

Management Organisation

MMO Site Assessment: Beachy Head East MPA (DRAFT)

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Title: MMO Site Assessment: Beachy Head East MPA Contents

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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 high and moderate energy circalittoral rock, subtidal coarse sediment and subtidal sand in Beachy Head East 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 ongoing fishing activities by bottom towed gear occurring in the site on the designated features high and moderate energy circalittoral rock and subtidal sand pose a significant risk of hindering the achievement of the conservation objectives of Beachy Head East MPA. As such the Marine Management Organisation (MMO) concludes that management measures are required.

1 Introduction

This assessment considers whether fishing activities are compatible with the conservation objectives of Beachy Head East MPA. The assessment is confined to the portion of the MPA where fishing is regulated by the Marine Management Organisation (MMO), this being the area that lies beyond the 6 nautical mile (nm) limit.

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 effect.

2 Site information

2.1 Overview

The following Natural England conservation advice package 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 in this assessment:

- <u>Natural England Conservation Advice Beachy Head East MCZ¹</u>
- Defra Factsheet Beachy Head East Marine Conservation Zone²

Beachy Head East MPA is an inshore site located along the coast near Eastbourne in East Sussex, in the Eastern Channel region and covers an area of approximately 95 km² (**Figure 1**). The site straddles the 6 nm limit with approximately 193 km² (approximately 98.7 %) of the site falling within the 6 nm limit and the remaining 2.6 km² (approximately 1.3 %) falling outside the 6 nm limit. Fishing in Beachy Head East MPA is regulated by Sussex Inshore Fisheries and Conservation Authority (IFCA) (0 to 6 nm) and MMO (beyond 6 nm).

The sandstone and chalk reef system in Beachy Head East MPA provides a variety of habitats for a wide range of species. Between Beachy Head point and Holywell, there are chalk reefs which extend from the subtidal area up to the coast and white cliffs, forming sheltered rock pools at high tide. The subtidal sand feature within the site is considered an important nursery area for commercially important fish species such as, herring, plaice, and Dover sole. Plaice and Dover sole survive by camouflaging themselves in subtidal sand allowing them to avoid predators. Both subtidal sand and coarse sediment features also provide a habitat for invertebrate species on which adult fish prey.

High and moderate energy circalittoral rock features are present throughout the site and provide habitats for a wide variety of animals due to the varying conditions that can be found in these areas. These animals include, hydroids, sponges, star fish, sea squirts, anemones, and bryozoans. Photographic transects from surveys of the site have demonstrated the complexity of the area with the rocky reef habitats containing gullies, overhangs, and ridges.

 ¹ Natural England Conservation Advice Pakcage - Beachy Head East MCZ: <u>designatedsites.naturalengland.org.uk/Marine/MarineSiteDetail.aspx?SiteCode=UK</u> <u>MCZ0053</u> (last accessed 18 August 2024)
 ² Defra Fact Sheet - Beachy Head East MCZ:

<u>assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_d</u> <u>ata/file/914351/mcz-beachy-head-east-2019.pdf</u> (last accessed 18 August 2024)



Beachy Head East Marine Protected Area

Management Overview of site location and designated features



Datum: ETRS 1989 Projection: Lambert Azimuthal Equal Area MMO Reference: 10786 Not to be used for navigation. Contains Collins Bartholomew, DEFRA, MMO, Natural England, Ordnance Survey and UKHO data. © Collins Bartholomew, DEFRA, MMO, Natural England, Ordnance Survey and UKHO copyright and database right 2024. © ICES Statistical Rectangles dataset 2020. ICES, Copenhagen. Contains public sector information licensed under the Open Government Licence v3.0

Figure 1: Site overview and feature map.

Beachy Head East MPA was designated as a marine conservation zone (MCZ) in 2019. The designated features and their general management approaches are set out below in **Table 1**.

The general management approaches for the features of Beachy Head East MPA have been set based on a vulnerability assessment.

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i able	1: Des	signated	reatures	ana g	eneral	manag	jement a	approac	cnes.

Designated feature	General management approach		
High energy circalittoral rock*			
Moderate energy circalittoral rock*			
Subtidal chalk	Recover to favourable condition		
Peat and clay exposures			
Ross worm (Sabellaria spinulosa)			
Subtidal coarse sediment*			
Subtidal sand*			
Littoral chalk communities	Maintain in favourable condition		
Short snouted seahorse			
(Hippocampus hippocampus)			

An asterisk (*) in the table demonstrates which designated feature is found within the MMO portion of the site.

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. More information on this can be found in <u>Natural England's supplementary advice on conservation</u> <u>objective – Beachy Head East MCZ¹</u>.

2.2 Scope of this assessment

The scope of this assessment covers fishing activities alone, and relevant activities in combination with fishing. It does not cover fishing in areas of this site inshore of 6 nm, for which Sussex Inshore Fisheries and Conservation Authority (IFCA) is the regulator. Hereafter, all references to the site or MPA refer only to the portion offshore of 6 nm unless otherwise indicated.

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 2009³.

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

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.

³ For more information see: <u>www.legislation.gov.uk/ukpga/2009/23/section/126</u> (Last accessed: 25 July 2024).

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

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

For more information about the above evidence sources, please see the <u>Stage 3</u> <u>MPA Site Assessment Methodology</u> document⁴, 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 andlandings data for Beachy Head East MPA, 2016 to 2021.

Gear type	Gear name	Gear code	Justification		
	Gill nets (not specified)	GN			
Anchored	Gillnets and entangling	GEN	Present in under 12 metre (r		
nets and	nets	GLIN	landings data for ICES		
lines	Set gillnet (anchored)	GNS	statistical rectangles that		
	Trammel net	GTR	overlap the site.		
	Towed dredge	DRB			
Bottom	Beam trawl	ТВВ	Present in VMS records and under 12 m landings data for ICES statistical rectangles		
towed	Bottom otter trawl	ОТВ	that overlap the site.		
gear	Twin bottom otter trawl		-		
	Scottish / fly seine	SSC	-		
	Otter trawls (unspecified)	OT			
	Twin bottom otter trawl	OTT	Present in under 12 m		
	Drift gillnet	GND	andings data for ICES		
Midwater	Hand-operated pole-and- line	LHP	overlap the site.		
gear	Hook and line (unspecified)	LX			
	Midwater otter trawl	ОТМ			
Traps	Pot/Creel	FPO	Present in VMS records and under 12 m landings data for ICES statistical rectangles that overlap the site.		

⁴ Stage 3 MPA Site Assessment Methodology document:

www.gov.uk/government/publications/stage-3-site-assessments (Last accessed: 25 July 2024)

Gear type	Gear name	Gear code	Justification
	Trap	FIX	Present in under 12 m landings data for ICES statistical rectangles that overlap the site.

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 Beachy Head East MPA.

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

- **Midwater gears:** although the use of midwater gears does occur within Beachy Head East MPA, there is no feasible pathway for gears of this type to interact with benthic designated features under normal operation. 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 Beachy Head East MPA is not considered to be capable of affecting the designated features other than insignificantly and is not considered further within this assessment.
- **Shore based activities:** as the MMO portion of the site lies beyond the 6 nm limit, it is not possible that shore-based activities would be capable of affecting the designated features due to distance; shore-based activities are therefore not considered further within this assessment.

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

• Littoral chalk communities, Ross worm (*Sabellaria spinulosa*), short snouted seahorse (*Hippocampus hippocampus*), peat and clay exposures and subtidal chalk features: these features are only present inshore of the 6 nm limit, so will not be considered 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 Lines⁵
- Stage 3 Fishing Gear MPA Impacts Evidence Bottom Towed Gear⁶; and
- Stage 3 Fishing Gear MPA Impacts Evidence Traps⁷.

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 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 out in **sections 3.1** and **3.2**.

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

⁷ Stage 3 Fishing Gear MPA Impacts Evidence Traps:

⁵ Stage 3 Fishing Gear MPA Impacts Evidence Anchored Nets and Lines <u>www.gov.uk/government/publications/stage-3-impacts-evidence</u> (last accessed: 01 August 2024).

⁶ Stage 3 Fishing Gear MPA Impacts Evidence Bottom Towed Gear: <u>www.gov.uk/government/publications/stage-3-impacts-evidence</u> (last accessed: 01 August 2024).

www.gov.uk/government/publications/stage-3-impacts-evidence (last accessed: 01 August 2024).

 Table 3: Sensitivity to potential pressures from fishing activities on designated features of Beachy Head East MPA.

	Designated features											
Potential pressures		High energy circalittoral rock			Moderate energy circalittoral rock			Subtidal coarse sediment		Subtidal sand		1
	Α	В	Т	Α	В	Т	Α	В	Т	Α	В	Т
Abrasion or disturbance of the substrate on the surface of												
the seabed												
Changes in suspended solids (water clarity)												
Barrier to species movement												
Deoxygenation												
Hydrocarbon and polycyclic aromatic hydrocarbon contamination												
Introduction of light												
Introduction of microbial pathogens												
Introduction or spread of invasive non-indigenous species												
Nutrient enrichment												
Organic enrichment												
Penetration and/or disturbance of the substrate below the												
surface of the seabed, including abrasion												
Physical change (to another sediment type)												
Removal of non-target species												
Removal of target species												
Smothering and siltation rate changes (light)												
Synthetic compound contamination												
Transition elements and organo-metal contamination												

4 Part B - Fishing activity assessment

Part B of this assessment was carried out in a manner that is consistent with the 'significant risk of hindering the achievement of the conservation objectives' test required by section 126 of the Marine and Coastal Access Act 2009³.

Table 3 shows the fishing activities and pressures identified in Part A which havebeen included for assessment in Part B. The most relevant attributes of thedesignated features that could be compromised by fishing pressures were identifiedusing the Beachy Head East MPA conservation advice package and are shown in**Table 4** and **Table 5**.

Table 4: Relevant favourable condition targets for identified pressures on rocky reef (high and moderate energy circalittoral rock feature).

Feature	Attribute	Target	Relevant pressures
High and moderate energy circalittoral rock	Structure and function: presence and abundance of key structural and influential species	[Maintain OR Recover OR Restore]	 Relevant to: Abrasion or disturbance of the substrate
	Distribution: presence and spatial distribution of biological communities		on the surface of the seabed;
	Extent and distribution Structure: physical structure of	Recover	 Removal of non-target species:
	rocky substrate Structure: species composition of component communities		 Removal of target species.

Table 5. Relevant favourable condition targets for identified pressures onsediment features (subtidal coarse sediment and subtidal sand).

Feature	Attribute	Target	Relevant pressures
	Distribution: presence and spatial distribution of biological communities Extent and distribution Structure: sediment	Maintain	 Relevant to: Abrasion or disturbance of the substrate on the surface of the seabed
Subtidal coarse sediment	composition and distribution Structure: species composition of component communities Structure: species composition of component communities	Maintain	 Relevant to: Abrasion or disturbance of the substrate on the surface of the seabed Changes in suspended solids (water clarity) (subtidal sand only) Penetration and/or
sand	Structure and function: presence and abundance of key structural and influential species Structure and function: presence and abundance of key structural and influential species	[Maintain OR Recover OR Restore]	 disturbance of the substrate below the surface of the seabed, including abrasion Removal of non-target species Removal of target species (subtidal sand only)

4.1 Fisheries access and existing management

The MMO portion of Beachy Head East MPA lies entirely within the 6 to 12 nm zone, the only non-UK vessels that can operate within the site are those from Belgium and France, if licensed by the UK to do so. VMS records indicate that the site is used by UK, French and Belgian vessels.

More information on non-UK vessel access to UK waters can be found on MMO's <u>Single Issuing Authority</u> page⁸.

The Kingfisher fishing restriction map (Seafish, 2023) contains information on MPA management measures for the portion of the site inside of 6 nm.

MMO will continue to engage directly with IFCAs regarding recommended management measures nearby/adjacent to their areas of jurisdiction.

4.2 Fishing activity summary

Table A1.1 to **Table A1. 8** in Annex 1 display a detailed breakdown of fishing activity within Beachy Head East MPA. VMS record counts, landings data and fishing effort days data were available from 2016 to 2021, and Swept Area Ratio (SAR) values was available from 2016 to 2020.

Of the fishing activities not screened out in Part A of this assessment, VMS data show that trawls and traps are the only fishing gears used by vessels over 12 m in the MMO portion of the site. Whilst the prevalence of these gear types is minimal, with an annual average of 14 records per year for pots and a total of two records for trawls, the site assessment covers an area of only 2.6 km². Landings data show that a total of 9.93 tonnes (t) was landed by UK vessels over 12 m using pots, with an average of 1.66 t per year, between 2016 and 2021. For EU vessels, VMS data show that trawls were the only fishing gear deployed, with landings only recorded in 2018 and 2019, at 0.33 t and 0.21 t respectively.

Under 12 m UK vessels using bottom towed gear landed 0.49 t on average per year. Under 12 m UK vessels using pots landed an average of 1.75 t per year. Under 12 m UK vessels using anchored nets and lines landed an average of 0.39 t per year. 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 for the MMO portion of the Beachy Head East MPA, this is 0.1 %.

For the EU under 12 m fleet operating within the site, vessels using bottom towed gears landed an average annual of 0.1 t; vessels using pots landed an annual

⁸ The UK Single Issuing Authority: <u>gov.uk/guidance/united-kingdom-single-issuing-</u> <u>authority-uksia</u> (Last accessed on: 26 July 2023).

average of 0.004 t; and vessels using anchored nets and lines landed an average annual of 0.07 t.

Mean surface SAR values for bottom towed gear activity for C-squares intersecting Beachy Head East MPA increased from 0.37 in 2017 to 0.78 in 2018 and then decreased to 0.53 in 2019. Mean subsurface SAR values stayed stable between 2016 and 2020 with 0.21 as the lowest value in 2017, and 0.44 as the highest mean value in 2020. An SAR value of 1 means that each area C-square experiences a pass of fishing gear on average once a year.

Average fishing effort recorded by UK vessels under 12 m in length for the area of Beachy Head MPA that intersects ICES rectangle 30F0 was 4.99 days for static gear, and 1.25 days for bottom towed gear. There was a total of 7.52 days of fishing effort recorded by UK vessels under 12 m in length using bottom towed gear, and 29.92 days for static gear in Beachy Head East MPA. Beachy Head East MPA is entirely within ICES rectangle 30F0 and takes up 0.1 % of the rectangle. Fishing effort days are derived from logbooks and collected at ICES rectangle level and then apportioned accordingly.

4.3 Pressures by gear type

The Stage 3 Fishing Gear MPA Impacts Evidence documents for anchored nets and lines⁵, bottom towed gear⁶ and traps⁷ 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 sand; and moderate and high energy circalittoral rock 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. 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 Beachy Head East 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. We acknowledge that these pressures may require consideration as a result of any future evidence review, in conjunction with updated conservation advice from Natural England.

4.3.1 Anchored nets and lines

The designated features of Beachy Head East MPA have been considered in relation to pressures from anchored nets and lines.

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

Section 4.2 describes fishing activity within Beachy Head East MPA and notes that, according to VMS records and landings data, the use of anchored nets and lines is low.

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.

High and moderate energy circalittoral rock

As per section 7.3 of the anchored nets and lines Impacts Evidence document⁵, abrasion impacts from this gear type may cause sediment veneer disturbance and damage to epifaunal/epifloral communities, physical damage to the rock itself is unlikely. Some studies indicate that slow growing branching species and rock with erect branching species are considered particularly sensitive to damage from netting, whilst rock with low-lying fast growing faunal turf has been determined as having moderate sensitivity to moderate levels of netting. Repeated netting activity could damage reefs and the associated communities through cumulative damage. As the fishing activity data for the under 12 m fleet does not indicate where it occurs within the site, the use of anchored nets and lines may be occurring over the high and moderate energy circalittoral rock.

Of the 14 biotopes that could be found within the high energy circalittoral rock feature for the Eastern Channel region (**Table 6**), five biotopes have medium sensitivity to abrasion from anchored nets and lines and nine biotopes have low sensitivity. The low sensitivity biotopes all have high resilience to abrasion from anchored nets and lines.

Of the 13 biotopes that could be found within the moderate energy circalittoral rock feature for the Eastern Channel region (**Table 6**), nine have medium sensitivity to abrasion from anchored nets and lines.

Two medium sensitivity biotopes containing *S. spinulosa* could be present in the site, however research suggests that netting on *S. spinulosa* should have a low impact due to the small footprint of the gear. The medium sensitivity biotope containing *Mytilus edulis* beds is unlikely to be present in the MMO portion of the site as they have only been recorded inshore of 6 nm. The circalittoral faunal communities biotope and the cushion sponges and hydroid biotopes are unlikely to be present in the site as they are found in variable salinity environments which are usually further inshore or in saline lagoons (Readman, Lloyd and Watson, 2023b, 2023c).

Table 6. High and moderate energy circalittoral rock and subtidal sand biotopes that could be found within the Southern North Sea and Eastern Channel regions which are sensitive to abrasion from static gear. None of the subtidal coarse sediment biotopes are sensitive to abrasion from static gear.

Feature	Biotope	Sensitivity to abrasion
	Bryozoan turf and erect sponges on tide-swept circalittoral rock (Readman, Lloyd and Watson, 2023a)	Medium
	Mixed turf of hydroids and large ascidians with <i>Swiftia pallida</i> and <i>Caryophyllia smithii</i> on weakly tide-swept circalittoral rock (Readman, 2016e)	Medium
High energy circalittoral	Sparse sponges, <i>Nemertesia</i> spp., and <i>Alcyonidium diaphanum</i> on circalittoral mixed substrata (Readman, Lloyd and Watson, 2023d)	Medium
rock	<i>Suberites spp.</i> with a mixed turf of crisiids and <i>Bugula</i> spp. on heavily silted moderately wave- exposed shallow circalittoral rock (Readman, Lloyd and Watson, 2023f)	Medium
	Sponges and anemones on vertical circalittoral bedrock (Readman, Lloyd and Watson, 2023e)	Medium
	<i>Sabellaria</i> reefs on circalittoral rock (Tillin, Gibb, <i>et al.</i> , 2023)	Medium
	<i>Sabellaria spinulosa</i> encrusted circalittoral rock (Tillin, Marshall, <i>et al.</i> , 2023)	Medium
Moderate	Piddocks with a sparse associated fauna in sublittoral very soft chalk or clay (Tillin and Hill, 2016)	Medium
circalittoral	<i>Polydora</i> sp. tubes on moderately exposed sublittoral soft rock (De-Bastos <i>et al.</i> , 2023b)	Medium
IUCK	<i>Hiatella-</i> bored vertical sublittoral limestone rock (Tillin, 2016)	Medium
	<i>Mytilus edulis</i> beds with hydroids and ascidians on tide- swept exposed to moderately wave-exposed circalittoral rock (Tyler-Walters, Mainwaring and Williams, 2022)	Medium

	Cushion sponges and hydroids on turbid tide-swept sheltered circalittoral rock (Readman, Lloyd and Watson, 2023b)	Medium
	<i>Urticina felina</i> and sand-tolerant fauna on sand-scoured or covered circalittoral rock (Tillin and Hiscock, 2016)	Medium
Subtidal sand	<i>Echinocardium cordatum</i> and <i>Ensis</i> spp. in lower shore and shallow sublittoral slightly muddy fine sand (De- Bastos <i>et al.</i> , 2023a)	Medium

The biotopes 'piddocks with a sparse associated fauna in sublittoral very soft chalk or clay', '*Polydora* sp. tubes on moderately exposed sublittoral soft rock' and '*Urticina felina* and sand-tolerant fauna on sand-scoured or covered circalittoral rock' (Tillin and Hill, 2016; Tillin and Hiscock, 2016; De-Bastos *et al.*, 2023b) could be found within the site and are categorised with medium sensitivity because they include species that protrude from the surface and that could be removed by abrasion (such as sponges, bryozoans, ascidians, hydroids and anemones). However, this sensitivity to removal via abrasion was predominantly linked to studies using bottom towed gears rather than anchored nets and lines. Furthermore, many of the species listed in the biotopes reach sexual maturity quickly, can reproduce asexually to aid recovery of damaged populations, and can undertake resting stages that are very resistant of environmental perturbation.

With regards to the discussion above, the assessed activity levels and the evidence available for the impact of anchored nets and lines, together with the low scale of footprint for impacts from anchored nets and lines, the risk of abrasion damage is considered unlikely to occur above the pressure benchmark for the high and moderate energy circalittoral rock feature. **MMO concludes that impacts of abrasion or disturbance from ongoing use of anchored nets and lines does not pose a significant risk of hindering the achievement of the conservation objective of the MPA for high and moderate energy circalittoral rock features.**

Subtidal coarse sediment and subtidal sand

As per section 9.3 of the anchored nets and lines Impacts Evidence document⁵, abrasion impacts from this gear type are unlikely to negatively impact the extent or distribution of any sediment feature or structure and function of the ecosystem in a significant manner, as subtidal sediment habitats are considered resilient to all but intense fishing activity using anchored nets and lines due to the static nature of the gear type and small spatial footprint on species rich sediment habitats or those with long-lived bivalves.

Of the three biotopes which may be present within the subtidal coarse sediment in Beachy Head East MPA, one biotope '*Pomatoceros triqueter* with barnacles and bryozoan crusts on unstable circalittoral cobbles and pebbles' has low sensitivity to

abrasion from anchored nets and lines (Tyler-Walters, Tillin and Watson, 2024) and two are not sensitive (McQuillan, Tillin and Watson, 2023; Tillin, 2023). Of the four biotopes that can be found in the subtidal sand, the biotope '*Echinocardium cordatum* and *Ensis* spp.' in lower shore and shallow sublittoral slightly muddy fine sand' has medium sensitivity (De-Bastos *et al.*, 2023a), this biotope has a depth range of lower shore to 30m so is likely to be at the edge of its depth range within the MMO portion of the site. For the further three biotopes, two have low sensitivity (Readman and Garrard, 2019; Tillin, Tyler-Walters and Garrard, 2019) and one is not sensitive (Tyler-Walters and Garrard, 2019) (**Table 6**).

Given the relatively low intensity of anchored nets and lines activity within the site, together with the low scale of footprint for impacts from anchored nets and lines; the risk of abrasion damage is considered unlikely to occur above the pressure benchmark for the subtidal coarse sediment and subtidal sand features.

With regards to the discussion above, the assessed activity levels and the evidence available for the impact of anchored nets and lines, **MMO concludes that impacts** of abrasion or disturbance from ongoing use of anchored nets and lines does not pose a significant risk of hindering the achievement of the conservation objective of the MPA for moderate energy circalittoral rock, subtidal coarse sediment, or subtidal sand.

Overall, MMO concludes that the ongoing use of anchored nets and lines does not pose a significant risk of hindering the achievement of the conservation objectives of the MPA for the features moderate energy circalittoral rock, subtidal coarse sediment, and subtidal sand.

4.3.2 Bottom towed gear

High and moderate energy circalittoral rock

The following features of Beachy Head East MPA have been considered in relation to pressures from bottom towed gear.

- 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^{*;}
- Removal of non-target species;

Pressures marked with matching superscript symbols (*) have been consolidated due to the similar nature of their impacts on the sediment features.

Section 4.2 describes fishing activity within Beachy Head East MPA and notes that there was a total of two VMS records for bottom towed gear between 2016 and 2020. Landings and fishing effort data suggest additional activity derived from the under 12 m UK fleet. However, fishing effort data and under 12 m landings are collected at ICES rectangle level and then apportioned as if they are distributed equally across the rectangle, which means that there is lower confidence as to the

actual levels of activity taking place within the site, furthermore the MMO portion of Beachy Head East MPA accounts for 0.1% of ICES rectangle 30F0.

Most studies assessing bottom towed fishing impacts focus on soft sedimentary habitats (Roberts *et al.*, 2010), with few empirical studies quantifying the impact of fisheries to hard bottom habitats (Defra, 2014). Empirical studies of bottom towed gear on rocky reefs are generally restricted to non-UK habitats and assessing the impacts of experimental trawling (Defra, 2014).

Bottom towed gear can abrade the substrate of rocky reefs, leading to damage and removal of the attached and associated epifauna. Fishing gear components (for example, bridles and sweeps) can snag on rocks, causing abrasion damage and leading to rocks and boulders being rolled, moved, and displaced (Freese *et al.*, 1999; Hall-Spencer, Allain and Fossa, 2002; Grieve, Brady and Polet, 2014). Bottom towed gear can also modify and homogenise the substrate, as soft rocks are broken up (Attrill *et al.*, 2011). Although harder substrate is relatively resistant to physical damage, bottom towed fishing gears can still damage the substrate and its associated communities (Roberts *et al.*, 2010).

Bedrock, boulder, and cobble reef have variable levels of accessibility to bottom towed fishing and thus variable levels of vulnerability to physical damage. Steep rock, uneven ground and boulder reef are generally unsuitable for bottom trawls and dredges due to the risk of gear damage (Howarth and Stewart, 2014). However, rocky reefs can still be damaged if they are located amongst or adjacent to commercially viable fishing grounds (Boulcott and Howell, 2011) or they are fished by towed gears that are designed for rocky habitats, such as rock-hopper trawls (Hartnoll, 1998; Roberts *et al.*, 2010).

Towed gears may indirectly impact rocky reef communities through increased sediment load and suspended material can affect the efficiency of filter feeding species that are frequently found on sublittoral rock habitats (Hartnoll, 1998). Depending on the extent of siltation, moderate and high energy circalittoral rock can have medium-to-high sensitivity to this pressure (Tillin, Bolam and Hiddink, 2010) with increased sediment loading particularly posing a risk to rocky habitats found adjacent to soft sediments subjected to demersal towed fishing (Hartnoll, 1998). However, direct physical impacts are generally considered the highest concern for the impacts of bottom towed fishing on rocky reef habitats (Hall *et al.*, 2008).

Although harder rock substrates are less vulnerable to physical damage, bottom towed gear can substantially impact the fauna and flora associated with sublittoral rock habitats. Towing trawls across rocky substrates can cause damage or death to substantial proportions of large, upright attached species, such as sponges and corals (Løkkeborg, 2005). For example, in the Gulf of Alaska during bottom trawling on pebble, cobble and boulder habitats, 67 % of sponges were damaged during a single trawl pass (Freese *et al.*, 1999). Other species (such as hydroids, anemones, bryozoans, tunicates, and echinoderms) are also vulnerable to damage (Freese *et al.*)

al., 1999; McConnaughey, Mier and Dew, 2000; Sewell and Hiscock, 2005). Alongside, the removal of erect epifaunal and large sessile species (Sewell and Hiscock, 2005), trawling can lead to habitat homogenisation and reduced biodiversity and habitat complexity (Engel and Kvitek, 1998; Freese *et al.*, 1999; Sewell and Hiscock, 2005; Attrill *et al.*, 2011; Goodwin and Picton, 2011). As shown by Boulcott and Howell (2011), not all epifauna on rocky reefs may be damaged during trawls due to inconsistent contact between the gear and the seabed on uneven ground. However, due to the gear bouncing off the substrate, bottom towed gear can cause incremental damage to benthic communities in rocky habitats, which contrasts to loose sediment habitats where the majority of damage occurs on the first pass (Boulcott and Howell, 2011).

The impacts of bottom towed fishing on rock habitats will depend on several factors, such as gear type, gear design and fishing intensity (Van Dolah, Wendt and Nicholson, 1987; Engel and Kvitek, 1998). Impacts are also likely to be variable due to the wide variety of structures and communities present (Connor *et al.*, 2022). For example, communities with higher proportions of larger, long-lived, fragile, and sessile epifauna may be the most vulnerable (Roberts *et al.*, 2010; Hiddink *et al.*, 2017).

The sensitivity of sublittoral rock habitats is likely to be highly variable due to the wide variety of communities that can be present (Roberts *et al.*, 2010). For example, rocks with erect branching species may have high sensitivity to all bottom towed gear types (even at low levels of fishing intensity), whereas rocks with low-lying and fast-growing fauna may have low sensitivity, albeit to a single gear pass (Hall *et al.*, 2008; Eno *et al.*, 2013).

A non-quantitative sensitivity assessment developed by Tillin et al. (2010) assessed the sensitivity of MPA features to various pressures. This sensitivity matrix classified moderate and high energy circalittoral rock as having medium or medium to high sensitivity to penetration and abrasion pressures, except for moderate energy circalittoral rock, which had low-to-high sensitivity to surface abrasion.

Recovery rates for the habitats associated with sublittoral rock will similarly depend on the species present. Recovery rates may vary with life history characteristics, larval longevity, dispersal potential, recruitment, and growth rates (Roberts *et al.*, 2010; Kaiser *et al.*, 2018). Some subtidal rock organisms may have strong regenerative abilities, whereas some sessile species rely on spawning events to recolonise, which can prevent reestablishment if fishing occurs frequently in between spawning events (Roberts *et al.*, 2010). The longevity of species will also be critical to recovery rates, with short-lived fauna (for example, with lifespans of one to three years) potentially recovering from trawling in 0.5 to three years, whereas long lived fauna (for example, with lifespans over ten years) may take several years (less than eight years) to recover (Hiddink *et al.*, 2019). Field evidence from the UK provides an indication that rocky reef habitats can recover from the impacts of bottom towed fishing when this pressure is removed. In 2008, the use of bottom towed fishing gear was prohibited in Lyme Bay for the purpose of maintaining and recovering the benthos in this circalittoral rock, boulder, and cobble reef habitat (Attrill *et al.*, 2012). Three years after the closure, species abundance, diversity and richness improved (Attrill *et al.*, 2012) with changes indicating recovery of some epibenthic fauna (Sheehan *et al.*, 2013). However, not all sites in the MPA exhibited recovery trends Attrill *et al.*, 2012), potentially due to variation in life-history characteristics (Kaiser *et al.*, 2018), with long-lived species such as pink sea-fan (*Eunicella verrucosa*) and Ross corals (*Pentapora foliacea*), potentially taking 17 to 20 years to recover, whereas shorter-lived species (such as scallops and dead man's fingers, *Alcyonium digitatum*) taking 2.5 to six years to recover.

Although several factors can affect habitat recovery (for example, environmental changes and other anthropogenic disturbances), the prohibition of bottom towed fishing in Lyme Bay and the subsequent positive change for most species over the following ten years indicates that such fishing activities are incompatible with circalittoral rocky reef habitats and other areas of substantial hard substrate that have an affinity for species with poor recoverability (Kaiser *et al.*, 2018). Consequently, it is recommended that bottom towed fishing should be entirely avoided in these habitats within MPAs (Kaiser *et al.*, 2018).

Therefore, MMO concludes that the ongoing use of bottom towed gear poses a significant risk of hindering the achievement of the conservation objective for high and moderate energy circalittoral rock in Beachy Head East MPA.

Subtidal coarse sediment and subtidal sand

The following features of Beachy Head East MPA have been considered in relation to pressures from bottom towed gear.

- Abrasion or disturbance of the substrate on the surface of the seabed*;
- Changes in suspended solids (water clarity) (subtidal sand only);
- Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion^{*};
- Removal of non-target species;
- Removal of target species (subtidal sand only).

Pressures marked with matching superscript symbols (*) have been consolidated due to the similar nature of their impacts on the sediment features.

Section 4.2 describes fishing activity within Beachy Head East MPA and notes that there was a total of two VMS records for bottom towed gear between 2016 and 2020. Landings and fishing effort data suggest additional activity derived from the under 12 m UK fleet. However, fishing effort data and under 12 m landings are collected at ICES rectangle level and then apportioned as if they are distributed

equally across the rectangle, which means that there is lower confidence as to the actual levels of activity taking place within the site. As per section 8.4 of the bottom towed gear Impacts Evidence document⁶, the abrasion and penetration pressures from this gear type can have both biological and physical impacts. The 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 to the biological structure of sediment habitats. Biological impacts include damage and mortality to flora and fauna on the seabed via surface and subsurface abrasion and penetration, as well as long term shifts in biological communities towards smaller, short-lived, opportunistic species that exhibit greater resilience to anthropogenic activity.

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. 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). Where sessile or attached epifauna are present, demersal seines have the potential to disturb or damage epifauna when the ropes of a seine net are closed to herd demersal fish. Such erect fauna play an important role in biological communities with recruitment and reproductive success of species such as scallops heavily influenced by availability of suitable settlement habitat (Brand, 2006; Beukers-Stewart and Beukers-Stewart, 2009).

Of the three biotopes which could be found within the subtidal coarse sediment in Beachy Head East MPA, one biotope '*Pomatoceros triqueter* with barnacles and bryozoan crusts on unstable circalittoral cobbles and pebbles' (Tyler-Walters, Tillin and Watson, 2024) has low sensitivity to abrasion and penetration from demersal seines, demersal trawls, and dredges and the two remaining biotopes are not sensitive to abrasion and penetration from bottom towed gear. Abrasion impacts from bottom towed gear are likely to be less significant due to the bottom towed gear activity levels within the MMO portion of the site, furthermore the biotopes found within the subtidal coarse sediment feature have high resistance and resilience in relation to abrasion and penetration impact on the surface of the seabed from bottom towed gears.

Of the four biotopes which could be found within subtidal sand, one biotope has *Echinocardium cordatum* and *Ensis* spp. in lower shore and shallow sublittoral slightly muddy fine sand' has medium sensitivity to abrasion and penetration from demersal seines, demersal trawls and dredges. This biotope has a depth range of lower shore to 30 m so is likely to be at the edge of its depth range within the MMO portion of the site. The key species in the biotope –*Ensis ensis* and *Echinocardium cordatum*, are long lived and take several years to reach maturity (De-Bastos *et al.*, 2023a) which indicates the resistance of this biotope is low, therefore when a significant proportion of the population is lost, the biotope may take longer to return to original species diversity and abundance (De-Bastos *et al.*, 2023a).The remaining three biotopes have low sensitivity to abrasion and penetration from bottom towed gear (Readman and Garrard, 2019; Tillin, Tyler-Walters and Garrard, 2019; Tyler-Walters and Garrard, 2019), and therefore will not be discussed further.

The pressure 'changes in suspended solids (water clarity)' is only relevant for the subtidal sand feature. Suspended solid changes occur when bottom towed gear connect with the seabed, causing the top layer of the sediment to mix with the surrounding water. This can affect the ability of some organisms to feed or breathe. The subsequent settling rate of different sediment types, and entrainment in prevailing currents, can result in a change in the structure and function of the feature in finer scale topography, sediment quality and sediment composition. The degree of impact will vary according to the amount of fishing activity, the gear used and the sediment type. For example, trawling can influence the sorting of sediments in trawled areas. Where the sediments lie close to rocky reefs, settling sand particles can have an adverse impact on sessile epifaunal communities associated with these reefs, this is relevant within this site where subtidal sand and circalittoral rock forms a mosaic habitat (Dale et al., 2011). Sediments and faunal communities react differently to these pressures depending on grain size, the degree of sediment impaction and frequency or severity of the pressure upon them. Of the four biotopes which could be found within the subtidal sand, one has low sensitivity to this pressure 'Infralittoral mobile clean sand with sparse fauna' (Tillin, Tyler-Walters and Garrard, 2019), and the remaining three are not sensitive to this pressure from bottom towed gear (Readman and Garrard, 2019; Tyler-Walters and Garrard, 2019; De-Bastos et al., 2023a).

As noted in section 4.2 it is difficult to confirm the exact levels of under 12 m fishing activity due to the apportionment of under 12 m activity to ICES rectangle 30F0 of which the MMO portion of the MPA accounts for 0.1 % of the ICES rectangle. However, as there is a medium sensitivity biotope present within the subtidal sand feature, the levels of activity described may cause substantial damage as the first pass of a trawl has the largest and most damaging initial impact on biomass and production of sediments, causing high levels of mortality. Subsequent passes have additional effects and repeated passes allow little time for species to recover. This contributes to a shift in the biological community, removing the most sensitive species while allowing resilient organisms to remain, suggesting that infrequent trawling may be sufficient to maintain a community in an altered state. This could be illustrated in the biotopes which are present in the site having low sensitivity to abrasion and penetration from bottom towed gears. This may also be the result of bottom towed fishing activity causing a shifted baseline for biological community structures towards more resilient, endemic fauna.

The medium sensitivity biotope found within the subtidal sand feature *Echinocardium cordatum* and *Ensis* spp. in lower shore and shallow sublittoral slightly muddy fine sand' is known to have medium resilience, however when a significant proportion of the population is lost, although the individual key species may recolonize the area within five years, the biotope may take longer to return to original species diversity and abundance and resilience is likely to then be low.

When assessing the risk of bottom towed gears hindering the conservation objectives for subtidal sand, it was the sensitivity of the relevant biotopes to penetration and/or disturbance of the substrate below the surface of the seabed that was the most crucial consideration. In contrast to the subtidal sand biotopes, all the subtidal coarse sediment biotopes that may be present within the MMO portion of the site have low sensitivity to penetration, and disturbance due to the high resilience of the associated biological communities which are either capable of rapid recovery following the pass of bottom towed gear, adapted to disturbance, or robust enough to tolerate associated pressures (Tyler-Walters, Tillin and Watson, 2024). In terms of the location of the sediment features, there is a large area of subtidal coarse sediment in the southeast corner of the site which does not form a mosaic habitat with subtidal sand, whereas the subtidal sand feature forms a mosaic habitat with the high energy circalittoral rock within this site.

With regards to the discussion above which discusses the medium sensitivity biotope present, the assessed activity levels and the evidence available for the impact of bottom towed gears, **MMO concludes that the impacts of abrasion or disturbance and penetration from ongoing use of bottom towed gear on the subtidal sand of Beachy Head East MPA may result in a significant risk of hindering the achievement of the conservation objectives of the MPA.**

With regards to the discussion above discussing the presence of the low sensitivity biotopes within subtidal coarse sediment, coupled with the biotopes high resilience and resistance to abrasion pressures in addition to the low activity levels of bottom towed gear within the site, **MMO concludes that the impacts of abrasion or disturbance and penetration from ongoing use of bottom towed gear at the activity levels described on the subtidal coarse sediment of Beachy Head East MPA does not pose a significant risk of hindering the achievement of the conservation objectives of the MPA.**

Overall, MMO concludes that the impacts of abrasion or disturbance and penetration from ongoing use of bottom towed gear on high and moderate energy circalittoral reef, and subtidal sand features of Beachy Head East MPA may result in a significant risk of hindering the achievement of the conservation objectives of the MPA. For subtidal coarse sediment, MMO concludes that the impacts of abrasion or disturbance and penetration from ongoing use of bottom towed gear does not pose a significant risk of hindering the achievement of the conservation objectives of the Beachy Head East MPA.

4.3.3 Traps

The following features of Beachy Head East MPA have been considered in relation to pressures from traps.

Moderate and high energy circalittoral rock, subtidal coarse sediment and subtidal sand

- Abrasion or disturbance of the substrate on the surface of the seabed;
- Removal of non-target species; and
- Removal of target species.

Section 4.2 describes fishing activity within Beachy Head East MPA and notes that VMS records show between 2016 and 2021 there was an average of 1.65 t landed per year by over 12 m vessels using traps. Landings data for under 12 m vessels show that the use of traps is occurring in the site with vessels under 12 m landing approximately 1.75 t per year on average between 2016 and 2021.

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.

High and moderate energy circalittoral rock

As per section 7.3 of the traps Impacts Evidence document⁷, abrasion impacts from this gear type are unlikely to impact the rocky substrate itself but may impact associated taxa. Most of the literature before 2015 has suggested that traps are unlikely to significantly impact rocky reef biotopes. However, more recent studies suggest that traps may have negative impacts on the biological functions of reef habitats at increased spatial and temporal intensities (Rees, 2018; Gall *et al.*, 2020; Rees, Sheehan and Attrill, 2021). Studies show that upright and branching species that protrude from the reef (such as sponges or bryozoans) were found to be particularly vulnerable to damage from the hauling of pots. Whilst it is not always possible to correlate fishing activity data into pot numbers, the levels of activity in the across the site, considering the small site of the MMO portion of the site, may result in a high concentration of activity.

Of the 14 biotopes that could be found within the high energy circalittoral rock feature for the Eastern Channel region (**Table 6**), five have medium sensitivity to abrasion from traps (Readman, 2016e; Readman, Lloyd and Watson, 2023a, 2023d, 2023f, 2023e) and nine have low sensitivity (Readman, 2016d, 2016c, 2016a, 2016b; Stamp, Lloyd and Watson, 2016; T. E. Stamp, 2016; Stamp and Tyler-Walters, 2018b, 2018a; Stamp and E. Williams, 2021). The low sensitivity biotopes all have high resilience to abrasion from traps. The five biotopes with medium sensitivity have low resistance and medium resilience to abrasion pressure from traps. The physical footprints of traps are much smaller than mobile gears such as trawls and dredges (Nielsen *et al.*, 2013), making it very unlikely that traps fished commercially would land, soak and be hauled, in exactly the same location on successive fishing trips (Eno *et al.*, 2001). Erect species typically found in the biotopes present such as *Flustra foliacea, Alcyonium digitatum* and *Nemertesia ramosa* are all expected to recover between six and 36 months from mechanical interference (based on crushing, physical blows, or rubbing and erosion of a single passage of a standard scallop dredge across the organism (Jackson, 2004; Tyler-Walters and Ballerstedt, 2007; Budd, 2008). It is likely, therefore, that these species will not be severely damaged and are expected to recover between fishing events.

Of the 13 biotopes that could be found within the moderate energy circalittoral rock feature for the Eastern Channel region (**Table 6**), nine have medium sensitivity to abrasion from traps (Tillin, 2016; Tillin and Hill, 2016; Tillin and Hiscock, 2016; Tyler-Walters, Mainwaring and Williams, 2022; De-Bastos *et al.*, 2023b; Readman, Lloyd and Watson, 2023b, 2023c; Tillin, Gibb, *et al.*, 2023; Tillin, Marshall, *et al.*, 2023), and four biotopes have low sensitivity (Stamp and Tyler-Walters, 2016; T. E Stamp, 2016; Readman and Williams, 2021; Stamp and E Williams, 2021). The low sensitivity biotopes all have high resilience to abrasion from traps.

Two medium sensitivity biotopes containing *Sabellaria spinulosa* could be present in the site. Research suggests that the sensitivity of *S. spinulosa* to static gears is low to medium depending on fishing intensity and impact. The medium sensitivity biotope containing *Mytilus edulis* beds is unlikely to be present in MMO portion of the site as they have only been recorded inshore of 6 nm. The circalittoral faunal communities' biotope and the cushion sponges and hydroid biotopes are unlikely to be present in the site as they are found in variable salinity environments which are usually further inshore or in saline lagoons (Tillin, Gibb, *et al.*, 2023; Tillin, Marshall, *et al.*, 2023).

The biotopes 'piddocks with a sparse associated fauna in sublittoral very soft chalk or clay', '*Polydora* sp. tubes on moderately exposed sublittoral soft rock' and '*Urticina felina* and sand-tolerant fauna on sand-scoured or covered circalittoral rock'(Tillin and Hill, 2016; Tillin and Hiscock, 2016; De-Bastos *et al.*, 2023b) could be found within the site and are categorised with medium sensitivity because they include species that protrude from the surface and that could be removed by abrasion (such as sponges, bryozoans, ascidians, hydroids and anemones). However, it should be noted that this sensitivity to removal via abrasion was predominantly linked to studies using bottom towed gears rather than traps. Furthermore, many of the species listed in the biotopes reach sexual maturity quickly, can reproduce asexually to aid recovery of damaged populations, and can undertake resting stages that are very resistant of environmental perturbation.

With regards to the discussion above, the assessed activity levels and the evidence available for the impact of traps, together with the low scale of footprint for impacts from these gears, the risk of abrasion damage is considered unlikely to occur above the pressure benchmark for the high and moderate energy circalittoral rock feature. MMO concludes that impacts of abrasion or disturbance from ongoing use of traps does not pose a significant risk of hindering the achievement of the conservation objective of the MPA for high and moderate energy circalittoral rock features.

Subtidal coarse sediment and subtidal sand

As per section 9.4 of the Traps Impacts Evidence document⁷, 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.

Of the three biotopes which may be present within the subtidal coarse sediment in Beachy Head East MPA, one biotope '*Pomatoceros triqueter* with barnacles and bryozoan crusts on unstable circalittoral cobbles and pebbles' has low sensitivity to abrasion from traps (Tyler-Walters, Tillin and Watson, 2024) and two are not sensitive (McQuillan, Tillin and Watson, 2023; Tillin, 2023). Of the four biotopes that can be found in the subtidal sand, the biotope *Echinocardium cordatum* and *Ensis* spp. in lower shore and shallow sublittoral slightly muddy fine sand' has medium sensitivity (De-Bastos *et al.*, 2023a), two have low sensitivity (Readman and Garrard, 2019; Tillin, Tyler-Walters and Garrard, 2019) and one biotope is not sensitive (Tyler-Walters and Garrard, 2019).

With regards to the discussion above, the assessed activity levels and the evidence available for the impact of traps, together with the low scale of footprint for impacts from these gears, the risk of abrasion damage is considered unlikely to occur above the pressure benchmark for the subtidal coarse sediment and subtidal sand features. **MMO concludes that impacts of abrasion or disturbance from ongoing use of traps does not pose a significant risk of hindering the achievement of the conservation objective of the MPA for subtidal coarse sediment and subtidal sand features.**

Overall, MMO concludes that the ongoing use of traps does not pose a significant risk of hindering the achievement of the conservation objectives of the MPA for the features moderate energy circalittoral rock, subtidal coarse sediment, and subtidal sand.

4.4 Part B conclusion

The assessment of anchored nets and lines, bottom towed fishing gear and traps on high energy circalittoral rock, moderate energy circalittoral rock, and subtidal sand features of Beachy Head East MPA has concluded that:

- the ongoing use of anchored nets and lines and traps will not pose a significant risk of hindering the achievement of the conservation objectives of the MPA;
- the ongoing use of bottom towed gears on high energy circalittoral rock, moderate energy circalittoral rock, and subtidal sand may result in a significant risk of hindering the achievement of the conservation objectives of the MPA.

Management measures will therefore be implemented for bottom towed fishing for Beachy Head East MPA. **Section 6** contains further details of these measures.

5 Part C - In-combination assessment

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

- fishing interactions assessed in Part B but which were not considered, alone, to 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. Beachy Head East MPA straddles the 6 nm limit and therefore, only activities that are within 5 km of the portion of the site seawards of the 6 nm limit were considered. This assessment considers the in-combination impacts of marine licensable activities that are ongoing or upcoming, and 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.

In Part B, bottom towed gear was identified as requiring management over three of the four designated features (subtidal sand, high energy circalittoral rock and medium energy circalittoral rock) in the site to avoid posing a significant risk of hindering the achievement of the site conservation objectives. Bottom towed gear over subtidal coarse sediment, and traps, anchored nets and lines over subtidal sand, subtidal coarse sediment, high energy circalittoral rock and moderate energy circalittoral rock are the remaining fishing activities occurring within Beachy Head East 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 three active marine licences within the 5 km buffer. **Table 7** shows this activity and the relevant category 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 number¹⁰.

Marine licence case reference number	PAD Category	Description
L/2012/00284/5 Aggregate dredging Extraction (and disposal) of non- living resources		Cemex UK Marine Limited licensed marine aggregates dredging from area 460 over a period of 15 years. The works are just under 2 km from the boundary of the MPA and within the 5 km buffer of Beachy Head East
		MPA. No direct or indirect pressure pathway for impact and therefore, no in-combination effects possible.
L/2012/00285/5	Aggregate dredging Extraction (and disposal) of non- living resources	Hanson Aggregates Marine Limited licensed marine aggregates dredging from area 460 over a period of 15 years. The works are just under 2 km from the boundary of the MPA and within the 5 km buffer of Beachy Head East MPA.
		No direct or indirect pressure pathway for impact and therefore,

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

⁹ JNCC Marine Pressures-Activities Database (PAD) v1.5 2022: <u>https://hub.jncc.gov.uk/assets/97447f16-9f38-49ff-a3af-56d437fd1951</u> (last accessed: 31 July 2024)

¹⁰ Detail on the marine licence activities can be viewed on the public register of marine licence applications:

www.marinelicensing.marinemanagement.org.uk/mmofox5/fox/live/MMO_PUBLIC_R EGISTER (last accessed 31 July 2024)

Marine licence case reference number	PAD Category	Description				
		no in-combination effects possible.				
L/2012/00286/5	Aggregate dredging Extraction (and disposal) of non-	Tarmac Marine Dredging Limited licensed marine aggregates dredging from area 460 over a period of 15 years.				
	living resources	The works are just under 2 km from the boundary of the MPA and within the 5 km buffer of Beachy Head East MPA.				
		No direct or indirect pressure pathway for impact and therefore, no in-combination effects possible.				

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

Table 8 summarises the pressures exerted by fishing and non-fishing activities andidentifies those exerted by both (Y: pressure exerted). Activity-pressure interactionsare highlighted dark blue to illustrate an in-combination effect. Only fishing activitywith no proposed or current fisheries management in place are considered.

	Non-fishing activities		ies	
Potential pressures	Extraction (and disposal) of non-living resources	Anchored nets and lines	Traps	Bottom Towed Gear – subtidal coarse sediment
Abrasion or disturbance of the substrate on the surface of the seabed	γ	Υ	Υ	Y
Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion	Υ			Y
Removal of non-target species	Y	Y	Y	Y

	Non-fishing activities	Fishing activities				
Potential pressures	Extraction (and disposal) of non-living resources	Anchored nets and lines	Traps	Bottom Towed Gear – subtidal coarse sediment		
Removal of target species		Y	Y			
Smothering and siltation rate changes (light)	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, removal of target and non-target species

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

Subtidal coarse sediment

The combined impacts from bottom towed gear, 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 on the designated feature subtidal coarse sediment. **Section 4.2** describes fishing activity within Beachy Head East MPA and notes average annual landings from for both under 12 and over 12 m vessels for bottom towed gear, anchored nets and lines, and traps was 0.6 t, 0.46 t and 3.41 tonnes respectively, and annual average fishing effort in days for under 12 m vessels was 1, 3, and 2 days respectively. Given the activity levels described, in addition to bottom towed gear, anchored nets and lines, and traps alone having been assessed in Part B as having no significant risk of hindering the site conservation objectives there is unlikely to be an in-combination effect. Furthermore, as discussed in **section 4.3**, there are no sensitive biotopes found within the subtidal coarse sediment in Beachy Head East MPA.

Subtidal sand, high and moderate energy circalittoral rock

The combined impacts from anchored nets and lines and traps over the features subtidal sand, and high and moderate energy circalittoral rock could potentially

increase the risk of negative effects from the pressure abrasion and disturbance of the substrate on the surface of the seabed. Average annual landings from for both under 12 and over 12 m vessels for anchored nets and lines, and traps was 0.46 t and 3.41 tonnes respectively, and annual average fishing effort was 1 and 2 days respectively. 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 MMO portion of Beachy Head East MPA only takes up 0.1 % of ICES rectangle 30F0.

As discussed in **section 4.3**, for the feature subtidal sand, there are four biotopes, of which three are of low sensitivity. The biotope *Echinocardium cordatum* and *Ensis* spp. in lower shore and shallow sublittoral slightly muddy fine sand' has medium sensitivity (De-Bastos *et al.*, 2023a). This biotope is generally only recorded in shallow inshore areas and given the relatively low intensity of anchored nets and lines, and traps activity within the site, together with the low scale of footprint for impacts from anchored nets and lines, and traps; the risk of abrasion damage is considered unlikely to occur above the pressure benchmark for subtidal sand features. For the features high and moderate energy circalittoral rock, the medium sensitivity biotopes that may be found within the site have species listed within these biotopes that reach sexual maturity quickly, can reproduce asexually to aid recovery of damaged populations, and can undertake resting stages that are very resistant of environmental perturbation.

Given the activity level described and the low scale of footprint for impacts from both these static gear groups, and no evidence to suggest that sensitive biotopes are present for subtidal sand, and the high resistance of the medium sensitivity biotopes that may be found within the high and medium energy circalittoral rock features, MMO does not consider the in-combination effect from these activities as likely to cause a significant risk of hindering the achievement of the conservation objectives. The sensitivities of the subtidal sand, and high and moderate energy circalittoral rock features within the site are described in **section 4.3**.

Therefore, MMO concludes that the combined pressures from bottom towed gears (over subtidal coarse sediment), anchored nets and lines and traps will not result in a significant risk of hindering the achievement of the conservation objectives for the Beachy Head East MPA at current levels.

5.2 Fishing vs non-fishing activities in-combination pressures

The pressures exerted by the non-fishing activity will also be considered incombination 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, removal of non-target species and penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion, smothering and siltation rate changes

The designated features high energy circalittoral rock and moderate energy circalittoral rock, subtidal coarse sediment and subtidal sand of the Beachy Head East 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. Subtidal sand is also sensitive to physical damage through penetration, and or disturbance of the seabed surface substrate from bottom towed gear.

As detailed in **section 3.3** pressures associated with anchored nets and lines and traps over all the designated features within the site, and bottom towed gear over subtidal coarse sediment at the current level of activity are not considered to be causing a significant impact. It is possible that activities linked to the aggregate dredging activity, in-combination with bottom towed gear, anchored nets and lines and traps may increase the potential for this pressure to have negative cumulative effects on the designated features of the MPA.

However, as previously stated, the aggregates will be dredged from adjacent to and not within the boundary of the MPA. Therefore, no pathway exists for in-combination impacts from abrasion and disturbance of the substrate on the surface of the seabed, removal of non-target species and penetration, and/or disturbance of the substrate below the surface of the seabed between bottom towed gear, anchored nets and lines and traps and non-fishing activity. There is the potential for smothering and siltation to occur from aggregate dredging in combination with bottom towed gear, however, the biotopes present within subtidal coarse sediment feature are not sensitive to this pressure.

Therefore, MMO concludes that the combined pressures from bottom towed gear, 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 the Beachy Head East MPA.

5.3 Part C conclusion

MMO concludes that different fishing gear types in combination, and fishing incombination with other relevant activities will not result in a significant risk of hindering the achievement of the conservation objectives for the Beachy Head East 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 all capable of affecting (other than insignificantly) the designated features of Beachy Head East MPA.

Part B of this assessment concluded that ongoing use of bottom towed gear on the features high and moderate energy circalittoral rock and subtidal sand of Beachy Head East MPA may hinder the achievement of the conservation objectives of the MPA as a result of the impacts of abrasion or disturbance, penetration (subtidal sand only) and suspended solid changes (subtidal sand only).

Parts B and C of this assessment concluded that the ongoing use of anchored nets and lines and traps, alone or in combination, on the features high and moderate energy circalittoral rock and subtidal sand does not pose a significant risk of hindering the achievement of the conservation objectives of the MPA. Part B and Part C also concluded that the ongoing use of bottom towed gear, anchored nets and lines, and traps, alone or in combination, on the feature subtidal coarse sediment 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 on the features moderate and high energy circalittoral rock and subtidal sand in Beachy Head East 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 <u>Stage 3 MPA Site Assessment Methodology</u>⁴ document.



Datum: ETRS 1989 Projection: Lambert Azimuthal Equal Area MMO Reference: 10786 Not to be used for navigation. Contains Collins Bartholomew, DEFRA, MMO, Natural England, Ordnance Survey and UKHO data. © Collins Bartholomew, DEFRA, MMO, Natural England, Ordnance Survey and UKHO copyright and database right 2024. © ICES Statistical Rectangles dataset 2020. ICES, Copenhagen. Contains public sector information licensed under the Open Government Licence v3.0

Figure 2. Map of proposed management

7 Review of this assessment

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

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

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

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Annex 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) for Beachy Head East MPA.

		201	6	201	7	201	8	201	9	202	0	202	1	Tota (2016 202	al 5 to 1)	Annual average (2016 to 2021)	
Gear group	Gear code	Nation group	Count	%	Count	%	Count										
Demorael troud	TBB	EU	0	0	0	0	1	100	1	100	0	0	0	0	2	100	<1
Demersartiawi	TBB to	otal	0	0	0	0	1	100	1	100	0	0	0	0	2	100	<1
Demersal trawl	total		0	0	0	0	1	6	1	100	0	0	0	0	2	100	<1
Trans	FPO	UK	12	100	15	100	16	100	19	100	16	100	5	100	83	100	14
Парз	FPO to	otal	12	100	15	100	16	100	19	100	16	100	5	100	83	100	14
Traps total		12	100	15	100	16	100	19	100	16	100	5	100	83	98	14	
Grand total			12	100	15	100	17	100	20	100	16	100	5	100	85	100	14

Table A1.2. UK live weight landings tonnage (t) estimates by gear from vessels over 12 m in length in the MMO section of Beachy Head East MPA (2016 to 2021).

Gear Group	Gear code	2016	2017	2018	2019	2020	2021	Total (2016 to 2021)	Average (2016 to 2021)
Traps	FPO	1.50	1.47	2.40	2.76	1.33	0.47	9.93	1.66
Traps total		1.50	1.47	2.40	2.76	1.33	0.47	9.93	1.66
Grand total		1.50	1.47	2.40	2.76	1.33	0.47	9.93	1.66

Table A1. 3: EU27 live weight landings tonnage (t) estimates by gear from vessels over 12 m in length in the MMO section of Beachy Head East MPA (2016 to 2021).

Gear group	Gear code	2016	2017	2018	2019	2020	2021	Total (2016 to 2021)	Average (2016 to 2021)
Demersal trawl	ТВВ	0	0	0.33	0.21	0	0	0.53	0.09
Demersal trawl to	tal	0	0	0.33	0.21	0	0	0.53	0.09
Grand total		0	0	0.33	0.21	0	0	0.53	0.09

Table A1.4. Percentage of each ICES rectangle intersected by the MMO section of Beachy Head East MPA.

ICES rectangle	Percentage overlap (%)
30F0	0.10

Table A1. 5. UK live weight landings tonnage (t) estimates by gear from vessels under 12 m in length for the MMO section of Beachy Head East MPA (2016 to 2021).

Gear Group	Gear code	2016	2017	2018	2019	2020	2021	Total (2016 to 2021)	Average (2016 to 2021)
	ОТВ	0.01	0.39	0.62	0.48	0.25	0.21	1.96	0.33
Demorsal trawl	OTT	0	0.02	0	0	0	0	0.02	<0.01
	TBB	0.02	0.02	0.02	0.01	0.01	0.01	0.09	0.02
	OT	0.38	0.13	0	0	0	0	0.51	0.09
Demersal trawl total		0.42	0.56	0.64	0.49	0.27	0.21	2.59	0.43
Dredge	DRB	0.04	0.02	0.01	0.04	0.05	0.19	0.35	0.06
Dredge total		0.04	0.02	0.01	0.04	0.05	0.19	0.35	0.06
Trans	FPO	1.84	1.31	1.28	1.70	2.57	1.65	10.35	1.73
Паръ	FIX	0.11	0.04	0	0	0	0	0.15	0.03
Traps total		1.95	1.35	1.28	1.70	2.57	1.65	10.50	1.75
	GN	0.31	0.25	0.26	0.28	0.17	0.17	1.44	0.24
Anchored net/line	GNS	0.03	0.01	0.03	0.02	0.01	0.01	0.11	0.02
	GTR	0.21	0.18	0.15	0.14	0.06	0.07	0.81	0.14
	GEN	0.01	0	0	0	0	0	0.01	<0.01
Anchored net/line tota	al	0.54	0.44	0.43	0.43	0.24	0.24	2.32	0.39
Midwater - gill drift	GND	0.03	0	0	0	0	0	0.03	0.01
Midwater - gill drift to	tal	0.03	0	0	0	0	0	0.03	0.01
Midwater book/lines	LX	0.02	0.03	0.02	0.02	0.03	0.03	0.15	0.03
	LHP	0	0	0.01	0.01	0.02	0.02	0.06	0.01
Midwater hook/lines t	otal	0.02	0.03	0.03	0.03	0.04	0.04	0.19	0.03
Grand total		3.00	2.40	2.39	2.69	3.17	2.33	15.98	2.66

Table A1.6. EU27 live weight landings tonnage (t) estimates by gear from vessels under 12 m in length for the MMO section of Beachy Head East MPA (2016 to 2021).

Gear group	Gear code	2016	2017	2018	2019	2020	2021	Total (2016 to 2021)	Average (2016 to 2021)
Demersal seine	SSC	0	0	0.01	0.04	0.01	0	0.06	0.01
Demersal seine total		0	0	0.01	0.04	0.01	0	0.06	0.01
Dredge	DRB	0.03	0.01	0.01	0.01	0.01	0.01	0.06	0.01
Dredge total		0.03	0.01	0.01	0.01	0.01	0.01	0.08	0.01
Anchored net/line	GTR	0.10	0.14	0.08	0.03	0.04	0.02	0.38	0.07
Anchored net/line total		0.10	0.14	0.08	0.03	0.04	0.02	0.40	0.07
Traps	FPO	0	0.01	0.01	0	0	0	0.02	<0.01
Traps total		0	0.01	0.01	0	0	0	0.02	<0.01
Midwater - gill drift	GND	0	<0.01	0	0	0	0	<0.01	<0.01
Midwater – gill drift total		0	<0.01	0	0	0	0	<0.01	<0.01
Midwater – hook/ lines	LHP	0	0	<0.01	0	0	0	<0.01	<0.01
Midwater – hook/ lines tota		0	0	<0.01	0	0	0	<0.01	<0.01
Midwater - trawl	OTM	0	0	0	<0.01	0	0	<0.01	<0.01
Midwater – trawl total	Midwater – trawl total		0	0	<0.01	0	0	< 0.01	<0.01
Grand total		0.13	0.16	0.10	0.08	0.07	0.03	0.57	0.09

Table A1. 7: Fishing effort (days) recorded by UK vessels under 12 m in length, separated by gear type for the area of Beachy Head East MPA that intersects ICES rectangles 30F0 (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).

ICES					Fishing	effort (day	/s at sea)		
rectangle	Gear group	2016	2017	2018	2019	2020	2021	Total (2016 to 2021)	Average (2016 to 2021)
	Demersal trawl	1.29	1.34	1.63	1.37	0.81	0.66	7.10	1.18
	Dredges	0.07	0.05	0.01	0.07	0.07	0.15	0.27	0.07
	Bottom towed gear total	1.37	1.39	1.64	1.43	0.88	0.81	7.52	1.25
	Midwater gill drift	0.33	0.04	0.02	0.03	0.00	0	0.42	0.07
30F0	Midwater hooks/lines	0.47	0.61	0.68	0.55	0.79	0.92	4.01	0.67
	Midwater gear total	0.79	0.65	0.70	0.58	0.79	0.92	4.43	0.74
	Anchored nets and lines	4.95	4.04	3.66	2.73	2.08	1.65	19.11	3.19
	Traps	2.02	1.48	1.50	1.84	2.32	1.65	10.81	1.80
	Static gear total	6.97	5.51	5.16	4.58	4.41	3.29	29.92	4.99
MPA total		9.13	7.55	7.51	6.59	6.08	5.02	41.88	6.98

Table A1. 8: Mean annual surface and subsurface SAR values for C-squares intersecting the MMO section of Beachy Head EastMPA (2016 to 2020).

Gear group	SAR category	2016	2017	2018	2019	2020
Demersal seines	Surface	0	0.17	0.37	0.19	0.08
	Subsurface	0	0	< 0.01	0.01	<0.01
Dredges	Surface	0.02	0.01	0.01	0.03	0.03
	Subsurface	0.02	0.01	0.01	0.03	0.03
Demersal trawls	Surface	0.38	0.19	0.41	0.32	0.41
	Subsurface	0.37	0.19	0.41	0.30	0.41
Bottom towed gear total	Surface	0.40	0.38	0.79	0.53	0.53
	Subsurface	0.39	0.21	0.42	0.35	0.45