) and smothering and siltation rate changes pressures. Of the four biotopes potentially found within the subtidal coarse sediment feature, three were identified as being not sensitive to both suspended solids (water clarity) and smothering and siltation rate changes, the one remaining biotope was identified as having a low sensitivity to both pressures.

Table A2.2 of **Annex 2** demonstrates the seven biotopes identified as potentially being present within the subtidal mixed sediments feature. **Table 6** shows the four biotopes identified as having medium sensitivity to smothering and siltation rate changes. Two further biotopes were identified as having low sensitivity and biotope as not sensitive. All seven biotopes were identified as being not sensitive to changes in suspended solids.

Table A2.3 of **Annex 2** outlines the subtidal sand feature biotopes that may be found. However, all biotopes have low sensitivity or are not sensitive to smothering and siltation rate changes and changes in suspended solids.

Table 6: Subtidal mixed sediments biotopes that may be found within Offshore Overfalls MPA with a medium sensitivity to, smothering and siltation rate changes (light) and changes in suspended solids (water clarity).

Biotope	Sensitivity
Subtidal mixed sediments	
Sabella pavonina with sponges and anemones on infralittoral mixed sediment (Perry and Watson, 2023b)	Abrasion: Medium Penetration: Medium Smothering and siltation rate changes (light): Medium Changes in suspended solids (water clarity): Not sensitive
Cerianthus lloydii and other burrowing anemones in circalittoral muddy mixed sediment (Perry and Watson, 2024)	Abrasion: Medium Penetration: Medium Smothering and siltation rate changes (light): Medium Changes in suspended solids (water clarity): Not sensitive
Cerianthus lloydii with *Nemertesia spp*. and other hydroids in circalittoral muddy mixed sediment (Perry and Watson, 2023a)	Abrasion: Medium Penetration: Medium Smothering and siltation rate changes (light): Medium Changes in suspended solids (water clarity): Not sensitive
Ophiothrix fragilis and/or *Ophiocomina nigra* brittlestar beds on sublittoral mixed sediment (De-Bastos, Hill, Garrard, *et al.*, 2023)	Abrasion: Medium Penetration: Medium Smothering and siltation rate changes (light): Medium Changes in suspended solids (water clarity): Not sensitive

As described in section 8.4.2 of the bottom towed gear Impacts Evidence document[6], changes in suspended sediment in the water column may have a range of biological effects on different species within the habitat, affecting their ability to feed or breathe. The impacts on the biological communities of sediment habitats from smothering and siltation as variable depending on the species present. Research used to inform the Impacts Evidence document indicates that sedentary, filter or suspension feeders, such as *Cerianthus lloydii, Sabella pavonina and other hydroids,* sponges and anemones which may be present in the site as having medium sensitivity to changes in smothering and siltation rates and low resistance and are likely to be impacted most whereas mobile epifauna appear highly resilient and resistant.

Based on the rationale above for the relevant pressures identified, bottom towed gears operating within Offshore Overfalls MPA have the potential to impact biological communities and the overall ecosystem function of the sediment features found within the site. Given the sensitivity of biotopes identified within the subtidal mixed sediments to smothering and siltation rate changes, low resistance to this type of fishing activity and slow recoverability it is likely that the ongoing use of bottom towed gear will pose a significant risk of hindering the achievement of the conservation objective of 'recover to favourable condition' of this feature of Offshore Overfalls MPA.

With regards to the discussion above, the assessed activity levels and the evidence available for the impact of bottom towed gears**, MMO conclude that the ongoing use of bottom towed gear does pose a significant risk of hindering the achievement of the conservation objectives of Offshore Overfalls MPA.**

4.3.3 Traps

The following features of Offshore Overfalls MPA have been considered in relation to pressures from traps.

Subtidal coarse sediment, subtidal mixed sediments and subtidal sand

The relevant pressures on the subtidal sediment features of Offshore Overfalls MPA from traps were identified in **Table 4** and are:

- abrasion or disturbance of the substrate on the surface of the seabed.

As noted above, impacts from removal of target/non-target species pressures are not being considered in detail in this assessment, as they are assessed more completely within the abrasion pressure.

Impacts on these features relating to abrasion or disturbance of the substrate on the surface of the seabed occur primarily during the setting and retrieval of traps and their associated ropes, weights and anchors, as well as by their movement over the seabed during rough weather.

Traps and anchored nets and lines fishing gear exert similar pressures on the biotopes associated with the sediment features of the site, therefore the biotopes identified as having medium sensitivity to abrasion in the anchored nets and lines section (**Section 4.3.1**) also apply here for the traps section.

As described in section 9.4 of the traps Impacts Evidence document[7], there is limited primary evidence on the impacts of static gears on sediment habitats. However, available literature suggests that static gears are unlikely to significantly impact the physical structure of the sediment and have a relatively low impact on benthic communities in comparison to towed gears and are likely to be of limited concern to subtidal sediment habitats. Equally, these fishing methods are unlikely to negatively impact the extent or distribution of any sediment feature or structure and function of the ecosystem in a significant manner due to the static nature and relatively small footprint of the gear. Although no primary evidence is available on the impact of traps on subtidal sand specifically, sensitivity assessments indicate that the impact of traps is of limited concern due to the generally high energy environments where subtidal sand occurs and the likely greater impact of natural disturbance in these environments compared to the level of pressure exerted and the footprint of traps fishing gear.

Abrasion of the seabed is particularly apparent during hauling of gear or the movement of gear along the seabed when subject to strong tides, currents or storm activity. However, interaction of lines and associated anchors with the seabed is likely to be minimal. Impacts to biological communities could become a concern if activity reaches a particularly high level of intensity, or particularly sensitive species are present, as there is the potential for the snagging of gear and subsequent entanglement and damage to fragile epifauna as the level of fishing activity and therefore density level of anchors and ropes increases.

The overarching conclusion from the literature available is that subtidal sediments are estimated to have no or low sensitivity to all but heavy levels of fishing intensity from static fishing on stable species rich sediment habitats or those with long-lived bivalves, however the potential for impact will be dependent on the intensity of fishing activity taking place. Increasing levels of activity increase the likelihood of weights and ropes associated with nets and lines damaging, entangling or removing epifaunal species, in particular those species which are upright and protrude from the sediment and in the case of this site, the presence of *Cerianthus lloydii* which has a low recovery rate following physical disturbance based on long-lifespan and slow growth rate.

The annual average fishing effort recorded by UK vessels under 12 m using traps for the area of Offshore Overfalls MPA that intersects ICES rectangles 30E9 and 29E9 was 358 fishing effort days. However, the majority of potting in ICES rectangle 30E9 is likely to take place within the 6 nm boundary, and further inshore and therefore mostly not within Offshore Overfalls MPA, this has been confirmed by MMO coastal

officers (pers. comms). Given the level of trap fishing activity currently occurring within the site, coupled with the limited abrasive impacts of potting compared to bottom towed gear, it is unlikely that the ongoing use of traps will pose a significant risk of hindering the achievement of the general management approach, and conservation objective of 'recover to favourable condition' of the sediment features of Offshore Overfalls MPA.

Therefore, MMO conclude that the ongoing use of traps, at the levels described, does not pose a significant risk of hindering the achievement of the conservation objectives of Offshore Overfalls MPA.

4.4 Part B conclusion

The assessment of anchored nets and lines, bottom towed gears and traps on the subtidal sediment features of Offshore Overfalls MPA has concluded that:

- the ongoing use of anchored nets and lines and traps does not pose a significant risk of hindering the achievement of the conservation objectives of the MPA;
- there is a significant risk of the ongoing use of bottom towed gears hindering the achievement of the conservation objectives of the MPA.

Management measures will therefore be implemented for bottom towed gears. **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 pose a significant risk of hindering the achievement of the conservation objectives; 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 way in which the activity 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 any relevant activities.

This assessment considers the in-combination impacts of marine licensable activities that are ongoing or upcoming, with the same 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 significant risk of hindering the achievement of the site's conservation objectives 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.

Bottom towed gear was identified in Part B as requiring management to avoid posing a significant risk of hindering the achievement of the site's conservation objectives. Anchored nets and lines and traps are the only remaining fishing activities occurring within Offshore Overfalls 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 56 projects, within the 5 km buffer applied. **Table 7** shows these activities and the relevant

categories from the JNCC Pressures-Activities Database (PAD)[9]. Details on these licences can be viewed on the public register of marine licence applications and decisions by searching for the marine licence case reference number[10].

[9] JNCC Pressures-Activities Database (PAD): hub.jncc.gov.uk/assets/97447f16-9f38-49ff-a3af-56d437fd1951 (last accessed 23 April 2024)

[10] Public register of marine licence applications and decisions: marinelicensing.marinemanagement.org.uk/mmofox5/fox/live/MMO_PUBLIC_REGISTER (last accessed 24 April 2024)

Table 7: Summary of marine licensable activities and associated PAD categories.

Marine licence case reference number[10]	PAD Category	Description
DCO/2013/00006 and DCO/2019/00005	Offshore wind: construction; operation and maintenance Power cable: construction; operation and maintenance	Rampion 2 offshore wind farm. This will be an extension to the west of the current Rampion site comprised of up to 90 wind turbines, associated foundations and all the electrical infrastructure required. This activity is in the 5 km buffer area adjacent to a small part of the northern edge of the MPA boundary. **No direct or indirect pressure pathway for impact and therefore, no in-combination effects possible.**
MLA/2014/00592/3, MLA/2016/00507/1, MLA/2017/00095/1, MLA/2019/00184, MLA/2016/00341/3, MLA/2018/00082/1, MLA/2015/00331, MLA/2016/00446/1, MLA/2020/00067, MLA/2022/00484, MLA/2018/00285/2, MLA/2019/00370, MLA/2016/00025/3, MLA/2021/00255, MLA/2023/00115, MLA/2017/00105, MLA/2014/00392/6, MLA/2016/00216/1, MLA/2018/00378, MLA/2021/00080, MLA/2017/00478/4, MLA/2015/00285/1, MLA/2016/00501/2, MLA/2016/00355/4, MLA/2021/00437, MLA/2016/00509, MLA/2016/00093/2, MLA/2016/00433/5,	Dredge and spoil disposal	Numerous dredging licenses that dispose of sediment at the Nab Tower Offshore Disposal site in the English Channel. This disposal area is in the 5 km buffer area northwest of the MPA boundary. **Table 3** shows that designated features within the MPA are not sensitive to the pressures changes in suspended solids (water clarity) and smothering and siltation rate changes (light) from static gears, so there is no pathway for in-combination effects caused by sedimentation from suspended dredge or spoil materials entering the MPA. **No direct or indirect pressure pathway for impact and therefore, no in-combination effects possible.**

Marine licence case reference number[10]	PAD Category	Description
MLA/2017/00094/1, MLA/2016/00215, MLA/2020/00099/1, MLA/2014/00288/1, MLA/2014/00210/2, MLA/2015/00287/1, MLA/2014/00420/2, MLA/2021/00221/1, MLA/2016/00484, MLA/2021/00530, MLA/2016/00098, MLA/2015/00284/1, MLA/2014/00208/1, MLA/2016/00421, MLA/2015/00216/1, MLA/2023/00048, MLA/2018/00003, MLA/2017/00308, MLA/2020/00035 and MLA/2023/00237		
MLA/2012/00374/5	Aggregate dredging Physical sampling	Aggregate dredging and sampling by Tarmac Marine Dredging Limited This activity is in the 5 km buffer area northwest of the MPA boundary. **Table 3** shows that designated features within the MPA are not sensitive to the pressures changes in suspended solids (water clarity) and smothering and siltation rate changes (light) from static gears, so there is no pathway for in-combination effects caused by sedimentation from suspended dredge materials entering the MPA. **No direct or indirect pressure pathway for impact and therefore, no in-combination effects possible.**

Marine licence case reference number[10]	PAD Category	Description
MLA/2012/00375/4 and MLA/2012/00319/7	Aggregate dredging Physical sampling	Aggregate dredging and sampling by Volker Dredging Limited. This activity is in the 5 km buffer area northwest of the MPA boundary. **Table 3** shows that designated features within the MPA are not sensitive to the pressures changes in suspended solids (water clarity) and smothering and siltation rate changes (light) from static gears, so there is no pathway for in-combination effects caused by sedimentation from suspended dredge materials entering the MPA. **No direct or indirect pressure pathway for impact and therefore, no in-combination effects possible.**
MLA/2012/00320/7	Aggregate dredging Physical sampling	Aggregate dredging and sampling by Cemex UK Marine Limited This activity is in the 5 km buffer area northwest of the MPA boundary. **Table 3** shows that designated features within the MPA are not sensitive to the pressures changes in suspended solids (water clarity) and smothering and siltation rate changes (light) from static gears, so there is no pathway for in-combination effects caused by sedimentation from suspended dredge materials entering the MPA. **No direct or indirect pressure pathway for impact and therefore, no in-combination effects possible.**

Marine licence case reference number[10]	PAD Category	Description
MLA/2012/00302/5	Aggregate dredging Physical sampling	Marine aggregate dredging by Westminster Gravels Limited. This activity is in the 5 km buffer area northwest of the MPA boundary. **Table 3** shows that designated features within the MPA are not sensitive to the pressures changes in suspended solids (water clarity) and smothering and siltation rate changes (light) from static gears, so there is no pathway for in-combination effects caused by sedimentation from suspended dredge materials entering the MPA. **No direct or indirect pressure pathway for impact and therefore, no in-combination effects possible.**
MLA/2016/00209/4	Power cable: construction; operation and maintenance	Interconnexion France Angleterre 2 (IFA2) is a 1000-megawatt high voltage direct current (HVDC) electrical interconnector between the British and French transmission systems. Construction of the interconnector was completed in 2021, therefore there is no direct or indirect pressure pathway for impact from construction activities and ongoing pressures from infrastructure do not overlap with pressures from fishing. The cable goes through the east portion of the MPA. **Possible in-combination effects from operation and maintenance.**

The PAD and **Table 3**, were used to identify medium to high-risk pressures exerted by fishing and non-fishing activities to identify those which require in-combination assessment **Table 8**.

Table 8 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 8: Pressures exerted by fishing and non-fishing activities.

	Non-fishing activities					Fishing activities	
Potential pressures	**Offshore wind: construction; operation and maintenance**	**Power cable: construction; operation and maintenance**	**Aggregate dredging**	**Dredge and spoil disposal**	**Physical sampling**	**Anchored nets and lines**	**Traps**
Abrasion or disturbance of the substrate on the surface of the seabed	Y	Y	Y	Y	Y	Y	Y
Removal of non-target species			Y			Y	Y
Removal of target species						Y	Y

5.1 Fishing vs Fishing in-combination pressures

Fisheries vs fisheries in-combination pressures will be considered in this section.

5.1.1 Abrasion and disturbance of the substrate on the surface of the seabed and Removal of non-target species

As noted in **section 4.3**, impacts from the removal of non-target species pressure are not being considered in detail in this assessment. In-combination impacts from the removal of non-target species pressure are more fully assessed under the abrasion pressure, as the detail of key structural and influential species is yet to be fully defined. Therefore, the removal pressure is not considered further in this in-combination assessment. The pressure may require further consideration as future evidence becomes available, in conjunction with updated conservation advice from JNCC and Natural England.

Section 4.2 describes fishing activity within Offshore Overfalls MPA and notes that there were no VMS records for anchored nets and lines within the site. There was an annual average of 13 VMS records for vessels using traps within the site. Landings data for under 12 m vessels using anchored nets and lines averaged approximately 35 t between 2016 and 2020, and average fishing effort for UK under 12 m vessels using anchored nets and lines was 416 days per year between 2016 and 2021. Landings data for under 12 m vessels using traps averaged approximately 160 t, and average fishing effort for UK under 12 m vessels using traps was 358 days per year between 2016 and 2021. This results in a combined annual average from anchored nets and lines and traps of 166 t (2016 to 2020) and 774 days (2016 to 2021).

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, under 12 m landings and UK under 12 m fishing effort (days) are both collected at ICES rectangle level and then apportioned to the site based on percentage overlap. This reduces the confidence in the actual levels of activity taking place within the MMO portion of the MPA, as it suggests fishing activity is distributed equally across the rectangle. The majority of under 12 m vessels using anchored nets and lines and traps in Offshore Overfalls MPA occurred within ICES rectangle 30E9. The MPA overlaps with just 11.74 % of ICES rectangle 30E9. This ICES rectangle also covers a large portion of the southern coastline of the UK and waters inshore of 6 nm. Communications with MMO coastal teams have confirmed that under 12 m vessels using static gears are likely to be concentrated within the inshore portion of the ICES rectangle rather than the portion inside the MPA (pers. comms).

Given the activity level described and the low scale of footprint for impacts from both these static gear groups, MMO does not consider the in-combination effect from

these activities as likely to result in a significant risk of hindering the achievement of the site's conservation objectives.

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

5.2 Fishing vs non-fishing activities in-combination pressures

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

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

The designated features of Offshore Overfalls MPA are sensitive to physical damage through surface abrasion and disturbance of the substrate from anchored nets and lines and traps 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.

Activities associated with the IFA2 interconnector (MLA/2016/00209/4) might cause abrasion or disturbance of the seabed relate to power cable operation and maintenance. The licence itself expires on 26 January 2117 and only covers the construction of new works. This is likely because the cable was designed to minimise or eliminate the requirement for routine maintenance or repair throughout its lifetime. It is likely, however, that the cable will need some form of operation and maintenance activities in the future. Such activities could include cable repair, cable remediation, jacking up or the replacement of existing cable protection or placed rock.

As detailed in **section 5.1.1**, anchored nets and lines and traps at the activity levels described are not considered to be causing significant pressure through abrasion and disturbance. It is possible that the activities linked to the marine licences discussed in this section, in-combination with anchored nets and lines and traps, may increase the potential for the abrasion pressure to have negative cumulative effects on these features of the MPA. However, as the cable has been designed to minimise the need for maintenance or repair, any abrasion or disturbance impacts from operation and maintenance will be infrequent, localised and likely contained within the existing cable corridor. Therefore, 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 for Offshore Overfalls MPA.

5.3 Part C conclusion

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

Further management measures will not therefore be implemented for fishing 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 Offshore Overfalls MPA.

Part B of this assessment concluded that the ongoing use of bottom towed gear on the sedimentary features subtidal sand, subtidal coarse sediment and subtidal mixed sediments of Offshore Overfalls MPA may hinder 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.

Part C of this assessment concluded that the ongoing use of anchored nets and lines and traps, alone or in combination, 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 Offshore Overfalls 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[4].

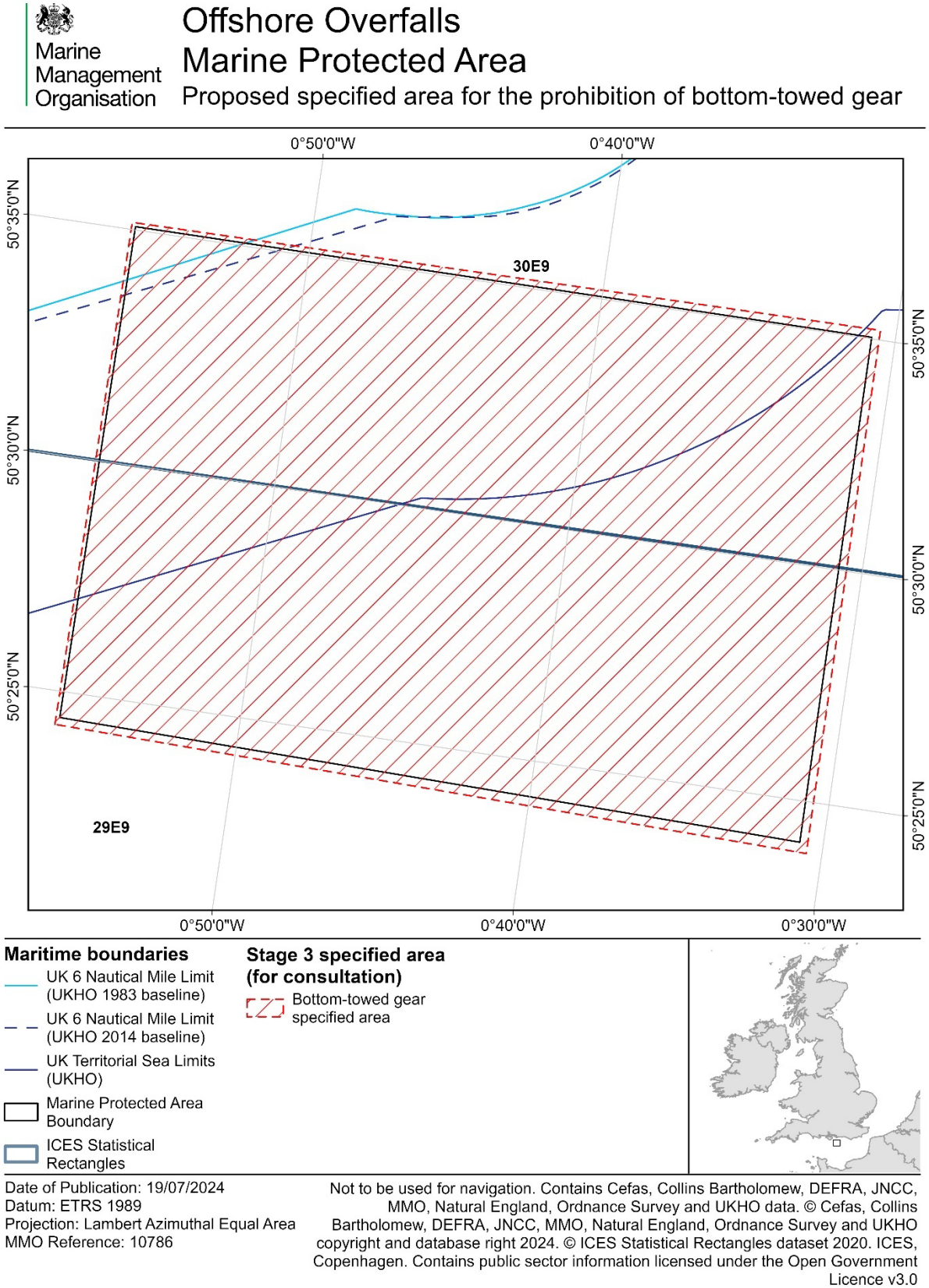

Figure 2: Map of proposed management.

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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Annexes

Annex 1: Fishing activity data

Table A1. 1: VMS record count per nation group (UK and EU Member State) and proportional activity (%), per gear, per gear group, per year (2016 to 2020), totals and annual average (2016 to 2020). All numbers are rounded to the nearest whole number.

			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 seine	**SDN**	EU Member State	22	100	5	100	17	100	5	100	2	100	2	100	53	100	9
	SDN total		**22**	**100**	**5**	**100**	**17**	**100**	**5**	**100**	**2**	**67**	**2**	**50**	**53**	**95**	**9**
	SSC	EU Member State	0	0	0	0	0	0	0	0	1	100	2	100	3	100	1
	SSC total		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**33**	**2**	**50**	**3**	**5**	**1**
Demersal seine total			**22**	**1**	**5**	**0**	**17**	**1**	**5**	**0**	**3**	**0**	**4**	**0**	**56**	**0**	**9**
Demersal trawl	**OTB**	EU Member State	2,614	100	1,329	100	828	100	872	99	1,802	99	2,066	99	9,511	99	1,585
	OTB	UK	5	0	2	0	2	0	9	1	24	1	12	1	54	1	9

			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
	OTB total		**2,619**	**94**	**1,331**	**93**	**830**	**77**	**881**	**84**	**1,826**	**95**	**2078**	**89**	**9,565**	**90**	**1594**
	OTT	EU Member State	0	0	0	0	0	0	2	100	13	100	0	0	15	100	3
	OTT total		**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**13**	**1**	**0**	**0**	**15**	**0**	**3**
	PTB	UK	0	0	0	0	13	100	0	0	0	0	0	0	13	100	2
	PTB total		**0**	**0**	**0**	**0**	**13**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**13**	**0**	**2**
	TB	EU Member State	0	0	0	0	0	0	0	0	0	0	3	100	3	100	1
	TB total		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**3**	**0**	**1**
	TBB	EU Member State	62	40	72	73	140	61	151	91	68	86	255	96	748	75	125
	TBB	UK	94	60	27	27	89	39	15	9	11	14	11	4	247	25	41
	TBB total		**156**	**6**	**99**	**7**	**229**	**21**	**166**	**16**	**79**	**4**	**266**	**11**	**995**	**9**	**166**
Demersal trawl total			**2,775**	**81**	**1,430**	**84**	**1,072**	**84**	**1,049**	**87**	**1,918**	**84**	**2,347**	**77**	**10,591**	**82**	**1,765**
Dredge	**DRB**	EU Member State	498	97	216	95	35	83	27	90	266	98	229	41	1271	77	212

			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
	DRB	UK	17	3	11	5	7	17	3	10	6	2	335	59	379	23	63
	DRB total		**515**	**100**	**227**	**100**	**42**	**100**	**30**	**100**	**272**	**100**	**564**	**100**	**1,650**	**100**	**275**
Dredge total			**515**	**15**	**227**	**13**	**42**	**3**	**30**	**2**	**272**	**12**	**564**	**18**	**1,650**	**13**	**275**
Midwater trawl	OTM	EU Member State	76	100	30	100	42	100	74	100	27	100	37	100	286	100	48
	OTM Total		**76**	**87**	**30**	**70**	**42**	**34**	**74**	**81**	**27**	**32**	**37**	**26**	**286**	**50**	**48**
	PTM	EU Member State	11	100	0	0	83	100	10	59	57	100	102	96	263	92	44
	PTM	UK	0	0	13	100	0	0	7	41	0	0	4	4	24	8	4
	PTM total		**11**	**13**	**13**	**30**	**83**	**66**	**17**	**19**	**57**	**68**	**106**	**74**	**287**	**50**	**48**
Midwater trawl total			**87**	**3**	**43**	**3**	**125**	**10**	**91**	**8**	**84**	**4**	**143**	**5**	**573**	**4**	**96**
Traps	FPO	UK	21	100	1	100	3	100	30	100	18	100	4	100	77	100	13
	FPO total		**21**	**100**	**1**	**100**	**3**	**100**	**30**	**100**	**18**	**100**	**4**	**100**	**77**	**100**	**13**
Traps total			**21**	**1**	**1**	**0**	**3**	**0**	**30**	**2**	**18**	**1**	**4**	**0**	**77**	**1**	**13**

			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**
Unknown	**NK**	EU Member State	0	0	0	0	7	58	0	0	0	0	0	0	7	58	1
	NK	European Free Trade Association	0	0	0	0	5	42	0	0	0	0	0	0	5	42	1
	NK total		**0**	**0**	**0**	**0**	**12**	**100**	**0**	**0**	**0**	**0**	**0**	**0**	**12**	**100**	**2**
Unknown total			**0**	**0**	**0**	**0**	**12**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**12**	**0**	**2**
Grand total			**3,420**	**5**	**1,706**	**2**	**1,271**	**2**	**1,205**	**2**	**2,295**	**4**	**3,062**	**5**	**12,959**	**3**	**2,160**

Table A1. 2: UK live weight landings tonnage (t) estimates by gear from vessels over 12 m in length in the MMO section of Offshore Overfalls MPA (2016 to 2020).

Gear group	Gear code	2016	2017	2018	2019	2020	Total (2016 to 2020)	Average (2016 to 2020)
Demersal seine	SSC	0	0	0	0	0	0	0
Demersal seine total		**0**	**0**	**0**	**0**	**0**	**0**	**0**
Demersal trawl	OT	0	0	0	0	0	0	0
	OTB	0.72	1.30	0.71	1.93	5.21	9.88	1.98
	PTB	0	0	1.68	0	0	1.68	0.34
	TBB	9.81	3.40	17.99	3.71	1.14	36.04	7.21
Demersal trawl total		**10.53**	**4.69**	**20.38**	**5.64**	**6.35**	**47.60**	**9.52**
Dredge	DRB	2.94	3.08	1.18	1.45	1.82	10.47	2.09
	HMD	0	0	0	0	0	0	0
Dredge total		**2.94**	**3.08**	**1.18**	**1.45**	**1.82**	**10.47**	**2.09**
Midwater trawl	OTM	0	0	0	0	0	0	0
	PTM	0	161.54	0	160.08	0	321.62	64.32
Midwater trawl total		**0**	**161.54**	**0**	**160.08**	**0**	**321.62**	**64.32**
Traps	FPO	3.33	0.1	0.59	5.5	3.76	13.29	2.66
Traps total		**3.33**	**0.1**	**0.59**	**5.5**	**3.76**	**13.29**	**2.66**
Grand total		**16.8**	**169.42**	**22.15**	**172.67**	**11.94**	**392.98**	**78.6**

Table A1. 3: EU27 live weight landings tonnage (t) estimates by gear from vessels over 12 m in length in the MMO section of Offshore Overfalls MPA (2016 to 2020).

Gear group	Gear code	2016	2017	2018	2019	2020	Total (2016 to 2020)	Average (2016 to 2020)
Demersal seine	SDN	3.17	0.36	1.33	0.32	0.08	5.26	1.05
	SSC	0	0	0	0	0.47	0.47	0.09
Demersal seine total		**3.17**	**0.36**	**1.33**	**0.32**	**0.54**	**5.72**	**1.14**
Demersal trawl	OTB	189.76	91.21	59.72	52.94	134.63	528.25	105.65
	TBB	10.72	17.84	24.25	23.02	12.20	88.03	17.61
Demersal trawl total		**200.48**	**109.05**	**83.97**	**75.96**	**146.83**	**616.28**	**123.26**
Dredge	DRB	21.10	28.19	4.77	1.90	3.90	59.86	11.97
Dredge total		**21.10**	**28.19**	**4.77**	**1.90**	**3.90**	**59.86**	**11.97**
Midwater trawl	OTM	418.39	365.65	307.25	341.17	239.91	1,672.38	334.48
	PTM	1.11	0	1.21	0.54	2.05	4.91	0.98
Midwater trawl total		**419.50**	**365.65**	**308.46**	**341.71**	**241.96**	**1,677.28**	**335.46**
Grand total		**644.25**	**503.24**	**398.53**	**419.89**	**393.24**	**2,359.15**	**471.83**

Table A1. 4: Percentage of each ICES rectangle intersected by the MMO section of Offshore Overfalls MPA.

ICES rectangle	Percentage overlap (%)
29E9	8.00
30E9	11.74

Table A1. 5: UK live weight landings tonnage (t) estimates by gear from vessels under 12 m in length for the MMO section of Offshore Overfalls MPA (2016 to 2020).

Gear group	Gear code	2016	2017	2018	2019	2020	Total (2016 to 2020)	Average (2016 to 2020)
Anchored nets and lines	GN	19.69	21.50	20.52	20.61	14.31	96.64	19.33
	GNS	0	1.05	1.64	0.83	0.69	4.20	0.84
	GTR	23.64	15.78	14.62	12.52	8.57	75.12	15.02
	LL	0.01	0.14	0.37	0.23	0.12	0.87	0.17
	LLS	0	0.01	0	0	0	0.01	<0.01
Anchored nets and lines total		**43.33**	**38.47**	**37.14**	**34.19**	**23.70**	**176.84**	**35.37**
Demersal trawl	OT	11.16	5.71	0	0	0	16.87	3.37
	OTB	0	11.25	10.17	12.35	6.66	40.43	8.09
	OTT	0	0	0.03	0.06	0.20	0.29	0.06
	PTB	0	0	0.01	0	0	0.01	<0.01

Gear group	Gear code	2016	2017	2018	2019	2020	Total (2016 to 2020)	Average (2016 to 2020)
	TBB	3.35	1.07	0	0	1.24	5.66	1.13
Demersal trawl total		**14.51**	**18.02**	**10.20**	**12.41**	**8.10**	**63.25**	**12.65**
Dredge	DRB	9.33	6.36	3.63	8.69	9.28	37.29	7.46
Dredge total		**9.33**	**6.36**	**3.63**	**8.69**	**9.28**	**37.29**	**7.46**
Midwater - Gill Drift	GND	1.15	0.46	0.17	<0.01	0.10	1.90	0.38
Midwater - Gill Drift total		**1.15**	**0.46**	**0.17**	**<0.01**	**0.10**	**1.90**	**0.38**
Midwater Hook/Lines	HF	2.46	2.31	1.5	2.88	4.83	13.98	2.8
	LHP	0.85	1.24	1.23	1.47	1.95	6.74	1.35
	LTL	0	0	0	0	0.2	0.2	0.04
	LX	2.6	3.26	3.11	2.94	2.99	14.91	2.98
Midwater Hook/Lines total		**5.91**	**6.81**	**5.83**	**7.3**	**9.98**	**35.83**	**7.17**
Traps	FIX	16.45	3.58	0	0	0	20.03	4.01
	FPO	172.3	180.13	115.11	144.45	166.09	778.08	155.62
	FYK	0	0	0	0	0	0	0
Traps total		**188.75**	**183.71**	**115.11**	**144.45**	**166.09**	**798.11**	**159.62**
Grand total		**262.98**	**253.84**	**172.09**	**207.04**	**217.26**	**1,113.21**	**222.64**

Table A1. 6: EU27 live weight landings tonnage (t) estimates by gear from vessels under 12 m in length for the MMO section of Offshore Overfalls MPA (2016 to 2020).

Gear group	Gear code	2016	2017	2018	2019	2020	Total (2016 to 2020)	Average (2016 to 2020)
Anchored nets and lines	LLS	0.08	0	0.04	0	0	0.11	0.02
	GTR	0	0.03	0.01	0.01	<0.01	0.05	0.01
	GNS	0.02	0.02	0	0	0	0.05	0.01
	GTN	0	0	0	0.01	0	0.01	<0.01
Anchored nets and lines total		**0.10**	**0.05**	**0.04**	**0.02**	**<0.01**	**0.21**	**0.04**
Demersal seine	SSC	0	0	1.39	0.87	0.17	2.43	0.49
Demersal seine total		**0**	**0**	**1.39**	**0.87**	**0.17**	**2.43**	**0.49**
Demersal trawl	OTB	0.07	0	0.13	<0.01	<0.01	0.21	0.04
Demersal trawl total		**0.07**	**0**	**0.13**	**<0.01**	**<0.01**	**0.21**	**0.04**
Dredge	DRB	0.44	0.41	0.51	0.04	0.08	1.48	0.30
Dredge total		**0.44**	**0.41**	**0.51**	**0.04**	**0.08**	**1.48**	**0.30**
Midwater Hook/Lines	LHP	0.17	0	0.06	0	0	0.22	0.04
Midwater Hook/Lines total		**0.17**	**0**	**0.06**	**0**	**0**	**0.22**	**0.04**
Traps	FPO	0	0.03	0.46	2.79	0.18	3.46	0.69
Traps total		**0**	**0.03**	**0.46**	**2.79**	**0.18**	**3.46**	**0.69**

Gear group	Gear code	2016	2017	2018	2019	2020	Total (2016 to 2020)	Average (2016 to 2020)
Grand Total		0.77	0.49	2.59	3.72	0.44	8.02	1.60

Table A1. 7: Mean annual surface and subsurface SAR values for C-squares intersecting the MMO section of Offshore Overfalls MPA (2016 to 2020).

Gear group	SAR category	2016	2017	2018	2019	2020
Demersal Seines	Surface	0.12	0.03	0.06	0.02	0
	Subsurface	0	0	0	0	0
Dredges	Surface	0.01	0.01	<0.01	<0.01	0.01
	Subsurface	0.01	0.01	<0.01	<0.01	0.01
Demersal Trawls	Surface	2.97	1.44	1.04	0.84	1.48
	Subsurface	0.29	0.16	0.18	0.16	0.17
Bottom Towed Gear	Surface	3.10	1.47	1.10	0.87	1.48
	Subsurface	0.30	0.17	0.18	0.16	0.18

Table A1. 8: Fishing effort (days) recorded by UK vessels under 12 m in length, separated by gear type for the area of Offshore Overfalls MPA that intersects the marine portion of ICES rectangles 29E9 and 30E9 (2016 to 2021). ICES rectangle level data has been apportioned to the MPA based on the percentage area of the ICES rectangle that intersects the MPA (see Table A1. 4). All numbers are rounded to the nearest whole number.

Gear group	Fishing effort (days at sea)							
	2016	2017	2018	2019	2020	2021	Total (2016 to 2021)	Annual average (2016 to 2021)
Demersal trawl	51	52	38	42	30	32	246	41
Dredge	36	33	21	33	24	49	196	32
Bottom towed gear	**87**	**85**	**59**	**76**	**54**	**81**	**443**	**74**
Midwater gill drift	16	6	2	0	3	4	31	5
Midwater hooks and lines	94	121	114	121	123	146	718	120
Midwater gear total	**110**	**128**	**116**	**121**	**126**	**149**	**749**	**125**
Traps	470	456	338	325	265	290	2,145	358
Anchored nets and lines	526	458	452	425	290	346	2,497	416
Static gear total	**996**	**914**	**790**	**751**	**555**	**636**	**4,642**	**774**
Unknown	0	0	0	0	0	1	1	0
Unknown total	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**
MPA total	**1,193**	**1,127**	**966**	**948**	**735**	**866**	**5,834**	**972**

Annex 2: Biotope information

Table A2.1: Subtidal coarse sediment biotopes that may be found within Offshore Overfalls MPA with sensitivity to the abrasion / disturbance and penetration of the substrate on the surface of the seabed, smothering and siltation rate changes (light) and changes in suspended solids (water clarity).

Biotope	Sensitivity
Pomatoceros triqueter with barnacles and bryozoan crusts on unstable circalittoral cobbles and pebbles (Tyler-Walters and Tillin, 2023)	Abrasion: Low Penetration: Low Smothering and siltation rate changes (light): Not sensitive Changes in suspended solids (water clarity): Not sensitive
Sparse fauna on highly mobile sublittoral shingle (cobbles and pebbles) (Tillin, 2023)	Abrasion: Not sensitive Penetration: Not sensitive Smothering and siltation rate changes (light): Not sensitive Changes in suspended solids (water clarity): Not sensitive
Dense *Lanice conchilega* and other polychaetes in tide-swept infralittoral sand and mixed gravelly sand (McQuillan, Tillin and Watson, 2023)	Abrasion: Not sensitive Penetration: Not sensitive Smothering and siltation rate changes (light): Not sensitive Changes in suspended solids (water clarity): Not sensitive
Mediomastus fragilis, *Lumbrineris* spp. and venerid bivalves in circalittoral coarse sand or gravel (Tillin and Watson, 2023)	Abrasion: Low Penetration: Low Smothering and siltation rate changes (light): Low Changes in suspended solids (water clarity): Low

Table A2.2: Subtidal mixed sediments biotopes that may be found within Offshore Overfalls MPA with sensitivity to the abrasion / disturbance and penetration of the substrate on the surface of the seabed, smothering and siltation rate changes (light) and changes in suspended solids (water clarity).

Biotope	Sensitivity
Sabella pavonina with sponges and anemones on infralittoral mixed sediment (Perry and Watson, 2023b)	Abrasion: Medium Penetration: Medium Smothering and siltation rate changes (light): Medium Changes in suspended solids (water clarity): Not sensitive
Cerianthus lloydii and other burrowing anemones in circalittoral muddy mixed sediment (Perry and Watson, 2024)	Abrasion: Medium Penetration: Medium Smothering and siltation rate changes (light): Medium Changes in suspended solids (water clarity): Not sensitive
Cerianthus lloydii with *Nemertesia spp*. and other hydroids in circalittoral muddy mixed sediment (Perry and Watson, 2023a)	Abrasion: Medium Penetration: Medium Smothering and siltation rate changes (light): Medium Changes in suspended solids (water clarity): Not sensitive
Flustra foliacea and *Hydrallmania falcata* on tide-swept circalittoral mixed sediment (Readman and Watson, 2024)	Abrasion: Medium Penetration: Medium Smothering and siltation rate changes (light): Not sensitive Changes in suspended solids (water clarity): Not sensitive
Ophiothrix fragilis and/or *Ophiocomina nigra* brittlestar beds on sublittoral mixed sediment (De-Bastos, Hill, Garrard, *et al.*, 2023)	Abrasion: Medium Penetration: Medium Smothering and siltation rate changes (light): Medium Changes in suspended solids (water clarity): Not sensitive

Biotope	Sensitivity
Crepidula fornicata and *Mediomastus fragilis* in variable salinity infralittoral mixed sediment (Readman and Rayment, 2016)	Abrasion: Low Penetration: Low Smothering and siltation rate changes (light): Low Changes in suspended solids (water clarity): Not sensitive
Crepidula fornicata with ascidians and anemones on infralittoral coarse mixed sediment (Readman, 2016)	Abrasion: Low Penetration: Low Smothering and siltation rate changes (light): Low Changes in suspended solids (water clarity): Not sensitive

Table A2.3: Subtidal sand biotopes that may be found within Offshore Overfalls MPA with sensitivity to the abrasion / disturbance and penetration of the substrate on the surface of the seabed, smothering and siltation rate changes (light) and changes in suspended solids (water clarity).

Biotope	Sensitivity
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 Smothering and siltation rate changes (light): Not sensitive Changes in suspended solids (water clarity): Not sensitive
Infralittoral mobile clean sand with sparse fauna (Tillin *et al.*, 2023) (Tillin, Tyler-Walters and Garrard, 2019)	Abrasion: Low Penetration: Low Smothering and siltation rate changes (light): Not sensitive Changes in suspended solids (water clarity): Low
Sertularia cupressina and *Hydrallmania falcata* on tide-swept sublittoral sand with cobbles or pebbles (Readman and Garrard, 2019)	Abrasion: Low Penetration: Low Smothering and siltation rate changes (light): Not sensitive

Biotope	Sensitivity
	Changes in suspended solids (water clarity): Not sensitive
Arenicola marina in infralittoral fine sand or muddy sand (Tyler-Walters and Garrard, 2019)	Abrasion: Not sensitive Penetration: Low Smothering and siltation rate changes (light): Not sensitive Changes in suspended solids (water clarity): Not sensitive