



Marine
Management
Organisation

MMO De Minimis Assessment: Highly Protected Marine Areas Fishing Byelaw 2023

August 2023



...ambitious for our seas and coasts

De Minimis Assessment (DMA)	
Title of Measure	Highly Protected Marine Areas (HPMAs) Fishing Byelaw 2023
Lead Department/Agency	Marine Management Organisation (MMO)
Expected Date of Implementation	Draft
Origin (Domestic or International)	Domestic
Date of Assessment	29/05/2023
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)	
<ul style="list-style-type: none"> • Option 0: Do nothing. • Option 1: No statutory restrictions. Introduce a voluntary agreement. • Option 2: Removal of pressures from specified areas of sites via prohibition of fishing activity. • Option 3: Removal of pressures via a whole site prohibition of fishing activity across all sites. <p>Option 3 is the preferred option.</p>	
Description of novel and contentious elements (if any)	
<ul style="list-style-type: none"> • First all fishing prohibitions for HPMAs to be implemented in English waters • In utilising powers introduced by the Fisheries Act 2020¹, MMO must have regard for UK-EU Trade and Cooperation Agreement². 	
Initial assessment of impacts on business	
<p>The main businesses directly impacted are those in the fishing industry, through profit foregone (from no longer being able to fish in the HPMA management areas). Available evidence suggests 163 UK fishing vessels are likely to be directly affected by the prohibition of fishing gears within the proposed management areas. The impacts are likely to be ongoing but are expected to be mitigated by use of other available fishing grounds. This</p>	

¹ For more information see: www.legislation.gov.uk/ukpga/2020/22/contents/enacted

² The EU-UK Trade and Cooperation Agreement: ec.europa.eu/info/strategy/relations-non-eu-countries/relations-united-kingdom/eu-uk-trade-and-cooperation-agreement_en ec.europa.eu/info/strategy/relations-non-eu-countries/relations-united-kingdom/eu-uk-trade-and-cooperation-agreement_en

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could however incur a one-off cost to switch gears if required when moving to a new location. These costs have been monetised.

The estimated monetised total cost to UK businesses over 30 years is expected to be between £384,000 (low estimate) and £1,166,000 (high estimate) (2020 present value, 2019 prices). The equivalent annual net direct cost to business (EANDCB) is expected to be between £20,000 (low estimate) and £62,000 (high estimate) (2020 present value, 2019 prices).

Non-monetised costs include the potential environmental impact of displaced fishing activity and impacts if fishers were to switch from less damaging to more damaging fishing gears, on habitats/areas outside of the management areas. While costs associated with displacement have been incorporated where possible into monetised costs, indirect costs may still occur and it has not been possible to monetise these. For example, potential lower catches due to higher competition amongst fishers outside of HPMAs.

Expected benefits come from the provision of ecosystem services including goods, services and cultural benefits derived from the marine environment. Benefits have been monetised and are estimated to be between £116,000,000 (low estimate) and £166,000,000 (high estimate) (2023 present value, 2020 prices) over thirty years.

The only monetised social benefit from the prohibition of fishing gears in the management areas are ecosystem services as detailed above. The net present social value which considers the discounted benefits and costs over the appraisal period (30 years), is between £114,000,000 (low estimate) and 166,000,000 (high estimate) (2023 present value, 2020 prices).

Non-monetised benefits include the protection of designated features and potential benefits to surrounding habitats/areas outside of the management areas by fishers switching to less damaging fishing gears.

Non-monetised costs include social costs from HPMAs, such as potential loss of jobs and mental health impacts, and public sector costs of monitoring and enforcement. We do not expect any considerable monitoring and enforcement costs to the public sector for offshore sites however, enforcement of management measures for newly designated HPMAs will reduce resources available elsewhere and if significant compliance risks occur there could be a considerable monetary cost required to address these. For the inshore site, additional costs are expected. These costs would fall on the North Western Inshore Fisheries and Conservation Authorities (NWIFCA) however the magnitude is currently uncertain.

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Summary of monetised impacts

- Estimated Net Present Social Value: £114,000,000 to £166,000,000 (2023 present value, 2020 prices)
- Estimated Business Net Present value: -£384,000 to -£1,166,000 (2020 present value, 2019 prices)
- Estimated Equivalent Annualised Net Direct Costs to Business: £20,000 to £62,000 (2020 present value, 2019 prices)
- Appraisal period: thirty years
- **BIT status/score: 0.01 to 0.03**

The proposal is a Regulatory Provision as it relates to business activity (commercial fishing); it has a regulatory effect by prohibiting the use of 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 - HCWS574³.

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.

³ Business Impact Target Statement: questions-statements.parliament.uk/written-statements/detail/2016-03-03/HCWS574 (Last accessed on: 27 July 2023).

Marine Management Organisation (MMO) MMO De Minimis Assessment: Highly Protected Marine Areas Fishing 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)⁴. MMO also has powers to manage fishing in order to conserve marine flora, fauna and habitats⁵.

MMO has undertaken an assessment⁶ of the impact of fishing activities in the three recently designated HPMAs. This assessment determined that there is a significant risk of the impacts from all fishing hindering the achievement of the conservation objectives of the HPMAs. The proposed byelaw will therefore prohibit the use of fishing gears within specified areas which include the whole of each site and a buffer zone.

Table 1 lists the three HPMAs and their designated features that the proposed byelaw is intended to protect. **Figure 1** displays the location of these HPMAs in the English marine area.

Table 1. HPMAs and designated features protected by the proposed byelaw.

MPA	Designated Feature
Allonby Bay	The marine ecosystem of the area, which means all marine flora and fauna, all marine habitats and all geological or geomorphological interests, including all abiotic elements and all supporting ecosystem functions and processes, in or on the sea bed, water column and the surface of the sea.
Dolphin Head	
North East of Farnes Deep	

1.2 Rationale for intervention and intended effects

Fishing activities have the potential to hinder the conservation objectives of HPMAs.

The MMO HPMAs Fisheries assessment⁶ has concluded that fishing activities are not compatible with the conservation objectives of the HPMAs. The proposed byelaw is

⁴ For more information see: www.legislation.gov.uk/ukpga/2009/23/section/125.

⁵ For more information see: www.legislation.gov.uk/ukpga/2009/23/section/129.

⁶ MMO 2023 Highly Protected Marine Areas Fisheries Assessment: <https://consult.defra.gov.uk/mmo/hpma-fishing-formal-consultation/> (Last accessed on: 27 July 2023).

intended to ensure conservation objectives of the HPMAs are furthered, conserving marine fauna and habitats by prohibiting fishing activity within the 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 and negative externalities:

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 and 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 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, reducing its biological diversity and overfishing. While fish stocks are abundant and the habitat continues to provide benefits to fishers through the sales of sea fisheries resources, there is no incentive to protect these habitats or reduce catches. A lack of ownership allows the activity to continue unchecked until such time fish stocks collapse and biological diversity falls to the point where catches are no longer profitable, and fishers move on to more productive grounds. Fish stocks can replenish over time however the capacity for recovery is dependent on the degree of both the damage to habitats and scale of overfishing. It should be noted however that fishing is highly regulated and activities do not continue unchecked. Technical conservation measures and annual quotas are used to avoid collapse of fish stocks, however measures to protect habitats and biological diversity are more limited.

Negative externalities

These occur when the cost of damage to the marine environment is not fully borne by the users causing the damage. Fishing can cause severe damage to fragile habitats which can reduce biodiversity and productivity and take many years to recover. Fishers who damage the marine environment do not directly face the cost of their damage. The only cost borne by fishers 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.

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

1.3 Marine Plan assessment

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

MMO North West Plan Area

Allonby Bay HPMA lies within the North West Marine Plan Area. [The North West Marine Plan](#)⁷ was adopted in 2021. The decision to propose management for this site has been made in accordance with the North West Marine Plan. In particular, the following marine plan policies in the North West Marine Plan are relevant:

- Air quality
 - [NW-AIR-1](#)
- Biodiversity
 - [NW-BIO-1](#), [NW-BIO-2](#), [NW-BIO-3](#)
- Climate change
 - [NW-CC-1](#), [NW-CC-2](#), [NW-CC-3](#)
- Cumulative effects
 - [NW-CE-1](#)
- Disturbance
 - [NW-DIST-1](#)
- Fishing
 - [NW-FISH-3](#)
- Heritage assests
 - [NW-HER-1](#)
- Invasive non-native species
 - [NW-INNS-1](#), [NW-INNS-2](#),
- Marine litter
 - [NW-ML-1](#), [NW-ML-2](#)
- Marine protected area network
 - [NW-MPA-1](#), [NW-MPA-2](#), [NW-MPA-4](#)
- Seascape and landscape
 - [NW-SCP-1](#)
- Knowledge, understanding, appreciation and enjoyment
 - [NW-SOC-1](#)
- Tourism and recreation
 - [NW-TR-1](#)
- Water quality
 - [NW-WQ-1](#)

⁷ The North West Marine Plan Documents: www.gov.uk/government/publications/the-north-west-marine-plans-documents (Last accessed on: 24 July 2023).

MMO North East Plan Area

North East of Farnes Deep HPMA lies within the North East Marine Plan Area. [The North East Marine Plan](#)⁸ was adopted in 2021. The decision to propose management for this 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](#)
- 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](#)

MMO South Plan Area

Dolphin Head HPMA lies within the South Marine Plan Area. [The South Marine Plan](#)⁹ was adopted in 2018. The decision to propose management for this site 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

⁸ The North East Marine Plan Documents: www.gov.uk/government/publications/the-north-east-marine-plans-documents (Last accessed on: 24 July 2023).

⁹ The South Marine Plan Documents: www.gov.uk/government/publications/the-south-marine-plans-documents (Last accessed on: 24 July 2023).

- [S-MPA-1](#), [S-MPA-2](#), [S-MPA-4](#)
- Social and Cultural
 - [S-SOC-1](#)
- Tourism and Recreation
 - [S-TR-1](#), [S-TR-2](#)

1.4 Marine strategy regulations

In proposing the management options for the HPMAs, MMO has considered the UK Marine Strategy, as required by regulation 9 of The Marine Strategy Regulations 2010¹⁰.

2 Policy objectives and intended effects

The policy objective of the byelaw is to further the conservation objectives of the HPMAs. This will be achieved by prohibiting fishing activity throughout the sites as well as small areas outside of the sites as appropriate.

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

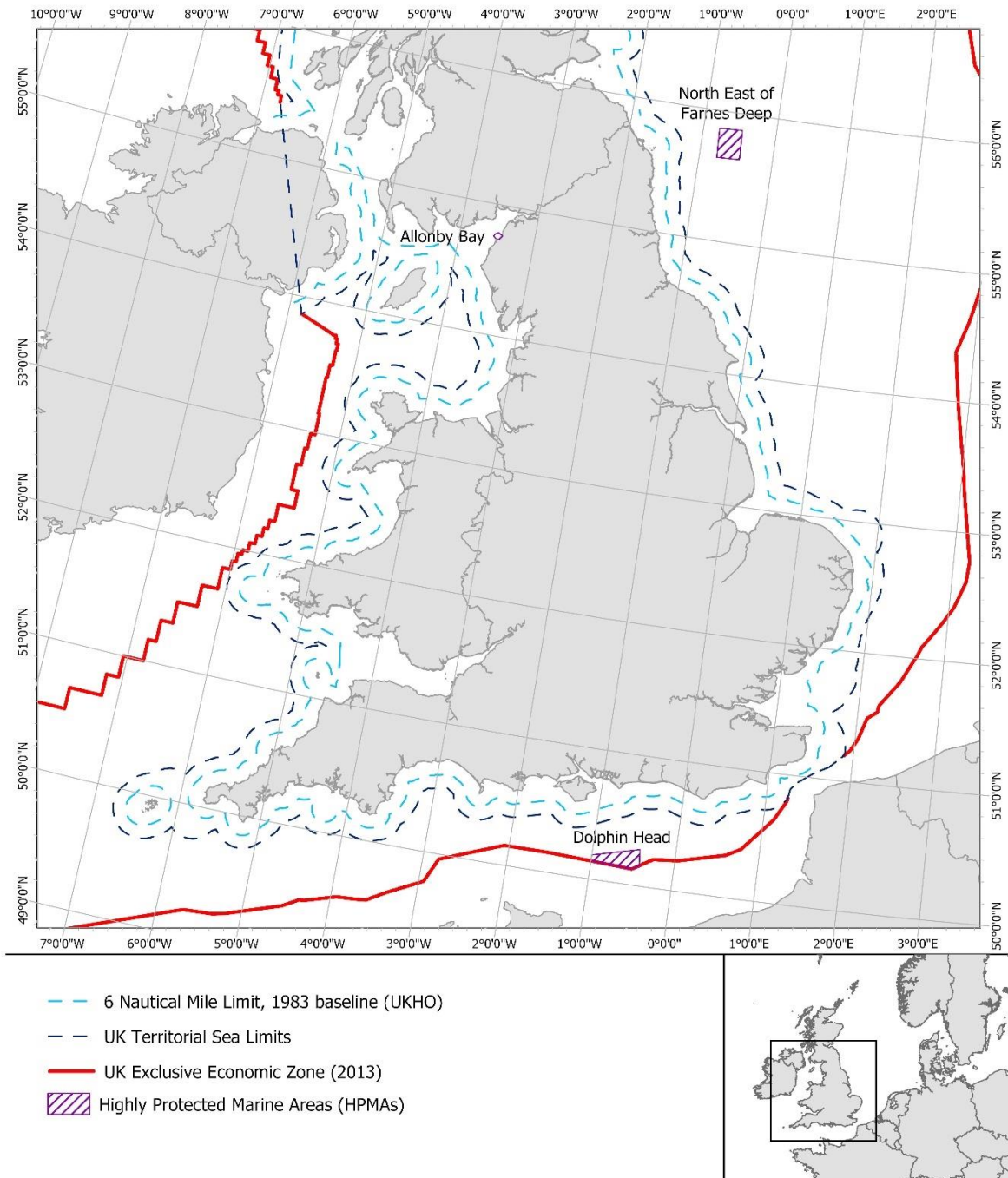
¹⁰ For more information see: www.legislation.gov.uk/ukxi/2010/1627/regulation/9.

Figure 1. HPMAs in English waters.



Marine Management Organisation

Highly Protected Marine Areas



Date of Publication: 19/07/2023
 Coordinate System: ETRS 1989 LAEA
 Projection: Lambert Azimuthal Equal Area
 MMO Reference: 10735

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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 HPMAs. 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 agreements or 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 fishing within MPAs (of which HPMAAs are a type) should be implemented through statutory regulation to ensure adequate protection is achieved (Defra, 2013). Introduction of a voluntary measure would not provide assurance that sufficient protection would be achieved.

Option 2: Removal of pressures from specified areas of sites via prohibition of fishing activity.

Prohibiting fishing activity within specified management areas of the sites containing particularly sensitive habitats will protect these habitats from the impacts of fishing activities. This option will conserve the particularly sensitive marine habitats and their fauna, whilst allowing fishing to take place in other areas of the sites. However, HPMAAs protect one feature, the whole ecosystem within the site boundary, with an aim to achieve full natural recovery of the structure and functions of the whole ecosystem. As such, this approach is unlikely to sufficiently further HPMA conservation objectives.

Option 3: Removal of pressures via a whole site prohibition of fishing activity across all sites.

This option would remove the impact of 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 achieving full natural recovery of the structure and functions of the whole HPMA ecosystem.

Option 3 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 and indirect damaging physical interactions between fishing activities adjacent

to HPMA designated features. The buffer zone extends beyond the boundary of the HPMA within English waters or to the Exclusive Economic Zone boundary.

MMO has followed Joint Nature Conservation Committee (JNCC) guidance (JNCC, 2012; Natural England and JNCC, 2023) regarding the application of a minimum management buffer zone to ensure appropriate protection of the designated feature of HPMA from the impacts of fishing activities. This follows a gear warp length: water depth ratio as below in **Table 2**.

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

Water depth	Ratio warp length to depth	Buffer
Shallow waters (0 to 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 around HPMA boundaries.

Due to the greater precaution required for HPMA, JNCC and Natural England also advised a minimum buffer requirement of 100 m to prevent sedimentation impacts within shallower HPMA such as Allonby Bay. Where the depth is such that the existing guidance (**Table 2**) results in a buffer greater than 100 m, the existing buffer guidance can be used. In some cases, the spatial extent of the buffer will extend marginally beyond the minimum calculated for simplicity and in order to facilitate compliance with the management measures.

4 Expected level of business impact

All costs analysed are compared to Option 0. As reflected above, Option 3 is the chosen option, therefore MMO has used this as the basis for comparison. A 30 year appraisal period has been used, rather than the typical 10 years, as HPMA management measures represent a large and concentrated upfront economic cost to a small number of businesses, whereas benefits will be diffused over a much wider population and timescale with some benefits related to habitat recovery unlikely to be realised until over 25 years from management implementation. This assumption is in line with HM Treasury Green Book guidance (HM Treasury, 2022).

Prohibition of the use of fishing gears in the HPMA 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.

The main businesses directly impacted would be those in the fishing industry. According to Statista (Clark, 2023), all businesses in the UK fishing and aquaculture industries are small or micro as they have under 49 employees. This was supported by evidence collected during Department for Environment Food and Rural Affairs (Defra) HPMA designation consultation, which indicated that most fishing activity is conducted by small vessels with a small number of employees. We do not expect small or micro businesses to be reimbursed for costs incurred by the policy, but there will be some support available to impacted business to aid any adaptation and diversification required. This includes the Fisheries and Seafood Scheme (MMO and Defra, 2021), the UK Seafood Fund (Defra, 2023b). Businesses will need to apply for these through a competitive process so support is not guaranteed but these could mitigate against the impact to small and micro businesses and support adaptation and diversification.

4.1 Vessel monitoring system maps

The [HPMA VMS Report Density WebApp \(2012 to 2021\)](#) has been produced to display VMS density information for the three HPMA, and this can be used to view VMS fishing activity considered in this assessment.

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.

Fishing activity in Allonby Bay HPMA is exclusively by UK vessels. There is a limited amount of commercial fishing activity taking place, the majority of which is via small vessels.

Fishing activity in Dolphin Head HPMA involves a relatively small number of UK vessels over 12 m in length alongside a large number of non-UK vessels. An estimated 78 % of vessels (236 non-UK vessels of 302 total vessels) and 96 % of activity (from VMS reports) is non-UK. All non-UK impacts are EU impacts. The proposed Dolphin Head HPMA management area overlaps with areas of the proposed MMO Marine Protected Areas Bottom Towed Fishing Gear Byelaw 2023¹¹. Specifically, the areas to be managed in Offshore Brighton MCZ. The costs associated with the Dolphin Head HPMA management area predate the MMO Marine Protected Areas Bottom Towed Fishing Gear Byelaw 2023 and therefore

¹¹ Formal Consultation - MMO management of fishing activity impacts in marine protected areas - Stage 2: consult.defra.gov.uk/mmo/stage-2-formal-consultation/ (Last accessed on: 20 July 2023).

may represent a slight overestimate due to the inclusion of costs derived from bottom towed gear prohibition in areas in which a prohibition of these gears will already be in place.

Fishing activity in North East of Farnes Deep HPMA involves both UK and non-UK vessels and 51 % of vessels are non-UK (67 non-UK vessels of 132 total vessels). However VMS reports suggest 15 % of activity is via UK vessels (1,674 non-UK pings of 1,962 total pings). The majority of the non-UK impact is EU (approximately 99 %) where the only non-EU impact is Norway (less than 1 %).

Table 3. Estimated number of UK vessels fishing within proposed management areas from 2012 to 2020.

Site	Total
Allonby Bay	32
Dolphin Head	66
North East of Farnes Deep	65
Total	163

Box 1. Non-UK fishing vessels

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

Non-UK landings data are only available for fishing 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. However, EFTA member states activity in the proposed management areas is considered minimal based on VMS data.

Estimates of fisheries landings values by EUMS vessels were determined by apportioning ICES Rectangle landings data provided by the European Commission Scientific, Technical and Economic Committee for Fisheries (STECF) to the intersecting proposed management areas (**Table 4**). In accordance with UK data these figures were calculated for the designated HPMA boundary and uplifted proportionally by the increased area of the HPMA management areas (**Table 6**).

For vessels larger than 12 m in length, landings were estimated using the proportion of EUMS VMS fishing activity occurring in the management areas versus the ICES rectangles. For vessels less than 12 m in length, landings were estimated by

apportioning ICES rectangle level landings to the management areas based on 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 2014 to 2020. Landings estimates for less than 12 m vessels are likely to be a significant overestimate as the methodology described above assumes fishing activity of less than 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 2014 and 2020, an annual average of £72,595 was estimated to be derived from the management areas by EUMS fishing vessels.

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 profit foregone and do not incorporate displacement effects. The costs to EUMS vessels are therefore considerably overestimated as the costs are based solely on revenue from landings. 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.

Table 4: EU fishing vessel revenue (£) estimates (2014 to 2020). Estimates were made for the designated HPMA boundary and these have been uplifted proportionally for the HPMA management area in accordance with Table 6. No fishing activity from EU member states occurs within Allonby Bay HPMA.

Site	HPMA estimated revenue			HPMA management area estimated revenue		
	Over 12 m	Under 12 m	Average annual	Over 12 m	Under 12 m	Average annual
Dolphin Head^a	71,360	563	18,700	72,910	575	19,106
North East of Farnes Deep	194,959	0	50,689	205,727	0	53,489
Total^a	266,319	563	69,389	278,637	575	72,595

^a As detailed in **section 4.2**, figures are likely to be slightly overestimated due to the inclusion of costs associated with bottom towed gears which will already be prohibited via MMO's Marine Protected Areas Bottom Towed Fishing Gear Byelaw 2023¹¹.

Table 5: Percentage contribution of countries to average EU revenue from over 12 m vessels (Table 4).

Site	Country	Percentage contribution to EU revenue over 12 m
Dolphin Head	France	92.2 %
	Netherlands	5.7 %
	Germany	1.5 %
	Belgium	0.6 %
	Ireland	0.1 %
	Lithuania	0.0 %
	Denmark	0.0 %
North East of Farnes Deep	Denmark	32.9 %
	Netherlands	32.0 %
	France	24.1 %
	Germany	5.8 %
	Sweden	4.6 %
	Lithuania	0.6 %

4.3 Monitoring and compliance

MMO compliance action is intelligence-led and risk-based in accordance with the National Intelligence Model (National Centre for Policing Excellence, 2005). Where intelligence suggests non-compliance or a risk of non-compliance with the byelaw, compliance resources will be deployed accordingly. This may include MMO fisheries patrol vessel presence or joint operations with other agencies (for example the Royal Navy, Border Force, the Environment Agency or the Association of Inshore Fisheries and Conservation Authorities). Joint 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 MPAs are set out by the Legislative and Regulatory Reform Act 2006¹² and the Regulators' Code¹³ and aim to ensure that MMO is proportionate, accountable, consistent, transparent and targeted in any compliance action it takes.

Offshore MPA inspections take place under standard operating procedure of MMO fisheries patrol vessels. MPA and byelaw inspection costs are likely absorbed by existing compliance systems and will not be considered here. However, enforcement of management measures for newly designated HPMAAs will reduce resources available elsewhere and if significant compliance issues occur there could be a considerable monetary cost required to address these incursions. For the inshore site, additional costs are expected. These costs would fall on Inshore Fisheries and Conservation Authorities (IFCAs), however the magnitude is currently uncertain.

4.4 Total monetised costs

The economic impacts of the management areas are estimated as the loss of profitability of fishing effort at the site or 'ongoing profit foregone' and one-off gear costs for fishers. These costs have been estimated and presented as part of this DMA as the estimated equivalent annual direct cost to business (EANDCB) (**Table 7**).

The monetised costs resulting from HPMA designation were recently estimated by Defra using evidence from the Centre for Environment, Fisheries and Aquaculture Science (Cefas)(Defra, 2023a). This evidence included displacement effects and is therefore considered an accurate representation of costs to fishers. As such, this evidence has been used to estimate the monetised costs of the HPMA management areas. As detailed above, the boundaries of the HPMA management areas include buffer zones which marginally extend the management areas outside of the designated HPMA boundary. To account for the slight increase in size of the HPMA management areas to that of the HPMA site boundaries and the potential increase in

¹² For more information see: www.legislation.gov.uk/ukpga/2006/51.

¹³ The Regulators' Code: www.gov.uk/government/publications/regulators-code (Last accessed on: 24 July 2023).

costs this larger area may represent, monetised costs have been uplifted where appropriate in line with the increased area of the management area (**Table 6**).

The business net present values (NPV) are detailed in **Table 8**. These assess the net direct impact to businesses over the appraisal period (30 years). There are no direct benefits to business, therefore this value is negative and represents a cost to business.

Table 6: Area (km²) of designated HPMAs, their respective management areas and the percentage increase in HPMA management area over the designated HPMA area as a result of applied management buffers (m).

HPMA	HPMA area (km ²)	HPMA management area (km ²)	Buffer size (m)	Area increase (%)
Allonby Bay	27.73	29.23	100	5 %
Dolphin Head	465.92	476.04	174	2 %
North East of Farnes Deep	491.82	518.98	300	6 %

Table 7: Equivalent annual net direct cost to business (£,000) (2019 prices, 2020 present value) to fishers of prohibiting fishing from HPMA management areas. Costs to fishers from prohibiting fishing from HPMA designated boundaries (as calculated by Cefas and published by Defra (Defra, 2023a)) are included for context¹⁴.

Site		Allonby Bay HPMA	Allonby Bay HPMA management area	Dolphin Head HPMA ^a	Dolphin Head HPMA management area ^a	North East of Farnes Deep HPMA	North East of Farnes Deep HPMA management area	Total (All HPMA) ^a	Total (All HPMA management areas) ^a
Costs (Low)	Profit foregone ^b	9	9	10	10	1	1	20	20
	Gear Costs ^c	0	0	0	0	0	0	0	0
	Total	9	9	10	10	1	1	20	20
Costs (High)	Profit foregone ^b	24	25	25	26	3	3	52	54
	Gear costs ^c	4	4	4	4	0	0	8	12
	Total	28	29	29	30	3	3	60	66

^a Profit forgone costs of management areas are uplifted based on percentage area increase of HPMA management area over HPMA designation boundary as detailed in **Table 6**.

^b As detailed in section 4.2 figures are likely to be a slight overestimate due to the inclusion of costs associated with the prohibition of bottom towed gears which will already be prohibited via MMOs Marine Protected Areas Bottom Towed Fishing Gear Byelaw 2023.

^c Gear costs have not been uplifted as the increased size of the HPMA management area is unlikely to have a significant effect on gear costs.

¹⁴ This price and present value base year follow Regulatory Policy Committee guidance for EANDCB and business NPV summary statistics.

Table 8: Estimated Business Net Present Value over 30 year appraisal period (£,000) (2019 prices, 2020 present value) of prohibiting fishing from HPMA management areas. Business NPV from prohibiting fishing from HPMA designated boundaries (as calculated by Cefas and published by Defra) are included for context.

Site	Allonby Bay HPMA	Allonby Bay HPMA management area ^a	Dolphin Head HPMA	Dolphin Head HPMA management area ^{a,b}	North East of Farnes Deep HPMA	North East of Farnes Deep HPMA management area ^a	Total (All HPMAs)	Total (All HPMA management areas) ^{a,b}
Business NPV (low)	-536	-558	-558	-567	-61	-62	-1,155	-1,166
Business NPV (high)	-167	-176	-187	-190	-17	-18	-371	-384

^a As detailed in section 4.2 figures are likely to be a slight overestimate due to the inclusion of costs associated with the prohibition of bottom towed gears which will already be prohibited via MMO's Marine Protected Areas Bottom Towed Fishing Gear Byelaw 2023.

^b Uplifted based on percentage area increase of HPMA management area over HPMA designation boundary as detailed in **Table 6**.

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 below as non-monetised costs.

4.5 Non-monetised costs

The proposed 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 difficult to accurately predict the location and therefore the environmental cost of displaced fishing activity.

HPMAs were chosen using ecological, social and economic criteria, selecting areas that provided maximum biodiversity and ecosystem benefits while seeking to minimise impacts on sea users. The potential impact of displacement to areas outside of HPMAs does not remove the requirement to ensure that fishing is managed to further the conservation objectives of the HPMAs.

HPMA fisheries management measures are likely to have an impact on competition between fishers due to their displacement to areas outside of HPMAs. If fishers already occupy the alternative areas there would be increased competition and overcrowding. However, an increase in fish populations within HPMAs as a result of recovery is anticipated. This would similarly increase fish populations in areas neighbouring HPMAs as a result of spillover and is likely to support the increased competition in the long term (Defra, 2022; Brander *et al.*, 2023). As such the long-term cost of increased competition is considered minimal.

Additionally, as mentioned previously, while monitoring of compliance with the HPMA management measures does not represent a considerable cost, this will reduce resources available elsewhere (for example: for other MPAs) and if significant compliance risks occur there could be a considerable monetary cost required to address these incursions. For the inshore site additional costs are expected, however these costs would fall on the North Western Inshore Fisheries and Conservation Authority (NWIFCA) and the magnitude is currently uncertain. For these reasons, monitoring and compliance is detailed here under non-monetised costs.

4.6 Monetised benefits

The key benefit of HPMA management measures is the environmental benefit both inside and outside of the HPMA. HPMAs allow marine ecosystems to recover to a mature state. This represents the only monetised social benefit from the prohibition of fishing gears in the management areas. Marine ecosystem services include the goods (for example: fish harvests, water), services (for example: recreation, erosion

control) and cultural benefits (for example: heritage values) that are derived from the marine environment. Habitats and species in the HPMA sites provide a range of ecosystem services. For example: some HPMA sites contain 'blue carbon' habitats which capture and store carbon, so provide carbon benefits; honeycomb reefs and blue mussel beds provide water purification and coastal erosion protection. The present value (PV) of benefits, which considers the discounted benefits over the appraisal period (30 years), is shown in **Table 9** below.

Table 9 HPMA estimated benefits present value (£,000 2020 prices, 2023 present value). These figures have not been uplifted in line with the increased size of the HPMA management area over the HPMA designated site boundaries as it is not believed the increased area is likely to alter these figures.

Site	Benefits Low (£,000)	Benefits High (£,000)
Allonby Bay	9,000	54,000
Dolphin Head	63,000	66,000
North East of Farnes Deep	44,000	46,000
Total	116,000	166,000

The benefits (**Table 9**) significantly outweigh the costs (**Table 8**), so the net present social value (NPSV) (**Table 10**), which subtracts the total (business and society) costs from the total benefits, is almost identical to the benefits present value (**Table 9**). As detailed previously, costs have been uplifted proportionally in line with the increased area of the HPMA management areas to that of the designated HPMA boundaries. Additionally, figures for Dolphin Head HPMA and management area are likely to be an overestimate (see **section 4.2**). Total benefits are unlikely to change as a result of this increased area, therefore the NPSV for HPMA management areas is derived from uplifted costs and maintained benefits.

Table 10: HPMA management areas estimated Net Present Social Value (£,000 2020 prices, 2023 present value).

Site	NPSV low £,000	NPSV high £,000
Allonby Bay HPMA	8,000	54,000
Allonby Bay HPMA management area	8,000	54,000
Dolphin Head HPMA	62,000	66,000
Dolphin Head HPMA management area	62,000	66,000
North East of Farnes Deep HPMA	44,000	46,000
North East of Farnes Deep HPMA management area	44,000	46,000
Total (All HPMA)	115,000	166,000
Total (All HPMA management areas)	114,000	166,000

5 Recommended management options

Following the above assessment, the recommended management option is Option 3: Removal of pressures from specified management areas via prohibition of fishing activity.

This will be achieved through implementation of the proposed Highly Protected Marine Areas Fishing Byelaw 2023¹⁵. 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.

¹⁵ MMO 2023 Highly Protected Marine Areas Fishing Byelaw 2023: <https://consult.defra.gov.uk/mmo/hpma-fishing-formal-consultation/> (Last accessed on: 27 July 2023).

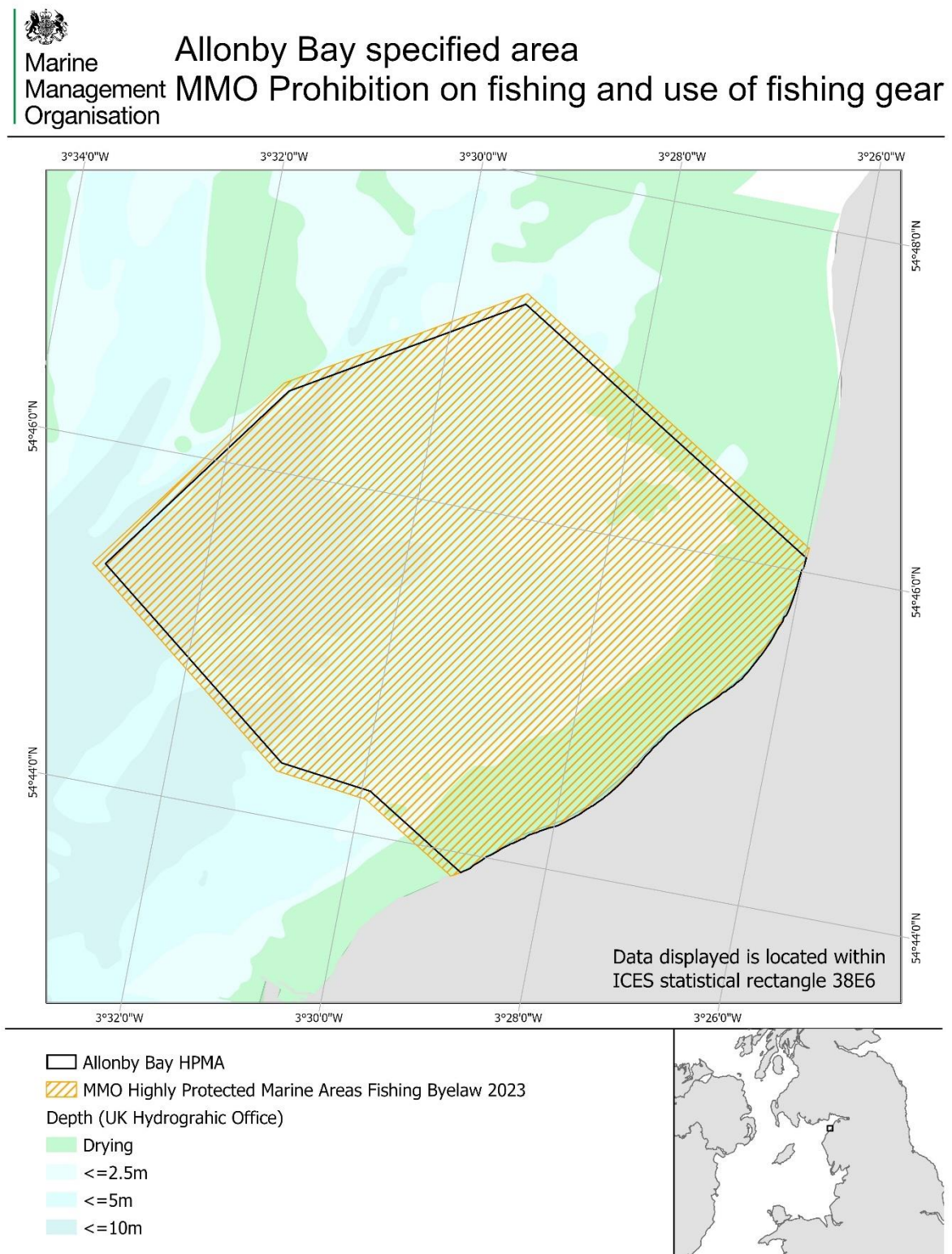
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Annex: Figures

Figure A.1: Proposed fishing management for Allonby Bay HPMa.



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 Projection: Lambert Azimuthal Equal Area
 MMO Reference: 10742

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Figure A.2: Proposed fishing management for Dolphin Head HPMA.

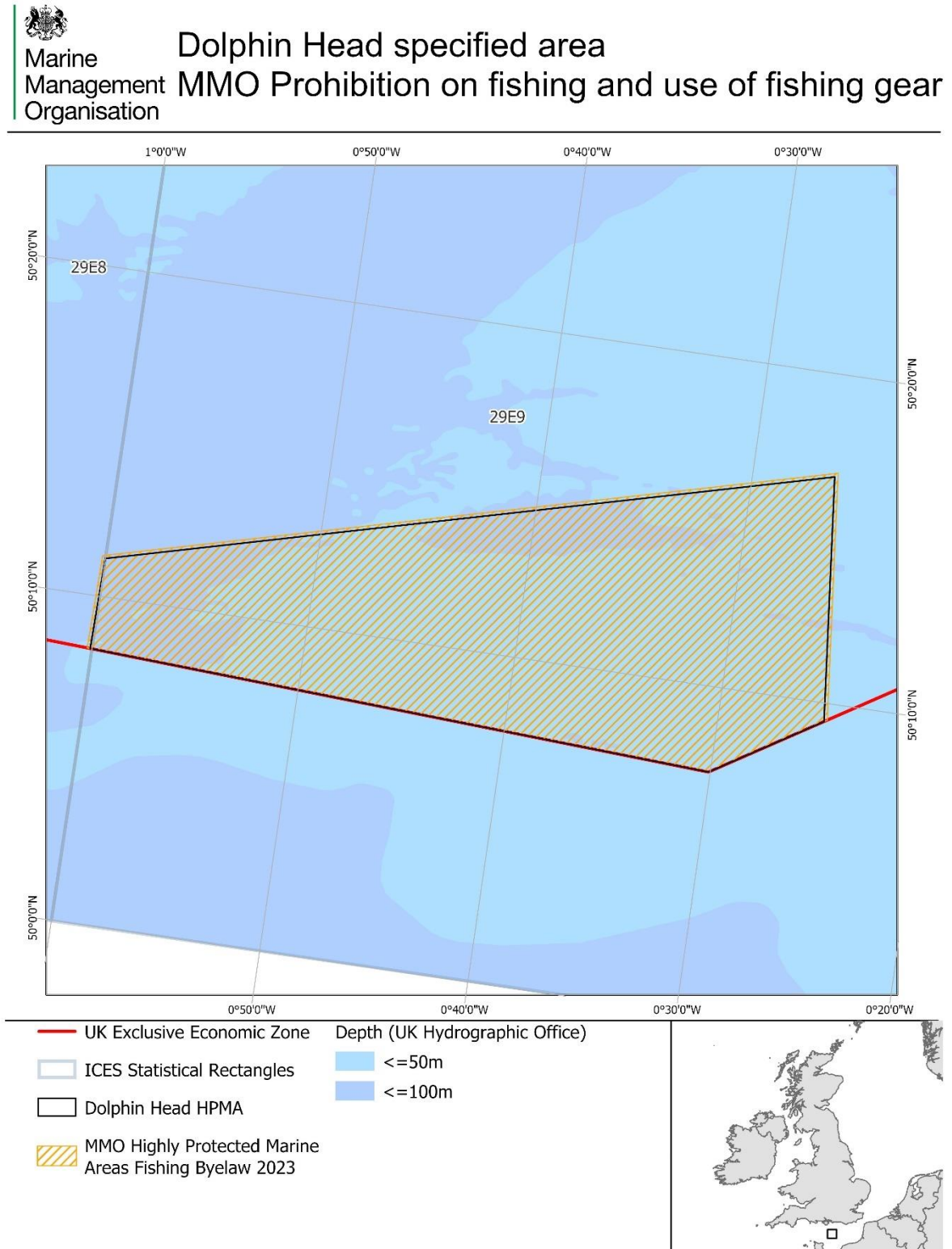
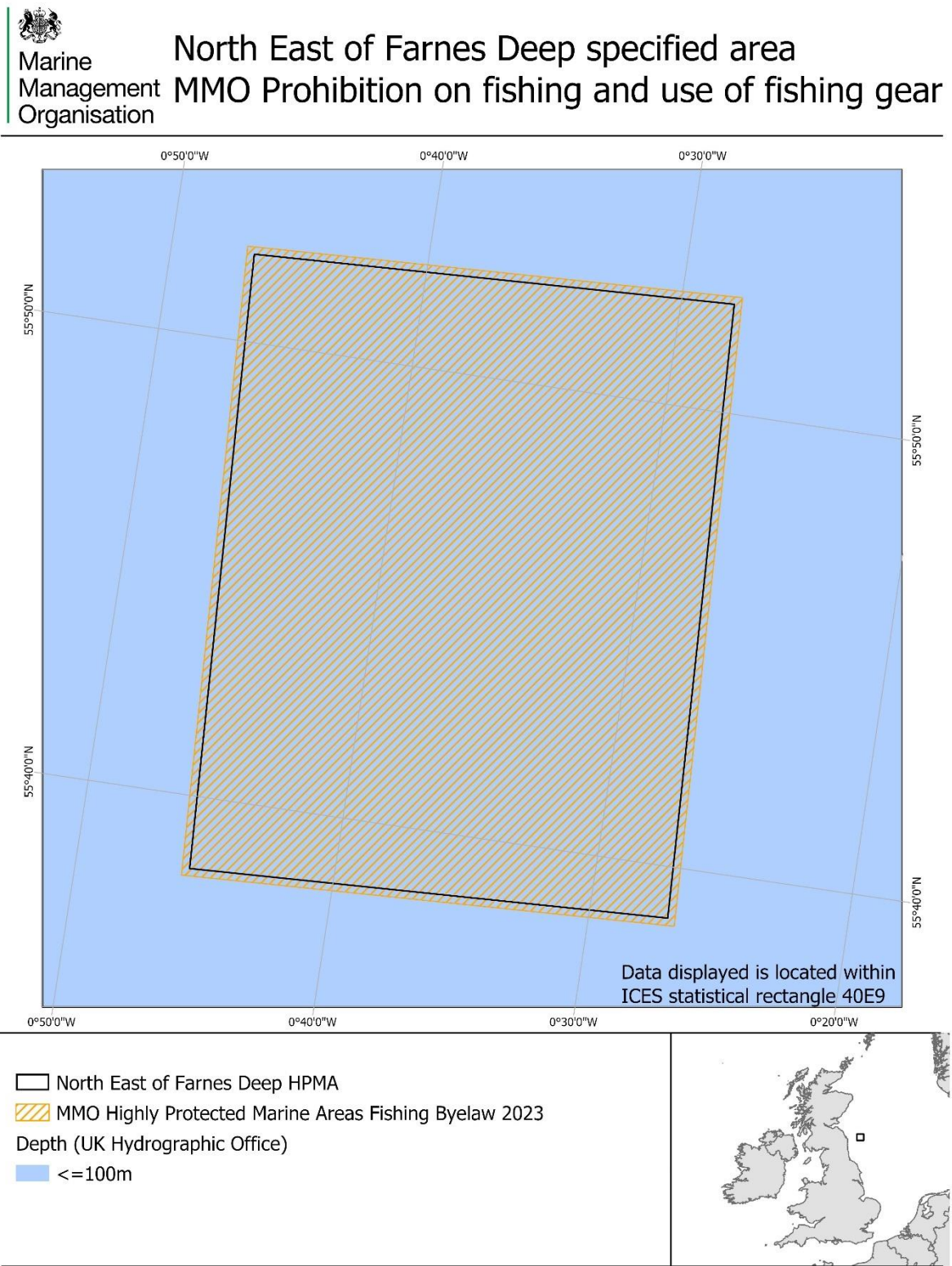


Figure A.3: Proposed fishing management for North East of Farnes Deep HPMa.



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