



Marine
Management
Organisation

MMO De Minimis Assessment: Marine Protected Areas Bottom Towed Fishing Gear Byelaw 2023

January 2023



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De Minimis Assessment (DMA)

Title of Measure	Marine Protected Areas Bottom Towed Fishing Gear Byelaw 2023
Lead Department/Agency	Marine Management Organisation (MMO)
Expected Date of Implementation	Draft
Origin (Domestic or International)	Domestic
Date of Assessment	31/08/2022
Lead Departmental Contact	Marine Conservation Team, Marine Management Organisation, Lancaster House, Hampshire Court, Newcastle, NE4 7YH. conservation@marinemanagement.org.uk
Departmental Triage Assessment	Low-cost regulation (fast track)

Viable policy options (including alternatives to regulation)

- **Option 0:** Do nothing.
- **Option 1:** No statutory restrictions. Introduce a voluntary agreement.
- **Option 2:** Removal of pressures from specified areas of designated feature via prohibition of bottom towed fishing. This may include a whole site prohibition where sensitive designated features are distributed throughout the whole site.
- **Option 3:** Removal of pressures via a whole site prohibition across all sites. The use of bottom towed gear will be prohibited throughout the MMO section of all sites considered in this assessment.

Option 2 is the preferred option.

Description of novel and contentious elements (if any)

- Management measures considered across multiple marine protected areas (MPAs).
- UK-EU Trade and Cooperation Agreement¹.

Initial assessment of impacts on business

Available evidence suggests 298 UK fishing vessels are likely to be directly affected by the prohibition of bottom towed fishing gears within the proposed management areas.

The impacts are likely to be ongoing as opposed to one-off but are expected to be mitigated by use of other available fishing grounds.

The estimated monetised total cost to UK businesses over ten years is expected to be £385,944, (2020 present value). The equivalent annual net direct cost to business (EANDCB) is £44,837 (2020 present value).

Non-monetised costs include the potential impact of displaced fishing activity on habitats/areas outside of the management areas, and indirect costs to the fishing industry

¹ https://ec.europa.eu/info/strategy/reasons-non-eu-countries/reasons-united-kingdom/eu-uk-trade-and-cooperation-agreement_en ec.europa.eu/info/strategy/reasons-non-eu-countries/reasons-united-kingdom/eu-uk-trade-and-cooperation-agreement_en

De Minimis Assessment (DMA)

associated with displacement to other fishing grounds.

None of the expected benefits of the proposed management measure have been monetised, however non-monetised benefits include the fulfilment of MMO's duties under the Marine and Coastal Access Act 2009², The Conservation of Habitats and Species Regulations 2017³ and The Conservation of Offshore Marine Habitats and Species Regulations 2017⁴ through the protection of designated features, as well as the ecosystem services they provide, including indirect benefits to the fishing industry resulting from spillover.

Summary of monetised impacts

- Estimated Net Present Value: -£385,944
- Estimated Business Net Present value: -£385,944
- Estimated Equivalent Annualised Net Direct Costs to Business: £44,837
- Appraisal period: ten years
- The Price Base Year and Present Value Base Year: 2019 and 2020
- **BIT status/score: 224186.1**

The proposal is a Regulatory Provision as it relates to business activity (commercial fishing); it has a regulatory effect by prohibiting the use of bottom towed fishing gears within specified areas; and has effect by virtue of the exercise of a function conferred on a Minister of the Crown or a relevant regulator.

The proposal is a Qualifying Regulatory Provision as it does not fall within any of the administrative exclusions set out in the Business Impact Target written ministerial statement - HCWS574⁵.

Rationale for producing a DMA (as opposed to a Regulatory Impact Assessment)

The fast-track appraisal route is appropriate as this regulation falls under the 'low cost' criteria - EANDCB is under £5m, as detailed in the initial assessment of impact on business above.

² www.legislation.gov.uk/ukpga/2009/23/contents

³ www.legislation.gov.uk/uksi/2017/1012/contents/made

⁴ www.legislation.gov.uk/uksi/2017/1013/contents/made

⁵ <https://questions-statements.parliament.uk/written-statements/detail/2016-03-03/HCWS574>

Marine Management Organisation (MMO) De Minimis Assessment: Marine Protected Areas Bottom Towed Fishing Gear Byelaw 2023

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1 Supporting evidence

1.1 Policy issue and rationale for Government intervention

MMO has duties to further the conservation objectives of marine protected areas (MPAs)⁶. MMO also has powers to manage fishing in order to conserve marine flora, fauna and habitats⁷.

MMO is implementing necessary management in offshore MPAs in a number of stages. As part of Stage 2 of this work, MMO has undertaken an assessment⁸ of the impact of bottom towed fishing in 13 MPAs. This assessment determined that bottom towed fishing gear may not be compatible with the conservation objectives of the MPAs. The proposed byelaw will further the conservation objectives of the MPAs by conserving marine fauna and habitats by prohibiting the use of bottom towed fishing gear within specified areas of the sites.

Table 1 lists the MPAs that have been included in the Stage 2 Assessment and the designated features that the proposed byelaw is intended to protect. Figure 1 displays the location of those MPAs in the English marine area.

Table 1. MPAs considered in Stage 2 and designated features protected by the proposed byelaw.

MPA	Designated Features
Cape Bank	Moderate energy circalittoral rock
East of Haig Fras	High energy circalittoral rock
	Moderate energy circalittoral rock
Farnes East	Moderate energy circalittoral rock
Foreland	High energy circalittoral rock
	Moderate energy circalittoral rock
Goodwin Sands	Moderate energy circalittoral rock
	Ross worm (<i>Sabellaria spinulosa</i>) reefs
Haig Fras	Rocky reef
Haisborough, Hammond and Winterton	Biogenic reef (<i>Sabellaria spp.</i>)
Hartland Point to Tintagel	High energy circalittoral rock
	Moderate energy circalittoral rock

⁶ Section 125 of the Marine and Coastal Access Act 2009, Regulation 9 of the Conservation of Habitats and Species Regulations 2017 and regulation 6 of the Conservation of Offshore Marine Habitats and Species Regulations 2017

⁷ Sections 129A and 129B of the Marine and Coastal Access Act 2009.

⁸ www.gov.uk/government/publications/managing-fisheries-in-marine-protection-areas-call-for-evidence

MPA	Designated Features
	Fragile sponge and anthozoan communities on subtidal rocky habitats
	Pink sea-fan (<i>Eunicella verrucosa</i>)
Land's End and Cape Bank	Rocky reef
North Norfolk Sandbanks and Saturn Reef	Biogenic reef (<i>Sabellaria spp.</i>)
Offshore Brighton	High energy circalittoral rock
South of Celtic Deep	Moderate energy circalittoral rock
Wight-Barfleur Reef	Rocky reef

1.2 Rationale for intervention and intended effects

Fishing activity has the potential to hinder the conservation objectives of MPAs.

The MMO Stage 2 MPA Fisheries Assessment has concluded that bottom towed fishing activities are not compatible with the conservation objectives of the Stage 2 sites. The proposed byelaw is intended to ensure conservation objectives of the Stage 2 sites are furthered, conserving marine fauna and habitats by prohibiting bottom towed fishing activities within specified areas.

Fishing activities have the potential to cause negative outcomes in the marine environment as a result of 'market failures'. These failures can be described as:

- **Public goods and services:** A number of goods and services provided by the marine environment, such as biological diversity, are 'public goods' (no-one can be excluded from benefiting from them, but use of the goods does not diminish the goods being available to others). The characteristics of public goods, being available to all but belonging to no-one, mean that individuals do not necessarily have an incentive to voluntarily ensure the continued existence of these goods which can lead to under-protection/provision. With regard to bottom towed fishing, this means that fishers can benefit from the biological diversity of marine habitats through sale of sea fisheries resources caught while simultaneously damaging the habitat and reducing its biological diversity. While the habitat continues to provide benefits to fishers through the sales of sea fisheries resources, there is no incentive to protect these habitats. A lack of ownership allows the activity to continue unchecked until such time biological diversity falls to the point where catches are no longer profitable, and fishers move on to more productive grounds.
- **Negative externalities:** These occur when the cost of damage to the marine environment is not fully borne by the users causing the damage. Bottom towed fishing can cause severe damage to fragile habitats which can reduce biodiversity and productivity and take many years to recover. The only cost borne by bottom towed gear fishers of this damage is the eventual reduction

in catches and the potential increase in fuel costs involved in moving to new fishing grounds. The availability of other fishing grounds lessens the cost associated with reduced catches, and potentially increased fuel costs are not significant enough to dissuade fishers from causing the damage in the first place.

- In many cases no monetary value is attached to the goods and services provided by the marine environment, and this can lead to more damage occurring than would occur if the users had to pay the price of damage. Even for those marine harvestable goods that are traded (such as wild fish), market prices often do not reflect the full economic cost of the exploitation or of any damage caused to the environment by that exploitation.

The proposed byelaw aims to redress these sources of market failure in the marine environment through conservation of designated features of MPAs, which will ensure negative externalities are reduced or suitably mitigated.

1.3 Marine Plan Assessment

The marine plan assessment is detailed below for each Stage 2 MPA according to the Marine Plan Area.

MMO East Plan Area

Haisborough, Hammond and Winterton MPA and North Norfolk Sandbanks and Saturn Reef MPA lie within the East Marine Plan Area. The East Marine Plan⁹ was adopted in 2014. The decision to propose management for these sites has been made in accordance with the East Marine Plan. In particular, the following marine plan policies in the East Marine Plan are relevant:

- Biodiversity
 - [E-BIO-1](#)
- Economic productivity
 - [E-EC-1](#), [E-EC-2](#)
- Fishing
 - [E-FISH-1](#)
- Co-existence
 - [E-GOV-2](#), [E-GOV-3](#)
- Marine Protected Area Network
 - [E-MPA-1](#)
- Tourism and recreation
 - [E-TR-1](#), [E-TR-3](#)
- Social and cultural

⁹ www.gov.uk/government/publications/east-inshore-and-east-offshore-marine-plans

- [E-SOC-1](#)

The remaining policies in the East Marine Plan are not applicable.

MMO South West Plan Area

Cape Bank MPA, East of Haig Fras MPA, Haig Fras MPA, Hartland Point to Tintagel MPA, Land's End and Cape Bank MPA and South of Celtic Deep MPA lie within the South West Marine Plan Area. The South West Marine Plan¹⁰ was adopted in 2021. The decision to propose management for these sites has been made in accordance with the South West Marine Plan. In particular, the following marine plan policies in the South West Marine Plan are relevant:

- Biodiversity
 - [SW-BIO-1](#), [SW-BIO-2](#), [SW-BIO-3](#), [SW-HAB-1](#)
- Cumulative effects
 - [SW-CE-1](#)
- Co-existence
 - [SW-CO-1](#)
- Employment
 - [SW-EMP-1](#)
- Fishing
 - [SW-FISH-1](#), [SW-FISH-2](#), [SW-FISH-3](#)
- Marine Protected Area Network
 - [SW-MPA-1](#), [SW-MPA-2](#), [SW-MPA-4](#), [SW-HAB-1](#)
- Tourism and Recreation
 - [SW-TR-1](#)

The remaining policies in the South West Marine Plan are not applicable.

MMO North East Plan Area

Farnes East MPA lies within the North East Marine Plan Area. The North East Marine Plan¹¹ was adopted in 2021. The decision to propose management for these sites has been made in accordance with the North East Marine Plan. In particular, the following marine plan policies in the North East Marine Plan are relevant:

- Biodiversity
 - [NE-BIO-1](#), [NE-BIO-2](#), [NE-BIO-3](#)
- Cumulative Effects
 - [NE-CE-1](#)

¹⁰ www.gov.uk/government/publications/the-south-west-marine-plans-documents

¹¹ www.gov.uk/government/publications/the-north-east-marine-plans-documents

- Co-existence
 - [NE-CO-1](#)
- Employment
 - [NE-EMP-1](#)
- Fishing
 - [NE-FISH-1](#), [NE-FISH-2](#), [NE-FISH-3](#)
- Marine Protected Area Network
 - [NE-MPA-1](#), [NE-MPA-2](#)
- Tourism and Recreation
 - [NE-TR-1](#)

The remaining policies in the North East Marine Plan are not applicable.

MMO South Plan Area

Foreland MPA, Wight-Barfleur Reef MPA and Offshore Brighton MPA lie within the South Marine Plan Area. The South Marine Plan¹² was adopted in 2018. The decision to propose management for these sites has been made in accordance with the South Marine Plan. In particular, the following marine plan policies in the South Marine Plan are relevant:

- Biodiversity
 - [S-BIO-1](#), [S-BIO-2](#), [S-BIO-3](#)
- Co-existence
 - [S-CO-1](#)
- Employment
 - [S-EMP-2](#)
- Fishing
 - [S-FISH-1](#), [S-FISH-2](#), [S-FISH-3](#), [S-FISH-4](#), [S-FISH-4-HER](#)
- Marine Protected Area Network
 - [S-MPA-1](#), [S-MPA-2](#), [S-MPA-4](#)
- Social and Cultural
 - [S-SOC-1](#)
- Tourism and Recreation
 - [S-TR-1](#), [S-TR-2](#)

The remaining policies in the South Marine Plan are not applicable.

¹² www.gov.uk/government/publications/the-south-marine-plans-documents

MMO South East Plan Area

Foreland MPA and Goodwin Sands MPA lie within the South East Marine Plan Area. The South East Marine Plan¹³ was adopted in 2021. The decision to propose management for these sites has been made in accordance with the South East Marine Plan. In particular, the following marine plan policies in the South East Marine Plan are relevant:

- Cumulative Effects
 - [SE-CE-1](#)
- Co-existence
 - [SE-CO-1](#)
- Biodiversity
 - [SE-BIO-1](#), [SE-BIO-2](#), [SE-BIO-3](#)
- Employment
 - [SE-EMP-1](#)
- Fishing
 - [SE-FISH-1](#), [SE-FISH-2](#), [SE-FISH-3](#)
- Marine Protected Area Network
 - [SE-MPA-1](#), [SE-MPA-2](#), [SE-MPA-4](#)
- Tourism and Recreation
 - [SE-TR-1](#)

The remaining policies in the South East Marine Plan are not applicable.

1.4 Marine Strategy Regulations

In proposing the management options for the Stage 2 sites, MMO has considered the UK Marine Strategy, as required by regulation 9 of the Marine Strategy Regulations 2010¹⁴.

2 Policy objectives and intended effects

The policy objective of the byelaw is to further the conservation objectives of the Stage 2 sites. This will be achieved by prohibiting certain fishing gears within specified areas of the sites.

The social and economic impacts of management intervention will be minimised where possible.

The byelaw will also amend the MMO Lands End and Cape Bank European Marine Site (Specified Areas) Bottom Towed Gear Byelaw¹⁵ ('the existing MMO byelaw').

¹³ www.gov.uk/government/publications/the-south-east-marine-plan-documents

¹⁴ www.legislation.gov.uk/ukSI/2010/1627/regulation/9/made

Part of the spatial restriction within this byelaw sits inside the Cornwall Inshore Fisheries and Conservation District. When the proposed Marine Protected Areas Bottom Towed Fishing Gear Byelaw 2023 comes into force it will cover the entirety of the Cape Bank MPA (and the Cape Bank section of the Land's End and Cape Bank MPA) outside of 6 nautical miles (nm). Cornwall IFCA have agreed to expand the spatial coverage of their Closed Areas (European Marine Sites) No. 2 Byelaw¹⁶ to include the area inshore of 6 nm covered by the existing MMO byelaw and are currently consulting on an amendment to the byelaw to achieve this. For consistency for stakeholders, the proposed Cornwall IFCA measures in the area will be identical to the current MMO measures both in spatial extent and in the type of provisions implemented.

In order to ensure continued protection for the area of Land's End and Cape Bank MPA within 6 nm, MMO will first amend the existing MMO byelaw via provisions within the proposed byelaw so that it applies only inshore of 6 nm. When the revised Cornwall IFCA byelaw is ready to come into force, MMO will introduce a further byelaw to revoke the MMO Lands End and Cape Bank European Marine Site (Specified Areas) Bottom Towed Gear Byelaw entirely.

MMO will coordinate with Cornwall IFCA and Defra to ensure that the revocation of the existing MMO byelaw and the coming into force of the Cornwall IFCA byelaw occur simultaneously, avoiding any gap in protection for the area.

The proposed byelaw also amends three existing byelaws:

- 'The Start Point To Plymouth Sound and Eddystone European Marine Site (Specified Areas) Bottom Towed Fishing Gear Byelaw' made by the Marine Management Organisation on 11 December 2013;
- 'The Margate and Long Sands European Marine Site (Specified Areas) Bottom Towed Fishing Gear Byelaw 2017' made by the Marine Management Organisation on 2 August 2017; and
- 'The West of Walney Marine Conservation Zone (Specified Area) Bottom Towed Fishing Gear Byelaw 2018' made by the Marine Management Organisation on 4 September 2018.

These byelaws are amended by the proposed byelaw in order to insert the requirement to have bottom towed fishing gear inboard, lashed and stowed when transiting specified areas (where use of those gears are prohibited) as defined within those byelaws.

¹⁵ www.gov.uk/government/publications/lands-end-and-cape-bank-european-marine-site-specified-areas-bottom-towed-gear-byelaw

¹⁶

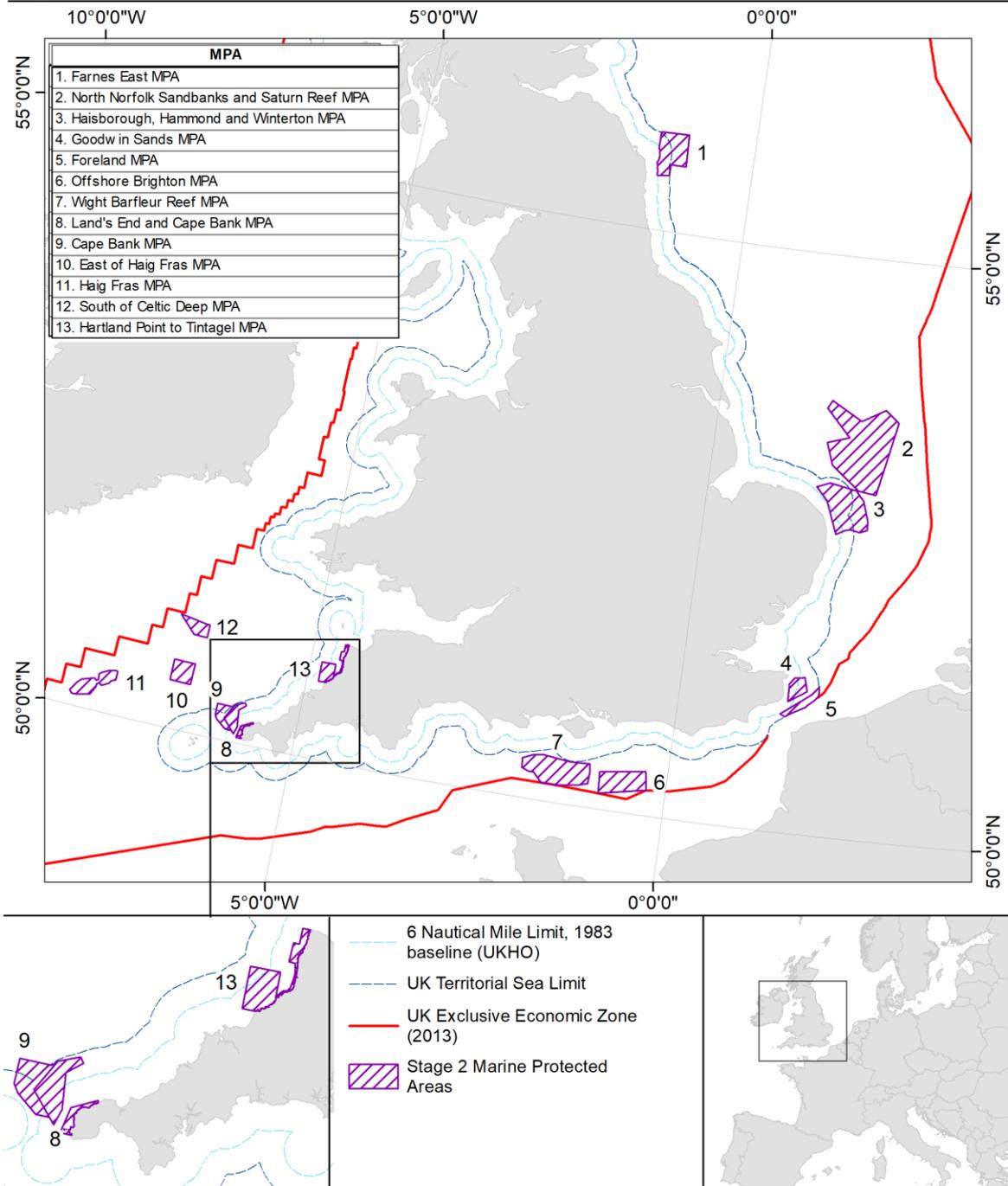
https://secure.toolkitfiles.co.uk/clients/17099/sitedata/Byelaws%20and%20orders/Cornwall_SFC/Closed-Areas-EMS-byelaw-No-2.pdf

The proposed byelaw also revokes the following byelaw:

- 'The Haisborough, Hammond and Winterton European Marine Site (Specified Areas) Bottom Towed Fishing Gear Byelaw' made by the Marine Management Organisation on 11 December 2013.



Stage 2 Marine Protected Areas



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Figure 1. MPAs included in Stage 2.

3 Policy options considered, including alternatives to regulation

Option 0: Do nothing.

This option is not a viable option to conserve the marine habitats and further the conservation objectives of the sites. All other options are compared to option 0.

Option 1: No statutory restrictions. Introduce a voluntary agreement.

This option would involve the development of voluntary codes of practice to protect features. MMO has considered this option in light of Better Regulation, which requires that new regulation is introduced only as a last resort. However, the government's expectation is that management measures for commercial fishing in MPAs should be implemented through statutory regulation to ensure adequate protection is achieved.

Option 2: Removal of pressures from specified management areas of designated feature via prohibition of bottom towed fishing. This may include a whole site prohibition where sensitive designated features are distributed throughout the whole site.

Prohibiting the use of bottom towed gear within specified management areas of the sites containing the rock and reef features will protect these features from the impacts of bottom towed fishing activities. This option will conserve the sites' marine habitats and fauna and further the conservation objectives of the MPAs, whilst allowing bottom towed fishing activities to take place in other areas of the sites.

Option 3: Removal of pressures via a whole site prohibition across all sites. The use of bottom towed gear will be prohibited throughout the MMO section of all sites considered in this assessment.

This option would remove the impact of bottom towed fishing activities from all areas of all the sites. This will help to achieve the conservation objectives of the sites and give the best possible chance of restoring the features to favourable condition. However, it would also prohibit bottom towed fishing activity in areas of the sites where rock and reef features do not occur. Interactions between bottom towed fishing gear and other designated features will be assessed and appropriate management implemented at a later stage.

Option 2 is the preferred option. As such, this is reflected in the costs and benefits analysis.

The boundaries of the management areas include buffer zones. This is to prevent direct damaging physical interactions between fishing activity adjacent to sensitive

features and the designated features. Where the sensitive site features exist up to the boundary of the MPA, the buffer zone extends beyond the boundary of the MPA within English waters or to the Economic Exclusion Zone boundary. The buffer distance is based on generalised warp length to water depth ratios, thereby taking into account the water depth at the site and the possible location of mobile gear on the seabed relative to a vessel at the sea surface. The management boundary has also been simplified to aid compliance. The buffer zone therefore has been calculated based on the maximum depth of the site following Natural England and Joint Nature Conservation Committee guidance as detailed in Table 2.

Table 2. Gear warp length: water depth ratio and buffer zone.

Water depth	Ratio warp length: depth	Buffer
Shallow waters (≤ 25 m)	4:1	4 x actual depth
Continental shelf (25 to 200 m)	3:1	3 x actual depth
Deep waters (200 to over 1000 m)	2:1	2 x actual depth

The methodology described above has been used to calculate the minimum buffer extent for spatial prohibitions within the Stage 2 MPAs. In some cases the spatial extent of the buffer will extend beyond the minimum calculated for simplicity and in order to facilitate effective enforcement of the management measures.

4 Expected level of business impact

All costs analysed are compared to Option 0. As reflected above, Option 2 is the chosen option, therefore MMO has used this as the basis for comparison.

MMO has used the best available evidence to assess the impact of the preferred management, however assumptions have been made in the development of this assessment:

- Vessel monitoring system (VMS) data assumes fishing activity from speed of travel. Speeds of up to six knots are considered fishing speed. Some vessels can tow bottom towed fishing gear at speeds greater than six knots which may lead to an underestimate of fishing activity. Some vessels may be travelling at speeds lower than six knots for reasons other than fishing (currents, tides etc.), this may lead to an overestimate of fishing activity.
- Economic performance indicators are estimated using the landings obtained from the MPA and individual vessels average Seafish calculated gross value added/profit ratios of fishing in the site. The economic performance indicators calculated per MPA are determined by the share of the value of landings derived by vessels fishing in the MPA versus overall value of their landings. It should be noted however that these estimates work on the assumption that

the costs of vessels are distributed the same way as earnings between all individual vessel's fishing grounds. Seafish produces the dataset by combining costs and earnings information from vessel accounts provided by vessel owners to the annual Seafish UK Fleet Survey with official effort, landings and capacity data for all active UK fishing vessels provided by MMO.

- The estimate of economic impact to and number of under 12 m vessels impacted given are likely to be an overestimate, as landings provided for non-VMS vessels are provided at International Council for the Exploration of the Seas (ICES) rectangle level. MMO has therefore presented landings for all under 12 m vessels as a proportion based on the percentage of a given ICES rectangle intersected by a management area.
- Displacement is difficult to quantify, and it is impossible to predict where exactly activities may be displaced to.
- Estimated costs to the fishing industry are likely to be an overestimate, as vessels are likely to offset some of the lost revenue by fishing in other areas.
- It is possible that the improved environmental status within the management areas could coincide with relatively more abundant fishing grounds beyond the management areas (due to spillover), and therefore the analysis may have underestimated the value of reduced fishing ground.
- Estimated costs to business for the prohibition of bottom towed fishing gear within North Norfolk Sandbanks and Saturn Reef MPA are likely to be an overestimate. Uncertainties in the extent and distribution of biogenic reef (*Sabellaria spp.*) within this site when estimating economic impacts necessitated the use of a larger management area for analysis. The management area proposed within the byelaw has since been refined upon receipt of additional habitat data and therefore the cost to business as a result of the proposed prohibition within this area is anticipated to be less than presented in this assessment. The management area used for economic analysis within North Norfolk Sandbanks and Saturn Reef MPA has an area of approximately 461.24 square kilometres (km²), whereas the refined management area has an area of approximately 370.66 km² – a reduction in area of approximately 20%.

Information used to assess the impacts of the closure has been taken from:

- VMS data for UK and non-UK vessels from 2016 to 2019 taken from entered log book and sales note data provided by MMO statistics;
- landings data for UK vessels under and over 12 m in length;
- non-UK landings data for vessels under and over 12 m in length;
- data from Seafish annual economic performance for the UK fishing fleet from 2016 to 2019¹⁷ and

¹⁷ <https://public.tableau.com/profile/seafish#!/vizhome/FleetEnquiryTool/1Overview>

- local MMO marine officer knowledge.

Prohibition of the use of bottom towed fishing gears in the management areas may result in the following costs:

- direct costs to the fishing industry from reduced access to fishing grounds;
- indirect costs to the fishing industry associated with displacement to other fishing grounds; and
- environmental impacts related to possible increased damage to habitats in other areas due to displacement.

Costs to the fishing industry have been monetised and these estimated values have been collated and presented as part of this DMA (Table 6, Table 7 and Table 8).

Environmental costs due to possible increased damage to habitats outside of the management areas due to displacement of fishing activity from the management areas to other areas are difficult to value and are therefore described here as non-monetised costs.

Prohibition of the use of bottom towed fishing gears in the management areas may result in indirect benefits to the fishing industry resulting from spillover and other environmental benefits related to the restoration of the habitat. These benefits are difficult to value and are therefore described under non-monetised benefits.

4.1 VMS maps

A WebApp displaying VMS activity for vessels using bottom towed fishing gear around the 13 MPAs considered in this assessment has been produced. [Access the WebApp here.](#)

4.2 Costs to the UK fishing industry

This DMA considers the economic impact to UK businesses. Economic impacts to non-UK businesses and individuals, including fishing vessels registered outside of the UK, are not in scope for the headline cost figures. However, evidence for non-UK fishing vessels has been provided for context.

Fisheries landings are reported at ICES statistical rectangle level. ICES standardise the division of sea areas for statistical analysis. Each ICES statistical rectangle is '30 min latitude by one degree longitude' in size which is approximately 30 nm by 30 nm (size varies with latitude due to the spheroid shape of the Earth).

To estimate the economic impacts of the management, fishing patterns of vessels using bottom towed gear within the management areas were analysed. The most recent four years of relevant VMS data and landings available (2016 – 2019) was used for this analysis. Landings and operating profit figures for 2020 are presented

for context but not included when calculating annual averages due to the impacts of COVID-19.

VMS records for UK vessel fishing activity that has occurred in each of the management areas from 2016 to 2020 are displayed in Table 3. VMS records for non-UK vessels are displayed in Table 4.

Table 3. Estimated number of UK vessels using bottom towed fishing gears within proposed management areas from 2016 – 2020.

Year	Under 12m*	Over 12m	Total
2016	123	25	148
2017	133	35	168
2018	90	22	112
2019	91	50	141
2020	76	30	106
Total (2016 - 2019)	215	83	298

*Figures represent all <12 m vessels with recorded landings within the ICES rectangles in which the management areas fall and therefore likely to be an over-estimate.

A previous version of this document stated that the total number of UK vessels using bottom towed fishing gears in the proposed management areas in 2020 was 96. This has been corrected to 106. The total number of over 12 m vessels using bottom towed fishing gears in the proposed management areas between 2016 and 2019 has also been corrected to 83 from 112.

Table 4. Number of non-UK vessels with bottom towed gear VMS fishing reports within proposed management areas from 2016 – 2020. Figures only include vessels larger than 12 m in length. No data is available concerning the number of vessels less than 12 m in length fishing within management areas, but as discussed previously it is expected to be minimal.

Country	2016	2017	2018	2019	2020	Total 2016 - 2019
Belgium	20	20	25	31	30	48
Germany	2	2	0	1	3	3
Denmark	0	1	1	1	0	1
France	119	106	90	91	95	152
Faroe Islands	1	0	0	1	0	2
Ireland	16	16	20	31	19	46
Netherlands	24	23	28	25	24	44
Norway	2	1	0	1	0	4
Portugal	0	1	0	0	0	1
Total	184	170	164	182	171	299

Analysis has been performed on VMS records from within each of the MPAs considered in this impact assessment.

Fishing activity in Cape Bank MPA mainly consists of demersal trawls, particularly bottom otter trawls, however some limited dredging activity has been known to occur. The majority of bottom towed gear activity (94 %) is conducted by non-UK, particularly French, vessels. However, UK, Belgian and Irish vessels are also active in the site.

Fishing activity in Farnes East MPA is almost exclusively by UK vessels (99%). The little non-UK fishing activity that occurs is from Dutch twin otter trawlers. The majority of UK activity within the site is dredging. The remainder of the UK activity within the site consists of demersal otter trawling.

Fishing activity in Foreland MPA is almost exclusively by non-UK vessels (99%). This is mainly from bottom otter trawling, however demersal seining (particularly 'Danish' or 'anchor' seines) and beam trawling also occur. The small amount of UK bottom towed gear activity that does occur is via otter trawling and seining.

Fishing activity in Goodwin Sands MPA is split between UK (50%) and non-UK (50%) vessels. The majority of all non-UK fishing activity within the site consists of bottom otter trawls (61%), and, to a lesser extent, demersal seines (11% Danish or anchor seines, 2% Scottish seines) and beam trawls (8 %). Bottom towed gears used by UK vessels with VMS within the site include Danish or anchor seines, Scottish seines, and bottom otter trawls.

Fishing activity in Haig Fras MPA is almost exclusively by non-UK vessels (99%) particularly from France and Ireland. Bottom otter trawls are most prevalent, however some limited seining, including Danish or anchor and pair seining, also occur.

Fishing activity in Haisborough, Hammond and Winterton MPA is conducted almost exclusively (99.6%) by non-UK vessels. Dutch beam trawlers are most prevalent, however there has also been limited use of otter trawls by German, French and Belgian vessels and beam trawls by German and Belgian vessels.

Fishing activity in Hartland Point to Tintagel MPA is limited, with no VMS reports recorded 2016 - 2019. However, reviewing sightings data and expert opinion, low intensity demersal trawling is undertaken by a few small inshore UK vessels.

Fishing activity in Land's End and Cape Bank MPA is currently managed via an MMO byelaw – 'The Lands End and Cape Bank European Marine Site (Specified Areas) Bottom Towed Gear Byelaw' - prohibiting bottom towed fishing gear activity in the majority of the site. VMS records show evidence of possible bottom towed gear activity in the site from both UK and non-UK vessels. MMO marine officers advise these are likely to be false fishing records owing to vessels travelling at slower speeds (and therefore falsely considered to be fishing) due to vessels travelling

against strong tidal movements in the area or to time their arrival into local ports with sufficient tide to allow entry and/or the allotted time provided by harbourmasters.

Fishing activity in North Norfolk Sandbanks and Saturn Reef MPA is conducted overwhelmingly by non-UK vessels (97%), particularly Dutch beam trawlers. There is also a small amount of beam trawling occurring from UK vessels. Otter trawling also occurs within the site at a much lower level, primarily from non-UK vessels.

Fishing activity in Offshore Brighton MPA consists mainly of non-UK activity (97%). The majority of the non-UK activity is from French vessels using mostly otter trawls followed by dredges and then demersal seines. The limited fishing activity from UK vessels is split evenly between dredging and seining.

Fishing activity in South of Celtic Deep MPA consists of non-UK vessels (83%) particularly Irish beam trawlers. However, some bottom otter trawling and dredging activity by non-UK vessels also occurs.

Fishing activity in Wight-Barfleur Reef MPA is almost exclusively (99%) conducted by non-UK vessels. French dredgers and bottom otter trawlers are most prevalent with some limited seining activity from other non-UK fishing vessels. The limited UK bottom towed gear activity that does occur is also via dredge and bottom otter trawl gears.

Landings associated with VMS for UK vessels within the proposed management areas for most recent five years of landings available (2016 - 2020) are displayed in Table 6. For context, non-UK vessels VMS activity 2016 - 2020 are displayed in Table 8.

The closure of fishing grounds can lead to significant displacement of fishing effort which can result in a range of costs. Displacement is dependent on the intensity and distribution of fishing activities within the site before the closure and on external factors (such as fish distribution, total allowable catch/quota, fuel prices).

Box 1. Non-UK fishing vessels

Although the focus of this DMA are the impacts on UK businesses and public bodies, vessels registered in other countries ('non-UK vessels') may also have access to fish in the proposed management areas.

Non-UK landings data are only available for vessels from EU member states (EUMS). Landings cannot be estimated for other nations such as European Free Trade Association (EFTA) member states (Iceland, Liechtenstein, Norway, and Switzerland) and have therefore not been included. For non-UK, non-EU nations, MMO only has VMS evidence for Norwegian activity within the management areas. It is unclear what fishing gears these vessels are using but activity from Norwegian vessels is very low and there is likely to be minimal financial impact (Table 4).

Estimates of fisheries landings values by EUMS vessels were determined by apportioning landings data provided by the European Commission Scientific, Technical and Economic Committee for Fisheries (STECF) for the ICES rectangles to the intersecting proposed management areas (Table 5). For vessels larger than 12m in length, landings were estimated using the proportion of EUMS VMS bottom towed gear fishing activity occurring in the management areas versus the ICES rectangles (Table 5). For vessels less than 12 m in length were estimated by apportioning ICES rectangle level landings based the proportion of the ICES rectangle that intersects a given management area. This provided an estimate of EUMS landings derived from the management area for the years 2016 – 2019. Landings estimates for <12 m vessels are likely to be a significant overestimate as the methodology described above assumes fishing activity of <12 m vessels is distributed evenly throughout an ICES rectangle. EUMS fishing activity of smaller vessels is more likely to take place in the areas of the ICES rectangles which are within their own territorial waters than England's and therefore outside of the management areas.

Between 2016 and 2019, an annual average of £3,761,517 was estimated to be derived from the management areas by EUMS vessels using bottom towed gear. Annual landings derived from the management areas by EUMS vessels using bottom towed gear were £4,614,976 in 2016, £3,106,134 in 2017, £3,542,861 in 2018 and £3,782,096 in 2019.

It is important to note that in contrast to the estimated costs to UK fishing vessels, estimated costs to EUMS vessels are based on the values of fish landed, rather than operating profit. The costs to EUMS vessels are therefore considerably overestimated as the costs are based solely on revenue from landings rather than operating profit. Furthermore, as per UK vessels, EUMS vessels are likely to offset some of their lost revenue by fishing in other areas.

For completeness, Table 9 presents best and worst-case landings scenarios where the best-case scenario assumes no bottom towed gear landings from within the ICES rectangles were derived from the management areas and the worst-case scenario assumes all bottom towed gear landings from the ICES rectangles were derived from within the management areas.

Using the methodology presented in 4.3, total familiarisation costs to non-UK vessels is £11,127, at a cost of £37 per vessel.

4.3 Familiarisation costs

The familiarisation cost is the cost to fishers of reading the byelaw. MMO have estimated that 298 UK vessels will be affected by the byelaw, and it is assumed that one fisher per vessel will be required to read the document. The draft byelaw is currently 4,630 words. Based upon the lower limit of reading technical text of 50 words per minute (EFTEC, 2013), there would be a required read time of 93 minutes per vessel. This means the total time spent reading the document across all 298 UK vessels will be 27,595 minutes, or 459.9 hours. Fishers normally receive a crew share rather than a fixed salary, so incomes can vary dramatically across different vessel sizes and types, but the average salary for employees in fishing and aquaculture in 2021 was £32,937 (ONS, 2022a). There are 52.1 weeks in a year, assuming the statutory annual leave of 5.6 weeks including bank holidays this leaves 46.5 working weeks¹⁸. Assuming an average 36 hour working week (ONS, 2022b), this means 1,674 hours worked a year. An average salary of £32,937 split across 1,674 hours generates a wage per hour of £19.68. At £19.68 per hour, the 459.9 hours spent reading the document across all vessels would generate a cost of £9,051. A 22% uplift for non-wage labour hourly costs needs to be added to generate the total familiarisation costs, which will be a final familiarisation cost of £11,042, at a cost of £37 per vessel (RPC, 2019). The total familiarisation cost of implementing the byelaw will be £11,042.

4.4 Monitoring and compliance

MMO compliance action is intelligence-led and risk-based in accordance with the National Intelligence Model (NCPE, 2005). Where intelligence suggests non-compliance or a risk of non-compliance with the byelaw, compliance resources will be deployed accordingly. This may include a Royal Navy fisheries patrol vessel presence, MMO fisheries patrol vessel presence or joint operations with other agencies (for example the Border Force or the Environment Agency). Joint

¹⁸ www.gov.uk/holiday-entitlement-rights

operations are not monetised here as they are requested on an *ad hoc* basis and costs can vary. MMO will coordinate any joint operations. The principles by which MMO will regulate marine protected areas are set out by the Legislative and Regulatory Reform Act 2006¹⁹ and the Regulators' Compliance Code²⁰ and aim to ensure that MMO is proportionate, accountable, consistent, transparent and targeted in any compliance action it takes.

Compliance costs for the inspection of MPAs and associated byelaws do not represent an additional cost. MPA inspections take place under standard operating procedure of Royal Navy/MMO fisheries patrol vessels. MPA and byelaw inspection costs are therefore absorbed by existing compliance systems and will not be considered here.

4.5 Total monetised costs

The economic impacts of the management areas are estimated as the loss of profitability of fishing effort at the site. This is informed by data from MMO on potential activity within the area and from the 2016 - 19 Seafish data on the profitability of fishing²¹. This estimate of operating profit combines cost and earning information provided by the vessel owners to the annual Seafish UK Fleet Survey with official landings and capacity data for vessels actively fishing within the management area provided by the MMO.

The MMO assigns gear and landings information to UK VMS fishing activity data via electronic logbook data submitted by fishers. MMO have estimated bottom towed gear landings via vessels larger than 12 m using this landings-linked VMS data from within the management areas.

Landings for vessels smaller than 12 m in length are only available at ICES rectangle level. To estimate the bottom towed gear landings derived from the management areas by such smaller vessels MMO have apportioned ICES rectangle landings data to management areas based on the area of the management area versus the ICES rectangle vessels. This estimate assumes landings from these smaller vessels are distributed evenly across the ICES rectangle. However, smaller vessels are more likely to be fishing closer to shore and therefore outside of the offshore management areas. As such, landings and ultimately operating profit estimates for vessels smaller than 12 m in length are likely to be an overestimate.

Seafish operating profit data was not available for Haig Fras MPA (2016 - 2019), North Norfolk Sandbanks and Saturn Reef MPA (2016) and Wight-Barfleur Reef

¹⁹ www.legislation.gov.uk/ukpga/2006/51/contents

²⁰ www.gov.uk/government/publications/regulators-code

²¹ <https://public.tableau.com/app/profile/seafish/viz/FleetEnquiryTool/1Overview>

MPA (2016 and 2019) because there were too few vessels operating in the management areas. To estimate operating profit for these years, the operating profit ratios for the ICES rectangle were applied to any landings for these sites. However, due to too few vessels operating in the relevant ICES rectangle, no operating profit figures could be estimated for Haig Fras MPA. There were minimal UK landings obtained from the Haig Fras MPA management area and therefore operating profit is expected to be insignificant. Operating profits for all management areas are presented in Table 7.

An estimate of £43,554 has been made for the average annual operating profit for UK landings derived from the management areas (Table 6).

A discount rate of 3.5% was applied to calculate the present value and 2019 was used as the price base year. The best estimate of highest net 2020 present value cost over ten years to the UK fishing industry of introducing management is estimated to be £374,903.

Table 5. EU member state vessel landings by value (£) for all management areas combined.

Year	Under 12m*	Over 12m	Total
2016	1,165	4,613,811	4,614,976
2017	3,658	3,102,476	3,106,134
2018	2,455	3,540,405	3,542,861
2019	9,802	3,772,293	3,782,096
2020	38,192	3,373,602	3,411,794
Total (2016 - 2019)	17,071	15,028,986	15,046,057
Annual Average (2016 - 2019)	4,270	3,757,246	3,761,517

Table 6. Estimated UK landings values (£) and operating profit (£) for vessels using bottom towed fishing gears in all management areas. Operating profit figures are based on Seafish economic data.

Year	Total landed value (£)	Operating profit (£)
2016	220,257	47,776
2017	234,419	50,929
2018	274,511	40,004
2019	349,298	35,510
2020	261,582	17,430
Annual Average (2016 - 2019)	269,621	43,554

4.6 Non-monetised costs

The management measures could lead to displacement of fishing activities to sensitive habitats elsewhere in English seas, increasing pressure on fauna and habitats in these areas (Hiddink *et al.*, 2006, Vaughan, 2017). However, it is not possible to accurately predict the location (and thus the associated costs) of displaced fishing activity.

MPAs were themselves chosen to protect rare and representative habitats, species, and geological features to contribute to an ecologically coherent network. The potential impact of displacement to areas outside of MPAs does not remove the requirement to ensure that fishing is managed to further the conservation objectives of the MPAs. The addition of management could result in some displacement of the fishing fleet to other fishing grounds, where there may be competition from an existing fishing fleet.

4.7 Non-monetised benefits

Marine ecosystems are essential for primary production and climate regulation, providing vital functions which support life. They also provide several ecosystem services (associated benefits), which are ‘the benefits which humans obtain from ecosystem functions and resources’ (Fontana *et al.*, 2013) at a local and global scale (Rees *et al.*, 2018).

To sustainably manage ecosystems which provide many benefits and interdependencies between natural and human systems, several national and international policy targets exist (Ashley *et al.*, 2018). The UK’s vision for ‘clean, healthy, safe, productive and biologically diverse ocean and seas’ is reflected in the UK Marine Strategy, helping the UK deliver its international obligations and commitments under the UN Convention on the Law of the Sea (UNCLOS), the OSPAR North-East Atlantic Environment Strategy, the Convention on Biological Diversity, and the UN Sustainable Development Goal 14 to conserve and sustainably use the oceans, seas and marine resources for sustainable development (Defra, 2019). At a national level, the UK Marine Strategy sets out objectives, targets, and indicators for the achievement of good environmental status in our seas (Defra, 2019).

Natural capital (defined below) approaches are central to the UK Government 25 Year Environment Plan (Ashley *et al.*, 2018; HM Government, 2018) which aims to enhance our natural capital, with policy choices being better-informed by natural capital approaches (HM Government, 2018).

Natural capital is the sum of our ecosystems, species, freshwater, land, soils, minerals, our air and our seas. These are all elements of nature that either directly or indirectly bring value to people and the country at large.

25 Year Environment Plan (HM Government, 2018)

Looking at the marine environment through a natural capital lens helps us to understand the assets within ecosystems which have the capacity to provide goods and services (Rees et al., 2018). Understanding the many diverse functions and values a habitat or species provides within an ecosystem helps to better secure and understand the associated indirect benefits different management approaches may provide.

For example, prohibiting the use of damaging activities may enhance the level of certain ecosystem services provided by MPA features and sub-features, such as climate regulation (Fletcher et al., 2012) and reducing wave energy (McManus, 2011), and recreational opportunities for SCUBA diving and sea angling can be protected.

Below are some of the ecosystem services that features considered in this assessment may provide.

4.7.1 Moderate and high energy circalittoral rock, and rocky reef

- Species diversification and formation of species habitat – circalittoral rock provides firm substrate for attachment and supports a diverse array of species such as polychaetes, sponges, cnidarians, and bryozoans (Jones, Hiscock, and Connor, 2000).
- Primary biomass production - circalittoral communities are largely generated from phytoplankton which supports benthic and pelagic organisms at higher trophic levels (Jones, Hiscock, and Connor, 2000). Also, a significant proportion of primary production sinks to the sea floor and is assimilated into the subtidal sediment (Jensen et al., 2003).
- Secondary biomass production – circalittoral communities are important secondary producers through growth of epibiotic organisms including sponges and tunicates (Jones, Hiscock, and Connor 2000).
- Tourism/recreation – circalittoral rock is a potential location for SCUBA diving and angling due to the high concentration of animal life.

4.7.2 Biogenic reef (*Sabellaria spp.*)

- Formation of a physical barrier – biogenic reefs can reduce incident wave energy (McManus, 2001).

- Species diversification and formation of species habitat – biogenic *Sabellaria spinulosa* reefs have a rich associated infauna and epifauna. The reefs provide firm substrate for attachment and support a diverse array of species such as polychaetes, sponges, cnidarians, and bryozoans (JNCC, 2022). *S. spinulosa* reef habitats are of greatest nature conservation significance as they occur on predominantly sediment or mixed sediment areas (Fletcher *et al.*, 2012). These enable a range of epibenthic species with their associated fauna and a specialised ‘crevice’ infauna, which would not otherwise be found in the area, to become established (Maddock, 2008).
- Secondary biomass production – biogenic reefs are important secondary producers through growth of epibiotic organisms including sponges and tunicates. (Jones, Hiscock, and Connor, 2000).
- Climate regulation - subtidal biogenic reefs play a major role in the global carbon cycle and act as a major store of carbon (Fletcher *et al.*, 2012).

5 Recommended management options

Following the above assessment, the recommended management option is Option 2: Removal of pressures from specified management areas of designated feature via prohibition of bottom towed fishing. This may include a whole site prohibition where sensitive designated features are distributed throughout the whole site.

This will be achieved through implementation of the proposed Marine Protected Areas Bottom Towed Fishing Gear Byelaw 2023. The byelaw will include an appropriate buffer to ensure bottom towed fishing activities occurring adjacent to highly sensitive designated features do not negatively impact those features.

6 References

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7 Annex: Tables and figures

Table 7. Estimated UK landings by value (£) for each management area.

Management Area	Landings					Annual average landings value from 2016 - 2019 (£)	Total landings value from 2016 - 2019 (£)
	2016	2017	2018	2019	2020		
Cape Bank MPA	72,582	55,862	37,723	98,363	52,985	66,132	264,529
East of Haig Fras MPA	95,439	86,614	150,861	90,021	62,665	105,734	422,934
Farnes East MPA	10,401	42,749	14,934	44,669	9,548	28,188	112,753
Foreland MPA	15,186	18,176	56,482	57,269	91,718	36,778	147,113
Goodwin Sands MPA	14,072	11,907	5,105	29,446	16,508	15,133	60,531
Haig Fras MPA	0	599	0	0	0	150	599
Haisborough, Hammond and Winterton MPA	1,343	2,721	1,708	1,983	5,376	1,939	7,755
Hartland Point to Tintagel MPA	171	2,080	1,751	3,389	1,314	1,848	7,391
North Norfolk Sandbanks and Saturn Reef MPA	10,420	3,006	12	441	5,757	3,470	13,880
Offshore Brighton MPA	154	519	23	335	0	258	1,032
South of Celtic Deep MPA	488	7,288	2,287	19	293	2,521	10,082
Wight-Barfleur MPA	0	2,899	3,625	23,363	15,417	7,472	29,887

Table 8. Estimated UK operating profit value (£) for each management area.

Management Area	Operating Profit				
	2016	2017	2018	2019	2020
Cape Bank MPA	19,334	13,116	5,752	18,776	11,658
East of Haig Fras MPA	18,701	17,880	17,268	6,775	2,591
Farnes East MPA	2,164	8,538	2,296	5,541	931
Foreland MPA	3,812	4,904	12,720	1,303	560
Goodwin Sands MPA	3,581	3,192	897	3,298	3,734
Haig Fras MPA*	0	0	0	0	0
Haisborough, Hammond and Winterton MPA	0	90	262	-759	-4,366
Hartland Point to Tintagel MPA	64	798	300	624	630
North Norfolk Sandbanks and Saturn Reef MPA	0	179	-1	-113	-2,135
Offshore Brighton MPA	30	125	2	63	0
South of Celtic Deep MPA	90	1,552	163	2	11
Wight-Barfleur MPA	0	555	343	0	3,816

*due to limited vessels fishing in the site/rectangle operating profit could not be shared due to confidentiality concerns however given there were so few landings (£599) operating profit is likely to be minimal/insignificant

Table 9. Non-UK bottom towed gear VMS records per year by management area.

Management Area	2016	2017	2018	2019	2020	2016 - 2019 Total
Cape Bank MPA	1,203	544	1,084	359	343	3,190
East of Haig Fras MPA	708	762	705	590	340	2,765
Farnes East MPA	0	5	0	0	0	5
Foreland MPA	1,833	572	1,260	2,720	3,090	6,385
Goodwin Sands MPA	205	111	94	94	42	504
Haig Fras MPA	270	253	376	167	87	1,066
Haisborough, Hammond and Winterton MPA	212	368	192	233	194	1,005
Hartland Point to Tintagel MPA	0	0	0	0	0	0
North Norfolk Sandbanks and Saturn Reef MPA	605	958	512	961	871	3,036
Offshore Brighton MPA	486	287	484	343	277	1,600
South of Celtic Deep MPA	23	26	59	39	42	147
Wight-Barfleur MPA	250	141	114	185	314	690
Grand Total	5,795	4,027	4,880	5,691	5,600	20,393

Table 10. EU27 2016 - 2020 best-case and worst-case EU member state landings by value (£). The best-case scenario assumes that no landings attributed to the ICES rectangles (for bottom towed gears) were derived from the management areas. The worst-case scenario assumes that all landings from bottom towed gears from within the ICES rectangles were derived from the management areas. Both scenarios contrast with Table 9 and Table 11 (landings estimated using the proportion of VMS fishing activity in the management area versus the rectangle). Values represent landings by bottom towed gear types for all EU member states. Landings values were not available for European Free Trade Association member states.

	2016	2017	2018	2019	2020	Annual Average 2016 - 2019
>12 m vessels	50,595,926	47,034,814	54,496,882	47,475,401	40,951,043	49,900,756
<12 m vessels	207,120	160,929	403,913	556,221	2,786,063	332,046
Worst case	50,803,046	47,195,743	54,900,794	48,031,622	43,737,107	50,232,801
Best case	0	0	0	0	0	0

Table 11. Estimated non-UK total landings value (£) per management area per nation.

Management area and non-UK nation	2016	2017	2018	2019	2020	2016 - 2019 Total (£)	2016 - 2019 Average (£)
Cape Bank MPA	1,665,147	216,539	269,057	150,300	188,578	2,301,043	575,261
Belgium	1,443,267	84,944	95,723	104,134	155,442	1,728,069	460,666
France	221,880	85,776	173,334	46,166	32,476	527,155	131,789
Ireland	0	45,820	0	0	660	45,820	35,522
East of Haig Fras MPA	165,476	165,897	199,717	174,925	145,891	706,016	176,504
Belgium	0	2,967	0	0	0	2,967	35,894
France	138,838	158,818	135,679	140,509	88,751	573,843	143,461
Ireland	26,639	4,113	64,038	34,416	57,140	129,206	54,533
Farnes East MPA	0	0	0	0	0	0	0
Netherlands	0	0	0	0	0	0	0
Foreland MPA	519,825	178,354	805,078	1,635,001	1,568,744	3,138,257	784,564
Belgium	60,228	12,620	202,203	509,979	325,308	785,030	313,919
Germany	0	0	0	0	340,712	0	0
France	452,682	165,727	523,719	1,081,390	876,005	2,223,517	444,703
Netherlands	6,827	0	78,824	43,557	26,520	129,208	32,302
Goodwin Sands MPA	66,167	36,614	112,165	57,664	51,130	272,610	60,982
Belgium	13,145	4,207	66,107	3,403	38,277	86,861	21,715
France	52,988	29,646	45,915	54,230	12,768	182,779	40,899
Netherlands	0	2,762	0	0	0	2,762	690
Haig Fras MPA	102,589	84,694	127,891	60,803	43,590	375,976	75,333
France	76,601	63,176	112,326	40,038	20,244	292,142	73,035
Ireland	25,988	21,518	15,564	20,762	23,346	83,832	31,374
Haisborough, Hammond and Winterton MPA	307,409	259,366	412,801	516,339	108,036	1,495,914	373,979
Belgium	167,934	0	286,468	387,808	0	842,209	243,238
France	94	0	0	0	0	94	23
Netherlands	139,382	259,366	126,333	128,531	107,759	653,611	130,727

Management area and non-UK nation	2016	2017	2018	2019	2020	2016 - 2019 Total (£)	2016 - 2019 Average (£)
Hartland Point to Tintagel MPA	0	0	0	0	0	0	0
North Norfolk Sandbanks and Saturn Reef MPA	1,276,509	1,506,556	1,138,779	636,058	797,488	4,557,903	911,581
Belgium	863,763	323,156	810,901	0	0	1,997,820	499,455
Germany	3,556	484,708	0	0	23,348	488,264	197,544
Denmark	0	0	0	527	0	527	132
France	94	3,361	0	0	0	3,455	717
Netherlands	409,096	695,331	327,759	629,025	737,969	2,061,210	515,303
Offshore Brighton MPA	209,658	56,657	92,199	69,015	41,375	427,529	188,566
Belgium	0	0	0	1,073	1,811	1,073	268
Germany	148,691	0	0	0	0	148,691	29,792
France	58,045	53,648	82,317	45,312	33,277	239,321	59,830
Ireland	0	0	0	10,522	5,875	10,522	14,071
Netherlands	1,879	2,069	8,295	10,604	0	22,847	5,712
South of Celtic Deep MPA	7,572	6,922	17,899	31,272	17,924	63,666	13,875
France	1,965	4,305	458	5,025	3,682	11,753	2,938
Ireland	5,607	2,617	17,441	26,247	14,243	51,913	10,970
Wight-Barfleur MPA	294,624	594,534	367,265	450,718	449,037	1,707,142	426,786
Belgium	21,573	146,261	223,185	323,477	226,152	714,497	228,256
Germany	150,137	47,846	0	108,861	68,332	306,844	76,711
Denmark	0	143,537	133,508	0	0	277,045	70,751
France	21,267	14,952	9,144	16,691	16,843	62,054	15,514
Ireland	1,556	0	0	0	0	1,556	3,414
Netherlands	100,091	143,537	1,164	4	136,663	244,796	61,199
Portugal	0	95,691	0	0	0	95,691	31,378
Total landings (£)	4,614,976	3,106,134	3,542,851	3,782,096	3,411,794	15,046,057	3,761,514

Table 12. Estimated annual landed value (£) from management areas by non-UK > 12 m and < 12 m vessels.

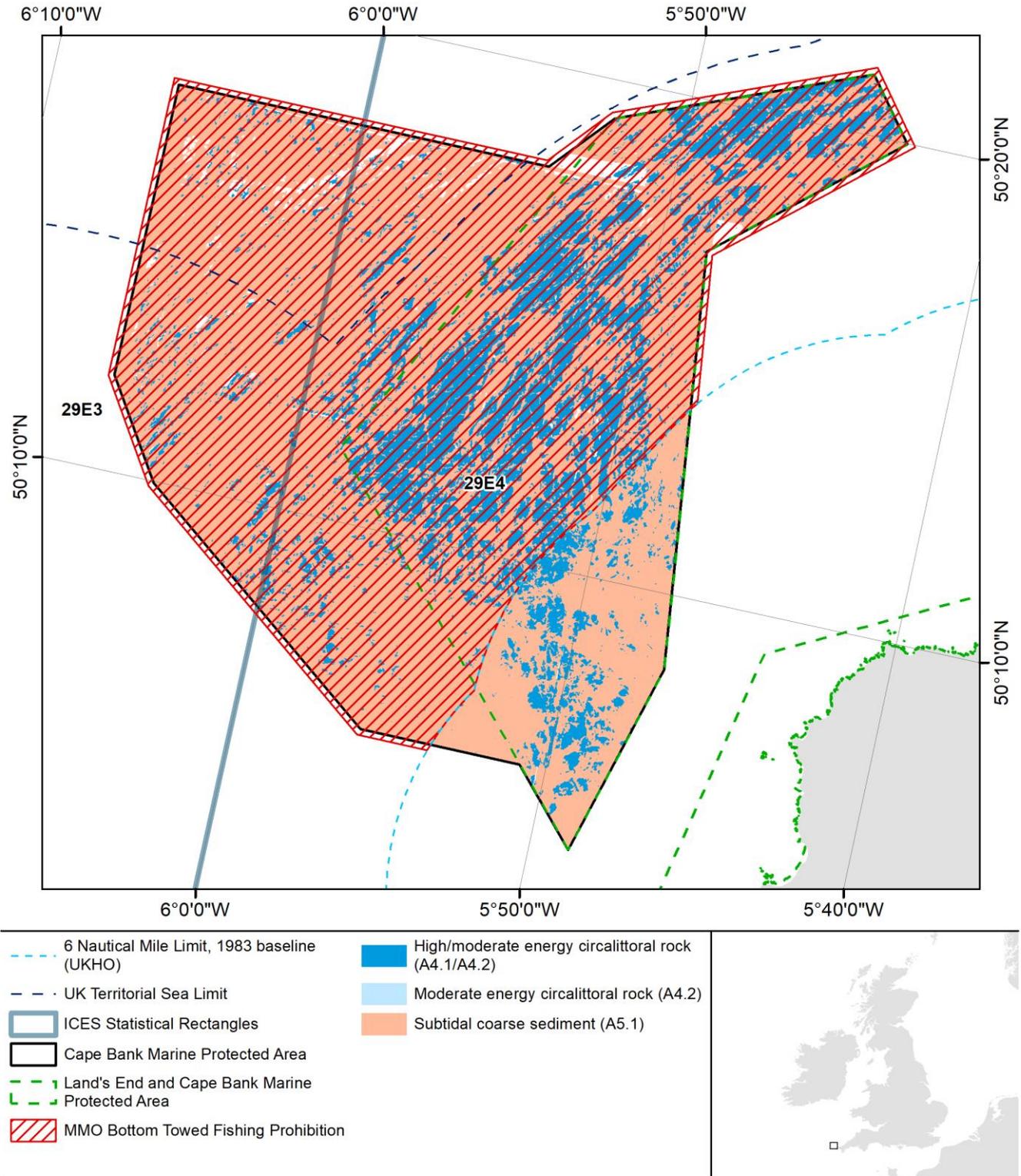
Management area and non-UK nation	2016		2017		2018		2019		2020	
	> 12 m	< 12 m	> 12 m	< 12 m	> 12 m	< 12 m	> 12 m	< 12 m	> 12 m	< 12 m
Cape Bank MPA	1,665,147	0	216,539	0	269,057	0	150,300	0	188,578	0
Belgium	1,443,267	0	84,944	0	95,723	0	104,134	0	155,442	0
France	221,880	0	85,776	0	173,334	0	46,166	0	32,476	0
Ireland	0	0	45,820	0	0	0	0	0	660	0
East of Haig Fras MPA	165,476	0	165,897	0	199,717	0	174,925	0	145,891	0
Belgium	0	0	2,967	0	0	0	0	0	0	0
France	138,838	0	158,818	0	135,679	0	140,509	0	88,751	0
Ireland	26,639	0	4,113	0	64,038	0	34,416	0	57,140	0
Farnes East MPA	0	0	0	0	0	0	0	0	0	0
Netherlands	0	0	0	0	0	0	0	0	0	0
Foreland MPA	519,737	88	178,347	7	804,746	332	1,634,926	75	1,568,544	200
Belgium	60,228	-	12,620	-	202,203	-	509,979	-	325,308	-
Germany	0	-	0	-	0	-	0	-	340,712	-
France	452,682	-	165,727	-	523,719	-	1,081,390	-	876,005	-
Netherlands	6,827	-	0	-	78,824	-	43,557	-	26,520	-
Goodwin Sands MPA	66,132	34	36,614	0	112,022	142	57,634	31	51,044	86
Belgium	13,145	-	4,207	0	66,107	-	3,403	-	38,277	-
France	52,988	-	29,646	0	45,915	-	54,230	-	12,768	-
Netherlands	0	-	2,762	0	0	-	0	-	0	-
Haig Fras MPA	102,589	0	84,694	0	127,891	0	60,801	2	43,590	0
France	76,601	0	63,176	0	112,326	0	40,038		20,244	0
Ireland	25,988	0	21,518	0	15,564	0	20,762		23,346	0
Haisborough, Hammond and Winterton MPA	307,409	0	259,366	0	412,801	0	516,339	0	107,759	277
Belgium	167,934	0	0	0	286,468	0	387,808	0	0	-
France	94	0	0	0	0	0	0	0	0	-
Netherlands	139,382	0	259,366	0	126,333	0	128,531	0	107,759	-

Management area and non-UK nation	2016		2017		2018		2019		2020	
	> 12 m	< 12 m	> 12 m	< 12 m	> 12 m	< 12 m	> 12 m	< 12 m	> 12 m	< 12 m
Hartland Point to Tintagel MPA	0	0	0	0	0	0	0	0	0	0
North Norfolk Sandbanks and Saturn Reef MPA	1,276,509	0	1,506,556	0	1,138,659	120	629,552	6,506	761,317	36,171
Belgium	863,763	0	323,156	0	810,901	-	0	-	0	-
Germany	3,556	0	484,708	0	0	-	0	-	23,348	-
Denmark	0	0	0	0	0	-	527	-	0	-
France	94	0	3,361	0	0	-	0	-	0	-
Netherlands	409,096	0	695,331	0	327,759	-	629,025	-	737,969	-
Offshore Brighton MPA	208,615	1,043	55,717	940	90,611	1,588	67,512	1,503	40,963	412
Belgium	0	-	0	-	0	-	1,073	-	1,811	-
Germany	148,691	-	0	-	0	-	0	-	0	-
France	58,045	-	53,648	-	82,317	-	45,312	-	33,277	-
Ireland	0	-	0	-	0	-	10,522	-	5,875	-
Netherlands	1,879	-	2,069	-	8,295	-	10,604	-	0	-
South of Celtic Deep MPA	7,572	0	6,922	0	17,899	0	31,272	0	17,924	0
France	1,965	0	4,305	0	458	0	5,025	0	3,682	0
Ireland	5,607	0	2,617	0	17,441	0	26,247	0	14,243	0
Wight-Barfleur MPA	294,624	0	591,823	2,711	367,002	263	449,033	1,685	447,991	1,046
Belgium	21,573	0	146,261	-	223,185	-	323,477	-	226,152	-
Germany	150,137	0	47,846	-	0	-	108,861	-	68,332	-
Denmark	0	0	143,537	-	133,508	-	0	-	0	-
France	21,267	0	14,952	-	9,144	-	16,691	-	16,843	-
Ireland	1,556	0	0	-	0	-	0	-	0	-
Netherlands	100,091	0	143,537	-	1,164	-	4	-	136,663	-
Portugal	0	0	95,691	-	0	-	0	-	0	-
Total landings (£)	4,613,811	1,165	3,102,476	3,658	3,540,405	2,445	3,772,293	9,802	3,373,602	38,192



Cape Bank Marine Protected Area

MMO Prohibition of Bottom Towed Fishing



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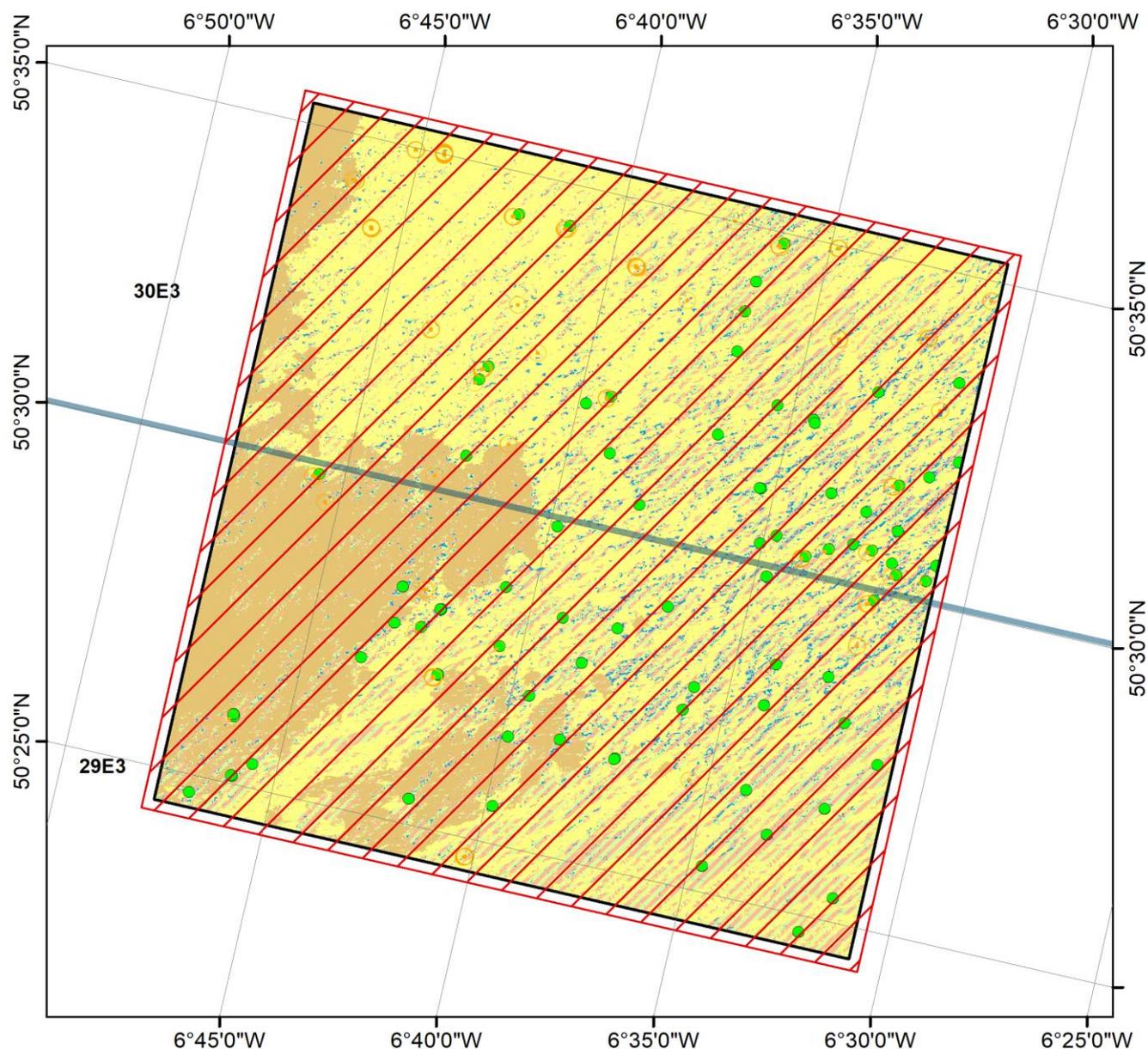
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Figure 2. Proposed bottom towed gear management for Cape Bank MPA and Land's End and Cape Bank MPA.



East of Haig Fras Marine Protected Area

MMO Prohibition of Bottom Towed Fishing



- | | |
|---|---|
| ICES Statistical Rectangles | High/moderate energy circalittoral rock (A4.1/A4.2) |
| East of Haig Fras Marine Protected Area | Subtidal coarse/mixed sediments (A5.1/A5.4) |
| MMO Bottom Towed Fishing Prohibition | Subtidal sand (A5.2) |
| Sea pen and burrowing megafauna communities | Subtidal mud (A5.3) |
| Fan mussel (<i>Atrina fragilis</i>) | |



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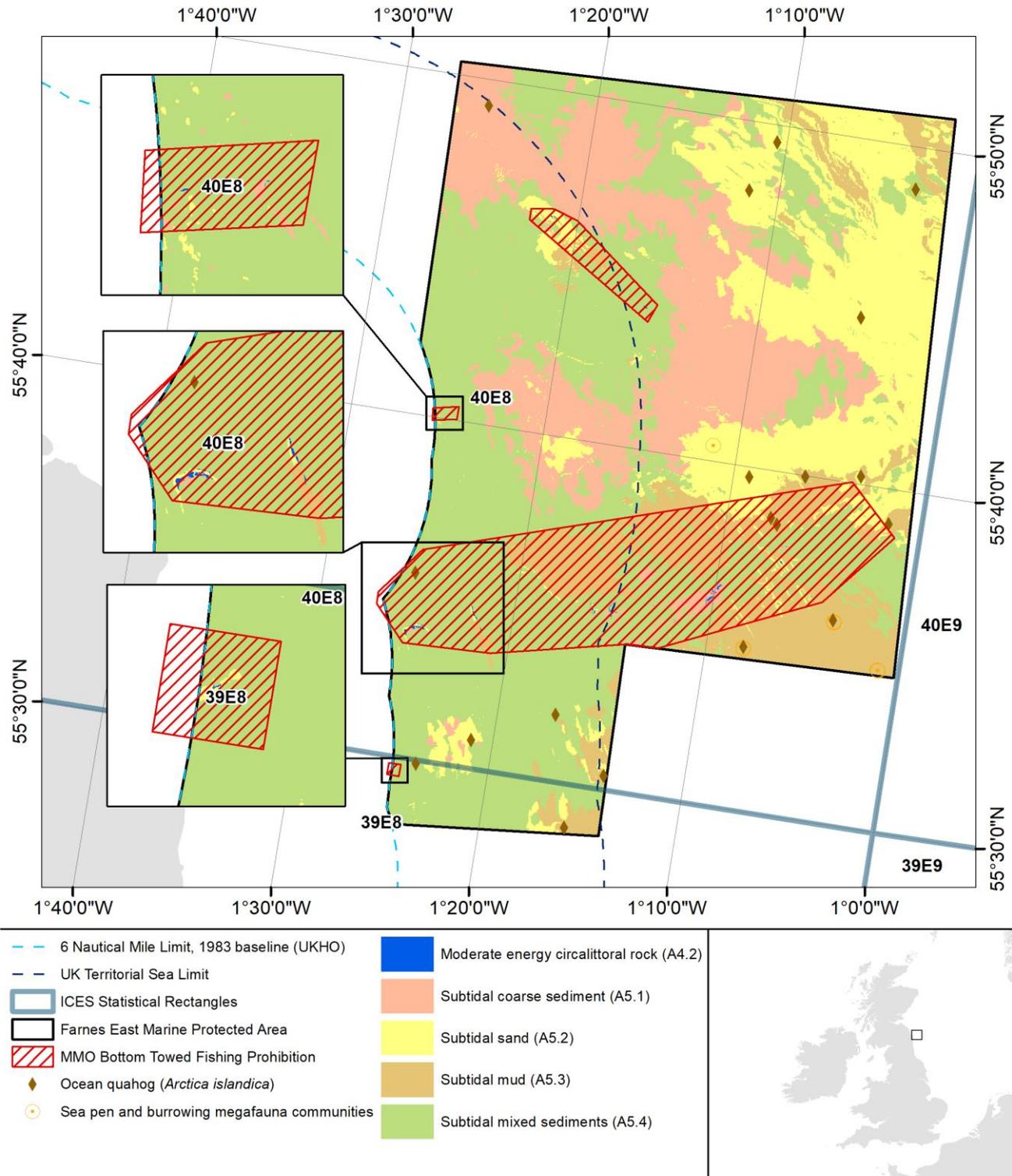
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Figure 3. Proposed bottom towed gear management for East of Haig Fras MPA.



Farnes East Marine Protected Area

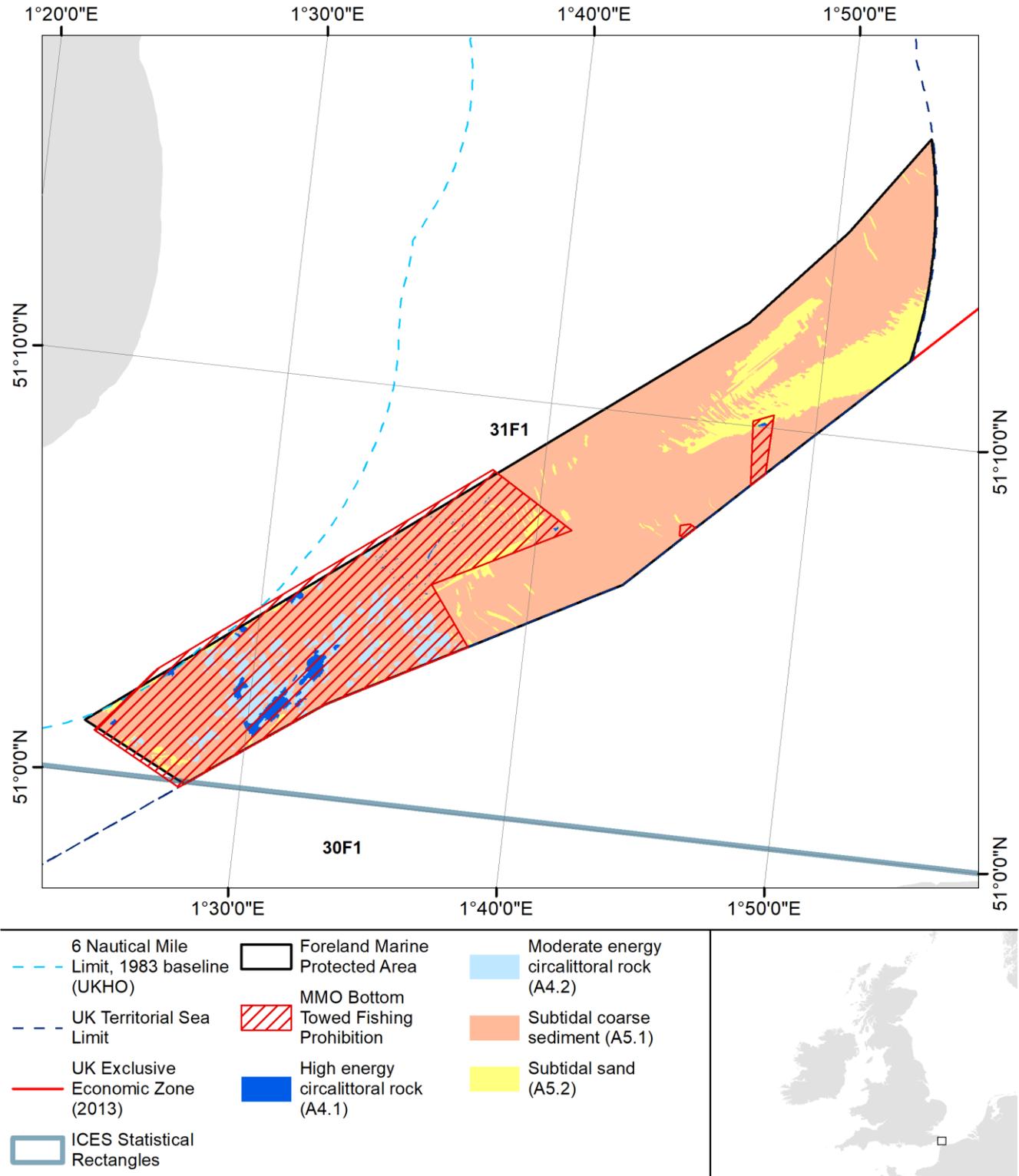
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Figure 4. Proposed bottom towed gear management for Farnes East MPA.



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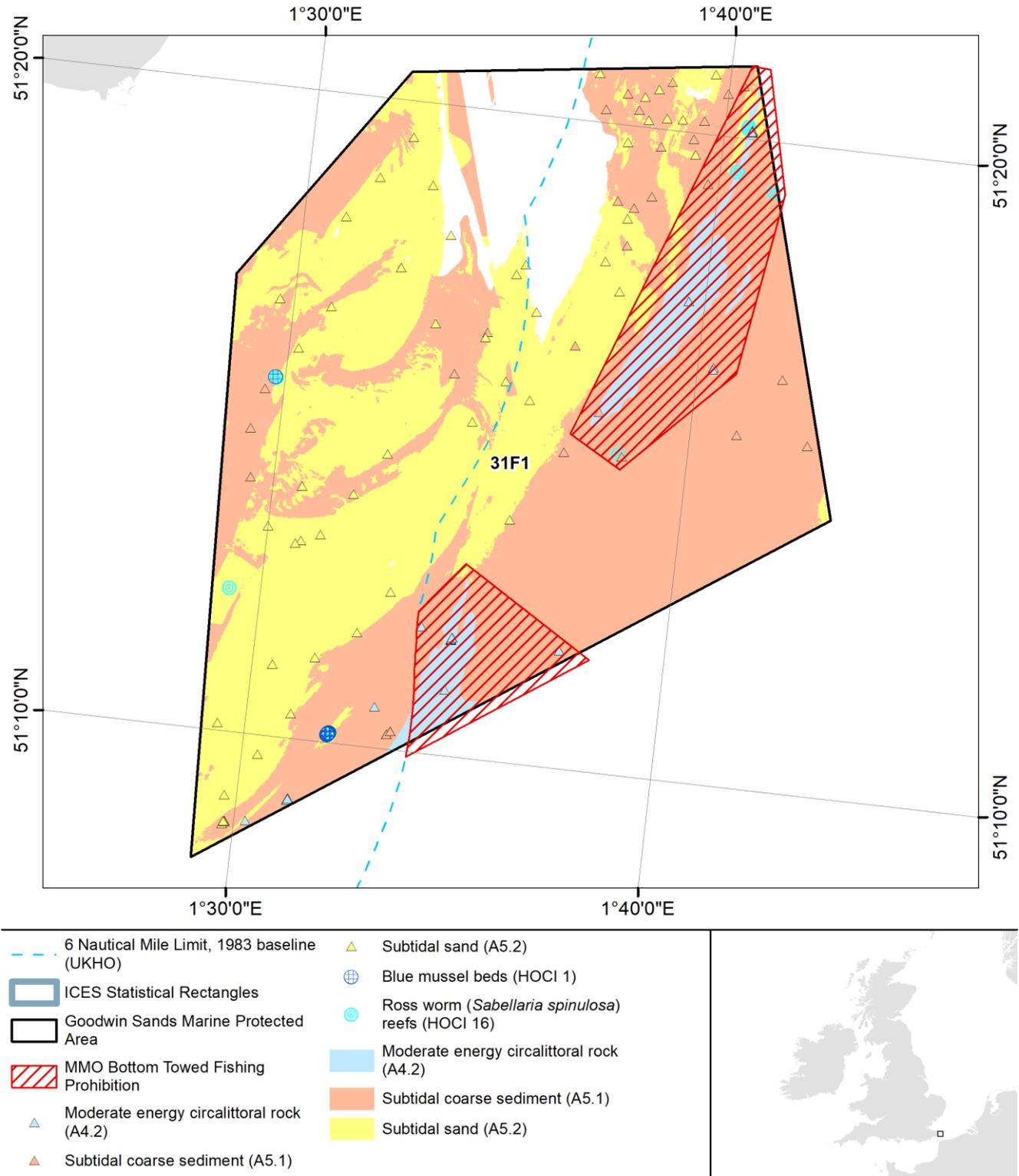
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Figure 5. Proposed bottom towed gear management for Foreland MPA.



Goodwin Sands Marine Protected Area

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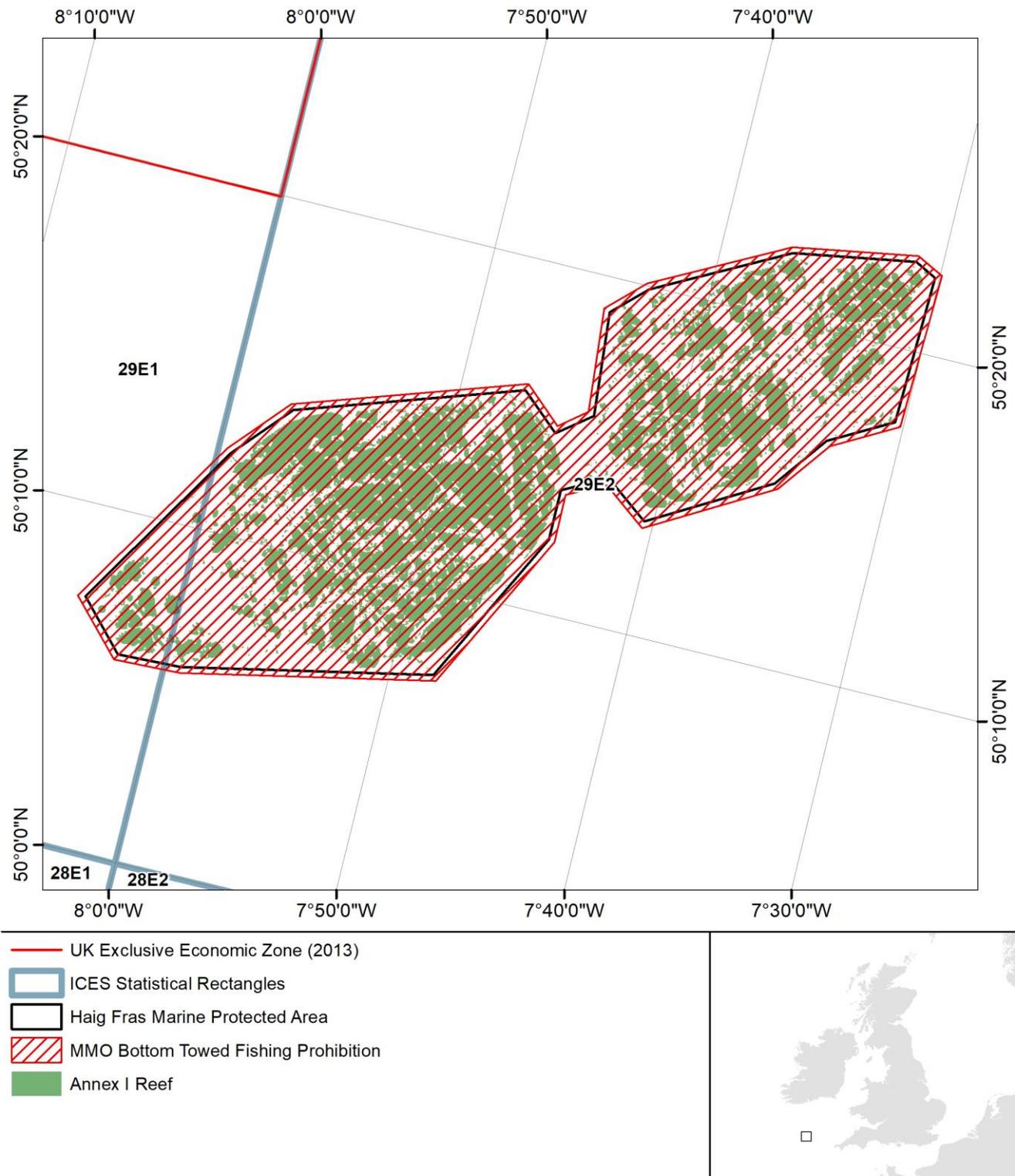
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Figure 6. Proposed bottom towed gear management for Goodwin Sands MPA.



Haig Fras Marine Protected Area

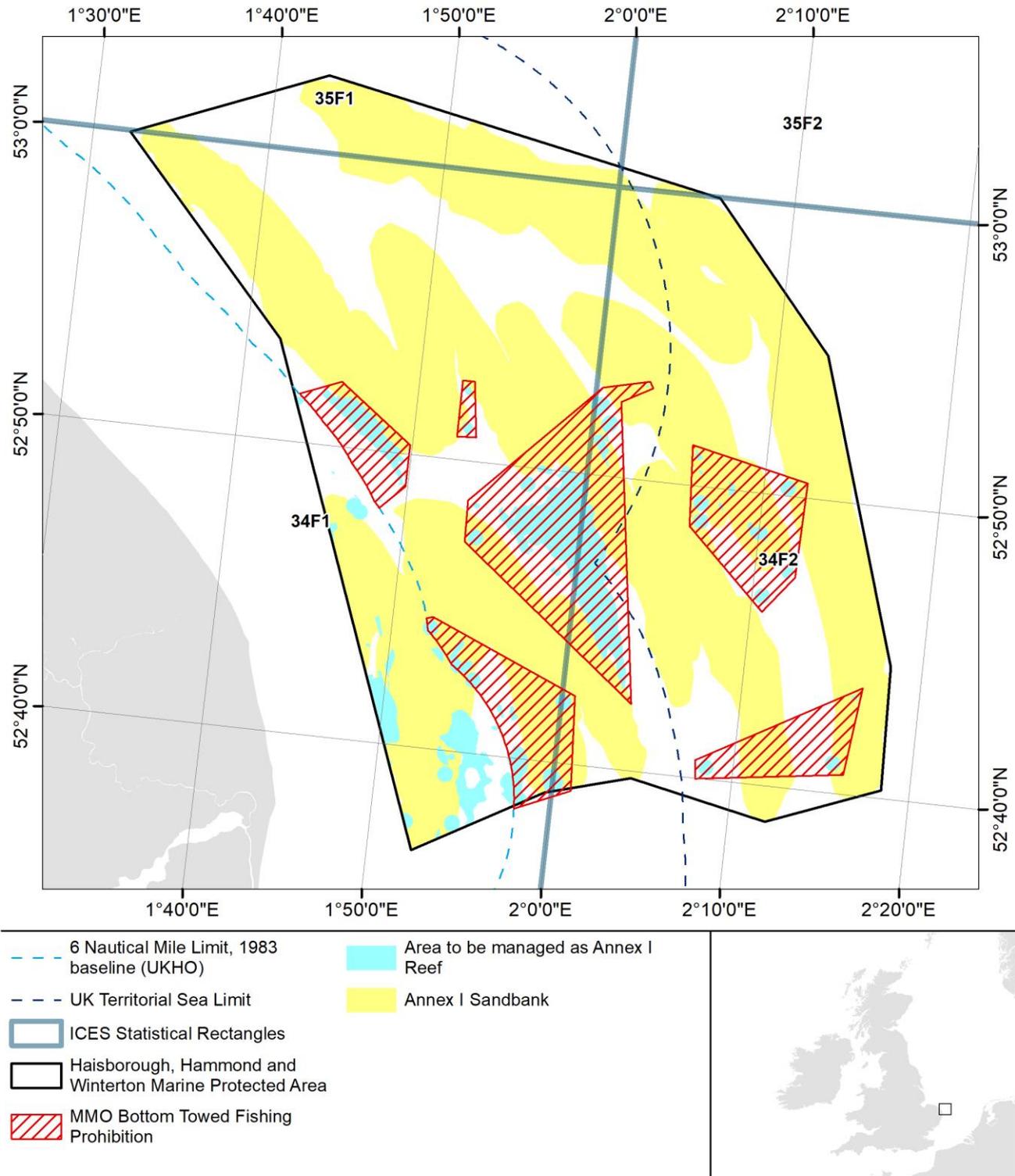
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Figure 7. Proposed bottom towed gear management for Haig Fras MPA.



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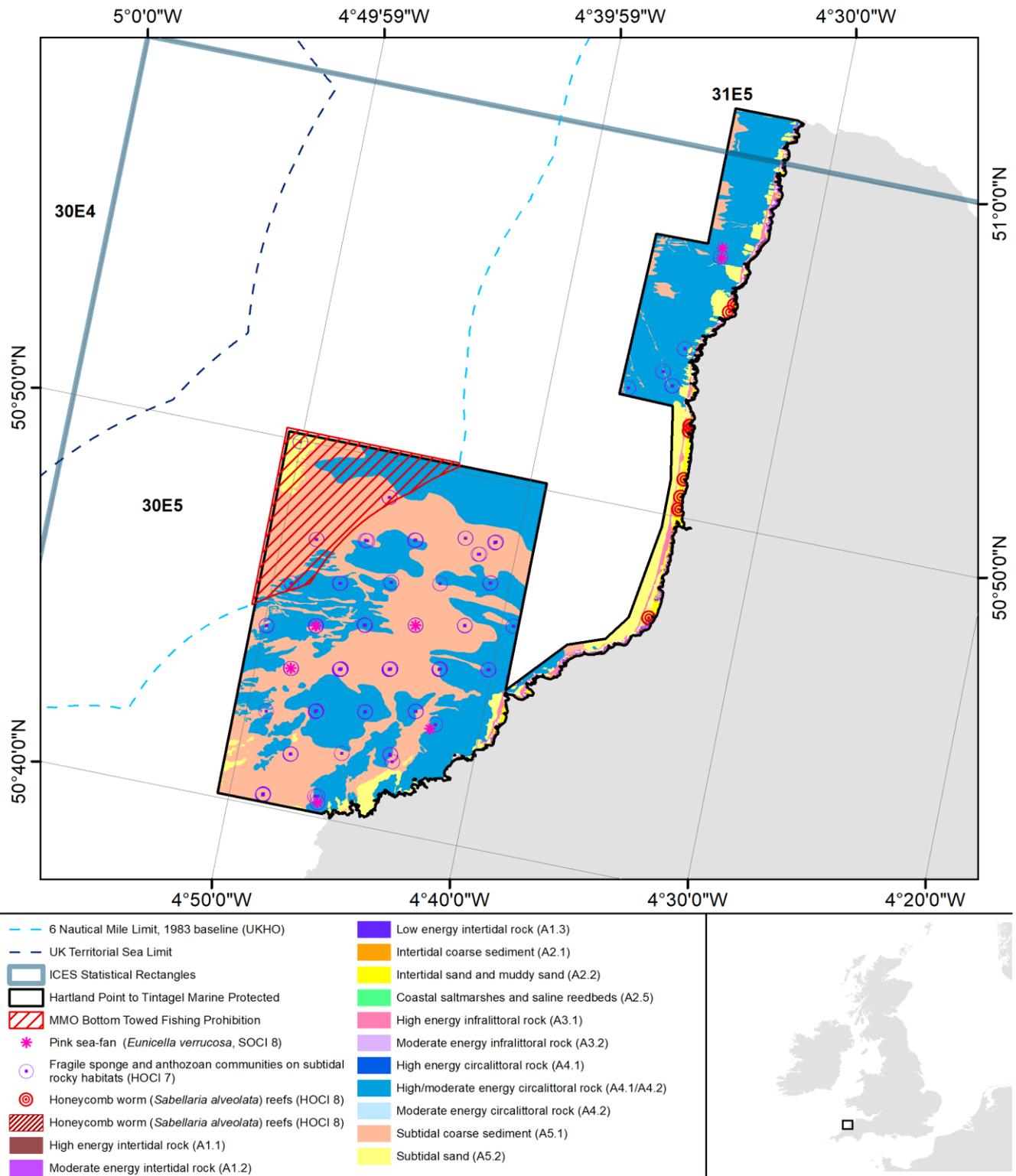
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Figure 8. Proposed bottom towed gear management for Haisborough, Hammond and Winterton MPA.



Hartland Point to Tintagel Marine Protected Area

MMO Prohibition of Bottom Towed Fishing



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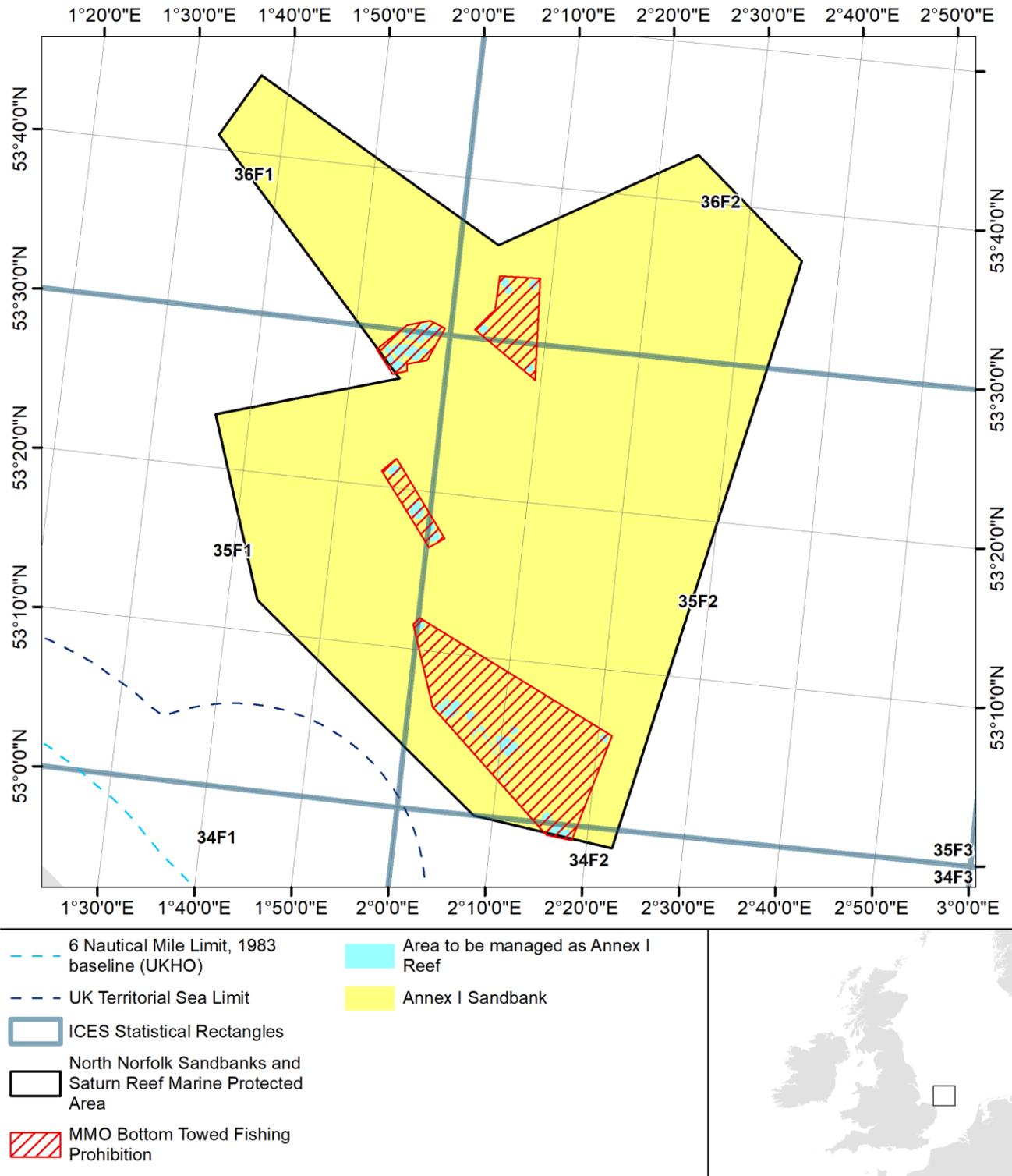
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Figure 9. Proposed bottom towed gear management for Hartland Point to Tintagel MPA.



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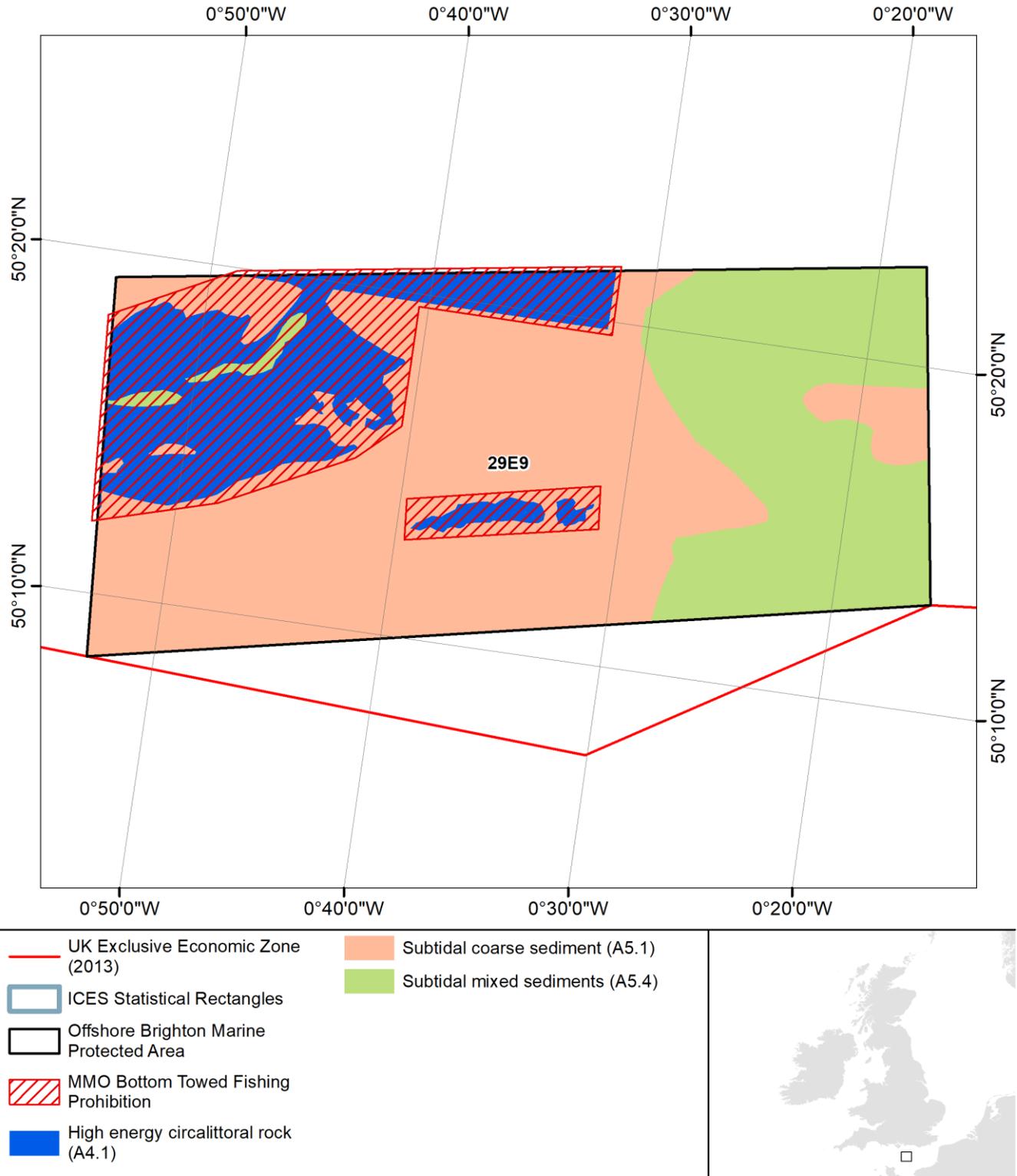
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Figure 10. Proposed bottom towed gear management for North Norfolk Sandbanks and Saturn Reef MPA.



Offshore Brighton Marine Protected Area

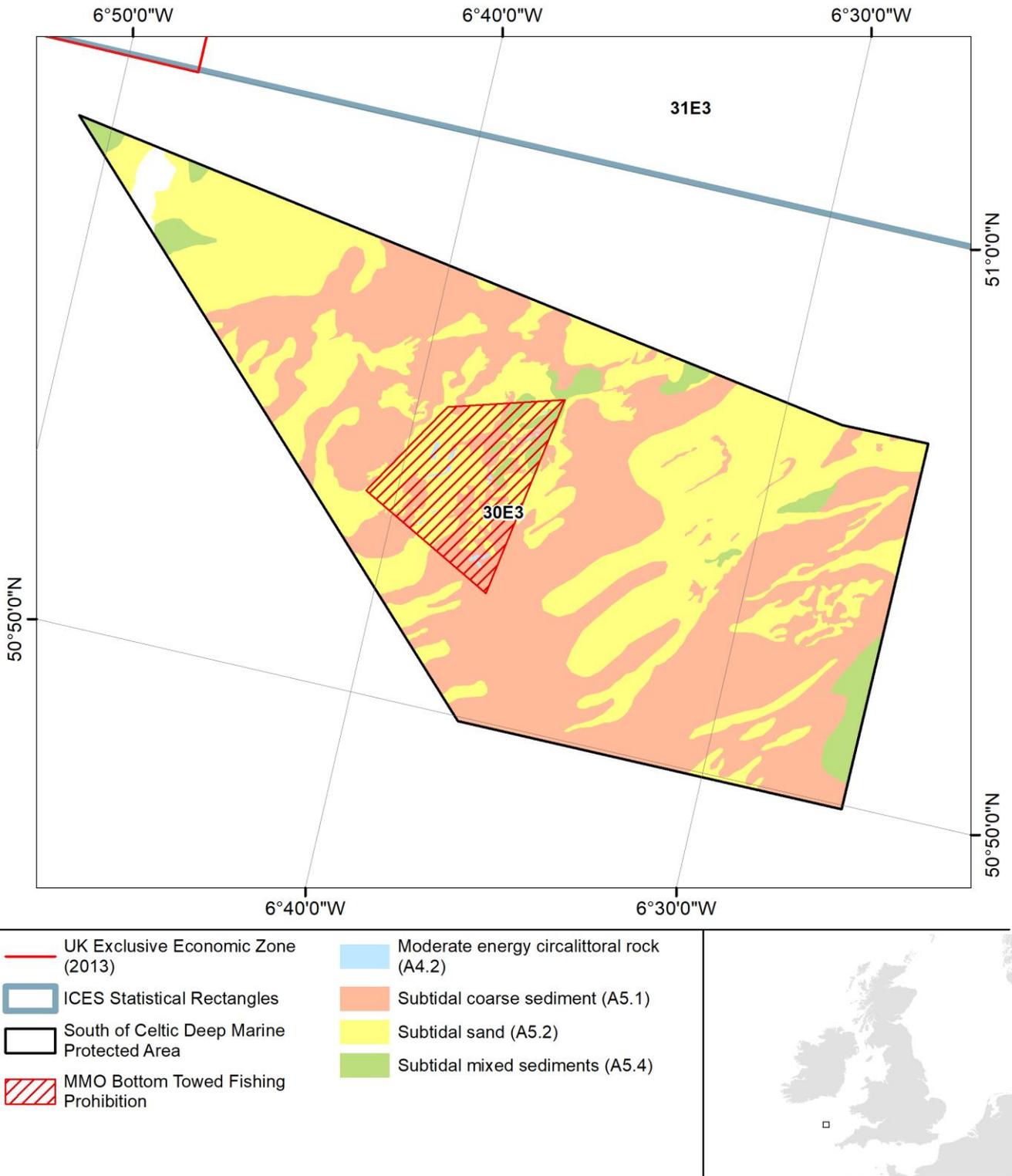
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Figure 11. Proposed bottom towed gear management for Offshore Brighton MPA.



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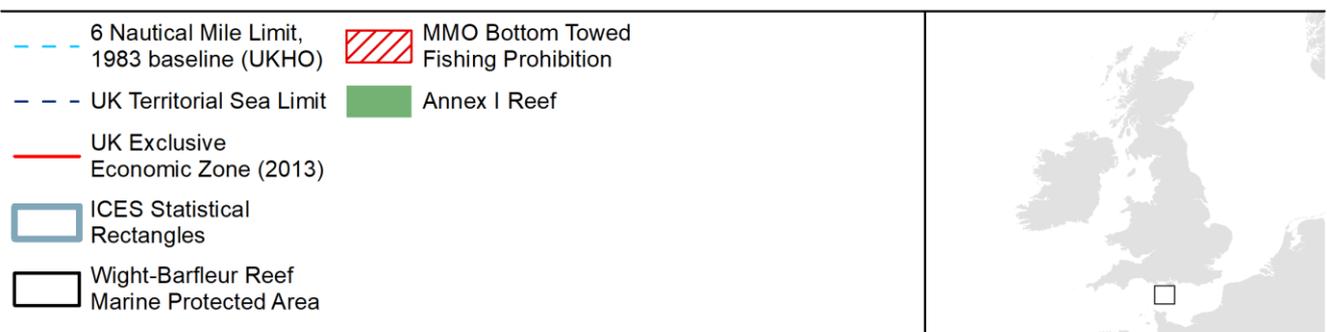
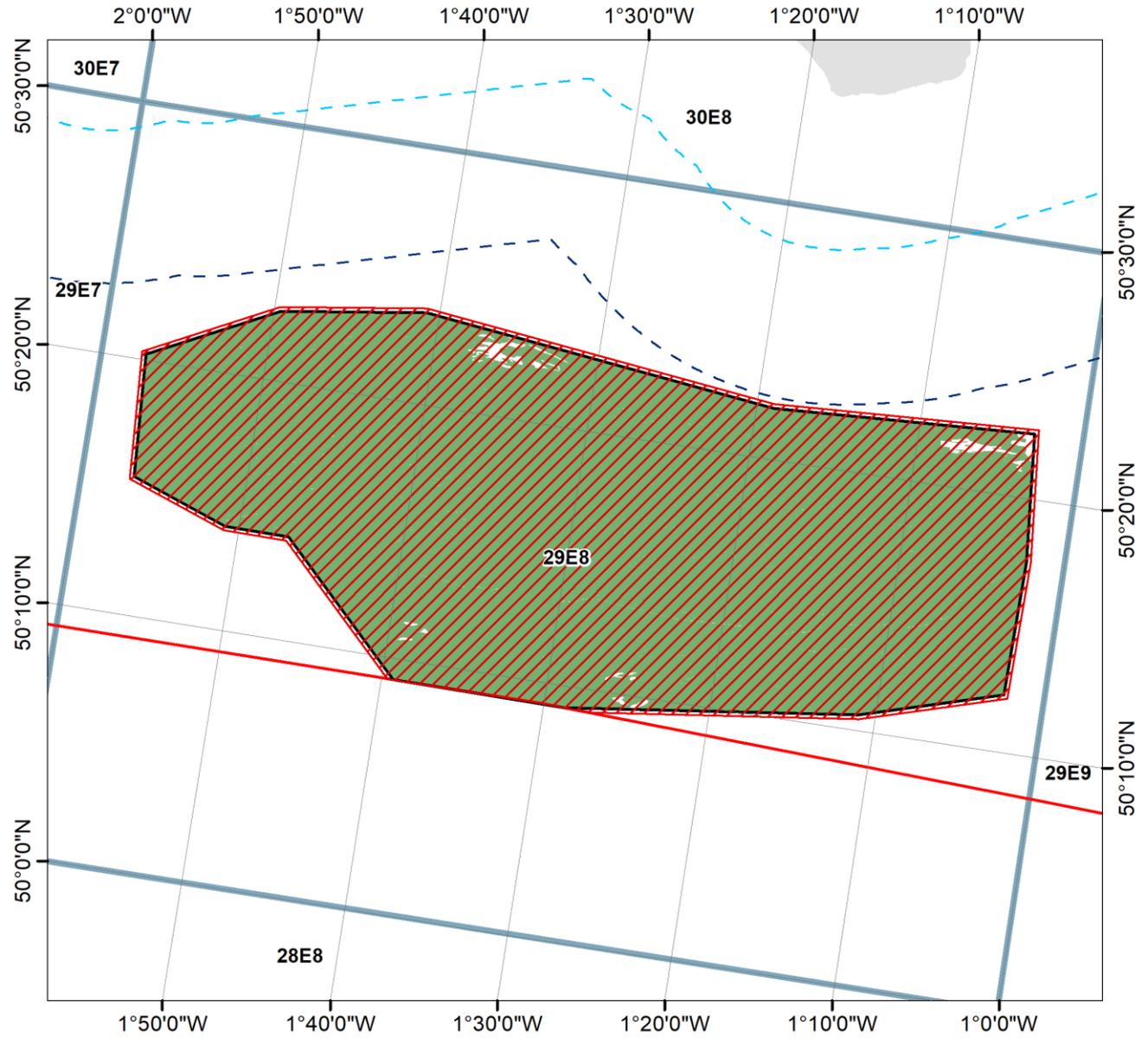
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Figure 12. Proposed bottom towed gear management for South of Celtic Deep MPA.



Wight-Barfleur Reef Marine Protected Area

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Figure 13. Proposed bottom towed gear management for Wight-Barfleur Reef MPA.