Marine Management Organisation

MMO Stage 3 Site Assessment: South-West Deeps (West) MPA (DRAFT)






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Title: MMO Stage 3 Site Assessment: South-West Deeps (West) 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, subtidal mud, subtidal sand and fan mussel in South-West Deeps (West) 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 anchored nets and lines and traps does not pose a significant risk of hindering the achievement of the conservation objectives of the MPA, however 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.

1 Introduction

This assessment considers whether fishing activities are compatible with the conservation objectives of South-West Deeps (West) 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 force.

2 Site information

2.1 Overview

The following Joint Nature Conservation Committee (JNCC) site information was used for background on site geography, designations, features, conservation objectives and general management approaches:

JNCC Site Information - South-West Deeps (West) MCZ[1]

South-West Deeps (West) MPA is located 230 km offshore in the Western Channel and Celtic Sea region to the south-west of Land's End and covers an area of approximately 1,824 km^2 (**Figure 1**). The site is adjacent to the boundary of the UK exclusive economic zone (EEZ). Fishing activity in the site is regulated by MMO. JNCC is the relevant statutory nature conservation body for the site.

South-West Deeps (West) MPA was designated as a MCZ in 2013, with additional designated features added to the site in 2016.

The site is designated for subtidal habitats, including approximately 1,500 km^2 of subtidal sand and the remaining area of the site comprised of subtidal coarse sediment, subtidal mixed sediments and subtidal mud. The site is also designated for fan mussel *Atrina fragilis,* a feature of conservation interest and for Celtic Sea Relict Sandbanks, a geomorphological feature that traverses the site from north to south. These sandbanks are some of the largest examples of this feature seen anywhere with some ridges extending to 200 km in length, 15 km in width and 50 m in height. These habitats support a broad diversity of species including polychaete worms, molluscs, echinoderms, and anemones alongside a variety of crustacean and fish species, notably the cuckoo ray *Leucoraja naevus* and monk or angler fish *Lophius piscatorius*.

[1] jncc.gov.uk/our-work/south-west-deeps-west-mpa/ (last accessed 12 July 2023)

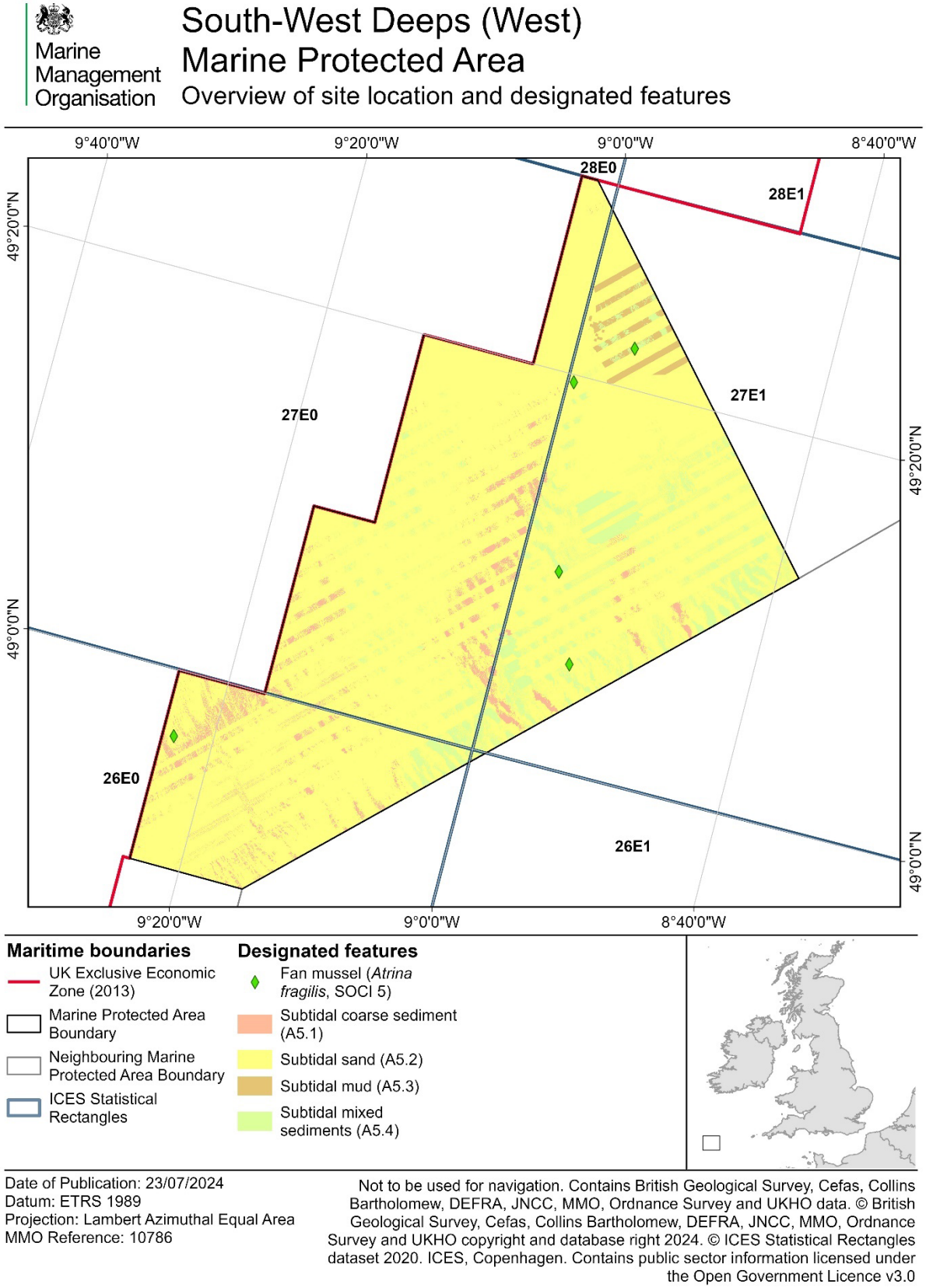

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Figure 1: Site overview map.

The designated features and their general management approaches are set out below in **Table 1.**

The general management approaches for the features of South-West Deeps (West) MPA have been set based on a vulnerability assessment.

Table 1: Designated features, and general management approaches.

Designated feature	General management approach
Subtidal coarse sediment	Recover to favourable condition. The following attributes are driving the recover objective for all the broad-scale habitats listed in the left column and fan mussel: • extent and distribution • structure and function • supporting processes
Subtidal sand	
Subtidal mud	
Subtidal mixed sediments	
Fan mussel *Atrina fragilis*	
Celtic Sea relict sandbanks	Maintain favourable condition.

For those features listed above with a 'recover to favourable condition' general management approach, JNCC consider that mobile demersal fishing is capable of significantly affecting the designated features of the site and that mobile demersal fishing should be managed to recover the broad-scale habitats and fan mussel.

JNCC consider the geological feature 'Celtic Sea relict sandbanks' to be in favourable condition. Based on best available evidence, JNCC do not consider that activities taking place are capable of affecting this protected feature at the activity levels described.

There is no feature condition assessment available for this site; in its absence a vulnerability assessment, which includes sensitivity and exposure information for features and activities in a site, is used as a proxy for condition.

2.2 Scope of this assessment

The scope of this assessment covers fishing activities alone, and relevant activities in combination with fishing.

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[2].

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 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.

[2] For more information see: 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[3], 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 South-West Deeps (West) MPA.

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.
	Gill nets (not specified)	GN	
	Set gillnet (anchored)	GNS	Present in VMS records and under 12 m vessel landings data for ICES statistical rectangles that overlap the site.
	Longlines (demersal)	LLS	
Bottom towed gear	Bottom otter trawl	OTB	
	Towed dredge	DRB	Present in under 12 m vessel landings data for ICES statistical rectangles that overlap the site.
	Twin bottom otter trawl	OTT	Present in VMS data.
	Pair seine	SPR	
	Nephrops trawl	TBN	
Midwater gear	Purse seine (ring net)	PS	Present in VMS data.

[3] Stage 3 MPA Site Assessment Methodology document: www.gov.uk/government/publications/stage-3-site-assessments (last accessed 10 September 2024)

Gear type	Gear name	Gear code	Justification
	Midwater pair trawl	PTM	
	Midwater otter trawl	OTM	
	Longlines (pelagic)	LLD	
	Boat operated lift net	LNB	
	Drift gillnet	GND	
	Hand-operated pole-and-line	LHP	Present in under 12 m vessel landings data for ICES statistical rectangles that overlap the site.
Traps	Pot/Creel	FPO	Present 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 South-West Deeps (West) 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 South-West Deeps (West) 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 South-West Deeps (West) 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' 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.

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[4];
- Stage 3 Fishing Gear MPA Impacts Evidence Bottom Towed Gear[5]; and
- Stage 3 Fishing Gear MPA Impacts Evidence Traps[6].

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 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.**

[4] Stage 3 Fishing Gear MPA Impacts Evidence Anchored Nets and Lines: www.gov.uk/government/publications/stage-3-impacts-evidence (last accessed 10 September 2024)
[5] Stage 3 Fishing Gear MPA Impacts Evidence Bottom Towed Gear: www.gov.uk/government/publications/stage-3-impacts-evidence (last accessed 10 September 2024)
[6] Stage 3 Fishing Gear MPA Impacts Evidence Traps: www.gov.uk/government/publications/stage-3-impacts-evidence (last accessed 10 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														
	Fan Mussel			Subtidal coarse sediment			Subtidal mixed sediments			Subtidal mud			Subtidal sand		
	A	B	T	A	B	T	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															
Nutrient enrichment															
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															
Underwater noise changes															
Visual disturbance															

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[7].

Table 3 shows the fishing activities and pressures identified in Part A which have been included for assessment in Part B. The important targets for favourable condition were identified within JNCC's conservation advice supplementary advice tables and are shown in **Table 4.** 'Important' in this context means only those targets relating to attributes that will most efficiently and directly help to define condition. These attributes should be clearly capable of identifying a change in condition.

Table 4 shows which targets were identified as important. The impacts of pressures on features were assessed against these targets to determine whether the activities causing the pressures are compatible with the site's conservation objectives.

Table 4: Relevant favourable condition targets for identified pressures.

Features	Attribute	Target	Relevant pressures
Subtidal coarse sediment Subtidal sand Subtidal mud Subtidal mixed sediments Fan mussel *Atrina fragilis*	Extent and distribution: presence and spatial distribution of biological communities Structure and function: presence and abundance of key structural and influential species Supporting processes: sedimentation rate	Recover to favourable condition	Relevant to: • 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

4.1 Fisheries access and existing management

Non-UK vessels can operate within South-West Deeps (West) MPA, provided that they have a licence issued by the UK to do so. Nationalities which fished within the

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

MPA from 2016 to 2021 include UK, Germany, Spain, France, Ireland and Portugal. VMS records indicate that UK and French vessels were most prevalent.

More information on non-UK vessel access to UK waters can be found on MMO's Single Issuing Authority page[8].

4.2 Fishing activity summary

Table A1. 1 to **Table A1. 8** in Annex 1 display a detailed breakdown of fishing activity within South-West Deeps (West) 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 types operated by over 12 m vessels within the site are bottom otter trawls, followed by twin bottom otter trawls, longlines (demersal) and to a lesser extent set gillnet (anchored). Landings data for gears operated by under 12 m vessels in the site are minimal, with landings for all gear types operated by under 12 m vessels equating to less than 0.09 tonnes (t) on average in the data reporting period of 2016-2020.

Anchored nets and lines:

According to VMS and landings data for over 12 m vessels, anchored nets and lines are the second most frequently deployed gear type in the site with an average count of 116 VMS records between 2016 and 2021, and approximately 59 tonnes landed on average between 2016 and 2020 across GNS and LLS. Under 12 m vessels using anchored nets and lines landed approximately 0.03 tonnes per year on average in the same data reporting period.

Under 12 m landings are recorded at ICES rectangle level and for the purpose of assessment have been attributed to the MPA based on the proportion of the ICES rectangle it overlays. No fishing effort data is available for ICES rectangles 26E0, 26E1, 27E0 and 27E1 in which South-West Deeps (West) MPA overlaps with 9.53 %, 0.02 %, 17.72 % and 17.74 % respectively. Fishing effort data is available for ICES rectangle 28E0 in which South-West Deeps (West) MPA overlaps with less than 0.01 % Average fishing effort recorded by UK vessels under 12 m in length using anchored nets and lines between 2016 and 2021 for the area of South-West Deeps (West) MPA that intersects ICES rectangle 28E0 was less than 0.01 days. Fishing effort days are derived from logbooks and is collected at ICES rectangle and then apportioned accordingly.

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

Bottom Towed Gear:

Demersal Seines

According to VMS data for over 12 m vessels, the use of demersal seines in the site is minimal with an average count of 1 VMS record between 2016 and 2021. No landings for vessels over 12 m or under 12m vessels were recorded for demersal seine fishing activity between 2016 and 2020. No fishing effort data is available for demersal seines in ICES rectangles 28E0, 26E1, 27E0 and 27E1. Surface and sub surface swept area ratio (SAR) values for demersal seine activity for C-squares intersecting the site are 0.

Demersal Trawls

According to VMS data, bottom otter trawls are the most prevalent type of fishing gear deployed in South-West Deeps (West) MPA. Between 2016 and 2021 there were 2,514 VMS records on average of this gear type per year. Twin bottom otter trawl activity also occurs within the site. Between 2016 and 2021 there were 332 VMS records on average of this gear type per year. Vessels over 12 m in length using demersal trawls landed approximately 314.6 tonnes per year (2016 to 2020), whereas vessels under 12 m in length landed approximately 0.03 tonnes in the same data reporting period. No fishing effort data is available for demersal trawls in ICES rectangles 28E0, 26E1, 27E0 and 27E1. Surface SAR values for demersal trawl activity for C-squares intersecting South-West Deeps (West) MPA increased from 1.26 in 2016 to 1.74 in 2020 whilst sub surface values increased from 0.10 to 0.14 in the same reporting period.

Dredges

According to VMS and landings data for over 12 m vessels, there was no towed dredge fishing activity undertaken in the site between 2016 and 2021. Landings data for under 12 m vessels using towed dredge show minimal activity, with average annual landings between 2016 and 2020 equating to 0.01 tonnes. Under 12 m landings are recorded at ICES rectangle level and have been attributed to the MPA based on the proportion of the ICES rectangle it overlays. No fishing effort data is available for towed dredges in ICES rectangles 28E0, 26E1, 27E0 and 27E1. Surface and sub surface swept area ratio (SAR) values for towed dredge activity for C-squares intersecting the site are 0.

Traps:

According to VMS and landings data for over 12 m vessels, there was no traps fishing activity undertaken in the site between 2016 and 2021. Landings data for under 12 m vessels using pots/creels show minimal activity, with average annual landings between 2016 and 2020 equating to 0.01 tonnes. Under 12 m landings are recorded at ICES rectangle level and have been attributed to the MPA based on the proportion of the ICES rectangle it overlays. No fishing effort data is available for traps in ICES rectangles 28E0, 26E1, 27E0 and 27E1.

4.3 Pressures by gear type

The Stage 3 Fishing Gear MPA Impacts Evidence documents for anchored nets and lines[4], bottom towed gear[5] and traps[6] 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 and subtidal mixed sediments 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.

Impacts from target and/or non-target removal pressures have been scoped out from this assessment in most cases, as the detail of key structural and influential species is yet to be fully defined and they are assessed more completely within the abrasion and penetration pressures. These pressures may require consideration as a result of any future evidence review, in conjunction with updated conservation advice from JNCC and Natural England. Where separate consideration of these pressures is required, this has been stated but generally includes the following:

MPAs with certain designated species features or designated features that may contain key commercially targeted species have been highlighted as requiring separate consideration of the removal pressures. This includes MPAs with an active Nephrops fishery**,** where the habitat sea-pen and burrowing megafauna communities is a designated feature, or where fan mussels, ocean quahog, spiny lobster and pink sea-fan are a designated species feature.

The designated feature in this site, fan mussels, may be sensitive to removal of non-target species pressures. However, fan mussels are not considered sensitive to removal pressures via static gear types, as removal of bivalves is highly unlikely through the use of static gear. As such, this feature is more fully assessed within the abrasion and penetration pressures.

4.3.1 Anchored nets and lines

The following features of South-West Deeps (West) MPA have been considered in relation to pressures from anchored nets and lines.

Subtidal coarse sediment; subtidal sand; subtidal mixed sediments; subtidal mud; fan mussel.

The relevant pressures on the features of South-West Deeps (West) MPA (outlined above) from anchored nets and lines were identified in **Table 4** and are:

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

Section 4.2 describes the fishing activity within South-West Deeps (West) MPA and from VMS and landings data, anchored nets and lines make up the second most frequently deployed gear type in the site.

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 movement over the seabed during rough weather.

Subtidal coarse sediment; subtidal sand; subtidal mixed sediments; subtidal mud

Biotope data for South-West Deeps (West) MPA at bioregion level is consolidated in the JNCC Biotope Databases. Biotope data for the Western Channel and Celtic Sea was extracted from the Biotope Presence Absence Database[9] to determine the number of biotopes that are likely to be present at the site. Biotope sensitivity data was then extracted from The Marine Life Information Network (MarLIN) to outline biotopes sensitivity for the appropriate pressure. **Table A2. 1** to **Table A2. 4** of Annex 2 detail the list of biotopes that may be found within the sediment features of the site.

For the subtidal coarse sediment feature, 12 biotopes have been identified which could be present in the site. As outlined in **Table A2. 1** in Annex 2, nine of these have low sensitivity to abrasion pressures and three are not sensitive to this pressure. Therefore, these have not been considered further within this section.

For the subtidal mixed sediments feature, seven biotopes have been identified which could be present in the site. Four of these biotopes, shown in **Table A2. 2** in Annex 2, were identified as having medium sensitivity to abrasion. For the subtidal sand feature, 14 biotopes have been identified which could be present in the site, four of which have medium sensitivity, shown in **Table A2. 3** in Annex 2. For the subtidal

[9] JNCC report 647: Biotope Presence-Absence spreadsheet (revised July 2020). Available online: Assigning the EUNIS classifications to UK's Offshore Regional Seas | JNCC Resource Hub (last accessed 28 November 2023)

mud feature, seventeen biotopes have been identified which could be present in the site, thirteen of which have medium sensitivity, as outlined in **Table A2. 4** in Annex 2.

Generally, subtidal sediments are less sensitive, and likely to recover more quickly from fishing activity impacts than more fragile habitats such as biogenic reefs, however fishing activity still has the potential to negatively impact these habitats and hinder the conservation objectives of the sites in which they are protected, particularly with regard to the structure and function of the biological communities present. These habitats usually contain populations of sessile epifauna, and physical damage, disturbance or removal of such species usually leads to slow recovery rates. Studies indicate that slow growing branching species and erect branching species are considered particularly sensitive to damage from netting. Repeated netting activity could damage communities associated with this feature through cumulative impacts. However, it should be noted that sensitivity to removal via abrasion was predominantly linked to studies using bottom towed gears rather than anchored nets and lines.

According to VMS and landings data for over 12 m vessels, anchored nets and lines are the second most frequently deployed gear type in the site with an average count of 116 VMS records between 2016 and 2021. VMS activity data shows that anchored nets and lines activity is evenly distributed throughout the MPA and is occurring over the subtidal sediment features. As described in section 9.4 of the anchored nets and lines Impacts Evidence document[4], there is limited information on the impacts of static gears on sand habitats, however available literature suggests that static gears such as anchored nets and lines have a relatively low impact on benthic communities in comparison to towed gears and are likely to be of limited concern to subtidal sand habitats. The impact of demersal nets and lines will likely be greatest on any epifauna present with resistance varying by species. There is limited information on the impacts of static gears on subtidal mud habitats, however available literature suggests that static gears such as anchored nets and lines have a relatively low impact on benthic communities in comparison to towed gears and are likely to be of limited concern to subtidal mud habitats. Sensitivity of erect epifauna to abrasion impacts from anchored nets and lines in subtidal mud habitats is likely to be species dependent.

A study within section 9.5 of the anchored nets and lines Impacts Evidence document[4] considering three species of sea-pens noted that species which cannot retract into the sediment and/or are more rigid are likely to be less tolerant to disturbance caused by potting but no lasting effects on the substrate were observed during the study. Similarly, even if uprooted, some sea-pens are able to reinsert themselves into the sediment. While these studies considered the impact of traps, the ability of sea-pens to flex under weight, reinsert following uprooting, and retract into the sediment, will similarly aid in their resilience to demersal nets, lines and their associated anchors. The potential for impact will be dependent on the intensity of fishing activity taking place with increasing activity increasing the likelihood of

weights and ropes associated with nets and lines damaging, entangling, or removing epifaunal species.

Section 9.4 of the anchored nets and lines Impacts Evidence document[4] indicates that 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. Subtidal sediment habitats are considered resilient to all but intense fishing activity using anchored nets and lines on species rich sediment habitats or those with long-lived bivalves. Potential impacts of abrasion or disturbance of the substrate on the surface of the seabed on the features of the site are more likely to occur during the hauling of gear or the movement of gear along the seabed due to strong tides, currents, or storm activity.

Overall, given the good rates of resilience and recoverability of the biotopes present on the feature and the likelihood that these biotopes already have some resilience to the described anchored nets and line levels in the site, there is a low risk of impacts to this feature at the levels described relating to abrasion or disturbance. The site is also subject to moderate hydrodynamic energy of the Western Channel and Celtic Sea, so it is likely that these biological communities are acclimatised to some level of natural disturbance. It is unlikely that the ongoing use of anchored nets and lines will pose a significant risk of hindering the achievement of the conservation objectives of South-West Deeps (West) MPA.

Fan Mussel (*Atrina fragilis)*

Fan mussel is a designated Species of Conservation Importance of the South-West Deeps (West) MPA, therefore sensitivity will be considered at a species level, rather than a biotope level, for this assessment. Fan mussel typically live in the sublittoral fringe, in subtidal mud, sandy mud or gravel habitats.

Abrasion towards sediment habitats will be more significant for bottom towed gears; however, impacts from anchored nets and lines are still possible through interactions between the seabed and the gear itself including associated lines and anchors. Surface abrasion and disturbance to the seabed could be caused during the setting and retrieval of nets/lines and their associated ground lines and anchors, as well as by their movement over the seabed during rough weather. This is more likely to occur if the gear moves across the seabed during hauling of gear or when the gear is subject to strong tides, currents or storm activity.

There is limited direct evidence of the impacts of static gears on subtidal sediments; however, research has shown that no static gears are considered to be a ‘major concern’ for subtidal sediments and estimated no or low sensitivity to all but heavy levels of fishing intensity on stable species on rich sediments or sand and gravel with long-lived bivalves. As interactions with the associated seabed are likely to be minimal, anchored nets and lines are unlikely to significantly impact the physical structure of subtidal mud, sandy mud or gravel habitats. Fan mussel is shown to

have high sensitivity to abrasion impacts, however, studies indicate that the anchored nets and lines gear type is unlikely to have significant impacts on fan mussel, as interactions with the associated seabed are likely to be minimal.

Overall, there is a low risk of impacts to this feature at the activity levels described. The site is also subject to moderate hydrodynamic energy of the Western Channel and Celtic Sea, so it is likely that these biological communities are acclimatised to some level of natural disturbance. It is unlikely that the ongoing use of anchored nets and lines will pose a significant risk of hindering the achievement of the conservation objective of South-West Deeps (West) MPA.

Therefore, MMO concludes that the ongoing use of anchored nets and lines at described levels does not pose a significant risk of hindering the achievement of the conservation objectives of South-West Deeps (West) MPA.

4.3.2 Bottom towed gear

The following features of South-West Deeps (West) MPA have been considered in relation to pressures from bottom towed gear:

Subtidal coarse sediment; subtidal sand; subtidal mixed sediments; subtidal mud

The relevant pressures on the subtidal sediment features of South-West Deeps (West) MPA (outlined above) 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^.

Fan Mussel (*Atrina fragilis)*

The relevant pressures on the fan mussel feature of South-West Deeps (West) MPA (outlined above) 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*;
- smothering and siltation rate changes.

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.

Subtidal coarse sediment; subtidal sand; subtidal mixed sediments; subtidal mud

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

As outlined in **Table A2. 1** in Annex 2, three subtidal coarse sediment biotopes have been identified as having medium sensitivity to penetration pressures, including *Branchiostoma lanceolatum* in circalittoral coarse sand with shell gravel. This biotope has been identified as sensitive due to the fragility of these species providing little protection from abrasion. This results in low resistance to penetration pressures, however with high resilience, sensitivity is categorised as medium. The four subtidal mixed sediments biotopes identified in the anchored nets and lines section as having medium sensitivity to abrasion, have also been identified as having medium sensitivity to penetration, as shown in **Table A2. 2** in Annex 2. These biotopes include *Cerianthus lloydii* and other burrowing anemones in circalittoral muddy mixed sediment. As a burrowing species, able to retract into a soft tube, *Cerianthus lloydii* has some protection from these pressures, however this tube may be damaged, and they can be more exposed when surface feeding. Consequently, this biotope has been assessed as having low resistance to penetration pressures resulting in a medium sensitivity. For the subtidal sand biotopes, five biotopes have been identified as having medium sensitivity to penetration, as outlined in **Table A2. 3** in Annex 2, with four being the same biotopes identified as having medium sensitivity to abrasion pressures in **section 4.3.1.** One such biotope is *Echinocardium cordatum* and *Ensis* spp. in lower shore and shallow sublittoral slightly muddy fine sand. The characterising species of the biotope are somewhat protected due to their infaunal position, however may be damaged by surface abrasion and penetration activities depending on the scale.

For subtidal mud, **Table A2. 4** in Annex 2 outlines the three biotopes which have been identified as having a high sensitivity to penetration pressures. An example of one of these biotopes is *Virgularia mirabilis* and O*phiura* spp. with Pecten maximus on circalittoral sandy or shelly mud. High sensitivity to penetration in this case is related to the fact that penetrative gear is likely to remove *Virgularia mirabilis* from their burrows removing a proportion of the population. A further 11 biotopes have medium sensitivity, as outlined in **Table A2. 4** in Annex 2.

Given the levels of demersal trawling occurring within the site, it is likely that the sedimentary features of the site are experiencing regular exposure to abrasion and penetration pressures.

As described in section 8.4.1 of the bottom towed gear Impacts Evidence document[5], 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 and demersal seines. Physical impacts are unlikely, however, to significantly impact the large-scale topography of sediment features. Of more concern are the impacts on the biological structure of

sediment habitats. Impacts on 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.

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[5], the first pass of a trawl has the largest initial impact on biomass and production in 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). Direct mortality due to otter trawling is considerable but has been found to be lower than that caused by beam trawling for a number of burrowing species, however research has shown that otter trawls remove, on average, around 6 % of faunal biomass per pass with the first trawl pass having the most significant impact.

Based on the rationale above, bottom towed gears operating within South-West Deeps (West) MPA have the potential to impact biological communities and the overall ecosystem function of the subtidal sediment features found in the site from abrasion, penetration, or disturbance of the substrate on the surface of the seabed pressures. Given the medium sensitivity of biotopes identified within the subtidal sediment habitats in the site, low resistance to this type of fishing activity and slow recoverability, it is likely that the ongoing use of bottom towed gear over the sediment features will pose a significant risk of hindering the achievement of the conservation objective of South-West Deeps (West) MPA.

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

Table A2. 1 to **Table A2. 4** 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.

One subtidal coarse sediment biotope, three subtidal mixed sediments' biotopes, and two subtidal mud biotopes were identified as having medium sensitivity to changes in suspended solids (water clarity) and/or smothering and siltation rate changes pressures.

As described in **section 4.2**, the majority of bottom towed gear activity in the site is being undertaken by vessels deploying bottom otter trawls. Research on the effects of sediment suspension by otter trawls used to inform the bottom towed gear Impacts Evidence document demonstrated that activity over sandy substrates can cause a sediment concentration increase behind the gear of up to 0.43 cm^3 per litre

and an estimated 41.3 kg of sediment can be suspended by all otter trawl components (ground gear and trawl doors) per metre. Further research used to inform the Impacts Evidence document on the effects of otter trawling on mud sediments found that a single trawling event by an otter trawl resulted in suspension of approximately 9.5 tonnes of sediment, including tens to hundreds of kilograms of associated particulate elements, per kilometre of track. The sediment plume in the near-bottom water was transported more than 1 km away over the following three to four days and elevated levels of re-suspended fine mud sediment were recorded for up to 5 days after their trawl disturbance event.

As described in section 8.4.2 of the bottom towed gear Impacts Evidence document[5], the degree of suspension and therefore the likely degree of impact varies between gear types and sediment type, however it is likely that the extent of impact will vary in line with the degree of resuspension, the larger the amount of entrainment of sediment, the greater the impact to vulnerable biological communities. More compacted substrates with higher mud fractions generate more sediment resuspension than those which are naturally cleaner. Resuspended sediment and the resulting increase in turbidity may be a risk to organisms that are vulnerable to increased levels of sediment particles in the water column and creates the potential for impacts via smothering. 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. Furthermore, section 8.4.2 of the bottom towed gear Impacts Evidence document[5] describes 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 bivalves, had low resistance to smothering, whereas mobile epifauna appear highly resilient and resistant.

Given the medium sensitivity of biotopes identified within the sediment features, low resistance to this type of fishing activity and slow recoverability, it is likely that the ongoing use of bottom towed gear over the sediment features will pose a significant risk of hindering the achievement of the conservation objective of South-West Deeps (West) MPA.

Fan Mussel (*Atrina fragilis)*

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

Section 5.1 of the bottom towed gear Impacts Evidence document[5] outlines the sensitivity of fan mussel to this fishing type, and they are considered very fragile and sensitive to physical and mechanical damage. Their recovery from impacts is considered low given their long lifespan, slow growth and low gamete production, however, primary evidence relating to impacts from these fishing methods is limited. This species is generally found in mud, sandy mud and fine gravel habitats,

particularly in full salinity sheltered areas with weak to moderately strong tidal flows. Their distribution has been linked to several environmental variables including depth, seabed topography, current speed, and percentage of mud and gravel. Up to 70 % of the shell lengths of fan mussel can be buried below the surface of sediments, with the posterior portion projecting above, making fan mussel sensitive to gear types which interact with the seabed, particularly dredges. Despite fan mussel being able to withdraw into their shells and repair damage to the posterior edge of the shell, they cannot survive being uprooted from the seabed.

Fan mussel is known to be negatively affected by the use of benthic fishing gear as it can dislodge or remove individuals, cause damage to emergent portions of the shell and potentially cause mortality. Furthermore, fan mussel is a slow growing, erect epifauna with slow recoverability and is assessed to have high sensitivity to bottom towed mobile gear. Research has shown that fan mussel is likely to have a ‘very low’ resilience and ‘high’ sensitivity to removal by a fishery that does not target it, and a ‘low’ resilience and ‘medium’ sensitivity to abrasion pressures.

Therefore, given the low resistance and high sensitivity of this species to bottom towed gear fishing activity coupled with the level of activity currently taking place in the site, it is likely that the ongoing use of bottom towed gear at the levels described will pose a significant risk of hindering the achievement of the conservation objective of South-West Deeps (West) MPA.

- Smothering and siltation rate changes (light).

Section 5.3.3 of the bottom towed gear Impacts Evidence document[5] describes the sensitivity of fan mussel to smothering and siltation rate changes. Although there is limited evidence on impacts of siltation rate changes on fan mussel, sediment plumes resulting from bottom towed gear will reduce light levels reaching the substrate, release nutrients and possible pollutants into the water column, and increase the total suspended sediment load. The deposition of suspended sediments may cause smothering of feeding and respiratory organs of sessile benthos.

Fan mussel are adapted to sedimentary lifestyles and have ciliated waste canals to remove sediment from the mantle. One third to one half of a fan mussel can protrude above the sediment surface (up to 10 to 15 cm for adults) which means that adult individuals may not be affected by smothering of up to 5 cm of fine sediment. However, small or juvenile individuals may be smothered by this amount of sediment and cases of higher sediment loads (for example 30 cm) are also likely to smother adult individuals. In addition, increased siltation results in a higher metabolic demand, leading to a likely decrease in growth and reproductive capacity.

Fan mussel are assessed to have ‘low’ resilience and ‘medium’ sensitivity to smothering and siltation rate changes. The impact of this pressure will depend on the intensity of bottom towed gear use and the proximity to fan mussel. Given the medium sensitivity of this species to bottom towed gear fishing activity coupled with the level of activity currently taking place in the site, it is likely that the ongoing use of

bottom towed gear at the levels described will pose a significant risk of hindering the achievement of the conservation objective of South-West Deeps (West) MPA.

Therefore, MMO conclude that the there is a significant risk of the ongoing use of bottom towed gear hindering the achievement of the conservation objectives of South-West Deeps (West) MPA.

4.3.3 Traps

The following features of South-West Deeps (West) MPA have been considered in relation to pressures from traps:

Subtidal coarse sediment; subtidal sand; subtidal mixed sediments; subtidal mud; fan mussel.

The relevant pressures on the features of South-West Deeps (West) MPA (outlined above) from traps were identified in **Table 4** and are:

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

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 movement over the seabed during rough weather.

Subtidal coarse sediment; subtidal sand; subtidal mixed sediments; subtidal mud

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[6], abrasion impacts from this gear type are unlikely to be a concern unless they occur where particularly sensitive species are present or when fishing occurs at damaging levels of intensity. **Section 4.2** describes the fishing activity within South-West Deeps (West) MPA, for vessels over 12 m no trap fishing activity has been undertaken in the site between 2016 and 2021 according to VMS and landings data. For vessels below 12 m, landings data recorded minimal activity of vessels using pots/creels, with average annual landings between 2016 and 2020 equating to 0.01 tonnes. Given the limited traps fishing activity being undertaken at the site, any interaction between traps and the feature is unlikely to be occurring.

There is limited primary evidence to indicate lasting impacts on sediment features from traps, however traps are considered of limited concern due to the generally high energy environments where these subtidal sediment features occur and the likely greater impact of natural disturbance in these environments compared with potting. Overall, given minimal levels of trap activity are occurring in the site, traps are

unlikely to adversely affect these features outlined in this section at the levels described and therefore are unlikely to pose a significant risk of hindering the conservation objectives of South-West Deeps (West) MPA.

Fan mussel (*Atrina fragilis)*

Traps and anchored nets and lines fishing gear exert similar pressures on the fan mussel feature, therefore the narrative in the anchored nets and lines section also applies here for the traps section.

As described in section 5.3.1 of the traps Impacts evidence document[6], traps are not generally considered a fishing activity that penetrates the seabed, and abrasion and penetration towards sediment habitats will be more significant in bottom towed gears. Studies have suggested that traps are unlikely to have lasting and detrimental impacts on fan mussel.

Given the limited traps fishing activity being undertaken at the site, any interaction between traps and the feature is unlikely to be occurring. Overall, there is a low risk of impacts on this feature at the activity levels described. It is unlikely that the ongoing use of traps at the levels described will pose a significant risk of hindering the achievement of the conservation objective of 'recover to favourable condition' of this feature of South-West Deeps (West) MPA.

Therefore, MMO concludes 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 South-West Deeps (West) MPA.

4.4 Part B conclusion

The assessment of anchored nets and lines, bottom towed gears, and traps on the subtidal coarse sediment, subtidal mixed sediments, subtidal mud, subtidal sand, and fan mussel features of South-West Deeps (West) 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 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 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.

There may be operational submarine cables within this 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 gears were identified in Part B as requiring management to a significant risk of hindering the achievement of the site conservation objectives. Anchored nets and lines and traps are the only remaining fishing activities occurring within South-West Deeps (West) 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 no other relevant activities occurring within or adjacent to the South-West Deeps (West) MPA, within the 5 km buffer applied. Therefore, only fishing in-combination with other fishing activities are considered hereafter.

Table 3 from **section 3.3**, was used to identify medium-high risk pressures exerted by fishing which require in-combination assessment (**Table 5**).

Table 5 summarises the pressures exerted by fishing and identifies those pressures exerted by all gears (Y: pressure exerted). Activity-pressure interactions are highlighted dark blue to indicate an in-combination effect. Only fishing activity with no proposed or current fisheries management in place are considered.

Table 5: Pressures exerted by fishing.

	Fishing activities	
Potential pressures	**Anchored nets and lines**	**Traps**
Abrasion or disturbance of the substrate on the surface of the seabed	Y	Y
Removal of non-target species	Y	Y
Removal of target species	Y	Y

5.1 In-combination pressure sections

The fishing pressures exerted by anchored nets and lines and traps will be considered in this section.

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 fan mussel feature is considered not to be at significant risk from these pressures via static gear use in this site (**Section 4.3**). 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 116 for anchored nets and lines; there were no VMS recordings or landings for over 12 m vessels using traps within the MPA. There is data available for anchored nets and lines in ICES rectangle 28E0, however there is only a very small overlap between the MPA and this rectangle, as such the fishing effort apportioned to the MPA is minimal. The average annual fishing effort for under 12 m vessels using anchored nets and lines between 2016 and 2021 in this overlap is less than 0.01 days. There is no fishing effort data available for under 12 m vessels using traps within any of the ICES rectangles which overlap with South West Deeps (West) MPA. While the fishing effort data is limited, this is supported by the estimated live weight landings for under 12 m vessels that equal an annual average of 0.04 tonnes, 0.01 tonnes for traps and 0.03 tonnes for anchored nets and lines, between 2016 and 2020 (Section 4.2).

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 are no VMS records or landings for over 12 m vessels using traps and the minimal landings for under 12 m vessels indicate that there is very little trap activity occurring within the MPA. With 116 VMS recordings, over 12 m vessels using anchored nets and lines landed an annual average of approximately 59 tonnes. Under 12 m vessels of this gear type show minimal activity with low annual average landings (0.04 tonnes). The described level of anchored nets and lines activity has been assessed alone to pose no significant risk to the conservation objectives. As such the addition of such limited trap activity is not considered to cause significant in-combination impacts.

Therefore, MMO concludes that the combined pressures from anchored nets and lines and traps will not result in a significant risk of hindering the achievement of the conservation objectives for the South-West Deeps (West) MPA at the levels described.

5.3 Part C conclusion

MMO concludes that fishing interactions in-combination will not result in a significant risk of hindering the achievement of the conservation objectives for South-West Deeps (West) 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 South West Deeps (West) MPA.

Part B of this assessment concluded that ongoing use of bottom towed gear on the subtidal coarse sediment, subtidal mixed sediments, subtidal mud, subtidal sand, and fan mussel features of South West Deeps (West) MPA may result in a significant risk of hindering the achievement of the conservation objectives of the MPA. Part B also concluded that the ongoing use of anchored nets and lines and traps at the described levels does not pose a significant risk of hindering the achievement of the conservation objectives.

Part C of this assessment concluded that combined pressures from anchored nets and lines and traps and other relevant activities do 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, MMO propose to implement a byelaw to prohibit the use of bottom towed gear on the subtidal coarse sediment, subtidal mixed sediments, subtidal mud, subtidal sand, and fan mussel features of South West Deeps (West) 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[3].

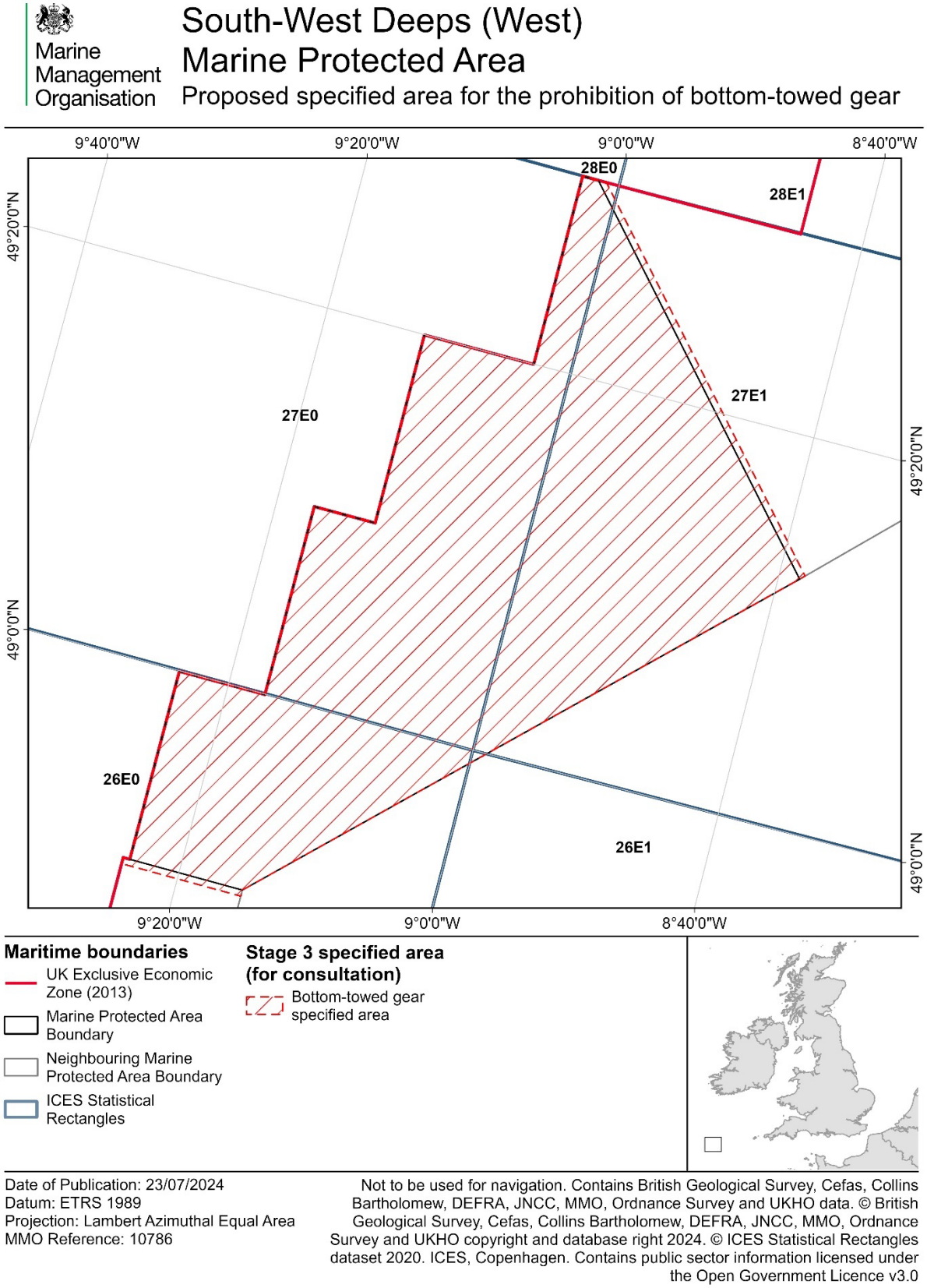

Figure 2: Map of proposed management.

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 (EU)) and proportional activity (%), per gear, per gear group, per year (2016 to 2021), totals and annual average (2016 to 2021). All numbers are rounded to the nearest whole number.

			2016		2017		2018		2019		2020		2021		Total (2016 to 2021)		Average (2016 to 2021)
Gear group	Gear code	Nation group	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count
Anchored Net/Line	GNS	EU	4	100	6	100	32	100	26	100	19	100	13	100	100	100	17
	GNS Total		**4**	**4**	**6**	**5**	**32**	**10**	**26**	**25**	**19**	**86**	**13**	**34**	**100**	**14**	**17**
	LLS	EU	93	100	106	100	292	100	78	100	3	100	25	100	597	100	100
	LLS Total		**93**	**96**	**106**	**95**	**292**	**90**	**78**	**75**	**3**	**14**	**25**	**66**	**597**	**86**	**100**
Anchored Net/Line Total			**97**	**4**	**112**	**3**	**324**	**13**	**104**	**4**	**22**	**1**	**38**	**1**	**697**	**4**	**116**
Demersal Seine	SPR	EU	0	0	0	0	0	0	0	0	3	100	0	0	3	100	1
	SPR Total		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**100**	**0**	**0**	**3**	**100**	**1**
Demersal Seine Total			**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**3**	**0**	**1**
Demersal trawl	OTB	EU	1,872	98	3,029	98	1,760	97	1,884	94	2,705	98	3,365	96	14,615	97	2,436
	OTB	UK	47	2	50	2	58	3	123	6	64	2	124	4	466	3	78
	OTB Total		**1,919**	**100**	**3,079**	**94**	**1,818**	**88**	**2,007**	**79**	**2,769**	**89**	**3,489**	**84**	**15,081**	**88**	**2,514**
	OTT	EU	1	100	205	100	246	100	526	100	332	100	683	100	1,993	100	332
	OTT Total		**1**	**0**	**205**	**6**	**246**	**12**	**526**	**21**	**332**	**11**	**683**	**16**	**1,993**	**12**	**332**
	TBN	UK	2	100	0	0	0	0	0	0	0	0	0	0	2	100	0
	TBN Total		**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**
Demersal trawl Total			**1,922**	**85**	**3,284**	**90**	**2,064**	**81**	**2,533**	**95**	**3,101**	**92**	**4,172**	**99**	**17,076**	**91**	**2,846**
Midwater – Gill Drift	GND	EU	148	100	175	100	124	100	0	0	0	0	0	0	447	100	75
	GND Total		**148**	**100**	**175**	**100**	**124**	**100**	**0**	**0**	**0**	**0**	**0**	**0**	**447**	**100**	**75**
Midwater – Gill Drift Total			**148**	**7**	**175**	**5**	**124**	**5**	**0**	**0**	**0**	**0**	**0**	**0**	**447**	**2**	**75**

			2016		2017		2018		2019		2020		2021		Total (2016 to 2021)		Average (2016 to 2021)
Gear group	**Gear code**	**Nation group**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**
Midwater – surrounding	**PS**	EU	0	0	0	0	0	0	0	0	2	100	0	0	2	100	0
	PS Total		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**100**	**0**	**0**	**2**	**100**	**0**
Midwater – surrounding Total			**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**	**0**	**2**	**0**	**0**
Midwater Hook/Lines	**LLD**	EU	99	100	69	100	27	100	18	100	25	100	2	100	240	100	40
	LLD Total		**99**	**100**	**69**	**100**	**27**	**100**	**18**	**100**	**25**	**100**	**2**	**100**	**240**	**100**	**40**
Midwater Hook/Lines Total			**99**	**4**	**69**	**2**	**27**	**1**	**18**	**1**	**25**	**1**	**2**	**0**	**240**	**1**	**40**
Midwater Trawl	**OTM**	EU	0	0	0	0	0	0	9	100	7	100	0	0	16	100	3
	OTM Total		**0**	**0**	**0**	**0**	**0**	**0**	**9**	**82**	**7**	**88**	**0**	**0**	**16**	**70**	**3**
	PTM	EU	1	100	0	0	3	100	2	100	1	100	0	0	7	100	1
	PTM Total		**1**	**100**	**0**	**0**	**3**	**100**	**2**	**18**	**1**	**13**	**0**	**0**	**7**	**30**	**1**
Midwater Trawl Total			**1**	**0**	**0**	**0**	**3**	**0**	**11**	**0**	**8**	**0**	**0**	**0**	**23**	**0**	**4**
Unknown	**NK**	EU	0	0	0	0	0	0	0	0	214	100	0	0	214	99	36
	NK	#N/A*	3	100	0	0	0	0	0	0	0	0	0	0	3	1	1
	NK Total		**3**	**100**	**0**	**0**	**0**	**0**	**0**	**0**	**214**	**100**	**0**	**0**	**217**	**100**	**36**
Unknown Total			**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**214**	**6**	**0**	**0**	**217**	**1**	**36**
Midwater Lift Net	**LNB**	EU	0	0	0	0	0	0	1	100	3	100	0	0	4	100	1
	LNB Total		**0**	**0**	**0**	**0**	**0**	**0**	**1**	**100**	**3**	**100**	**0**	**0**	**4**	**100**	**1**
Midwater Lift Net Total			**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**3**	**0**	**0**	**0**	**4**	**0**	**1**
Grand Total			**2,270**	**3**	**3,640**	**5**	**2,542**	**4**	**2,667**	**4**	**3,378**	**5**	**4,212**	**6**	**18,709**	**4**	**3,119**

* #N/A represents vessels of unknown nationality.

Table A1. 2: UK live weight landings tonnage (t) estimates by gear from vessels over 12 m in length in the MMO section of South-West Deeps (West) MPA (2016 to 2020). All numbers are rounded to the nearest two decimal places.

Gear group	Gear code	2016	2017	2018	2019	2020	Total (2016 to 2020)	Average (2016 to 2020)
Anchored Net/Line	GNS	0	0	0	0	0	0	0
Anchored Net/Line Total		**0**	**0**	**0**	**0**	**0**	**0**	**0**
Demersal trawl	OTB	18.17	31.36	21.57	41.54	22.24	134.87	26.97
	TBN	0.82	0	0	0	0	0.82	0.16
Demersal trawl Total		**18.99**	**31.36**	**21.57**	**41.54**	**22.24**	**135.70**	**27.14**
Grand Total		**18.99**	**31.36**	**21.57**	**41.54**	**22.24**	**135.70**	**27.14**

Table A1. 3: EU27 live weight landings tonnage (t) estimates by gear from vessels over 12 m in length in the MMO section of South-West Deeps (West) MPA (2016 to 2020). All numbers are rounded to two decimal places.

Gear group	Gear code	2016	2017	2018	2019	2020	Total (2016-2020)	Average (2016-2020)
Anchored Net/Line	GNS	23.94	63.10	43.07	18.62	28.73	177.46	35.49
	LLS	19.29	13.62	58.32	24.29	1.24	116.76	23.35
Anchored Net/Line Total		**43.23**	**76.72**	**101.39**	**42.90**	**29.97**	**294.22**	**58.84**
Demersal trawl	OTB	280.14	367.55	273.14	182.40	275.91	1379.15	275.83
	OTT	0.05	8.66	9.57	27.31	12.73	58.32	11.66
Demersal trawl Total		**280.19**	**376.21**	**282.71**	**209.71**	**288.65**	**1,437.47**	**287.49**
Midwater Hook/Lines	LLD	71.07	39.34	18.97	13.60	21.48	164.46	32.89
Midwater Hook/Lines Total		**71.07**	**39.34**	**18.97**	**13.60**	**21.48**	**164.46**	**32.89**
Midwater Trawl	OTM	0	0	0	14.36	0	14.36	2.87
	PTM	0	0	0.03	0	0.22	0.25	0.05
Midwater Trawl Total		**0**	**0**	**0.03**	**14.36**	**0.22**	**14.61**	**2.92**
Grand Total		**394.50**	**492.27**	**403.10**	**280.57**	**340.33**	**1,910.76**	**382.15**

Table A1. 4: Percentage of each ICES rectangle intersected by the MMO section of South-West Deeps (West) MPA.

ICES rectangle	Percentage overlap (%)
26E0	9.53
26E1	0.02
27E0	17.72
27E1	17.74
28E0	0.01

Table A1. 5: UK live weight landings tonnage (t) estimates by gear from vessels under 12 m in length for the MMO section of South-West Deeps (West) MPA (2016 to 2020). All numbers are rounded to two decimal places.

Gear group	Gear code	2016	2017	2018	2019	2020	Total (2016-2020)	Average (2016-2020)
Anchored Net/Line	GN	0	0	0	<0.01	0	<0.01	<0.01
Anchored Net/Line Total		**0**	**0**	**0**	**<0.01**	**0**	**<0.01**	**<0.01**
Grand Total		**0**	**0**	**0**	**<0.01**	**0**	**<0.01**	**<0.01**

Table A1. 6: EU27 live weight landings tonnage (t) estimates by gear from vessels under 12 m in length for the MMO section of South-West Deeps (West) MPA (2016 to 2020). All numbers are rounded to two decimal places.

Gear group	Gear code	2016	2017	2018	2019	2020	Total (2016-2020)	Average (2016-2020)
Anchored Net/Line	LLS	0	0	0	<0.01	0	<0.01	<0.01
	GTR	0	0	0	0.16	0	0.16	0.03
	GNS	0	0	0	<0.01	0	<0.01	<0.01
Anchored Net/Line Total		**0**	**0**	**0**	**0.16**	**0**	**0.16**	**0.03**
Demersal trawl	OTB	0	0.01	0	0.01	0.14	0.16	0.03
Demersal trawl Total		**0**	**0.01**	**0**	**0.01**	**0.14**	**0.16**	**0.03**
Dredge	DRB	0	0	0	0.05	0.01	0.06	0.01
	HMD	0	0	0	0	0	0	0
Dredge Total		**0**	**0**	**0**	**0.05**	**0.01**	**0.06**	**0.01**
Midwater Hook/Lines	LHP	0	0	0	0	<0.01	<0.01	<0.01
Midwater Hook/Lines Total		**0**	**0**	**0**	**0**	**<0.01**	**<0.01**	**<0.01**
Traps	FPO	0	0	0	0.04	<0.01	0.04	0.01
Traps Total		**0**	**0**	**0**	**0.04**	**0**	**0.04**	**0.01**
Grand Total		**0**	**0.01**	**0**	**0.26**	**0.15**	**0.42**	**0.08**

Table A1. 7: Mean annual surface and subsurface SAR values for C-squares intersecting the MMO section of South-West Deeps (West) MPA (2016 to 2020). All numbers are rounded to two decimal places.

Gear group	SAR category	2016	2017	2018	2019	2020
Demersal Seines	Surface	0	0	0	0	0
	Subsurface	0	0	0	0	0
Dredges	Surface	0	0	0	0	0
	Subsurface	0	0	0	0	0
Demersal Trawls	Surface	1.26	2.08	1.33	1.32	1.74
	Subsurface	0.10	0.16	0.10	0.10	0.14
Bottom Towed Gear	Surface	1.26	2.08	1.33	1.32	1.74
	Subsurface	0.10	0.16	0.10	0.10	0.14

Table A1. 8: Fishing effort (days) recorded by UK vessels under 12 m in length, separated by gear type for the area of South-West Deeps (West) MPA that intersects the marine portion of ICES rectangle 28E0 (2016 to 2021). There is no fishing effort data for ICES rectangles 26E0, 26E1, 27E0 and 27E1. ICES rectangle level data has been apportioned to the MPA based on the percentage area of the ICES rectangle that intersects the MPA (Table A1. 4).

Gear group	Fishing effort (days at sea)							
	2016	2017	2018	2019	2020	2021	Total (2016 to 2021)	Average (2016 to 2021)
Anchored nets and lines	0	0	0	<0.01	0	0	<0.01	<0.01
Static gear total	**0**	**0**	**0**	**<0.01**	**0**	**0**	**<0.01**	**<0.01**
MPA total	**0**	**0**	**0**	**<0.01**	**0**	**0**	**<0.01**	**<0.01**

Annex 2: Biotope information

Table A2. 1: Subtidal coarse sediment biotopes that may be found within South-West Deeps (West) 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
Sparse fauna on highly mobile sublittoral shingle (cobbles and pebbles) (Tillin, 2023)	Abrasion: Not sensitive Penetration: Not sensitive Changes in suspended solids (water clarity): Not sensitive Smothering and siltation rate changes (light): Not sensitive
Moerella spp. with venerid bivalves in infralittoral gravelly sand (Tillin and Watson, 2023e)	Abrasion: Low Penetration: Low Changes in suspended solids (water clarity): Low Smothering and siltation rate changes (light): Low Removal of target species: Medium
Hesionura elongata and *Microphthalmus similis* with other interstitial polychaetes in infralittoral mobile coarse sand (Marshall, Ashley and Watson, 2023)	Abrasion: Low Penetration: Medium Changes in suspended solids (water clarity): Not sensitive Smothering and siltation rate changes (light): Low
Glycera lapidum in impoverished infralittoral mobile gravel and sand (Tillin and Watson, 2023c)	Abrasion: Low Penetration: Low Changes in suspended solids (water clarity): Not sensitive Smothering and siltation rate changes (light): Low Removal of target species: Medium
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 Changes in suspended solids (water clarity): Not sensitive Smothering and siltation rate changes (light): Not sensitive
Pomatoceros triqueter with barnacles and bryozoan crusts on unstable circalittoral cobbles and pebbles (Tyler-Walters, Tillin and Watson, 2024)	Abrasion: Low Penetration: Low Changes in suspended solids (water clarity): Not sensitive Smothering and siltation rate changes (light): Not sensitive

Biotope	Sensitivity
Mediomastus fragilis, *Lumbrineris* spp. and venerid bivalves in circalittoral coarse sand or gravel (Tillin and Watson, 2023d)	Abrasion: Low Penetration: Low Changes in suspended solids (water clarity): Low Smothering and siltation rate changes (light): Low
Protodorvillea kefersteini and other polychaetes in impoverished circalittoral mixed gravelly sand (Tillin and Watson, 2023g)	Abrasion: Low Penetration: Low Changes in suspended solids (water clarity): Not sensitive Smothering and siltation rate changes (light): No evidence (NEv)
Neopentadactyla mixta in circalittoral shell gravel or coarse sand (Tyler-Walters, Durkin and Watson, 2023)	Abrasion: Not sensitive Penetration: Medium Changes in suspended solids (water clarity): Medium Smothering and siltation rate changes (light): Not sensitive Removal of non-target species: Medium
Branchiostoma lanceolatum in circalittoral coarse sand with shell gravel (Tillin and Watson, 2023a)	Abrasion: Low Penetration: Medium Changes in suspended solids (water clarity): Not sensitive Smothering and siltation rate changes (light): Low
Glycera lapidum, *Thyasira* spp. and *Amythasides macroglossus* in offshore gravelly sand (Tillin and Watson, 2023b)	Abrasion: Low Penetration: Low Changes in suspended solids (water clarity): Not sensitive Smothering and siltation rate changes (light): Low
Hesionura elongata and *Protodorvillea kefersteini* in offshore coarse sand (Tillin and Ashley, 2016)	Abrasion: Low Penetration: Low Changes in suspended solids (water clarity): No evidence (NEv) Smothering and siltation rate changes (light): No evidence (NEv)

Table A2. 2: Subtidal mixed sediments biotopes that may be found within South-West Deeps (West) 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
Venerupis senegalensis, *Amphipholis squamata* and *Apseudes latreilli* in infralittoral mixed sediment (Tillin, Rayment and Watson, 2023)	Abrasion: Low Penetration: Low Changes in suspended solids (water clarity): Low Smothering and siltation rate changes (light): Low
Cerianthus lloydii and other burrowing anemones in circalittoral muddy mixed sediment (Perry and Watson, 2024)	Abrasion: Medium Penetration: Medium Changes in suspended solids (water clarity): Not sensitive Smothering and siltation rate changes (light): Medium
Cerianthus lloydii with *Nemertesia* spp. and other hydroids in circalittoral muddy mixed sediment (Perry and Watson, 2023)	Abrasion: Medium Penetration: Medium Changes in suspended solids (water clarity): Not sensitive Smothering and siltation rate changes (light): Medium
Mysella bidentata and *Thyasira* spp. in circalittoral muddy mixed sediment (De-Bastos, Marshall and Watson, 2023)	Abrasion: Low Penetration: Low Changes in suspended solids (water clarity): Not sensitive Smothering and siltation rate changes (light): Not sensitive
Flustra foliacea and *Hydrallmania falcata* on tide-swept circalittoral mixed sediment (Readman and Watson, 2024)	Abrasion: Medium Penetration: Medium Changes in suspended solids (water clarity): Not sensitive Smothering and siltation rate changes (light): 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 Changes in suspended solids (water clarity): Not sensitive Smothering and siltation rate changes (light): Medium
Polychaete-rich deep *Venus* community in offshore mixed sediments (Tillin and Watson, 2023f)	Abrasion: Low Penetration: Low Changes in suspended solids (water clarity): Low Smothering and siltation rate changes (light): Low

Table A2. 3: Subtidal sand biotopes that may be found within South-West Deeps (West) 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 Changes in suspended solids (water clarity): Not sensitive Smothering and siltation rate changes (light): Not sensitive
Amphiura brachiate with *Astropecten irregularis* and other echinoderms in circalittoral muddy sand (De-Bastos, Lloyd and Watson, 2023)	Abrasion: Medium Penetration: Medium Changes in suspended solids (water clarity): Not sensitive Smothering and siltation rate changes (light): Low
Maldanid polychaetes and *Eudorellopsis deformis* in deep circalittoral sand or muddy sand (Ashley, 2016)	Abrasion: Medium Penetration: Medium Changes in suspended solids (water clarity): Not sensitive Smothering and siltation rate changes (light): Not sensitive
Owenia fusiformis and *Amphiura filiformis* in deep circalittoral sand or muddy sand (De-Bastos, 2023)	Abrasion: Medium Penetration: Medium Changes in suspended solids (water clarity): Not sensitive Smothering and siltation rate changes (light): Low
Semi-permanent tube-building amphipods and polychaetes in sublittoral sand (De-Bastos, Rayment, Lloyd, *et al.*, 2023)	Abrasion: Low Penetration: Medium Changes in suspended solids (water clarity): Low Smothering and siltation rate changes (light): Low

Table A2. 4: Subtidal mud biotopes that may be found within South-West Deeps (West) 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
Amphiura filiformis and *Nuculoma tenuis* in circalittoral and offshore muddy sand (De-Bastos and Watson, 2023a)	Abrasion: Medium Penetration: Medium Changes in suspended solids (water clarity): Not sensitive Smothering and siltation rate changes (light): Not sensitive
Virgularia mirabilis and *Ophiura* spp. with Pecten maximus on circalittoral sandy or shelly mud (Hill *et al.*, 2024b)	Abrasion: Medium Penetration: **High** Changes in suspended solids (water clarity): Medium Smothering and siltation rate changes (light): Medium
Virgularia mirabilis and *Ophiura* spp. With Pecten maximus, hydroids and ascidians on circalittoral sandy or shelly mud with shells or stones (Hill *et al.*, 2024a)	Abrasion: Medium Penetration: **High** Changes in suspended solids (water clarity): Medium Smothering and siltation rate changes (light): Medium
Sea-pens and burrowing megafauna in circalittoral fine mud (Hill *et al.*, 2023)	Abrasion: Medium Penetration: **High** Changes in suspended solids (water clarity): Not sensitive Smothering and siltation rate changes (light): Not sensitive
Ampharete falcata turf with *Parvicardium ovale* on cohesive muddy sediment near margins of deep stratified seas (De-Bastos and Hill, 2016a)	Abrasion: Medium Penetration: Medium Changes in suspended solids (water clarity): Not sensitive Smothering and siltation rate changes (light): Low
Sagartiogeton undatus and *Ascidiella aspersa* on infralittoral sandy mud (Readman and Watson, 2023)	Abrasion: Medium Penetration: Medium Changes in suspended solids (water clarity): Not sensitive Smothering and siltation rate changes (light): Not sensitive
Amphiura filiformis, *Mysella bidentata* and *Abra nitida* in circalittoral sandy mud (De-Bastos and Hill, 2016b)	Abrasion: Medium Penetration: Medium Changes in suspended solids (water clarity): Not sensitive Smothering and siltation rate changes (light): Not sensitive

Biotope	Sensitivity
Thyasira spp. and *Nuculoma tenuis* in circalittoral sandy mud (De-Bastos and Watson, 2023b)	Abrasion: Medium Penetration: Medium Changes in suspended solids (water clarity): Not sensitive Smothering and siltation rate changes (light): Not sensitive
Burrowing megafauna and *Maxmuelleria lankesteri* in circalittoral mud (Durkin and Tyler-Walters, 2022)	Abrasion: Medium Penetration: Medium Changes in suspended solids (water clarity): Not sensitive Smothering and siltation rate changes (light): Not sensitive
Brissopsis lyrifera and *Amphiura chiajei* in circalittoral mud (De-Bastos and Budd, 2016)	Abrasion: Medium Penetration: Medium Changes in suspended solids (water clarity): Not sensitive Smothering and siltation rate changes (light): Not sensitive
Levinsenia gracilis and *Heteromastus filifirmis* in offshore circalittoral mud and sandy mud (De-Bastos, 2016a)	Abrasion: Medium Penetration: Medium Changes in suspended solids (water clarity): Not sensitive Smothering and siltation rate changes (light): Not sensitive
Paramphinome jeffreysii, *Thyasira* spp. and *Amphiura filiformis* in offshore circalittoral sandy mud (De-Bastos, 2016c)	Abrasion: Medium Penetration: Medium Changes in suspended solids (water clarity): Not sensitive Smothering and siltation rate changes (light): Not sensitive
Myrtea spinifera and polychaetes in offshore circalittoral sandy mud (De-Bastos, 2016b)	Abrasion: Medium Penetration: Medium Changes in suspended solids (water clarity): Not sensitive Smothering and siltation rate changes (light): Not sensitive
Ampelisca spp., *Photis longicaudata* and other tube-building amphipods and polychaetes in infralittoral sandy mud (Tyler-Walters, De-Bastos and Watson, 2023)	Abrasion: Low Penetration: Medium Changes in suspended solids (water clarity): Low Smothering and siltation rate changes (light): Low