Marine Management Organisation

MMO Stage 3 Site Assessment: Haisborough, Hammond and Winterton MPA (DRAFT)

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Title: MMO Stage 3 Site Assessment: Haisborough, Hammond and Winterton MPA

Contents

Executive Summary

This assessment analyses the impact of anchored nets and lines, bottom towed gear and traps on the designated features ‘Annex I sandbanks which are slightly covered by sea water all the time’, and ‘Annex I Reefs’ in Haisborough, Hammond and Winterton Marine Protected Area (MPA) to determine whether an adverse effect on site integrity can be excluded. The assessment sets out the evidence considered and analyses the quality of that evidence.

The assessment finds that that the use of bottom towed gear and traps may have an adverse effect on the site integrity of the MPA and both its designated features. As such The Marine Management Organisation (MMO) concludes that management measures are required to restrict bottom towed gear and traps from Haisborough, Hammond and Winterton MPA.

Section 6 contains further details of these measures.

1 Introduction

This assessment considers whether fishing activities are compatible with the conservation objectives of Haisborough, Hammond and Winterton MPA.

This site is designated as a special area of conservation (SAC). This assessment uses the best available evidence to review site characteristics and fishing activity and determine if fishing activity is causing an adverse effect on the integrity 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 and Joint Nature Conservation Committee (JNCC) conservation advice packages were used for background on site geography, designations, features, conservation objectives and general management approaches in this assessment:

- JNCC Site Information – Haisborough, Hammond and Winterton MPA[1]; and
- Natural England and JNCC Conservation Advice – Haisborough, Hammond and Winterton MPA[2].

Haisborough, Hammond and Winterton MPA is located off the east coast of Norfolk and lies across the 6 nautical miles (nm) and 12 nm boundaries, partly in territorial waters and partly in offshore waters and covers 1,468 km^2 (**Figure 1**). The area of the site within MMO's jurisdiction is 1,330 km^2. The relevant statutory nature conservation bodies for the site are Natural England (0 to 12 nm) and JNCC (12 nm to 200 nm).

Haisborough, Hammond and Winterton MPA was designated as an SAC in 2017 to protect two Annex I priority habitats (**Figure 1**). The site contains a series of 'sandbanks which are slightly covered by sea water all the time' which run parallel to the coast and are composed of both subtidal sand and subtidal course sediment. The sandbank system consists of Haisborough Sand, Haisborough Tail, Hammond Knoll, Winterton Ridge and Hearty Knoll sandbanks. The sandbanks known as Hewett Ridge and Smiths Knoll are located along the outer site boundary, and Newarp Banks and North and Middle Cross Sands sandbanks lie on the southwest corner of the site. The peaks and troughs of the sandbanks supply the different physical habitats which support different biological communities. Polychaeta and amphipoda dominate the crests of the dunes, a mobile sediment environment, characteristic of low diversity. The sandbanks provide a breeding and nursey ground for commercially viable important fish species including sandeel (*Ammodytes spp*.), common dab (*Limanda limanda)* and European plaice (*Pleuronectes platessa*). The troughs can be as deep as 52 m beneath the sea surface and contain the coarser subtidal sediments, the preferred habitat for the tube-building ross worm *Sabellaria*

[1] JNCC Site Information – Haisborough, Hammond and Winterton MPA jncc.gov.uk/our-work/haisborough-hammond-and-winterton-mpa/ (last accessed 9 October 2023)

[2] Natural England and JNCC Conservation Advice – Haisborough, Hammond and Winterton MPA designatedsites.naturalengland.org.uk/Marine/MarineSiteDetail.aspx?SiteCode=UK0030369 (last accessed 10 October 2023)

spinulosa. S. spinulosa reefs are also a designated feature of the site and have been found in the troughs between the sandbanks, including at Haisborough Tail, Haisborough Gat, between Winterton Ridge and Hewett Ridge, and south of Middle Cross Sands. This habitat provides stability to the sandbank and encourages diverse aggregations of epifaunal and infaunal communities, increasing biodiversity within the reef, creating a hotspot of biodiversity. The series of sandbanks present within the site represent dynamic sediment environments and due to the prevailing currents, are highly mobile and appear to be moving eastwards and northwards. This is evidenced by megaripple and sandwave formations on the banks.

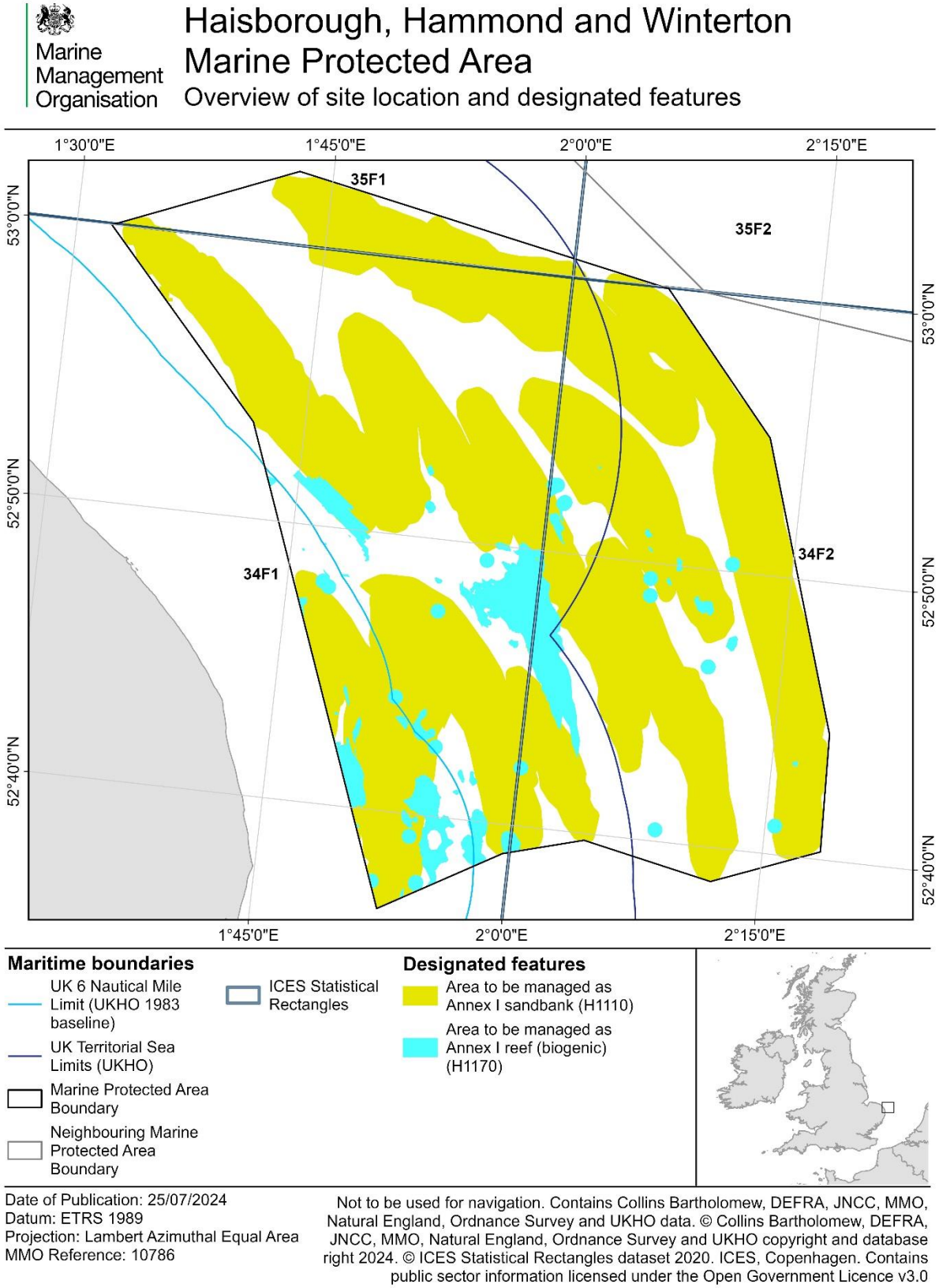

Figure 1: Site overview map.

The designated features and their conservation objectives are set out in

Table 1.

Table 1: Designated features, including supporting habitats, and conservation objectives.

Designated feature	Sub-feature	Conservation objective
Annex I Sandbanks which are slightly covered by sea water all the time	• Subtidal coarse sediment; and • subtidal sand.	For the feature to be in favourable condition thus ensuring site integrity in the long term and contribution to Favourable Conservation Status of Sandbanks which are slightly covered by sea water all the time. This contribution would be achieved by restoring, subject to natural change; • the extent and distribution of the qualifying habitat in the site; • the structure and function of the qualifying habitat in the site; and • the supporting processes on which the qualifying habitat relies.
Annex I Reefs	Subtidal biogenic reefs: Ross worm (*Sabellaria* spp.) reef	

Natural England and JNCC conducted a condition assessment of Haisborough, Hammond and Winterton in 2018/19, which used a vulnerability assessment approach due to insufficient monitoring evidence against a baseline to do a condition assessment. The assessments concluded the designated features to be in unfavourable - unknown condition. The conservation objectives of both designated features have been set as restore as a result of the assessments.

The restore target has been set for the sites attributes due to the presence of, and consent for the installation of hard substrate, and the fishing activity taking place within the site. These activities in relation to the high sensitivity of the features may impact the site's attributes. Biotope data for features within Haisborough, Hammond and Winterton MPA are only available at the bioregion level for Southern North Sea. More information can be found in Natural England and JNCC supplementary advice on conservation objectives – Haisborough, Hammond and Winterton SAC[2]

2.2 Scope of this assessment

The scope of this assessment covers fishing activities alone, and relevant plans or projects in combination with fishing. It does not cover areas of this site inshore of 6 nm, for which Eastern Inshore Fisheries and Conservation Authority (IFCA) is the regulator.

Bottom towed gear interactions with the features Annex I reef: biogenic (*S. spinulosa*) have not been included in this assessment as they have already been addressed in the MMO Stage 2 assessment of Haisborough, Hammond and Winterton MPA and prohibited by the MMO Marine Protected Areas Bottom Towed Fishing Gear Byelaw 2023. Stage 2 assessed the impacts of fishing using bottom towed gears on rock and rocky and biogenic reef in 13 MPAs.

3 Part A - Identified pressures on the MPA

Part A of this assessment was carried out in a manner that is consistent with the 'likely significant effect (LSE)' test required by regulation 63 of the Conservation of Habitats and Species Regulations 2017[3] and regulation 28 of the Conservation of Offshore Marine Habitats and Species Regulations 2017[4].

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

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

2. The pressure-feature interactions **are** included for assessment in Part B:
    a. if the feature is exposed to the pressure, or is likely to be in the future;
    b. if the potential scale or magnitude of any effect is likely to be significant;
    c. if it is not possible to determine whether the magnitude of any effect is likely to be significant; 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] For more information see: www.legislation.gov.uk/uksi/2017/1012/regulation/63
[4] For more information see: www.legislation.gov.uk/uksi/2017/1013/regulation/28

3.1 Activities taking place

Table 2 lists all commercial fishing gears included for assessment. All other gears are excluded from 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.

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);
- expert opinion from MMO marine officers, inshore fisheries and conservation officers; and
- swept area ratio (SAR) data.

For more information about the above evidence sources, please see the Stage 3 MPA Site Assessment Methodology document[5], which describes each type of fishing activity evidence and summarises the strengths and limitations of each source.

[5] Stage 3 MPA Site Assessment Methodology document: www.gov.uk/government/publications/stage-3-site-assessments (last accessed 11 September 2024).

Table 2: Fishing activities covered by this assessment present in VMS records (2016 to 2021) and landings data (2016 to 2020) for Haisborough, Hammond and Winterton 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
	Longline (unspecified)	LL	
	Longlines (demersal)	LLS	
	Set gillnet (anchored)	GNS	
	Trammel net	GTR	
Bottom towed gear	Beam trawl	TBB	Present in VMS records and under 12 m landings data for ICES statistical rectangles that overlap the site
	Bottom otter trawl	OTB	
	Otter trawls (unspecified)	OT	
	Danish / anchor seine	SDN	Present in VMS records
	Bottom pair trawl	PTB	Present in under 12 m landings data for ICES statistical rectangles that overlap the site
	Scottish / fly seine	SSC	
	Twin bottom otter trawl	OTT	
Midwater gear	Drift gillnet	GND	
	Hand-operated pole-and-line	LHP	
	Hook and line (unspecified)	LX	
	Midwater otter trawl	OTM	Present in VMS records
Traps	Fyke net	FYK	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
Miscellaneous	Miscellaneous	MHX, MIS	Present in under 12 m landings data for ICES statistical rectangles that overlap the site
Unknown	Unknown	NK	Present in VMS records

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 Haisborough, Hammond and Winterton MPA.

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

- **Midwater gears:** although the use of midwater gears does occur within Haisborough, Hammond and Winterton 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 Haisborough, Hammond and Winterton MPA is not considered to be capable of affecting the designated features other than insignificantly and is not considered further within this assessment.
- **Bottom towed gear interactions with the feature Ross worm (*Sabellaria spinulosa)* reefs:** these interactions have not been included in this assessment as they have already been addressed in the Stage 2 assessment of Haisborough, Hammond and Winterton MPA[6]. Stage 2 assessed the impacts of fishing using bottom towed gears on rock, rocky and biogenic reef in 13 MPAs. These features were chosen for Stage 2 as they are some of the most sensitive to the impacts of bottom towed gear.
- **Miscellaneous and 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.

3.3 Pressures to be taken forward to Part B

The Stage 3 Fishing Gear MPA Impacts Evidence documents were created which 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.

[6] Stage 2 MPA Fisheries Assessment: assets.publishing.service.gov.uk/media/65bb6d583e26be0011e47e23/Stage_2_MPA_Fisheries_Assessment.pdf (last accessed 08/09/2023)

- Stage 3 Fishing Gear MPA Impacts Evidence Anchored Nets and Lines[7];
- Stage 3 Fishing Gear MPA Impacts Evidence Bottom Towed Gear[8]; and
- Stage 3 Fishing Gear MPA Impacts Evidence Traps[9].

To determine whether a pressure should be taken forward for this particular site, **Table 3** uses the information from the Impacts Evidence documents, alongside site level information, including sensitivity assessments, 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 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 Anchored Nets and Lines: www.gov.uk/government/publications/stage-3-impacts-evidence (last accessed: 11 September 2024).
[8] Stage 3 Fishing Gear MPA Impacts Evidence Bottom Towed Gear: www.gov.uk/government/publications/stage-3-impacts-evidence (last accessed: 11 September 2024).
[9] Stage 3 Fishing Gear MPA Impacts Evidence Traps: www.gov.uk/government/publications/stage-3-impacts-evidence (last accessed: 11 September 2024).

Table 3: Summary of pressures on designated features of Haisborough, Hammond and Winterton MPA to be taken forward to Part B.

Potential pressures	Designated features and sub-features							
	Annex I Reef		Annex I Sandbanks which are slightly covered by sea water all the time					
	S. spinulosa reef		Subtidal coarse sediment			Subtidal sand		
	A	T	A	B	T	A	B	T
Abrasion or disturbance of the substrate on the surface of the seabed								
Barrier to species movement								
Changes in suspended solids (water clarity)								
Deoxygenation								
Hydrocarbon and polycyclic aromatic hydrocarbon (PAH) contamination								
Introduction of light								
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 sediment type)								
Removal of non-target species								
Removal of target species								
Smothering and siltation rate changes								
Synthetic compound contamination								
Transition elements and organo-metal contamination								
Underwater noise changes								

4 Part B – Fishing activity assessment

Part B of this assessment was carried out in a manner that is consistent with the 'appropriate assessment' required by regulation 63 of the Conservation of Habitats and Species Regulations 2017[3] and regulation 28 of the Conservation of Offshore Marine Habitats and Species Regulations 2017[4].

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

Table 4: Relevant favourable condition targets for identified pressures for all site features.

Attribute	Target	Relevant pressures (See Table 3)
Distribution: presence and spatial distribution of biological communities [Δ]	Restore the presence and spatial distribution of subtidal sandbank communities and reef communities.	Following pressures are important for all gear types and have potential to impact attribute: • Abrasion or disturbance of the substrate on the surface of the seabed; • Removal of non-target species; and • Removal of target species. Following pressures are important only for bottom towed gear: • Smothering and siltation rate changes; • Changes in suspended solids (water clarity); and • Penetration and/or disturbance of the substrate below the surface of the seabed, including abrasion.
Structure and function: presence and abundance of key structural and influential species[Δ]	Restore the abundance of listed species to enable each for them to be a viable component of the habitat.	
Structure: sediment composition and distribution*	Restore the distribution of sediment composition across the feature.	
Structure: species composition of component communities [Δ]	Restore the species composition of all component communities.	
Supporting processes: sediment movement and hydrodynamic regime (habitat)	Maintain all hydrodynamic and physical conditions.	
Extent and distribution	Restore the total extent and spatial distribution of all designated features.	
Supporting processes: water quality - turbidity	Maintain natural levels of turbidity across the habitats.	
Structure: topography and volume*	Maintain the presence of topographic features and volume of sediment in the sandbank.	

Attributes marked with superscript symbol (*) are relevant to the Annex I Sandbanks which are slightly covered by sea water all the time designated feature only. Attributes marked with superscript symbol ([Δ]) are only relevant to the removal of target/non-target species pressure.

4.1 Fisheries access and existing management

Non-UK vessels also operate within Haisborough, Hammond and Winterton MPA. Between 6 and 12 nm, vessels from France and Belgium have access, and outside of 12 nm, additional nationalities are present including Germany and the Netherlands. The majority of fishing within the MPA are vessels from the Netherlands. More information on non-UK vessel access to UK waters can be found on MMO's Single Issuing Authority page[10].

The Kingfisher fishing restriction map (Seafish, 2023) contains information on MPA management measures for the portion of the site inside of 6 nm. More information on these byelaws can be found on Eastern IFCA's website[11]. MMO will continue to engage directly with IFCAs regarding recommended management measures nearby/adjacent to their areas of jurisdiction.

Offshore of 6nm, Haisborough, Hammond and Winterton MPA is subject to the following MMO byelaw:

- Marine Protected Areas Bottom Towed Fishing Gear Byelaw 2023 to conserve the following marine fauna and habitats:
  I. Annex I reef,
  II. high energy circalittoral rock,
  III. moderate energy circalittoral rock,
  IV. fragile sponge and anthozoan communities on subtidal rocky habitats; and
  V. pink sea-fan (*Eunicella verrucosa*).

4.2 Fishing activity summary

Table A1. 1 to **Table A1. 8** in Annex 1 display a detailed breakdown of fishing activity within Haisborough, Hammond and Winterton MPA.

Demersal trawling is the most prevalent fishing activity within the MPA with an annual average of 1,073 VMS records from vessels over 12 m in length, over the 6-year period (2016 to 2021) with beam trawling accounting for 99 % of the VMS records. Between 2016 to 2020 vessels over 12 m in length landed a total of 619.72 tonnes (t) with demersal trawling accounting for 578.32 t, a total of 93 % of all over 12 m vessels fishing activity. Vessels under 12 m in length using demersal trawls, landed an annual average of 1.13 t in the same period. Swept area ratio (SAR)

[10] The UK Single Issuing Authority: www.gov.uk/guidance/united-kingdom-single-issuing-authority-uksia (Last accessed on: 23 August 2023).

[11] Eastern IFCA Byelaw Summary: www.eastern-ifca.gov.uk/byelaws/ (Last accessed on: 10 October 2023)

analysis indicates that demersal trawl activity for the period 2016 to 2020 is concentrated in the southeast corner of the site. Surface SAR values for C-squares intersecting Haisborough, Hammond and Winterton MPA ranges between 0.26 and 0.44, and subsurface values between 0.26 and 0.44. A SAR value of 1 means that each area C-square experiences a pass of fishing gear on average once a year. VMS activity shows that demersal trawling occurs only beyond the 12 nm limit within the MPA and is more concentrated in the southeast section, particularly along the site boundary. No dredging for scallops occurs within the site. There is no VMS or landings data to indicate that there is any dredging occurring in the site.

The use of traps (pots and creels) occurs within the site although VMS data concludes that very limited activity occurs by vessels over 12 m in length. A total of 5 trap VMS records occurred in 2020 landing 3.82 t and no records occurred in other years. Vessels under 12 m in length landed an annual average of 127.35 t over the same period equating to 90 % of all landings for vessels under 12 m. UK under 12 m landings data, which are recorded at ICES rectangle level and have been attributed to the MPA based on the proportion of the ICES rectangles it overlays, indicates that there may be a significant level of traps being used within the site; an annual average of approximately 855 days fishing effort was recorded between 2016 and 2021.

There is no VMS activity data or landings data to suggest that vessels over 12 m in length are using anchored nets and lines within the MPA. Vessels using this gear, and under 12 m in length have landed 2.15 t annually on average over the 5-year period (2016 to 2020) equating to 1.5 % of total landing for vessels under 12 m in length.

4.3 Pressures by gear type

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

The Annex I feature ‘Sandbanks which are slightly covered by sea water all the time’ is comprised of the subtidal coarse sediment and subtidal sand sub-features. These sub-features have similar sensitivities to the pressures identified for different gear types, so 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.

Annex 2 contains tables of all of the biotopes within the Southern North Sea bioregion according to Natural England and JNCC Conservation Advice[2]. Using the most current and available research (Eggleton *et al.*, 2020), evidence suggests there are a number of these biotopes present within Haisborough, Hammond and Winterton MPA. These are presented in **Table A2. 1** alongside their sensitivities to relevant pressures from different fishing gears. A number of biotopes are also unlikely to be present with the MPA based on the biology and ecology of keystone species within the biotope and habitats present within the site. These are presented in **Table A2. 2** and have been ruled out from this assessment according to the following reasoning. The biotope '*Echinocardium cordatum* and *Ensis* spp. in lower shore and shallow sublittoral slightly muddy fine sand' (De-Bastos *et al.*, 2023) is unlikely to be present in the site because direct monitoring surveys identified the sediment of the MPA as medium to very coarse, which is not a suitable habitat for these species. Furthermore, direct sampling of the sandbanks found no evidence of this biotope (Eggleton *et al.*, 2020). Four *S. spinulosa* biotopes are not being considered as they are all associated with circalittoral rock which is not present within the MPA (Tillin, Gibb, *et al.*, 2023; Tillin, Marshall, Gibb, Lloyd, *et al.*, 2023a, 2023b; Tillin, Marshall, Gibb, Williams, *et al.*, 2023). However, it must be acknowledged that there is a lack of data and therefore does not equate to confirmed absence, and hence confidence in the absence of the biotopes not being considered must be regarded as low.

The biotopes within the designated features of the site with at least medium sensitivity to the relevant pressures from different fishing gears are presented in **Table 5**.

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

Table 5: Biotopes within the designated features of the site with at least medium sensitivity to the relevant pressures from different fishing gears.

Designated feature	Broad-scale habitats	Biotopes	Sensitivity to relevant pressures
Annex I Reef	*S. spinulosa* reef	*Sabellaria spinulosa* on stable circalittoral mixed sediment (Tillin et al., 2022)*	Medium sensitivity to abrasion from anchored nets and lines, and traps.
Annex I Sandbanks	Subtidal coarse sediment	*Hesionura elongata* and *Microphthalmus similis* with other interstitial polychaetes in infralittoral mobile coarse sand (Marshall, Ashley and Watson, 2023)	Medium sensitivity to penetration from demersal trawls.

4.3.1 Anchored nets and lines

The following features of Haisborough, Hammond and Winterton MPA have been considered in relation to the following pressures from anchored nets and lines:

Annex I sandbanks which are slightly covered by sea water all the time

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

Static gears such as anchored nets and lines are found to have a relatively low impact on benthic sandbank communities compared to other gear types due to the small spatial footprint of the gear. Section 9.4 of the anchored nets and lines Impacts Evidence documents[7] discusses the pressures associated with this gear type on sandbanks and sediments. Abrasion of the seabed can occur especially during hauling of the gear or when the gear is subjected to strong tides, currents, or storm activity, predominantly from the footropes and anchors. However, these impacts will vary depending on several variables including intensity of the activity in an area, exposure to natural disturbance and the presence of particularly sensitive species.

Sandbanks contain a mixture of different physical habitats with individually different biological communities. The flanks and troughs of the sandbanks have more stable coarse sediments which encourage diverse infaunal and epifaunal communities which when damaged are often slow to recover. Haisborough, Hammond and Winterton MPA contain five relevant biotopes for the coarse sediment sub-feature (**Table A2. 2**) ranging from not sensitive to low sensitivity to the abrasion pressure due to the key species resilience to scour and wave action, and a high rate of recolonisation through larval dispersal (Marshall, Ashley and Watson, 2023; McQuillan, Tillin and Watson, 2023; Tillin, 2023; Tillin and Watson, 2023; Tyler-Walters and Tillin, 2023). However, recovery of the feature will depend on the level and frequency of the pressure acting on it.

Subtidal clean sand communities are likely to recover from disturbance more quickly compared to muddy sand habitats which have slower physical and biological recovery rates highlighting the complexities within the subtidal sand feature. There are six subtidal sand biotopes which may be present within the 'Sandbanks which are slightly covered by sea water all the time' feature for the MPA (**Table A2. 2**). However, all six are either not sensitive or have low sensitivity to the abrasion or disturbance of the substrate on the surface of the seabed pressure associated with all fishing gear types (Readman and Garrard, 2019; Tillin, Tyler-Walters and Garrard, 2019; Tyler-Walters and Garrard, 2019; Tillin and Garrard, 2022; Tillin and Rayment, 2022; Tillin and Budd, 2023). Key species within the biotopes, such as *Nephtys cirrose* (Tillin and Garrard, 2022) are subjected to hydrodynamic disturbance and as such can tolerate greater stresses and disturbance. Furthermore, some of the characterising macrofauna within these biotopes, breed several times per lifetime and have a high reproductive capacity.

Therefore, **MMO concludes that the ongoing use of anchored nets and lines over Annex I sandbanks at the activity levels described will not result in an adverse effect on site integrity.**

Biogenic reef – Ross worm (*Sabellaria spinulosa*) reefs

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

Reef formed by *S. spinulosa* are structurally fragile and therefore interactions with any fishing gear have the potential to negatively impact the habitat and associated biotopes (Tillin *et al.*, 2022). Section 8.3 of the anchored nets and lines Impacts Evidence documents[7] describes the impacts from abrasion/disturbance pressure and notes that netting on a *S. spinulosa* reef should have a low impact due to the small footprint of the activity. However, surface abrasion is still likely to occur during retrieval of the gear, or when the gear is subjected to strong tides and storm activity, which can reduce abundance, biomass species richness and inevitably ecosystem function and productivity. Physical disturbance can result in the epifauna, especially emergent species, being dislodged or damaged. However certain events such as fracturing damage, or partial removal of *Sabellaria spp.* reef structure, may not result in the complete disappearance of the reef. It has been shown that damaged parts of the reef can be rebuilt in time, depending on the extent and nature of the damage as per section 8.1.2 in the anchored nets and lines Impacts Evidence document[7]. Development of such reefs is assisted by the settlement of *Sabellaria* larvae which are known to selectively settle in areas of suitable substrate, particularly on existing *Sabellaria* tubes. Sensitivity and resilience for the biotope '*Sabellaria spinulosa* on stable circalittoral mixed sediment' to the abrasion/disturbance pressure is assessed as medium as surface abrasion can severely damage or remove a reef (Tillin *et al.*, 2022).

The impact of the abrasion/disturbance pressure associated with anchored nets and lines will vary depending on gear type, fishing intensity, habitat and environmental factors. **Section 4.2** identifies that very limited activity is taking place using anchored nets and lines by over 12 m vessels and the majority of activity taking place by under 12 m vessels is occurring in ICES area 34F1 which occupies 36 % of the MPA. Due to the static nature and small footprint of the gear, the resilience and sensitivity of the biotopes to the abrasion pressure, and the low levels of fishing activity (anchored nets and lines) present within the site the impacts on the reef feature are expected to be minimal.

Therefore, **MMO concludes that the ongoing use of anchored nets and lines over Ross worm (*Sabellaria spinulosa*) reefs at the activity levels described will not result in an adverse effect on site integrity.**

4.3.2 Bottom towed gear

The following features of Haisborough, Hammond and Winterton MPA have been considered in relation to the following pressures from bottom towed gear:

Annex I sandbanks which are slightly covered by sea water all the time.

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

Note: *Pressures marked with matching superscript symbols ($^{\Delta}$ and *) have been consolidated in this assessment due to the similar nature of their impacts on the sediment features.*

As noted in Section 3.3 bottom towed gear interactions with Ross worm (Sabellaria spinulosa) reefs have not been included in this assessment as they have already been addressed in the Stage 2 assessment of Haisborough, Hammond and Winterton MPA.

Sandbanks consist of sandy sediments that are permanently covered by shallow sea water, typically at depths of less than 20 m below chart datum (Natural England, 2015). However, within Haisborough, Hammond and Winterton MPA, sandbanks can reach depths of 52 m and consist of subtidal coarse sediment and subtidal sand. **Table A2. 2** in Annex 2 identifies all the biotopes present within the sediment sub features of the site. Section 8.4 in the bottom towed gear Impacts Evidence documents[8] identifies and explains the potential impacts caused by penetration and abrasion, the change in water clarity and smothering and siltation rates and how these differ between the different bottom towed gears and the varying sediments found.

Bottom towed gear has the potential to cause an adverse effect on the integrity of the site, especially in intensively fished areas. Abrasion and penetration pressures have both biological and physical impacts to sediment features. Section 8.4.1 of the bottom towed gear Impacts Evidence document[8] looks at the results of the abrasion pressure and notes physical impacts range from the creation of furrows and berms in the sediment to the flattening of bottom features such as ripples and the homogenisation of sediments. 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 from bottom towed gear include damage and mortality to flora and fauna on the seabed via surface and subsurface abrasion and penetration.

The first pass of a trawl has the largest and most damaging initial impact on biomass and production of sediments, subsequent passes have smaller additional affects (Hiddink *et al.*, 2006). 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.

Bottom towed gear connects with the seabed causing the top layer of the sediment to mix with the surrounding water potentially changing the suspended solids in the ambient water and for that reason this activity effects the smothering and siltation rates and impacts the water clarity. Section 8.4.2 within the bottom towed gear Impacts Evidence document[8] collates all research on this pressure and concludes changes in suspended sediment in the water column may have a range of biological effects on different species within the habitat, affecting fish health and clogging filtering organs of suspension feeding animals.

Sandbanks found within Haisborough, Hammond and Winterton MPA have differing sensitivities to the pressures acting upon them depending on the type of subtidal sediment and biotopes (**Table A2. 2**). Subtidal coarse sediment biotopes are not sensitive to the ‘changes in suspended solids (water clarity)' pressure at the benchmark. Species within these biotopes (Marshall, Ashley and Watson, 2023; McQuillan, Tillin and Watson, 2023; Tillin, 2023; Tillin and Watson, 2023; Tyler-Walters and Tillin, 2023) are resilient to this pressure as a result of continued sediment disturbance from wave action resulting in variations in turbidity and suspended solids.

Subtidal coarse and subtidal sand sediment biotopes within the Sandbanks feature, have a low sensitivity and medium resistance to the ‘smothering and siltation rate changes’ pressure. *Glycera lapidum* in impoverished infralittoral mobile gravel and sand (Tillin and Watson, 2023) is one of the sandbank biotopes considered within the subtidal coarse sediment sub feature and is an example of how species are able to withstand this pressure acting upon them. Characterising species within this biotope are naturally used to continued or periodic sediment disturbance from wave

action. Demersal trawling stirs up the sediment resulting in finer particles in the water column, and long-term deposits of fine material may decrease the abundance of characterising species. However, the species displays high recoverability due to inhabiting mobile sediments and their ability to reposition themselves within the sediment (Tillin and Watson, 2023).

The sandbanks of Haisborough, Hammond and Winterton MPA contain biotopes with a range of sensitivities to the abrasion/penetration pressures, varying from not sensitive to medium sensitivity (**Table A2. 2**). Abrasion impacts are greater on subtidal coarse sediment compared to subtidal sand, as the coarser habitats often contain populations of sessile epifauna such as *Spirobranchus triqueter* with barnacles and bryozoan crusts on unstable circalittoral cobbles and pebbles (Tyler-Walters and Tillin, 2023), a biotope that has low resistance to the abrasion and penetration pressures due to the erect and encrusting species present. *Hesionura elongata* and *Microphthalmus similis* with other interstitial polychaetes in infralittoral mobile coarse sand has medium sensitivity to the penetration and/or disturbance of the substratum below the surface of the seabed, including abrasion pressure as the characterizing species are burrowing species the impact from damage to the sub-surface sea bed would be greater than damage to the sea bed surface (Marshall, Ashley and Watson, 2023)

Section 4.2 notes that fishing activity is taking place by both over and under 12 m vessels. VMS activity data shows that most of the activity is occurring southeast of the site, offshore of the 12 nm limit with the highest concentration happening along the boundary of the site, across Smiths Knoll sandbank. Knoll sandbank is a known location of *Fabulina fabula* and *Magelona mirabilis* with venerid bivalves and amphipods in infralittoral compacted fine muddy sand biotope (Eggleton *et al.*, 2020; Tillin and Rayment, 2022). Changes in benthic structure are known to occur following fishing with bottom towed gear and has the potential to negatively impact these biotopes and alter the presence and spatial distribution of the biological communities present.

The sensitivity of the biotopes present within each designated feature and the levels of fishing activity described in the site indicates that the abrasion pressure from bottom towed gear, as supported by the bottom towed gear Impacts Evidence documents[8], will be detrimental to the extent and distribution of the qualifying habitat in the site; the structure and function of the qualifying habitat in the site; and the supporting processes on which the qualifying habitat relies.

Therefore, **MMO concludes that the ongoing use of bottom towed gear at the activity levels described may result in an adverse effect on the site integrity of Haisborough, Hammond and Winterton MPA.**

4.3.3 Traps

The following features of Haisborough, Hammond and Winterton MPA have been considered in relation to the following pressures from traps:

Annex I sandbanks which are slightly covered by sea water all the time

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

Static gear types such as traps are not likely to significantly impact the physical structure of sediment features due to the small footprint of the gear, however evidence suggests that there can be a low impact on benthic communities. Section 9.4 within the traps Impacts Evidence documents[9] describes abrasion/disturbance of the substrate on the surface of the seabed as one of the potential impacts from the use of traps. The interaction with the seabed and associated lines and anchors may impact the benthic communities if high levels of fishing activity take place in the area. This can cause abrasion and disturbance of the subtidal sediments during the setting and retrieval of the gear, as well as movement of the gear on the seabed from tides, currents, and storm activity.

The sensitivities of Annex I sandbanks are summarised in Section 9.2 of the traps Impacts Evidence documents[9] and notes that clean sand communities are likely to recover from disturbance more quickly whereas communities from subtidal coarse sediments have a slower physical and biological recovery rate. However, all biotopes found within the sandbanks feature (**Table A2. 2**) have low or no sensitivity and high resilience to the abrasion pressure from traps. This is covered more thoroughly within **Section 4.3.2.**

Therefore, **MMO concludes that the ongoing use of traps over the Annex I sandbank feature at the activity levels described will not result in an adverse effect on site integrity.**

Biogenic reef – Ross worm (*Sabellaria spinulosa*) reefs

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

When conditions are favourable, dense aggregation of the sedentary tube building polychaetes form, producing fragile tubes from sand and shell fragments. The worms are most sensitive to substratum loss and displacement as they are fixed to the substratum and cannot reattach once dislodged or rebuild their tubes if removed from them which makes them particularly vulnerable to the abrasion or disturbance of the substrate on the surface of the seabed pressure.

As discussed in Section 8.1 of the traps Impacts Evidence documents[9] sensitivity to the pressure of abrasion or disturbance on the reef will vary depending on the location and fishing intensity. Traps cause direct physical impacts to biogenic reefs, causing damage to reef structure and reducing the substrate available for species to attach to which reduces the reefs capacity to support epifauna and infauna

communities, negatively affecting the biodiversity of the reef. The biogenic reef biotope present within the MPA, *Sabellaria spinulosa* on stable circalittoral mixed sediment (Tillin *et al.*, 2022), has a low resistance to the abrasion/disturbance pressure due to the fragility of the tubes/reefs they build. The impact could result in lethal damage to the worms, resulting in a sensitivity rating of medium to the abrasion/disturbance pressure.

Section 4.2 explains that there is significant fishing activity using traps. 90 % of all vessels under 12 m in length operating within the MPA use traps and 88 % of all trap activity is occurring in ICES rectangle 34F1 (**Table A1. 8**). Although traps are not mobile in nature and have small footprint, the movement of the gear due to adverse weather and strong tides owed to the offshore location of the MPA and the intensity at which they are used within the site, is likely to damage the tubes and result in lethal damage to the worms and resulting in a loss of the reef within the footprint of the direct impact, compromising the extent and distribution of the reef.

Therefore, **MMO concludes that the ongoing use of traps over the Ross worm (*Sabellaria spinulosa*) reefs at the activity levels described may result in an adverse effect on site integrity.**

4.4 Part B conclusion

The assessment of anchored nets and lines, bottom towed gear and traps on Annex I sandbanks which are slightly covered by sea water all the time and Ross worm *Sabellaria spinulosa* reefs features of Haisborough, Hammond and Winterton MPA has revealed that these fishing activities may have an adverse effect on the site integrity of the MPA. As such MMO conclude that management measures are required to restrict bottom towed gear and traps from Haisborough, Hammond and Winterton MPA. Section 6 contains further details of these measures.

5 Part C – In-combination assessment

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

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

ArcGIS software has been used to check relevant activities that occur within, or adjacent to, the assessed site where there could be a pathway for impact. To determine relevant activities to be included in this part of the assessment, a distance of 5 km was selected as suitable to capture any potential way in which the activity could impact the benthic feature of the site in-combination effects 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 adverse effect on site integrity with fishing is expected to be very low. Following formal consultation, relevant oil, gas, and carbon storage industry activities that could impact the site in-combination with the effects of assessed fishing activities will be included before finalising this assessment, alongside marine licence applications submitted after August 2023.

There are 25 active oil and gas pipelines running through the site. The addition of these lines along with the rock armour to protect them has resulted in the loss of approximately 36,014 m^2 of Annex I sandbank feature. The pipeline protection is likely to be hindering the site integrity and compromising the ability of the site to meet its conservation objectives.

In Part B, traps were identified as requiring management over areas of Ross worm (*S. spinulosa*) reefs, and bottom towed gear was identified as requiring management over Annex I sandbanks to avoid posing a significant risk of hindering the conservation objectives of the site. Bottom towed gear interactions with Ross worm (*S. spinulosa*) reefs have already been addressed in the MMO Stage 2 assessment

of Haisborough, Hammond and Winterton MPA and prohibited by the MMO Marine Protected Areas Bottom Towed Fishing Gear Byelaw. Anchored nets and lines and Traps over Annex I sandbanks are the only fishing in-combination interactions within Haisborough, Hammond and Winterton MPA that need to be considered. In-combination effects of these fishing activities as well as these activities in-combination with other relevant activities will be assessed in this section. Including assessment of anchored nets and lines in combination with other activities over *Sabellaria* reef.

In accordance with the methodology detailed above, ArcGIS identified ten projects, within the 5 km buffer applied. Table 6 shows this activity and the relevant category from the JNCC Pressures-Activities Database (PAD)[12]. Details on the marine licence activities can be viewed on the public register of marine licence applications and decisions, searching by the marine licence case reference numbers.

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

Marine licence case reference number[13]	PAD Category	Description
MLA/2011/00099/12	Other deposits	Scroby Sands Offshore Wind Farm – Scour prevention trial. Outside of the site boundary. **No direct or indirect pressure pathway for impact and therefore, no in-combination effects possible.**
MLA/2018/00304	Decommissioning of works and maintenance of existing works	Scroby Sands Offshore Wind Farm - Marine licence for essential repairs on the inter array and export transmission cables for the already constructed Scroby Sands OWF site, in the North Sea. Outside of the site boundary.

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

[13] Public register of marine licence applications and decisions: www.marinelicensing.marinemanagement.org.uk/mmofox5/fox/live/MMO_PUBLIC_REGISTER

		No direct or indirect pressure pathway for impact and therefore, no in-combination effects possible.
MLA/2014/00273	Maintenance of existing works	To install further Tyre Filled Nets to the scour hole at T25 and then to carry out a full installation at 5 other turbines. Outside of the site boundary. **No direct or indirect pressure pathway for impact and therefore, no in-combination effects possible.**
MLA/2018/00350	Other deposits	Simulated oil spill spraying operations. **No pressure pathway.**
MLA/2013/00338/1	Aggregate dredging	Marine licence to dredge aggregates from The Crown Estate Licence Areas 242-361 and 328A, which are situated between 22km from the Anglian coastline to the east of Lowestoft and Great Yarmouth. Outside of the site boundary. **No direct or indirect pressure pathway for impact and therefore, no in-combination effects possible.**
MLA/2023/00222	Sampling	The Crown Estate will be undertaking vibrocore sampling across several areas with the overall total sediment removal of 6.65 m^3. Outside of site boundary. **No direct or indirect pressure pathway for impact and therefore, no in-combination effects possible.**
MLA/2013/00119/2	Aggregate dredging and sampling	Marine licence that will permit the continued marine aggregate extraction at Area 212, 240, 328B and 328C within the Anglian

		Regions. Outside of the site boundary. **No direct or indirect pressure pathway for impact and therefore, no in-combination effects possible.**
MLA/2018/00174/1	Aggregate dredging and sampling	Marine licence to permit continued marine aggregate extraction and associated survey requirements within Area 254, located east of Great Yarmouth. Outside of the MMO portion of the site boundary. **No direct or indirect pressure pathway for impact and therefore, no in-combination effects possible.**
MLA/2014/00346	Aggregate dredging and sampling	Areas 296 Cross Sands Marine licence for continued marine aggregate extraction and survey requirements at Area 296. Inside the site boundary. **Possible in-combination effects.**
MLA/2014/00354/2	Aggregate dredging	North Cross Sands Marine licence that will permit marine aggregate extraction and survey requirements to commence from Area 494. Inside the site boundary. **Possible in-combination effect**
DCO/2020/00006 DCO/2020/00007 DCO/2020/00008 DCO/2020/00009	Offshore wind: construction; operation and maintenance. Power cable: construction; operation and maintenance	Norfolk Vanguard and Norfolk Boreas offshore wind farms is a development 73 km from the coast of Norfolk, covering an area of approximately 725 km^2. It will contain 158 wind turbines and produce 4.2 GW of energy. The three sites, North Vanguard West, North Vanguard East and Norfolk Boreas site outside of Haisborough, Hammond and Winterton however the cables transmitting the power will run

		through the MPA. **Possible in-combination effect**

The PAD and Table 3 from section 3.3 were used to identify medium-high risk pressures exerted by fishing and non-fishing activities to identify those which require in-combination assessment (Table 6).

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. Pressures from anchored nets and lines are considered over Annex I reef and Annex I sandbanks. Pressures from traps are considered over Annex I sandbanks only.

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

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

5.1 In-combination pressure sections

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

5.2 Fishing vs Fishing in-combination pressures

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

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

becomes available, in conjunction with updated conservation advice from JNCC and Natural England.

The cumulative impacts from anchored nets and lines and traps are only being considered in-combination over the Annex I sandbank designated feature as traps and bottom towed gear will be prohibited over *S. spinulosa* reef. 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.

As discussed in section 4.2 the only trap activity for vessels over 12 m occurred in 2020 with minimal landings and only 5 VMS records. However, 90 % of all landings by vessels under 12 m in length were attributed to trap activity within the MPA. Haisborough, Hammond and Winterton MPA overlaps four ICES rectangles, ICES rectangle 34F1 has the largest overlap with the MPA, 36.09 % (**Table A1. 7**) and the WebApps illustrate that the highest fishing effort days were within this ICES rectangle. It is noted that this rectangle overlaps the coast and includes the area inshore of 6 nm. Eastern IFCA have advised that 5 vessels are fishing in the MPA inside of the 6 nm limit. MMO local knowledge has highlighted that vessels under 12 m in length operating in the MPA are only using traps (targeting whelk, lobster and Cromer crab). The WebApps show anchored nets and lines activity occurs more frequently by vessels under 12 m in length with higher concentrations occurring in ICES rectangle 34F1, approximately 82 days per year between 2016 and 2021. It is recognised that landings are not evenly distributed across the ICES rectangle. The MPA covers 36 % of ICES rectangle 34F1 so approximately 30 days of effort is apportioned to the MPA. However, local MMO knowledge has confirmed that no anchored nets and lines activity is occurring within the site, all effort is occurring outside the ICES rectangle 34F1. Therefore, there is no in-combination impacts from traps and anchored nets and lines within the MMO portion of the MPA.

Both trap and anchored nets and lines activity have already been assessed independently as having no adverse effect on site integrity for Annex I sandbanks. The only biotope within the Annex I sandbanks designated feature with a medium sensitivity to the abrasion pressure is *Echinocardium cordatum* and *Ensis* spp. in lower shore and shallow sublittoral slightly muddy fine sand. This biotope has previously been screened out of this assessment due to it's unlikely presence in the MPA. At the described activity levels and location of the activity, the pressure of abrasion and disturbance of the substrate on the surface of the seabed from both activities combined would not impact the designated features of the MPA.

Therefore**, MMO do not consider the in-combination effect from these activities are likely to an adverse effect on site integrity for the Haisborough, Hammond and Winterton MPA at current levels.**

5.3 Fishing vs non-fishing activities in-combination pressures

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

The designated features of the Haisborough, Hammond and Winterton MPA are sensitive to physical damage through surface abrasion and disturbance of the substrate from both anchored nets and lines and traps over Annex I sandbanks and anchored nets and lines over *S. spinulosa* reef, 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.

Two marine licences are active within the MPA, both of which permit material to be removed from the site via dredging. Licenses MLA/2014/00346 (Area 296) and MLA/2014/00354/2 (Area 494) intersect a small section of the MPA close to the 6 nm boundary along the southern edge of the site.

The dredging activity within Area 296 has been ongoing since 1983, predating the sites designation in 2017. Aggregate dredging in area 494 is split into two areas which is known as a 'zoning scheme' allowing activity to take place in only half of the licensed area. A condition of the license is that pre-dredge monitoring is required before moving to a new area within the wider licence area. If the regular compliance surveys identify *S. spinulosa* reef presence, then an exclusion zone is put in place to avoid any impact to Annex I reef. Aggregate dredging licences are also only active for a fixed number of years, after which an absence of activity allows for recovery.

As detailed in **section 4.3**, at current activity levels anchored nets and lines are not considered to be causing significant pressure through abrasion and disturbance over the Annex I reef feature or Annex I sandbank feature. There is no VMS activity data or landings data to suggest that vessels over 12 m in length are using anchored nets and lines within the MPA. Vessels using this gear, and under 12 m in length have landed 2.15 t annually on average over the 5-year period (2016 to 2020). It is possible that the aggregate dredging in-combination with anchored nets and lines may increase the potential for this pressure to have negative cumulative effects on the designated Annex I reef feature of the MPA. However, the EIA presented in the environmental statement for both MLA/2014/00346 and MLA/2014/00354/2 assessed the effect of sediment removal on the Annex I reef feature and noted it to be not significant, additionally as previously mentioned a condition to the license is to complete pre-commencement surveys to identify currently unmapped *Sabellaria spinulosa* reef.

To the east of Haisborough, Hammond and Winterton MPA is land designated for the construction of Norfolk Vanguard and Norfolk Boreas offshore wind farms. Both areas have been consented however construction is yet to start. The Project's offshore cable corridor overlaps with the Haisborough, Hammond and Winterton MPA and therefore there is potential for the designated features to be impacted

during construction and maintenance through the abrasion and penetration pressures.

The Habitats Regulation Assessment for each of the projects identified various impacts; temporary physical disturbance, permanent habitat loss, the introduction of new substrates, and sediment smothering of the sandbank and reef features. The cable corridors in combination with traps and anchored nets and lines fishing activity will have a greater impact than each activity alone however the production of a Site Integrity Plan (SIP) and EIA provides a framework to develop and agree the mitigation and monitoring measures required and construction will not be allowed to begin without commitment to these measures.

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

Due to the minimal amounts of anchored nets and lines activity and the license conditions of the non-fishing activities taking place, it is unlikely there would be an adverse effect on site integrity. 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 non-fishing activity is considered insignificant over the Annex I reef. Trap activity in combination with non-fishing activities are also being considered however, traps are only being assessed over the Annex I sandbank feature and no non fishing activities are occurring over this feature, subsequently there is no in combination impact.

Therefore, **MMO concludes that the combined pressures from anchored nets and lines and other relevant activities will not result in an adverse effect on site integrity for the Haisborough, Hammond and Winterton MPA.**

5.4 Part C conclusion

MMO concludes that different fishing gear types in combination, and fishing in-combination with other relevant activities will not result in an adverse effect on the site integrity for the Haisborough, Hammond and Winterton MPA.

Further management measures will not therefore be implemented for fishing activities currently occurring within the MPA.

6 Conclusion and proposed management

Part A - Identified pressures on the MPA of this assessment concluded that bottom towed gear, anchored nets and lines and traps may result in an adverse effect on site integrity for Foreland MPA.

Part B – Fishing activity assessment of this assessment concluded the ongoing use of bottom towed gear on the sandbank feature of Haisborough, Hammond and Winterton MPA at the activity levels described may result in an adverse effect on site integrity as a result of impacts from abrasion or disturbance, penetration, changes in suspended solids and smothering and siltation rates changes. Part B also concluded the ongoing use of traps over the reef feature of Haisborough, Hammond and Winterton MPA at the activity levels describes may result in an adverse effect on site integrity as a result of impacts from abrasion or disturbance.

Part C – In-combination assessment of this assessment concluded that the use of anchored nets and line and traps at the activity levels described, alone or in combination, will not result in an adverse effect on site integrity of Haisborough, Hammond and Winterton MPA.

To ensure that fishing activities do not result in an adverse effect on site integrity of the MPA, MMO will implement a byelaw to prohibit the use of bottom towed gear throughout the MMO portion of the site and a further byelaw to prohibit the use of traps over the reef feature of the MMO portion of Haisborough, Hammond and Winterton MPA.

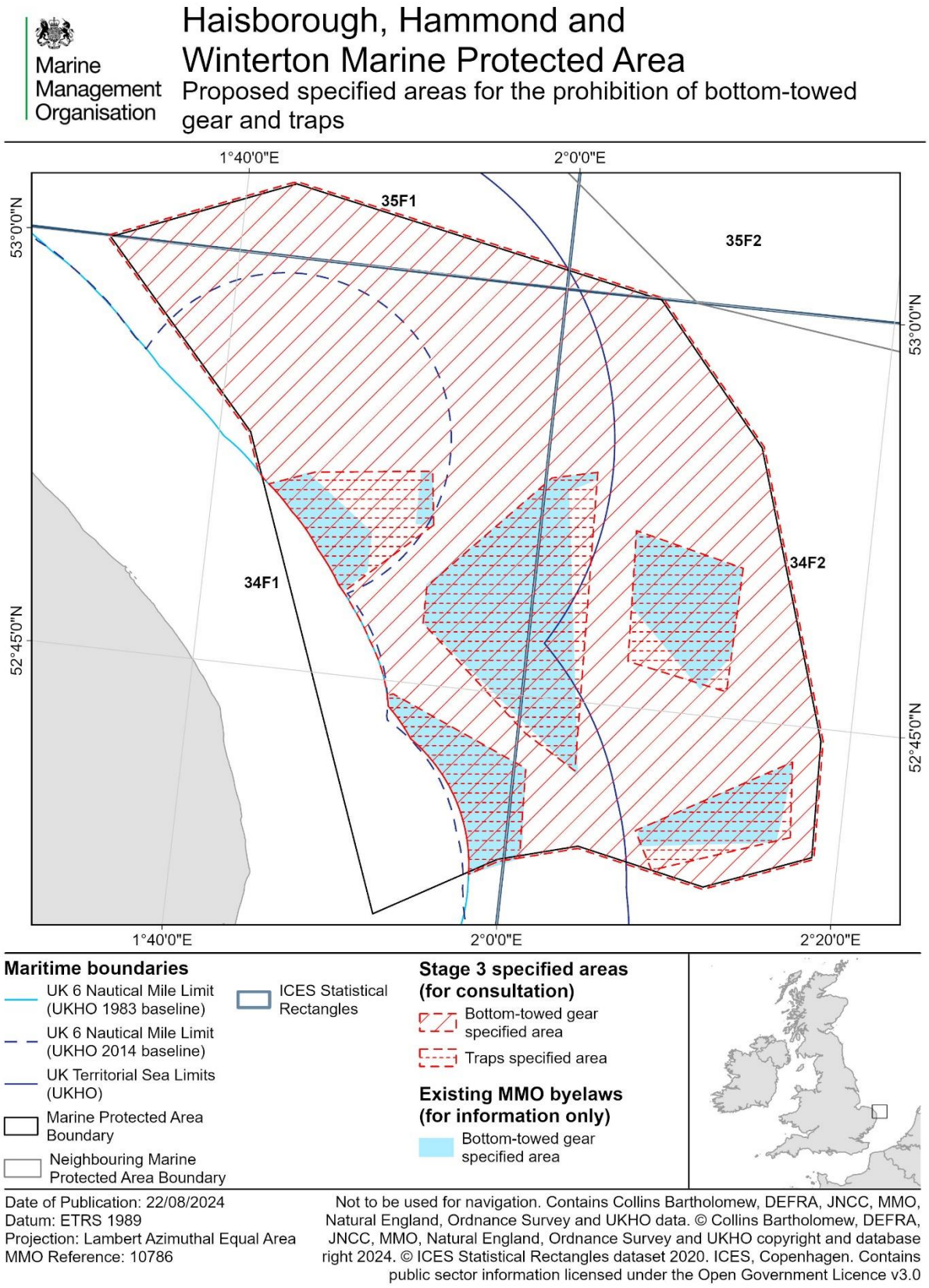

Figure 2 shows the proposed management area in line with the conclusions set out above.

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

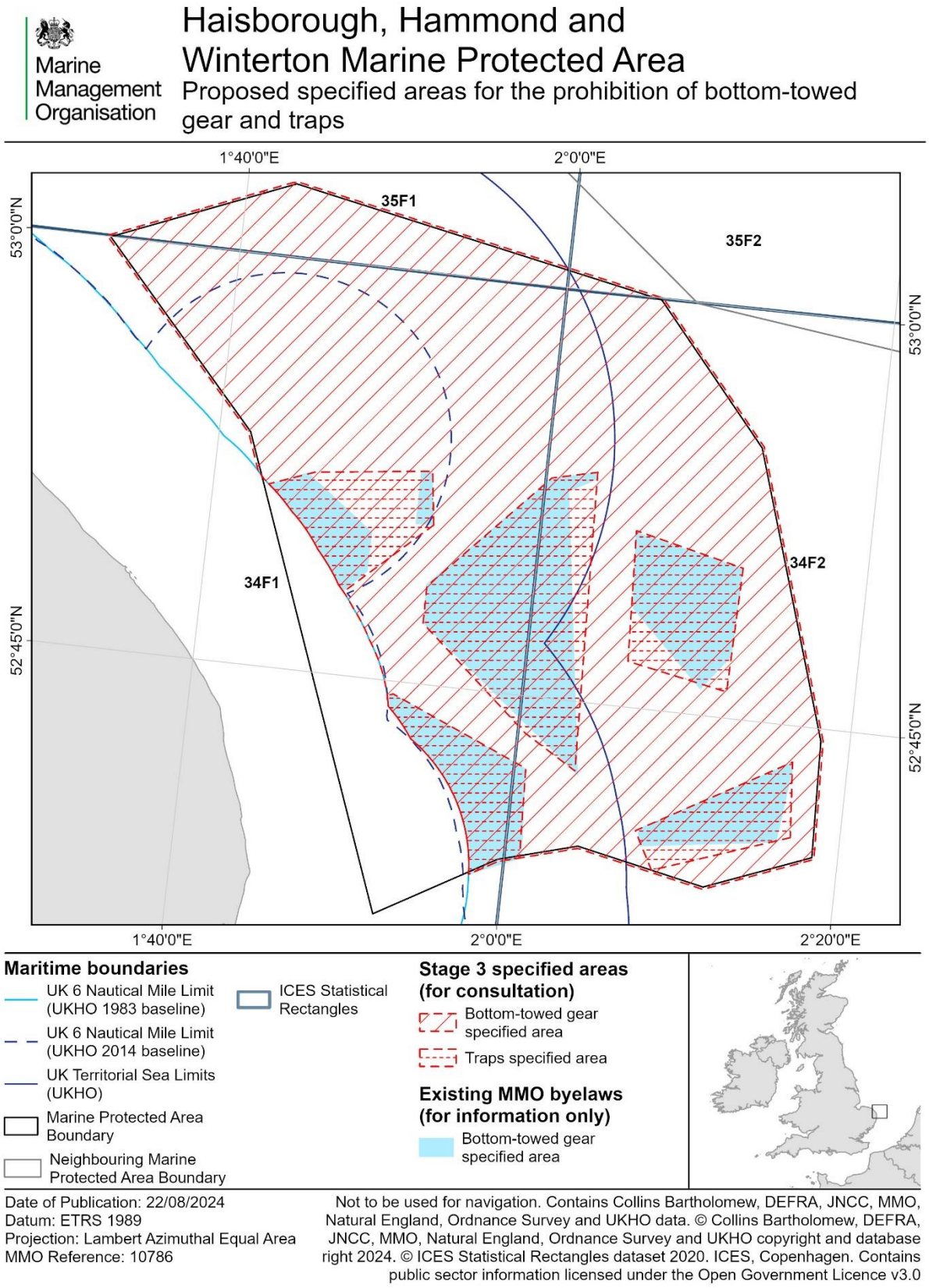

Figure 2: Map of proposed management

7 Review of this assessment

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

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

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

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Annexes

7.1 Annex 1 - Fishing activity data

Table A1. 1: VMS record count per nation group (UK, EU Member State 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). All numbers are rounded to the nearest whole number.

			2016		2017		2018		2019		2020		2021		Total (2016 to 2021)		Annual average (2016 to 2021)
Gear group	Gear code	Nation group	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count	%	Count
Demersal Seine	SDN	EU	0	0	1	100	1	100	0	0	2	100	1	100	5	100	1
	SDN Total		**0**	**0**	**1**	**100**	**1**	**100**	**0**	**0**	**2**	**100**	**1**	**100**	**5**	**100**	**1**
Demersal Seine Total			**0**	**0**	**1**	**0**	**1**	**0**	**0**	**0**	**2**	**0**	**1**	**0**	**5**	**0**	**1**
Demersal trawl	OTB	EU	9	100	2	100	6	100	1	100	22	100	2	8	42	65	7
	OTB	UK	0	0	0	0	0	0	0	0	0	0	23	92	23	35	4
	OTB Total		**9**	**1**	**2**	**0**	**6**	**0**	**1**	**0**	**22**	**3**	**25**	**3**	**65**	**1**	**11**
	PTB	EU	0	0	0	0	0	0	0	0	0	0	2	100	2	100	0
	PTB Total		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**2**	**0**	**0**
	TBB	EU	1,022	100	1,606	100	1,213	100	1,005	100	769	99	743	100	6,358	100	1,060
	TBB	UK	0	0	1	0	6	0	3	0	4	1	0	0	14	0	2
	TBB Total		**1,022**	**99**	**1,607**	**100**	**1,219**	**100**	**1,008**	**100**	**773**	**97**	**743**	**96**	**6,372**	**99**	**1,062**
Demersal trawl Total			**1,031**	**99**	**1,609**	**100**	**1,225**	**99**	**1,009**	**100**	**795**	**99**	**770**	**100**	**6,439**	**99**	**1,073**
	OTM	EU	4	100	0	0	1	100	3	100	2	100	0	0	10	100	2

			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**
Midwater Trawl	**OTM Total**		**4**	**100**	**0**	**0**	**1**	**100**	**3**	**100**	**2**	**100**	**0**	**0**	**10**	**100**	**2**
Midwater Trawl Total			**4**	**0**	**0**	**0**	**1**	**0**	**3**	**0**	**2**	**0**	**0**	**0**	**10**	**0**	**2**
Traps	FPO	EU	0	0	0	0	0	0	0	0	5	100	0	0	5	100	1
	FPO Total		**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**100**	**0**	**0**	**5**	**100**	**1**
Traps Total			**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**1**	**0**	**0**	**5**	**0**	**1**
Unknown	NK	EU	0	0	0	0	16	100	0	0	0	0	0	0	16	89	3
	NK	European Free Trade Association	2	100	0	0	0	0	0	0	0	0	0	0	2	11	0
	NK Total		**2**	**100**	**0**	**0**	**16**	**100**	**0**	**0**	**0**	**0**	**0**	**0**	**18**	**100**	**3**
Unknown Total			**2**	**0**	**0**	**0**	**16**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**18**	**0**	**3**
Grand Total			**1,037**	**1**	**1,610**	**2**	**1,243**	**2**	**1,012**	**1**	**804**	**1**	**771**	**1**	**6,477**	**2**	**1,080**

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

Gear group	Gear code	2016	2017	2018	2019	2020	Total (2016 to 2020)	Average (2016 to 2020)
Demersal trawl	TBB	0.00	0.18	0.66	0.38	0.40	1.62	0.32
Demersal trawl total		**0.00**	**0.18**	**0.66**	**0.38**	**0.40**	**1.62**	**0.32**
Grand total		**0**	**0.18**	**0.66**	**0.38**	**0.4**	**1.62**	**0.32**

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

Gear group	Gear code	2016	2017	2018	2019	2020	Total (2016 to 2020)	Average (2016 to 2020)
Demersal seine	SDN	0	0.04	0	0	0	0.04	0.01
Demersal seine total		**0**	**0.04**	**0**	**0**	**0**	**0.04**	**0.01**
Demersal trawl	OTB	0.03	0.02	0	0.04	0.23	0.32	0.06
	TBB	135.01	179.48	126.15	80.91	54.84	576.38	115.28
Demersal trawl total		**135.03**	**179.5**	**126.15**	**80.95**	**55.07**	**576.7**	**115.34**
Midwater trawl	OTM	30.55	0	6.98	0	0	37.53	7.51
Midwater trawl total		**30.55**	**0**	**6.98**	**0**	**0**	**37.53**	**7.51**
Traps	FPO	0	0	0	0	3.82	3.82	0.76
Traps total		**0**	**0**	**0**	**0**	**3.82**	**3.82**	**0.76**
Grand total		**165.59**	**179.54**	**133.13**	**80.95**	**58.89**	**618.1**	**123.62**

Table A1. 4: UK live weight landings tonnage (t) estimates by gear from vessels under 12 m in length for the MMO section of Haisborough, Hammond and Winterton MPA (2016 to 2020).

Gear group	Gear code	2016	2017	2018	2019	2020	Total (2016 to 2020)	Average (2016 to 2020)
Anchored Net/Line	GN	1.33	0.89	1.47	0.97	2.18	6.84	1.37
	GNS	0	0	0	0.01	0	0.01	0
	LL	1.85	0.73	0.03	0.13	0.02	2.76	0.55
	LLS	0	0.02	0.01	0.01	0.37	0.41	0.08
Anchored net/line total		**3.19**	**1.64**	**1.51**	**1.12**	**2.56**	**10.02**	**2**
Demersal trawl	OT	0	0.01	0	0	0	0.01	0
	OTB	0	0	0.15	0.01	0.05	0.2	0.04
	TBB	0.97	1.92	0.97	0.87	0.42	5.15	1.03
Demersal trawl total		**0.97**	**1.93**	**1.11**	**0.87**	**0.47**	**5.36**	**1.07**
Midwater - gill drift	GND	3.29	5.15	2.29	5.86	3.41	20	4
Midwater - gill drift total		**3.29**	**5.15**	**2.29**	**5.86**	**3.41**	**20**	**4**
Midwater - hook/lines	LX	0	0.05	0	0	0	0.05	0.01
Midwater - hook/lines total		**0**	**0.05**	**0**	**0**	**0**	**0.05**	**0.01**
Traps	FPO	106.64	173.29	67.19	165.28	123.49	635.89	127.18
Traps total		**106.64**	**173.29**	**67.19**	**165.28**	**123.49**	**635.89**	**127.18**
Unknown	MIS	0	0.01	0	3.88	27.51	31.4	6.28
Unknown total		**0**	**0.01**	**0**	**3.88**	**27.51**	**31.4**	**6.28**
Grand total		**114.09**	**182.07**	**72.1**	**177.02**	**157.44**	**702.72**	**140.54**

Table A1. 5: EU27 live weight landings tonnage (t) estimates by gear from vessels under 12 m in length for the MMO section of Haisborough, Hammond and Winterton MPA (2016 to 2020).

Gear group	Gear code	2016	2017	2018	2019	2020	Total (2016 to 2020)	Average (2016 to 2020)
Anchored net/line	GTR	0	0	0.72	0	0	0.72	0.14
	GNS	0.02	0	0	0	0	0.02	0
Anchored net/line total		**0.02**	**0**	**0.72**	**0**	**0**	**0.74**	**0.15**
Demersal seine	SSC	0	0	0	0	0.02	0.02	0
Demersal seine total		**0**	**0**	**0**	**0**	**0.02**	**0.02**	**0**
Demersal trawl	TBB	0	0	0	0.01	0.28	0.29	0.06
Demersal trawl total		**0**	**0**	**0**	**0.01**	**0.28**	**0.29**	**0.06**
Midwater - hook/lines	LHP	0	0.05	0	0	0	0.05	0.01
Midwater - hook/lines total		**0**	**0.05**	**0**	**0**	**0**	**0.05**	**0.01**
Traps	FPO	0	0	0	0	0.85	0.85	0.17
Traps total		**0**	**0**	**0**	**0**	**0.85**	**0.85**	**0.17**
Grand total		**0.02**	**0.05**	**0.72**	**0.01**	**1.14**	**1.95**	**0.39**

Table A1. 6: Mean annual surface and subsurface SAR values for C-squares intersecting the MMO section of Haisborough, Hammond and Winterton MPA (2016 to 2020).

Gear group	SAR category	2016	2017	2018	2019	2020
Demersal seines	**Surface**	<0.01	<0.01	<0.01	<0.01	<0.01
	Subsurface	0.00	<0.01	0.00	0.00	<0.01
Demersal trawls	**Surface**	0.38	0.42	0.38	0.44	0.26
	Subsurface	0.38	0.42	0.38	0.44	0.26
Dredges	**Surface**	0.00	0.00	0.00	0.00	0.00
	Subsurface	0.00	0.00	0.00	0.00	0.00
Bottom towed gear total	**Surface**	0.38	0.42	0.38	0.44	0.26
	Subsurface	0.38	0.42	0.38	0.44	0.26

Table A1. 7: Percentage overlap between ICES rectangles and Haisborough, Hammond and Winterton MPA.

ICES Rectangle	Percentage overlap %
34F1	36.09
34F2	16.83
35F1	2.42
35F2	0.11

Table A1. 8: Fishing effort (days) recorded by UK vessels under 12 m in length, separated by gear type for the area of Haisborough, Hammond and Winterton MPA that intersects ICES the marine portion of ICES rectangles 34F1, 34F2, 35F1 and 35F2 (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 trawl	4.72	18.13	12.23	15.58	4.94	7.81	63.40	10.57
Bottom towed gear total	**4.72**	**18.13**	**12.23**	**15.58**	**4.94**	**7.81**	**63.40**	**10.57**
Midwater - gill drift	28.69	24.98	18.32	29.79	19.85	16.79	138.41	23.07
Midwater - hooks and lines	0	1.17	0	0.54	0	1.08	2.80	0.47
Midwater gear total	**28.69**	**26.15**	**18.32**	**30.34**	**19.85**	**17.87**	**141.21**	**23.54**
Traps	874.42	911.70	699.95	875.03	646.25	710.05	4,717.41	786.24
Anchored nets and lines	31.18	24.55	36.65	26.05	27.95	36.15	182.54	30.42
Static gear total	**905.60**	**936.24**	**736.61**	**901.09**	**674.21**	**746.21**	**4,899.96**	**816.66**
Unknown	0	0.18	0	2.53	14.07	12.27	29.05	4.84
Unknown total	**0**	**0.18**	**0**	**2.53**	**14.07**	**12.27**	**29.05**	**4.84**
MPA total	**939.01**	**980.71**	**767.15**	**949.53**	**713.07**	**784.15**	**5,133.62**	**855.60**

Annex 2 - Biotope data

Table A2. 1: Biotopes within the Southern North Sea bioregion that are being considered in the assessment, and their sensitivities to relevant pressures from associated fishing activities.

Designated feature	Broad-scale habitats	Biotopes	Sensitivity to relevant pressures

Annex I Reef	*S. spinulosa* reef	*Sabellaria spinulosa* on stable circalittoral mixed sediment (Tillin *et al.*, 2022)*	• Medium sensitivity to:
			  • abrasion; and
			  • removal of non-target species from anchored nets and lines and traps.
			• No sensitivity to remaining pressures and gears.

Annex I Sandbanks	Subtidal coarse sediment	*Glycera lapidum* in impoverished infralittoral mobile gravel and sand (Tillin and Watson, 2023)	• Medium sensitivity to removal of target species from traps. • Low or no sensitivity to remaining pressures and gears.
		Hesionura elongata and *Microphthalmus similis* with other interstitial polychaetes in infralittoral mobile coarse sand (Marshall, Ashley and Watson, 2023)	• Medium sensitivity to penetration from demersal trawls. • Low or no sensitivity to remaining pressures and gears.
		Dense *Lanice conchilega* and other polychaetes in tide-swept infralittoral sand and mixed gravelly sand (McQuillan, Tillin and Watson, 2023)	Low or no sensitivity to all relevant pressures from all gears.
		Pomatoceros triqueter with barnacles and bryozoan crusts on unstable circalittoral cobbles and pebbles (Tyler-Walters and Tillin, 2023)	
		Sparse fauna on highly mobile sublittoral shingle (cobbles and pebbles) (Tillin, 2023)	

Designated feature	Broad-scale habitats	Biotopes	Sensitivity to relevant pressures
	Subtidal sand	*Abra alba* and *Nucula nitidosa* in circalittoral muddy sand or slightly mixed sediment (Tillin and Budd, 2023)	• Medium sensitivity to removal of target species from traps. • Low or no sensitivity to remaining pressures and gears.
		Fabulina fabula and *Magelona mirabilis* with venerid bivalves and amphipods in infralittoral compacted fine muddy sand (Tillin and Rayment, 2022)	

		Arenicola marina in infralittoral fine sand or muddy sand (Tyler-Walters and Garrard, 2019)	• Medium sensitivity to:
			  • removal of non-target species from anchored nets and lines, demersal trawls and traps; and
			  • removal of target species from traps.
			No sensitivity to remaining pressures and gears.

		Infralittoral mobile clean sand with sparse fauna (Tillin, Tyler-Walters and Garrard, 2019)	Low or no sensitivity to all relevant pressures from all gears.
		Nephtys cirrosa and *Bathyporeia* spp. in infralittoral sand (Tillin and Garrard, 2022)	
		Sertularia cupressina and *Hydrallmania falcata* on tide-swept sublittoral sand with cobbles or pebbles (Readman and Garrard, 2019)	

*The biotope *Sabellaria spinulosa* on stable circalittoral mixed sediment (Tillin *et al.*, 2022) has only been assessed for pressures associated with anchored nets and lines and traps as it was previously assessed in stage 2 for bottom towed gear interactions.

Table A2. 2: Biotopes within the Southern North Sea bioregion that are not being considered in the assessment.

Designated feature	Broad-scale habitats	Biotopes
Annex I Reef	*S. spinulosa* reef	*Sabellaria* reefs on circalittoral rock (Tillin, Gibb, *et al.*, 2023)
		Sabellaria spinulosa encrusted circalittoral rock (Tillin, Marshall, Gibb, Lloyd, *et al.*, 2023a)
		Sabellaria spinulosa with a bryozoan turf and barnacles on silty turbid circalittoral rock (Tillin, Marshall, Gibb, Lloyd, *et al.*, 2023b)
		Sabellaria spinulosa, didemnid and small ascidians on tide-swept moderately wave-exposed circalittoral rock (Tillin, Marshall, Gibb, Williams, *et al.*, 2023)
Annex I Sandbanks	Subtidal sand	*Echinocardium cordatum* and *Ensis* spp. in lower shore and shallow sublittoral slightly muddy fine sand (De-Bastos *et al.*, 2023)