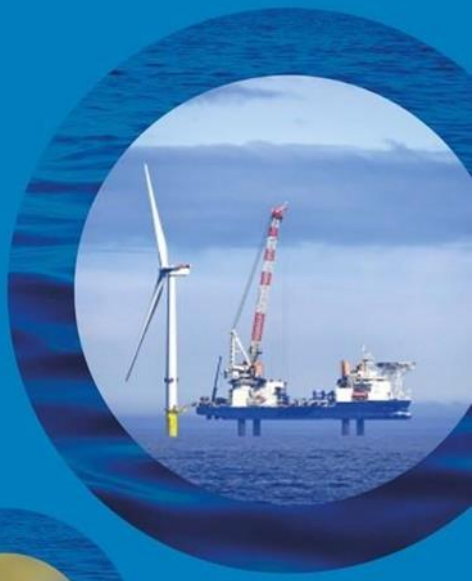
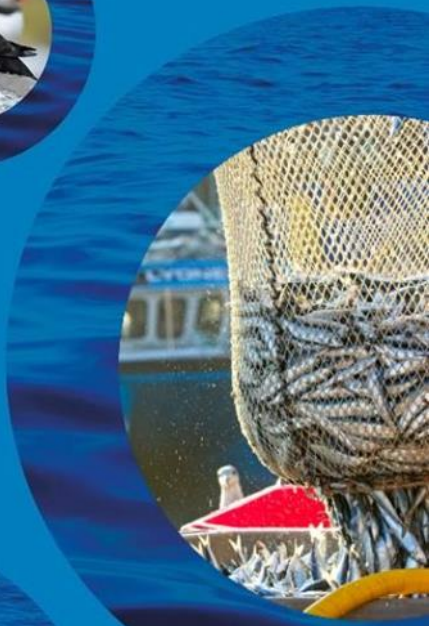
Marine Management Organisation



MMO Stage 3 Site Assessment: Holderness Offshore MPA (Draft)



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MMO Stage 3 Site Assessment: Holderness Offshore MPA (Draft)

Contents

Executive Summary

This assessment analyses the impact of anchored nets and lines, bottom towed gear, and traps on the designated features North Sea glacial tunnel valleys; ocean quahog (*Arctica islandica*); subtidal coarse sediment; subtidal mixed sediments and subtidal sand in Holderness Offshore Marine Protected Area (MPA). The assessment sets out the evidence considered and analyses the quality of that evidence. The assessment finds that the ongoing use of bottom towed gear 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 gear for Holderness Offshore MPA.

1 Introduction

This assessment considers whether fishing activities are compatible with the conservation objectives of Holderness Offshore MPA.

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

2 Site information

2.1 Overview

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

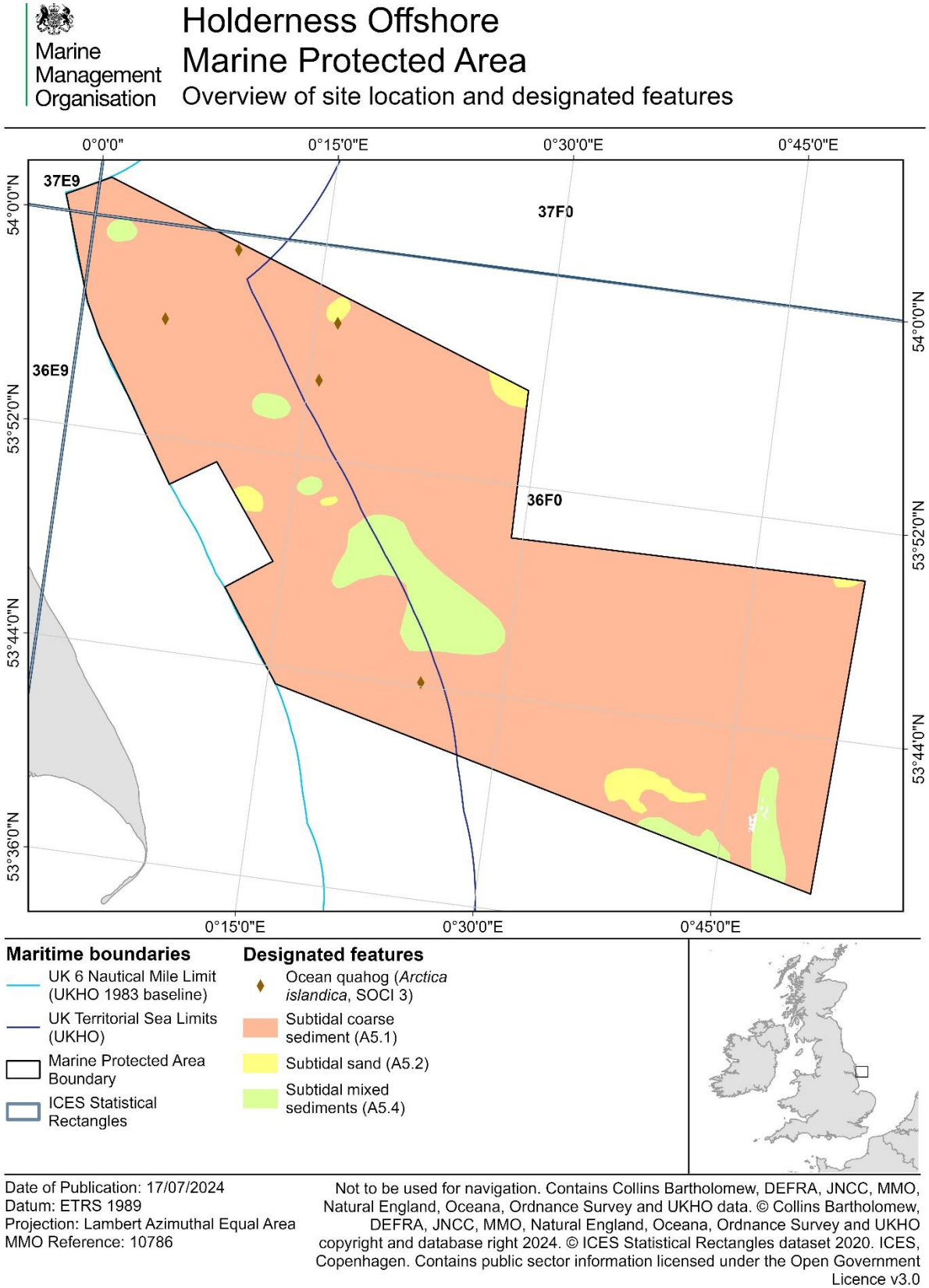
- JNCC Site Information – Holderness Offshore MCZ[1]
- Defra Factsheet – Holderness Offshore MCZ[2]

The site lies across the 12 nautical mile (nm) territorial sea limit, therefore joint conservation advice between JNCC and Natural England was delivered with JNCC as the lead. Holderness Offshore MPA is located approximately 11 kilometres (km) offshore from the Holderness coast in the Southern North Sea region (**Figure 1**). The site is relatively shallow, ranging in depth from just over 5 metres (m) down to 50 m and covers an area of 1,176 square kilometres (km^2).

Holderness Offshore MPA was designated as an MCZ in 2019. The seabed is dominated by subtidal coarse sediment and hosts subtidal sand, subtidal mixed sediments and part of a glacial tunnel valley. The subtidal coarse sediment is found throughout most of the site and consists of tide-swept circalittoral coarse sands, gravel and shingle. The subtidal sand exists in small patches in the site and the subtidal mixed sediments are also found in patches throughout the site, the largest of which is in the centre of the site.

The diverse seabed allows for a wide variety of species which live both in and on the sediment such as crustaceans (crabs and shrimp), starfish and sponges. This site is also a spawning and nursing ground for a range of fish species, for example lemon sole (*Microstomus kitt*), plaice and European sprat (*Sprattus sprattus*). The slow-growing bivalve, ocean quahog (*Arctica islandica*) is also a feature of the site. Ocean quahog is an OSPAR threatened/declining species of bivalve mollusc that can take up to six years to reach maturity and can live for over 500 years.

[1] Holderness Offshore Site Information Centre www.jncc.gov.uk/our-work/holderness-offshore-mpa/ (last accessed: 22 May 2023)
[2] Holderness Offshore Defra factsheet www.gov.uk/government/publications/marine-conservation-zones-holderness-offshore (last accessed: 22 May 2023)



Date of Publication: 17/07/2024
Datum: ETRS 1989
Projection: Lambert Azimuthal Equal Area
MMO Reference: 10786

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 Holderness Offshore MPA have been set based on a vulnerability assessment. The attributes driving these approaches are described in JNCC's supplementary advice on conservation objectives[1].

Ongoing demersal trawling, dredging, and oil and gas industry activities have resulted in some of the site's designated features having general management approaches to recover. JNCC and Natural England advise that, as far as is practicable, changes in substrata within Holderness Offshore MPA be kept to an absolute minimum in order to conserve ocean quahog populations and provide the best chance of any potential settlement for new recruits.

Table 1: Designated features and general management approaches.

Designated feature	General management approach
North Sea glacial tunnel valleys	Maintain in favourable condition
Ocean quahog (*Arctica islandica*)	Recover to favourable condition
Subtidal coarse sediment	
Subtidal mixed sediments	
Subtidal sand	

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 JNCC's supplementary advice on conservation objectives[1].

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[3].

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

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

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

Consideration of a pressure on a protected feature in 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] Marine and Coastal Access Act 2009 www.legislation.gov.uk/ukpga/2009/23/section/126 (last accessed: 02 August 2024)

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 data (SAR).

For more information about the above evidence sources, please see the Stage 3 MPA Site Assessment Methodology document[4], which describes each type of fishing activity evidence and summarises the strengths and limitations of each source.

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

Gear type	Gear name	Gear code	Justification
Anchored nets and lines	Gill nets (not specified)	GN	Present in under 12 m landings data for ICES statistical rectangles that overlap the site.
	Gillnets and entangling nets	GEN	
	Longline (unspecified)	LL	
	Longlines (demersal)	LLS	
	Set gillnet (anchored)	GNS	
	Trammel net	GTR	Present in under 12 m landings data for ICES statistical rectangles that overlap the site.
Bottom towed gear	Beam trawl	TBB	
	Bottom Pair Trawl	PTB	Present in VMS records and under 12 m landings data for ICES statistical rectangles that overlap the site.
	Bottom otter trawl	OTB	
	Danish / anchor seine	SDN	Present in VMS records.
	Hand mechanised dredge	HMD	
	Nephrops trawl	TBN	Present in under 12 m landings data for ICES statistical rectangles that overlap the site.
	Otter trawls (unspecified)	OT	
	Pair seine	SPR	Present in VMS records.
	Scottish / fly seine	SSC	

[4] Stage 3 MPA Site Assessment Methodology document: www.gov.uk/government/publications/stage-3-site-assessments (last accessed: 02 August 2024).

Gear type	Gear name	Gear code	Justification
	Towed dredge	DRB	Present in VMS records and under 12 m landings data for ICES statistical rectangles that overlap the site.
Midwater gear	Drift gillnet	GND	Present in under 12 m landings data for ICES statistical rectangles that overlap the site.
	Hand-operated pole-and-line	LHP	
	Hook and line (unspecified)	LX	
	Midwater otter trawl	OTM	Present in VMS records.
	Purse seine (ring net)	PS	
Shore based	Hand dredge	DRH	Present in under 12 m landings data for ICES statistical rectangles that overlap the site.
Traps	Pot / creel	FPO	Present in VMS records and under 12 m landings data for ICES statistical rectangles that overlap the site.
	Trap	FIX	Present in under 12 m landings data for ICES statistical rectangles that overlap the site.
Unknown	Unknown	NK	Present in VMS records.

3.2 Activities and features screened out

This section identifies activities or features that are **present or occurring but do not need to be considered** for Holderness Offshore 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 Holderness Offshore MPA, there is no feasible pathway for gears of this type to interact with benthic designated features. 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 Holderness Offshore MPA is not considered to be capable of affecting the designated features other than insignificantly and is not considered further within this assessment.
- **Shore based activities:** although landings data shows that fishing activity using hand dredges occurs within the site, this is based on all activity occurring within site-overlapping ICES rectangles. Holderness Offshore has four ICES rectangles overlapping the site. Rectangles 36E9, 37E9 and 36F0 also cover a large area of the coast where shored based activities occur. As the area of the site being assessed 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.
- **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.

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

- **Geological or geomorphological designated features:** these 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[5]
- Stage 3 Fishing Gear MPA Impacts Evidence Bottom Towed Gear[6]; and
- Stage 3 Fishing Gear MPA Impacts Evidence Traps[7].

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 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 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 either the feature is not sensitive to the pressure, or that the pressure from the gear type is not relevant to the feature.

[5] Stage 3 Fishing Gear MPA Impacts Evidence Anchored Nets and Lines: www.gov.uk/government/publications/stage-3-impacts-evidence (last accessed: 02 August 2024).
[6] Stage 3 Fishing Gear MPA Impacts Evidence Bottom Towed Gear: www.gov.uk/government/publications/stage-3-impacts-evidence (last accessed: 02 August 2024).
[7] Stage 3 Fishing Gear MPA Impacts Evidence Traps: www.gov.uk/government/publications/stage-3-impacts-evidence (last accessed: 02 August 2024).

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

Potential pressures	Designated features											
	Ocean quahog			Subtidal coarse sediment			Subtidal mixed sediments			Subtidal sand		
	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												
Organic enrichment												
Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion												
Physical change (to another seabed type)												
Physical change (to another sediment type)												
Removal of non-target species												
Removal of target species												
Smothering and siltation rate changes (light)												
Synthetic compound contamination												
Transition elements and organo-metal contamination												

4 Part B - Fishing activity assessment

Part B of this assessment was carried out in a manner that is consistent with the 'significant risk of hindering the achievement of the conservation objectives' test required by section 126 of the Marine and Coastal Access Act 2009[3].

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: Relevant favourable condition targets for identified pressures.

Feature	Attribute	Target	Relevant pressures
Subtidal coarse sediment; subtidal sand and subtidal mixed sediments	Extent and distribution: sediment composition and biological assemblages	Recover	Relevant to: • Abrasion/disturbance of the substrate on the surface of the seabed; • changes in suspended solids (water clarity); • penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion; • removal of non-target species; • removal of target species; and • smothering and siltation rate changes (light).
	Structure and function: finer scale topography	Maintain	
	Structure and function: sediment composition	Recover	
	Structure and function: key and influential species	Maintain OR Recover	
	Structure and function: characteristic communities	Recover	

Feature	Attribute	Target	Relevant pressures
	Structure and function: ecological processes		
	Supporting processes: hydrodynamic regime	Maintain	
	Supporting processes: water and sediment quality		
Ocean quahog	Extent and distribution	Recover	Relevant to: • Abrasion/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; and • removal of non-target species.
	Structure and function		
	Supporting processes: hydrodynamic regime	Maintain	
	Supporting processes: supporting habitats	Recover	
	Supporting processes: water and sediment quality	Maintain	

4.1 Fisheries access and existing management

Non-UK vessels can operate within the offshore (12 to 200 nm) portion of Holderness Offshore MPA, provided that they have a licence issued by the UK to do so. Nationalities which fished within the MPA from 2016 to 2021 include vessels from Belgium, Germany, Denmark, Spain, France, the Netherlands, Norway, Sweden and the UK. VMS records indicate that UK vessels are most prevalent. Following EU exit, non-UK vessels cannot operate within the 6 to 12 nm portion of ICES Statistical Area IVb, where Holderness Offshore MPA is situated.

No MPA specific fisheries measures are currently in place within Holderness Offshore MPA.

4.2 Fishing activity summary

Table A1. 1 to **Table A1. 8** in **Annex 1**: display a detailed breakdown of fishing activity within Holderness Offshore MPA. The following analysis considers only fishing activities not screened out in Part A of this assessment; midwater gears are therefore not examined here. VMS record counts were available from 2016 to 2021 and landings data and SAR values were available from 2016 to 2020. When discussing weights from landings in this section, figures used are a total of weights from UK and EU member states. VMS data show that the most prevalent gears operated by over 12 m vessels within the site were dredges and traps. Landings data show that the most prevalent gears operated by under 12 m vessels within the site were traps.

According to VMS data, traps were the most frequently deployed gear type by vessels over 12 m in Holderness Offshore MPA, with an average of 1,960 VMS records per year between 2016 and 2021. These vessels were present throughout most of the MPA, with highest concentrations of activity within the western part of the site inshore of 12 nm, and in the eastern part of the site along the northern boundary of the MPA. These areas are dominated by subtidal coarse sediment but also contain subtidal mixed sediments and subtidal sand. VMS data also show that trap activity occurred over the ocean quahog feature. These vessels landed on average, 616 t per year. Under 12 m landings data show that vessels using traps landed on average 392 t per year. The annual average fishing effort by UK vessels under 12 m in length using traps for the area of Holderness Offshore MPA that intersects ICES rectangles 36E9, 36F0, 37E9, 37F0 was estimated to be 16.38 days.

According to VMS data, dredging was the second most frequent gear type used within the site with an annual average count of 925 VMS records between 2016 and 2021. These vessels landed an annual average total of 172 t over the five-year period (2016 to 2020) with a peak in 2018 (436 t for the year). Dredging comprised 18 % of all fishing activity by over 12 m vessels in the site (including activities scoped out). Comparatively, dredge vessels under 12 m in length landed an annual average

of 0.5 t for the same period. SAR analysis of dredging activity produced mean surface and subsurface SAR values for C-squares intersecting Holderness Offshore MPA ranging from 0.01 to 0.19 for the whole site between 2016 and 2020. Maximum surface and subsurface SAR values ranged from 0.45 to 2.42 between 2016 and 2020. This means that on average the whole site was only passed over by dredges every five to ten years but that certain areas of the site were passed over completely by dredges up to 2.42 times each year. VMS data show that dredging activity mostly took place in two locations. The larger area of activity was situated centrally within the northern section of the site. Here, dredging occurred over all designated features but mainly on coarse sediment. The second area where dredging predominated was in the southeast of the site, with activity focussed on an area of mixed sediments sited over a North Sea glacial tunnel valley. Dredging also occurred sporadically between these two denser locations.

Other bottom towed gear activity within the site included the use of demersal seines and demersal trawls. On average, there were 14 VMS records for demersal seines per year between 2016 and 2021 and the mean surface SAR values for C-squares intersecting Holderness Offshore MPA ranged between 0.0 and 0.09 for the whole site. Apart from a single pair trawl record in 2021, otter trawls were the only demersal trawl used by over 12 m vessels in the site, with an annual average of 63 VMS records. Their use contributed 2 % of the total landings by weight (between 2016 and 2020) for vessels over 12 m in length in Holderness Offshore MPA.

There were no VMS records for anchored nets and lines within the site and vessels under 12 m in length using this gear type landed an annual average of 2 t.

4.3 Pressures by gear type

The Stage 3 Fishing Gear MPA Impacts Evidence documents for anchored nets and lines[5], bottom towed gear[6] and traps[7] 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, site conservation objectives, intensity of fishing activity taking place and exposure to natural disturbance.

As subtidal coarse sediment, subtidal mixed sediments and subtidal sand designated features 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 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, ocean quahog, may be sensitive to removal of non-target species pressures. However, ocean quahog is 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 Holderness Offshore MPA have been considered in relation to pressures from anchored nets and lines.

Ocean quahog (*Arctica islandica*)

The main pressure on the ocean quahog feature of Holderness Offshore MPA from anchored nets and lines was identified in **Table 3** as abrasion or disturbance of the substrate on the surface of the seabed.

Ocean quahog is found around all British and Irish coasts, as well as offshore, and is particularly sensitive to pressures exerted by fishing activity due to its slow growth rate, unpredictable recruitment, variable age of maturity and long planktonic larval stage. UK waters are likely to be a sink for new recruits, with larval settlements originating from Iceland. Reductions in adult ocean quahog density over fished grounds can negatively impact recovery due to less effective recruitment. A low and constant rate of recruitment may be sufficient for ocean quahog populations to recover from low to moderate disturbance; however, it may be difficult for ocean quahog to recover from a sustained high level of fishing.

Section 6.3 in the anchored nets and lines Impacts Evidence document[5] identifies and explains the potential impacts on ocean quahog caused by the abrasion or disturbance of the substrate on the surface of the seabed pressure. The use of anchored nets and lines is considered less damaging to benthic habitats than the use of mobile gears. However, abrasion and disturbance to the seabed can be caused during the setting and retrieval of the nets or lines and their associated anchors, as well as the movement over the seabed in rough weather resulting in the mortality of associated species. Ocean quahog prefer fine sediment but can occur in coarser sediments, which occupy the majority of the site. Supporting habitats within the site perform a vital role to ocean quahog populations and it is possible that these species play a critical role in maintaining the structure and function of the protected subtidal sedimentary habitats as well.

The impacts of anchored nets and lines will vary with the intensity of fishing activity. Section 6.3.1 in the anchored nets and lines Impacts Evidence documents[5] describes heavy fishing activity as daily fishing with more than nine pairs of anchors in a 2.5 nm^2 area. It also highlights how sedimentary habitats containing long lived bivalves were classed as having medium sensitivity to these high intensities of nets and longlines, and otherwise low sensitivity to lower intensities of nets and lines.

Section 4.2 describes the fishing activity within Holderness Offshore MPA and notes minimal use of anchored nets and lines within the site, with no VMS records for over 12 m vessels using this gear in the period considered. Landings data show vessels under 12 m in length using anchored nets and lines landed on average 1.59 t per year. Section 6.3.1 in the anchored nets and lines Impacts Evidence document[5] highlights that ocean quahog is not likely to be removed by anchored nets and lines. Furthermore, the static nature and small footprint of anchored nets and lines only affect a small area, minimising the risk of abrasion or disturbance of the substrate on the surface to the seabed. Anchored nets and lines activity within Holderness Offshore MPA at the activity levels described is not likely to cause an impact on the extent and distribution, structure and function, and supporting processes attributes and continued use of this gear type in the site is therefore compatible with the conservation objectives.

Sediment features

The main pressure on the subtidal coarse sediment, subtidal mixed sediments and subtidal sand features of Holderness Offshore MPA from anchored nets and lines was identified in **Table 3** as abrasion or disturbance of the substrate on the surface of the seabed.

Impacts on sediment 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.

Section 4.2 describes fishing activity within Holderness Offshore MPA and notes that, according to VMS and landings data, the use of anchored nets and lines appears minimal.

The only data showing fishing activity using these gears in the site is from under 12 m landings and UK under 12 m fishing effort (days), which 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 site, as it suggests fishing activity is distributed equally across the rectangle. As this data does not indicate where the activity occurs within the site, if it occurs at all, the use of anchored nets and lines may or may not be occurring over all three sediment features.

Abrasion impacts are greater on subtidal mixed sediments and subtidal coarse sediment compared to subtidal sand, as the coarser habitats often contain populations of sessile epifauna. As per section 9.3 of the anchored nets and lines Impacts Evidence document[5], 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. 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.

Information about the biotopes in the site was provided by the Biotope Presence-Absence spreadsheet of JNCC Report No.647 (Tillin et al., 2020), which listed European Nature Information System (EUNIS) biotopes that were present, likely to be present, or absent from each UK offshore bioregion based on survey data, environmental information, species records, literature and expert judgement. Biotopes were screened out if they were not located in the same region as Holderness Offshore MPA, and if they were not found at the depth range for the site (5 to 50 m). Information about the depth range of each biotope was listed in the Biotope Database of JNCC Report No. 647 (Tillin et al., 2020).

Of the three sediment features of the site, only ‘subtidal mixed sediments’ contain biotopes that are sensitive to the 'abrasion/disturbance of the substrate on the surface of the seabed’ pressure, but this is only in relation to bottom towed gear. Subtidal coarse sediment contains one biotope with unknown sensitivity to this pressure. These biotopes, and the pressures they are sensitive to, are listed in **Table 5**.

Table 5. Sediment biotopes with at least medium sensitivity to relevant pressures.

Broad-scale habitats	Biotope	Sensitivity
Subtidal mixed sediments	*Cerianthus lloydii* and other burrowing anemones in circalittoral muddy mixed sediment (Perry and Watson, 2024)	Sensitive to: • abrasion/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 (only relevant for bottom towed gear); and • smothering and siltation rate changes (light) (only relevant for bottom towed gear)
	Cerianthus lloydii with *Nemertesia* spp. and other hydroids in circalittoral muddy mixed sediment (Perry and Watson, 2023)	
	Ophiothrix fragilis and/or *Ophiocomina nigra* brittlestar beds on sublittoral mixed sediment (De-Bastos *et al.*, 2023)	
	Flustra foliacea and *Hydrallmania falcata* on tide-swept circalittoral mixed sediment (Readman and Watson, 2024)	Sensitive to: • abrasion/disturbance of the substrate on the surface of the seabed; and • penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion (only relevant for bottom towed gear).
Subtidal coarse sediment	*Branchiostoma lanceolatum* in circalittoral coarse sand with shell gravel (Tillin and Watson, 2023)	Sensitive to: • penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion (only relevant for bottom towed gear).

Fishing effort data indicates that there is currently minimal interaction occurring between anchored nets and lines activity and the designated features, so risk of abrasion and disturbance is limited. This activity within the site is therefore unlikely to cause an impact on the extent and distribution, structure and function, and supporting processes attributes and continued use of this gear type in the site is therefore compatible with the conservation objectives.

MMO concludes that the ongoing use of anchored nets and lines at the activity levels described does not pose a significant risk of hindering the achievement of the conservation objectives of the subtidal coarse sediment, subtidal sand, subtidal mixed sediments or ocean quahog (*Arctica islandica*) features of the MPA.

4.3.2 Bottom towed gear

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

Ocean quahog (*Arctica islandica*)

The main pressures on Ocean quahog in Holderness Offshore MPA from bottom towed gear were identified in **Table 3** 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*; and
- removal of non-target species.

All pressures have been consolidated in this assessment due to the similar nature of their impacts on the ocean quahog feature and the level of available literature.

Ocean quahog prefer finer sediments where they are found in higher densities, however smaller densities have been found to occur in coarser sediments and are therefore not limited by sediment type. The composition of all three sediment types found in Holderness Offshore MPA consist predominantly of sand.

Ocean quahog has a high sensitivity to physical habitat loss and as a burrowing species, extent and distribution of supporting habitats are important in governing the extent and distribution of the species (Tyler-Walters and Sabatini, 2017).

When pulled across the surface of the seabed various parts of demersal towed gear can cause penetration, abrasion, or disturbance to the seabed surface substrate, with impacts varying depending on the gear type and penetration depth. Ocean quahog live buried in up to 14 cm of sediment so can be damaged by the passing of bottom towed gear, which may result in mortality removing a large proportion of the population.

Section 6.3 of the bottom towed gear Impacts Evidence document[6] identifies and explains fully the potential impacts caused by penetration, abrasion and removal of non-target species and how these differ between the different bottom towed gears. Ocean quahog is highly sensitive to pressures caused by beam and otter trawling, especially in areas of high intensity. Gear types using tickler chains cause a higher mortality than those without. Ocean quahog caught in beam and otter trawls have a 90 % mortality rate, the highest of all invertebrate species. The main type of trawl used within Holderness Offshore MPA by vessels over 12 m in length was the bottom otter trawl contributing to 1.9 % of total landings by over 12 m vessels from 2016 to 2020.

Larger ocean quahog are vulnerable to damage by bottom towed gear, as the ratio of shell thickness to shell size decreases as the ocean quahog grows larger making them more fragile. However, juveniles are also vulnerable to damage by bottom

towed gear as they live at shallower depths and are more likely to encounter and be damaged by the gear. Ocean quahog populations in the North Sea are often highly skewed, containing either adults or juveniles as opposed to representatives of both age class. This is likely due to direct mortality through bottom towed gear. In sand, dredges penetrate deeper than beam trawls and otter trawl doors, potentially affecting a greater population of ocean quahog buried in this substrate.

Demersal seine gears have low ground penetration, only affecting the top 1.8 cm of the sediment. Ocean quahog can be found buried between 0 to 14 cm in the sediment, so this gear is unlikely to have an impact on those individuals buried deeper. **Section 4.2** highlights that there is limited demersal seine activity within the site with mean surface SAR values for C-squares intersecting Holderness Offshore MPA ranging between 0.0 and 0.09 for the whole site.

JNCC and Natural England advise that, as far as is practicable, changes in substrata within Holderness Offshore MPA be kept to an absolute minimum in order to conserve ocean quahog populations and provide the best chance of any potential settlement for new recruits, however bottom towed gear has also been shown to have the potential to affect subtidal sediment habitats which is discussed fully in the sediment features section below.

Dredging was the second most common gear type in VMS records within the site and occurred over all designated features. Section 6.1 of the bottom towed gear Impacts Evidence[6] documents finds ocean quahog are highly sensitive to the pressures associated with benthic trawling and dredging activities, notably penetration and/or disturbance of the substrate below the surface of the seabed and removal of non-target species. The dredging activity at the activity levels described has the potential to damage, displace or cause high levels of mortality in ocean quahog populations and therefore is not compatible with the extent and distribution, structure and function and supporting processes targets for this site.

Sediment features

The main pressures on the subtidal coarse sediment, subtidal mixed sediments and subtidal sand features of Holderness Offshore MPA from bottom towed gear were identified in **Table 3** and are:

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

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

Section 4.2 describes the high intensity of dredging activity and its prevalence over all the site's designated features, which are sensitive to the pressures listed above. Where dredging activity is most intense, maximum surface and subsurface SAR values were as high as 2.42, meaning some areas of the site were passed over completely by dredges up to 2.42 times per year. While demersal seines and demersal trawls are less prevalent than dredges, they exert the same pressures on the site's sensitive designated features.

Communities in subtidal coarse sediment and subtidal mixed sediments are particularly sensitive to bottom towed gear activity because they generally contain large proportions of long-lived and sessile epifauna which are easily damaged or removed by the pass of bottom towed gears leading to reduced diversity, abundance and occurrence. There is limited information on the impacts of bottom towed gear on subtidal sand, but 'clean' sand and 'well sorted' sediments generally appear to have greater resilience to and recovery from, fishing disturbance. As the mud fraction of sand increases (for example muddy sand vs coarse sand) recovery times also increase, making muddy sediments more sensitive.

According to JNCC's Supplementary Advice on Conservation Objectives[1] for the site, the composition of subtidal coarse sediment and subtidal mixed sediments within the site predominately consist of sand, followed closely by gravel, with a smaller proportion of silt or clay. Subtidal sand's composition likewise mainly consists of sand, but with smaller amounts of gravel and silt/clay.

As per section 8.4 of the bottom towed gear Impacts Evidence document[6], the abrasion and penetration pressures from this gear type can have both biological and physical impacts. However, physical impacts are unlikely 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. Furthermore, the close contact interaction between the fishing gear and seabed can also alter the habitat structure and attract short-term scavengers.

Contact of bottom towed gear with the seabed mixes the top layer of sediment and may cause suspension of these sediments in the water column and smothering of biological communities. Scallop dredges have been shown to entrain sandy sediments up to 30 m behind the gear. The dredge teeth rake through, loosen, and break up the top layer of sediment. Sediments and faunal communities react differently to this pressure depending on grain size, the degree of sediment impaction and frequency/severity of the pressure upon them. At certain levels of intensity this pressure has the potential to impact on the species of a site, however the communities that live in sediment habitats will be adapted to some level of sedimentation in accordance with rates of natural disturbance.

The hydrodynamic regime in the site generally consists of moderate wave and current energy at the seabed, with lower wave energy towards the east of the site. The relatively dynamic and unstable conditions occurring within the site are believed to be responsible for the dominance of subtidal coarse sediment found within this site. Finer surface sediments become mobilised, and it is expected that the spatial distribution of the surface sediments could change naturally over time. It is therefore likely that biological communities that predominate in Holderness Offshore MPA are acclimatised to some level of disturbance and variation in water conditions.

Of the three sediment features of the site, 'subtidal mixed sediments' contains four biotopes that are sensitive to the relevant pressures from bottom towed gear because species can be entangled and removed by abrasion and penetration and smothered by sediment deposition. Subtidal coarse sediment contains one biotope with unknown sensitivity to this pressure, and one biotope with medium sensitivity to penetration. However, this sensitivity is based on expert judgment without any direct evidence of mortality or damage. These biotopes, and the pressures they are sensitive to, are listed above in **Table 5**.

Given that the swept area ratios for the site indicate high levels of dredging activity in two distinct portions of the site, it is likely that the sedimentary features of Holderness Offshore are experiencing very regular exposure to abrasion, penetration, suspension and smothering pressures. This activity may hinder the achievement of the 'recover to favourable condition' targets of the sediment attributes.

With regards to the discussion above, the assessed activity levels and the evidence available for the impact of bottom towed gear, **MMO concludes that the ongoing use of bottom towed gear at the activity levels described poses a significant risk of hindering the achievement of the conservation objectives of the subtidal coarse sediment, subtidal sand, subtidal mixed sediments and ocean quahog (*Arctica islandica*) features of the MPA.**

4.3.3 Traps

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

Ocean quahog (*Arctica islandica*)

The main pressure on the ocean quahog feature of Holderness Offshore MPA from traps was identified in **Table 3** as abrasion or disturbance of the substrate on the surface of the seabed.

Traps are not known to target ocean quahog in UK waters and there is no evidence of individuals being caught as bycatch by traps. However, abrasion or disturbance of the substrate on the surface of the seabed can occur through the interaction of the gear and the associated anchors and lines on the surface of the seabed, which can cause damage or disturbance to benthic species. As discussed in section 6.3 within the traps Impact Evidence document[7], ocean quahog may live just below the surface or buried in up to 14 cm of sediment with their siphons protruding, therefore there is the potential to sustain damage to their siphons via traps.

As with all fishing activity any potential impacts of traps will be driven by fishing intensity, environmental factors, and life stage of this species. The relatively dynamic and unstable conditions occurring within the site are believed to be responsible for the dominance of subtidal coarse sediment. It is therefore likely that biological communities that predominate in Holderness Offshore MPA, including ocean quahog, are acclimatised to some level of disturbance and variation in water conditions.

Eno et al (2013) used expert judgement based on scientific literature to class the habitat ‘sand and gravel with long-lived bivalves’ as highly sensitive to all intensity levels of trap activity. The sensitivity assessment of ocean quahog on MarLIN, however, only classes the feature as highly sensitive to the abrasion pressure from mobile fishing gears (Tyler-Walters and Sabatini, 2017).

Section 4.2 notes that traps were the most frequently deployed gear type by vessels over 12 m in the site and had the highest landings by weight for both under and over 12 m vessels. Despite this relatively high level of activity compared to other gears within the site, there is no direct evidence that abrasion from traps will damage ocean quahog. It is unlikely that traps at the activity levels described will cause an impact on the extent and distribution, structure and function and supporting processes attributes and therefore is compatible with the conservation objectives.

Sediment features

The main pressure on the subtidal coarse sediment, subtidal mixed sediments and subtidal sand features of Holderness Offshore MPA from traps was identified in **Table 3** as 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 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. As per section 9.4 of the traps Impacts Evidence document[7], 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 due to the small footprint of the gear type on the sea bed.

Section 4.2 describes fishing activity within Holderness Offshore MPA and notes that, according to VMS and landings data, traps are the most used gear type and are deployed throughout the site over all designated features.

As above in **section 4.3.1**, only the ‘subtidal mixed sediments’ feature contains biotopes that are sensitive to the 'abrasion/disturbance of the substrate on the surface of the seabed’ pressure, but this is only in relation to bottom towed gear. Subtidal coarse sediment contains one biotope with unknown sensitivity to this pressure. These biotopes, and the pressures they are sensitive to, are listed above in **Table 5**.

Fishing effort and landings data indicate that interactions between traps and the designated features are occurring, so there is a risk of abrasion and disturbance. However, as there are no known species with a particular sensitivity to traps present and there is minimal primary evidence of negative impacts of traps on sediment habitats, the current activity levels are unlikely to be of a concern.

Therefore, **MMO conclude that the ongoing use of traps at the activity levels described does not pose a significant risk of hindering the achievement of the conservation objectives of the subtidal coarse sediment, subtidal sand, subtidal mixed sediments or ocean quahog (*Arctica islandica*) features of the MPA.**

4.4 Part B conclusion

The assessment of anchored nets and lines, bottom towed gear and traps on ocean quahog, subtidal coarse sediment, subtidal mixed sediments, and subtidal sand features of Holderness Offshore MPA has concluded that the ongoing use of bottom towed gear at the activity levels described 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 gear for Holderness Offshore 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** - Fishing activity assessment 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 feature of the site in-combination with those 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 and the 5 km buffer, 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 activity.

Bottom towed gears were identified in **Part B** as requiring management to avoid posing a significant risk of hindering the achievement of the site's conservation objectives. Traps and anchored nets and lines are the only remaining fishing

activities occurring within Holderness 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 thirteen projects within the 5 km buffer applied.

Table 6 shows these licences and the relevant categories from the JNCC Pressures-Activities Database (PAD)[8]. Details on these licences can be viewed on the public register of marine licence applications and decisions by searching for the marine licence case reference number[9].

[8] JNCC Pressures-Activities Database (PAD): hub.jncc.gov.uk/assets/97447f16-9f38-49ff-a3af-56d437fd1951 (last accessed 22 March 2024).

[9] Public register of marine licence applications and decisions: marinelicensing.marinemanagement.org.uk/mmofox5/fox/live/MMO_PUBLIC_REGISTER (last accessed 22 March 2024)

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

Marine licence case reference number	PAD Category	Description
MLA/2016/00147/3	Offshore wind: Operation and maintenance.	Westermost Rough Windfarm. This licence supports operation and maintenance activities as required over the lifetime of the wind farm. The covered activities are in relation to the wind turbines and associated foundations. **Outside of the site boundary.** **No direct or indirect pressure pathway for impact and therefore, no in-combination effects possible.**
MLA/2016/00360	Offshore wind: Operation and maintenance.	WMR export cable repair and remediation. Potential future cable maintenance includes 5 x export cable repair events required when cable fault or failure is detected. There may also be 10 x cable remediation events required, when lengths of the cable have become exposed and require re-burial. **Outside of the site boundary.** **No direct or indirect pressure pathway for impact and therefore, no in-combination effects possible.**

Marine licence case reference number	PAD Category	Description
MLA/2018/00350	Oil spills including oil spill response.	Freshwater will be deposited out of a low flying Boeing 727 aircraft on to a fictitious oil spill. Over the 10 years covered by the licence flights will occur on average three times per month at one of the nominated locations. Holderness Offshore MPA overlaps with the Spray East area. **Inside of the site boundary.** **Possible in-combination effects.**
MLA/2014/00253/2	Physical Sampling Aggregate dredging	Aggregate dredging and sampling. Area 514. **Outside of the site boundary.** **No direct or indirect pressure pathway for impact and therefore, no in-combination effects possible.**
34633/091124/12	Offshore wind: Construction	Westermost Rough Offshore Wind Farm site- Array and cable corridor construction. **Outside of the site boundary.** **No direct or indirect pressure pathway for impact and therefore, no in-combination effects possible.**
34011/080416/8 MLA/2014/00192/5 MLA/2018/00303/1	Offshore wind: Operation and maintenance	Humber gateway OWF Generating Assets/removals/deposits. **Outside of the site boundary.** **No direct or indirect pressure pathway for impact and therefore, no in-combination effects possible.**

Marine licence case reference number	PAD Category	Description
MLA/2017/00100/1	Offshore wind: Operation and maintenance	Routine operational and maintenance activities at five Offshore Substations (Barrow, Ormonde, Lincs, Westermost Rough, and Gunfleet Sands). **Outside of the site boundary.** **No direct or indirect pressure pathway for impact and therefore, no in-combination effects possible.**
MLA/2017/00106/4	Power cable: Construction; Laying, burial and protection; operation and maintenance	ML Viking Link Offshore. A High Voltage Direct Current (HVDC) electrical interconnector which will allow the transfer of power between Great Britain and Denmark. Licence required for the construction of approximately 620km of submarine cable. **Inside of the site boundary.** **Possible in-combination effect.**

Marine licence case reference number	PAD Category	Description
MLA/2014/00555/2	Power cable: Operation and maintenance Offshore wind: Operation and maintenance	This is an operational licence for Inter Array Cable Repair for Westermost Rough Offshore Wind Farm. This licence will only be used in the case of an unexpected fault of an array cable. The licence is in place for the remaining operational lifespan of the wind farm, ending in 2035, for the repair of up to 10 array cables. Westermost Rough Offshore Wind Farm array is not situated within the MPA boundaries but does overlap with the 5km buffer. **Outside of the site boundary.** **No direct or indirect pressure pathway for impact and therefore, no in-combination effects possible.**
DCO/2013/00010	Power cable: construction; laying, burial and protection; operation and maintenance.	Dogger Bank Creyke Beck, an offshore wind development in the Dogger Bank Zone. This will include two wind farms which will connect onshore through an export cable which will run through the 5 km buffer of Holderness Offshore MPA. **Outside of the site boundary.** **No direct or indirect pressure pathway for impact and therefore, no in-combination effects possible.**

Marine licence case reference number	PAD Category	Description
MLA/2023/00303	Power cable operation and maintenance.	HOW01 Export Cable Crossing Repair, Replacement or Reburial Works. Hornsea One wind farm has been fully operational since 2021, it has been identified that some of the cable crossings may require maintenance works during the lifetime of the project. The maximum work required would include 21 positions at 5 locations along the HOW01 export cable route. These works will only be commenced in the event that a cable crossing replacement is required. This cable route is not situated within the Holderness Offshore MPA but runs through the 5km buffer area. **Outside of the site boundary.** **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 to high risk pressures exerted by fishing and non-fishing activities to identify those which require in-combination assessment (**Table 7**).

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

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

	Non-fishing activities		Fishing activities	
Potential pressures	**Oil Spills including oil spill response**	**Power cable: construction; laying, burial and protection; operation and maintenance.**	**Anchored nets and lines**	**Traps**
Abrasion or disturbance of the substrate on the surface of the seabed	Y	Y	Y	Y
Removal of non-target species			Y	Y

5.1 Fishing vs Fishing in-combination pressures

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

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

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

Section 4.3 describes the fishing activity within Holderness Offshore MPA and notes that there were no VMS records for anchored nets and lines within the site. The annual average VMS records for over 12 m vessels using traps within the MPA totalled 1,960. For under 12 m vessels, between 2016 and 2020, the annual average fishing effort

estimated to have been derived from the MPA via traps and anchored nets and lines was 18.3 days (16.38 days for traps, 1.92 days for anchored nets and lines, **Annex 1**, calculated from **Table A1. 8**). For the same period (2016-2020), the total fishing effort (under 12s) estimated to have been derived from the MPA were 109.79 days (98.26 days for traps, 11.53 days for anchored nets and lines **Annex 1**, calculated from **Table A1. 8**). The fishing effort data is further supported by the estimated live weight landings for under 12 m vessels that equal an annual average of 394 tonnes, 392 tonnes for traps and 2 tonnes for anchored nets and lines, between 2016 and 2020 (**Section 4.3**).

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, due to the annual average anchored nets and line effort being low (1.92 days) and the small spatial footprint of traps, any in-combination impact is considered insignificant.

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 Holderness MPA at the activity levels described.

5.2 Fishing vs non-fishing activities in-combination pressures

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

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

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

Activities associated with oil spill including oil spill response (MLA/2018/00350) relate to spraying freshwater over the sea surface onto a simulated oil spill. While located within the MPA boundaries, these activities occur exclusively at the sea surface and therefore are spatially separated from fishing activities causing abrasion or disturbance to the seabed. Therefore, no pathway exists for in-combination impacts from abrasion and disturbance of the substrate on the surface of the seabed between anchored nets and lines and traps, and simulated oil spill response.

As part of the Viking Link interconnector project (MLA/2017/00106/4) there are several activities which might cause abrasion or disturbance of the seabed. These relate to power cable construction; laying, burial and protection; operation and maintenance. The licence end date is 01 July 2118, and the planned cable route goes through the east of Holderness Offshore MPA, as such there is potential for in-combination effects regarding the pressure abrasion and disturbance of the seabed. Relevant activities include the laying and burial of two HVDC cables and the placement of cable protection.

The submarine cable corridor crosses 17.3 km of the 1176 km^2 MPA site and is estimated to disturb around 0.692 km^2 of benthic habitat. Grab and video analysis from stations and transects along the proposed cable route, suggest that only the designated features subtidal coarse sediment and subtidal mixed sediments will be impacted. The cable became operational in December 2023, therefore it is now only necessary to consider operation and maintenance of the cable, which is expected to be infrequent.

As detailed in **section 4.2**, at the activity levels described, anchored nets and lines and traps are not considered to be causing significant in-combination impacts on the designated features of the site through the abrasion pressure. It is possible that activities linked to the Viking-Link interconnector cable, in-combination with anchored nets and lines and traps may increase the potential for this pressure to have negative cumulative effects on the designated features of the MPA. However, these cables are already in-situ and are unlikely to have any residual abrasion and disturbance pressure on the seabed in combination with the assessed fishing activity. Any submarine cable maintenance activities are expected to be infrequent and any repair work likely to last between 2 to 6 weeks. As repairs will also only occur over required sections of the cable any impacts of this maintenance will be localised. Due to the low frequency, localised impacts and temporary nature of any repair works, abrasion and disturbance pressure from these activities are unlikely to have a significant risk of in-combination impacts with anchored nets and lines and traps. Therefore, the scale of the in-combination impacts from abrasion and disturbance of the substrate on the surface of the seabed between anchored nets and lines and traps and non-fishing activity is considered insignificant.

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

5.3 Part C conclusion

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

Part B of this assessment concluded that ongoing use of bottom towed gear on ocean quahog feature and the sedimentary features of Holderness Offshore 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 B 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 of the MPA, MMO will implement a byelaw to prohibit the use of bottom towed gear on the sedimentary features and ocean quahog feature of Holderness Offshore 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[4] document.

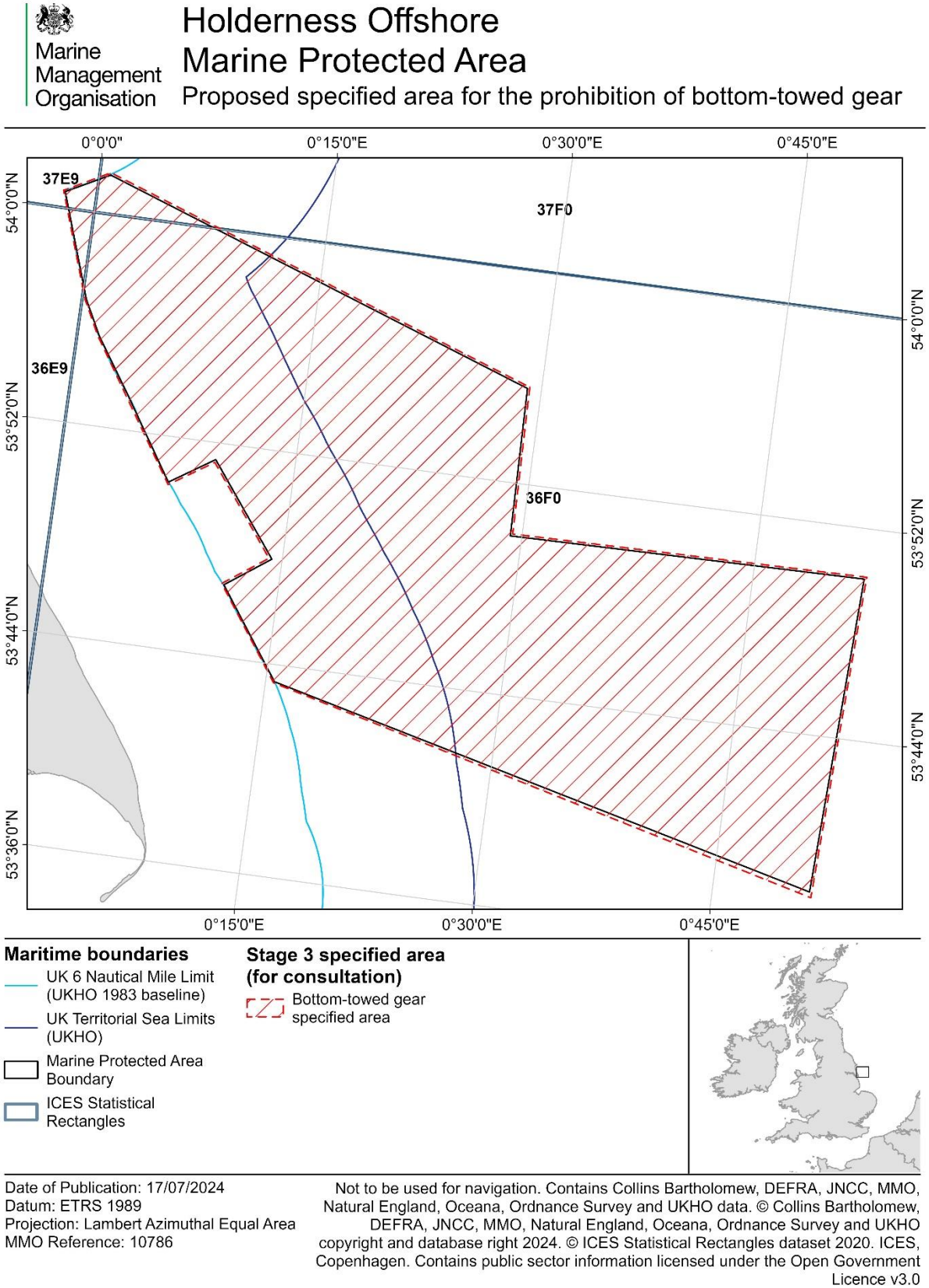


Figure 2: Map of proposed management.

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, EU Member State (EU) and European Free Trade Association (EFTA)) and proportional activity (%), per gear, per gear group, per year (2016 to 2021), totals and annual average (2016 to 2021).

			2016		2017		2018		2019		2020		2021		Total (2016 to 2021)		Annual average (2016 to 2021)
Gear group	**Gear code**	**Nation group**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**
Demersal Seine	SDN	EU	2	100	10	100	2	100	27	100	18	100	0	0	59	100	10
	SDN Total		**2**	**100**	**10**	**100**	**2**	**67**	**27**	**90**	**18**	**55**	**0**	**0**	**59**	**69**	**10**
	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**	**9**	**0**	**0**	**3**	**3**	**1**
	SSC	EU	0	0	0	0	1	100	3	100	12	100	7	88	23	96	4
	SSC	UK	0	0	0	0	0	0	0	0	0	0	1	13	1	4	0
	SSC Total		**0**	**0**	**0**	**0**	**1**	**33**	**3**	**10**	**12**	**36**	**8**	**100**	**24**	**28**	**4**
Demersal Seine Total			**2**	**0**	**10**	**0**	**3**	**0**	**30**	**1**	**33**	**2**	**8**	**0**	**86**	**0**	**14**
Demersal trawl	OTB	EU	108	100	101	100	9	100	78	100	51	100	29	100	376	100	63
	OTB Total		**108**	**100**	**101**	**100**	**9**	**100**	**78**	**100**	**51**	**100**	**29**	**97**	**376**	**100**	**63**
	PTB	EU	0	0	0	0	0	0	0	0	0	0	1	100	1	100	0
	PTB Total		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**3**	**1**	**0**	**0**
Demersal trawl Total			**108**	**3**	**101**	**3**	**9**	**0**	**78**	**3**	**51**	**2**	**30**	**1**	**377**	**2**	**63**
Dredge	DRB	EU	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0

			2016		2017		2018		2019		2020		2021		Total (2016 to 2021)		Annual average (2016 to 2021)
Gear group	**Gear code**	**Nation group**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**	**%**	**Count**
	DRB	UK	407	100	1,106	100	2,325	100	1,058	100	154	100	487	100	5537	100	923
	DRB Total		**407**	**100**	**1,107**	**99**	**2,325**	**100**	**1,058**	**100**	**154**	**100**	**487**	**100**	**5,538**	**100**	**923**
	HMD	UK	0	0	11	100	0	0	0	0	0	0	0	0	11	100	2
	HMD Total		**0**	**0**	**11**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**11**	**0**	**2**
Dredge Total			**407**	**12**	**1,118**	**36**	**2,325**	**64**	**1,058**	**38**	**154**	**7**	**487**	**18**	**5,549**	**31**	**925**
Midwater - surrounding	PS	EU	0	0	0	0	0	0	4	100	0	0	0	0	4	100	1
	PS Total		**0**	**0**	**0**	**0**	**0**	**0**	**4**	**100**	**0**	**0**	**0**	**0**	**4**	**100**	**1**
Midwater - surrounding Total			**0**	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**4**	**0**	**1**
Midwater Trawl	OTM	EU	0	0	1	100	25	100	0	0	8	100	0	0	34	100	6
	OTM Total		**0**	**0**	**1**	**100**	**25**	**100**	**0**	**0**	**8**	**100**	**0**	**0**	**34**	**100**	**6**
Midwater Trawl Total			**0**	**0**	**1**	**0**	**25**	**1**	**0**	**0**	**8**	**0**	**0**	**0**	**34**	**0**	**6**
Traps	FPO	EU	0	0	0	0	0	0	0	0	7	0	0	0	7	0	1
	FPO	UK	2,855	100	1,884	100	1,291	100	1,596	100	1,938	100	2,190	100	11,754	100	1,959
	FPO Total		**2,855**	**100**	**1,884**	**100**	**1,291**	**100**	**1,596**	**100**	**1,945**	**100**	**2,190**	**100**	**11,761**	**100**	**1,960**
Traps Total			**2,855**	**85**	**1,884**	**61**	**1,291**	**35**	**1,596**	**57**	**1,945**	**89**	**2,190**	**81**	**11,761**	**66**	**1,960**
Unknown	NK	EU	0	0	0	0	0	0	12	57	0	0	0	0	12	57	2
	NK	EFTA	0	0	0	0	0	0	9	43	0	0	0	0	9	43	2
	NK Total		**0**	**0**	**0**	**0**	**0**	**0**	**21**	**100**	**0**	**0**	**0**	**0**	**21**	**100**	**4**
Unknown Total			**0**	**0**	**0**	**0**	**0**	**0**	**21**	**1**	**0**	**0**	**0**	**0**	**21**	**0**	**4**
Grand Total			**3,372**	**5**	**3,114**	**4**	**3,653**	**5**	**2,787**	**4**	**2,191**	**3**	**2,715**	**4**	**17,832**	**4**	**2,972**

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

Gear group	Gear code	2016	2017	2018	2019	2020	Total (2016 to 2020)	Average (2016 to 2020)
Dredge	DRB	76.98	256.93	435.51	62.46	28.96	860.84	172.17
	HMD	0.00	1.33	0.00	0.00	0.00	1.33	0.27
Dredge total		**76.98**	**258.26**	**435.51**	**62.46**	**28.96**	**862.17**	**172.43**
Traps	FPO	844.48	706.93	370.26	525.22	633.51	3,080.41	616.08
Traps total		**844.48**	**706.93**	**370.26**	**525.22**	**633.51**	**3,080.41**	**616.08**
Grand total		**921.46**	**965.19**	**805.78**	**587.68**	**662.47**	**3,942.58**	**788.52**

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

Gear group	Gear code	2016	2017	2018	2019	2020	Total (2016-2020)	Average (2016-2020)
Demersal seine	SDN	0.00	0.03	0.00	2.55	0.02	2.59	0.52
	SSC	0.00	0.00	6.11	0.12	17.26	23.48	4.70
Demersal seine total		**0.00**	**0.03**	**6.11**	**2.67**	**17.27**	**26.07**	**5.21**
Demersal trawl	OTB	12.12	13.45	0.95	56.63	6.21	89.36	17.87
Demersal trawl total		**12.12**	**13.45**	**0.95**	**56.63**	**6.21**	**89.36**	**17.87**
Midwater trawl	OTM	0.00	7.60	143.13	0.00	479.34	630.06	126.01
Midwater trawl total		**0.00**	**7.60**	**143.13**	**0.00**	**479.34**	**630.06**	**126.01**
Grand total		**12.12**	**21.08**	**150.19**	**59.30**	**502.82**	**745.50**	**149.10**

Table A1. 4: Percentage of each ICES rectangle intersected by Holderness Offshore MPA.

ICES rectangle	Percentage overlap (%)
36E9	1.15
36F0	32.21
37E9	0.29
37F0	0.35

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

Gear group	Gear code	2016	2017	2018	2019	2020	Total (2016-2020)	Average (2016-2020)
Anchored nets and lines	GEN	0.18	0.21	0.00	0.00	0.00	0.39	0.08
	GN	0.12	0.19	0.13	0.02	0.06	0.52	0.10
	GNS	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	GTR	0.14	0.25	0.00	0.00	1.17	1.56	0.31
	LL	2.42	0.29	1.10	0.80	0.65	5.27	1.05
	LLS	0.00	0.00	0.09	0.00	0.00	0.09	0.02
Anchored nets and lines total		**2.86**	**0.95**	**1.33**	**0.81**	**1.88**	**7.83**	**1.57**
Demersal trawl	OT	0.05	0.00	0.00	0.00	0.00	0.05	0.01
	OTB	0.04	0.16	0.35	0.09	0.28	0.92	0.18
	TBB	0.03	0.00	0.00	0.00	0.00	0.03	0.01
	TBN	0.00	0.0009	0.00	0.00	0.00	0.0009	0.0002
Demersal trawl total		**0.12**	**0.16**	**0.35**	**0.09**	**0.28**	**1.01**	**0.20**
Dredge	DRB	0.34	0.60	0.56	0.82	0.40	2.72	0.54
Dredge total		**0.34**	**0.60**	**0.56**	**0.82**	**0.40**	**2.72**	**0.54**

Gear group	Gear code	2016	2017	2018	2019	2020	Total (2016-2020)	Average (2016-2020)
Midwater - gill drift	GND	0.00	0.00	0.09	0.00	0.00	0.09	0.02
Midwater - gill drift total		**0.00**	**0.00**	**0.09**	**0.00**	**0.00**	**0.09**	**0.02**
Midwater hook/lines	LHP	0.00	0.0002	0.00	0.00	0.00	0.0002	0.00003
	LX	0.01	0.00	0.00	0.00	0.00	0.01	0.00
Midwater hook/lines total		**0.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.01**	**0.00**
Traps	FIX	0.00	0.01	0.00	0.00	0.00	0.01	0.00
	FPO	379.23	375.93	369.04	475.74	360.44	1,960.38	392.08
Traps total		**379.23**	**375.93**	**369.04**	**475.74**	**360.44**	**1,960.39**	**392.08**
Grand total		**382.56**	**377.64**	**371.38**	**477.47**	**363.00**	**1,972.05**	**394.41**

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

Gear group	Gear code	2016	2017	2018	2019	2020	Total (2016-2020)	Average (2016-2020)
Anchored nets and lines	GNS	0.00	0.00	0.00	0.01	0.09	0.11	0.02
Anchored nets and lines total		**0.00**	**0.00**	**0.00**	**0.01**	**0.09**	**0.11**	**0.02**
Demersal seine	SSC	0.00	0.00	0.00	0.00	0.73	0.73	0.15
Demersal seine total		**0.00**	**0.00**	**0.00**	**0.00**	**0.73**	**0.73**	**0.15**
Demersal trawl	TBB	0.00	0.00	0.00	0.29	0.29	0.58	0.12
Demersal trawl total		**0.00**	**0.00**	**0.00**	**0.29**	**0.29**	**0.58**	**0.12**
Traps	FPO	0.02	0.002	0.001	0.0003	0.00	0.03	0.01
Traps total		**0.02**	**0.00**	**0.00**	**0.00**	**0.00**	**0.03**	**0.01**
Grand Total		**0.02**	**0.00**	**0.01**	**0.30**	**1.11**	**1.44**	**0.29**

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

Gear group	SAR category	2016	2017	2018	2019	2020
		Mean	Mean	Mean	Mean	Mean
Demersal seines	Surface	0.00	0.02	0.00	0.02	0.09
	Subsurface	0.00	0.00	0.00	0.00	0.00
Demersal trawls	Surface	0.04	0.03	0.01	0.01	0.02
	Subsurface	0.00	0.03	0.00	0.00	0.00
Dredges	Surface	0.04	0.12	0.19	0.05	0.01
	Subsurface	0.04	0.12	0.19	0.05	0.01
Bottom towed gear total	**Surface**	**0.08**	**0.17**	**0.20**	**0.08**	**0.12**
	Subsurface	**0.04**	**0.15**	**0.19**	**0.05**	**0.03**

Table A1. 8: Fishing effort (days) recorded by UK vessels under 12 m in length, separated by gear type for the area of Holderness Offshore MPA that intersects the marine portion of ICES rectangles 36E9, 36F0, 37E9 and 37F0 (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 (Table A1.4).

Gear group	Fishing effort (days at sea)							
	2016	2017	2018	2019	2020	2021	Total (2016 to 2021)	Annual average (2016 to 2021)
Demersal seine	0.04	0	0	0	0	0	0.04	0.01
Demersal trawl	0.18	1.11	1.24	2.86	0.60	2.28	8.27	1.38
Dredge	0	0	0.13	0.22	0.03	0	0.39	0.06
Bottom towed gear total	**0.22**	**1.11**	**1.37**	**3.08**	**0.63**	**2.28**	**8.71**	**1.45**
Midwater gill drift	0	0	0	0.01	0	0	0.01	>0
Midwater trawl	0	0	0	0	0	0.18	0.18	0.03
Midwater hooks and lines	2.34	1.33	1.18	1.82	0.97	0.60	8.24	1.37
Midwater gear total	**2.34**	**1.33**	**1.18**	**1.84**	**0.97**	**0.78**	**8.43**	**1.41**
Traps	13.48	14.38	21.53	23.53	14.84	10.51	98.26	16.38
Anchored nets and lines	2.11	1.96	2.40	1.09	1.85	2.12	11.53	1.92
Static gear total	**15.59**	**16.33**	**23.93**	**24.62**	**16.69**	**12.63**	**109.79**	**18.30**
MPA total	**18.15**	**18.78**	**26.48**	**29.54**	**18.30**	**15.68**	**126.93**	**21.15**