Marine Management Organisation

MMO De Minimis Assessment: Marine Protected Areas Fishing Gears Byelaw (Draft)

June 2025

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Title: Marine Protected Areas Fishing Gears Byelaw (Draft) **Date**: June 2025 **BRU No:** **Lead department or agency:** Marine Management Organisation (MMO) **Other departments or agencies:** Click here to enter text.	De-Minimis Assessment (DMA) **Stage**: Validation **Source of intervention**: Domestic **Type of measure**: Secondary
Summary: Rationale and Options	**Contact for enquiries:** conservation@marinemanagement.org.uk

Total Net Present Value	**Business Net Present Value**	**Net cost to business per year** (EANDCB in 2019 prices)
£3.1 billion (2019 price base, 2020 present value)	**£-7.8 million**	**£530,000**

Headline business figures have been rounded to two significant figures.

Rationale for intervention and intended outcomes

Fishing activity has the potential to hinder the conservation objectives of marine protected areas (MPAs). A series of MMO draft stage 3 MPA fisheries assessments[1] has concluded that certain types of fishing activities (including bottom towed gears, bottom-set nets and lines, and traps) are not compatible with the conservation objectives of the Stage 3 sites.

Four byelaws have been proposed to ensure conservation objectives of the Stage 3 sites are furthered, conserving marine fauna and habitats by prohibiting the relevant fishing activities within specified areas.

Unregulated fishing activities have the potential to cause negative outcomes for society as a result of 'market failures'. These failures can be described as public goods and negative externalities.

Negative externalities

Negative externalities are present within fisheries when the activity of fishing creates a cost to wider society which isn't paid by the fishers. Instead, that cost is faced by all of society, including through the reduction in ecosystem services that the marine environment provides. Fishers may not consider the costs to society when determining their effort levels, therefore this can lead to fishing above socially desirable levels. Government intervention is needed to reduce damage to the marine environment, protecting the ecosystem service benefits that can be provided.

Public goods

A number of goods and services provided by the marine environment, such as biological diversity, are 'public goods' (no-one can be excluded from enjoying them and their consumption 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.

Fisheries are a common pool resource, without government intervention no-one can be excluded from benefiting from them, but the extraction and consumption of these goods diminishes their availability to others. This can lead to a reduction and potential collapse of fish stocks. Government intervention is necessary to prevent this.

Fishing is, however, highly regulated and activities do not continue unchecked. Technical conservation measures and annual quotas are used to avoid collapse of fish stocks. Measures to protect MPAs seek to protect marine habitats, species and biological diversity.

Byelaws are statutory (regulated by law) rules and regulations. These byelaws aim 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.

Describe the policy options considered

The following options were considered as part of this DMA:

- **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 certain fishing activities. This may include certain fishing gear (bottom towed gear fishing gear, bottom-set nets and lines, and traps) prohibitions across the whole site where sensitive designated features are distributed throughout the site, or part-site prohibitions, where designated features have been identified.
- **Option 3:** Removal of pressures via a whole site prohibition across all sites. The use of certain fishing gears (bottom towed gear fishing gear, bottom-set nets and lines, and traps) will be prohibited throughout the MMO section of all sites considered in this assessment.

Option 2 is the preferred option, as it will allow for the removal of pressures deemed incompatible with the conservation objectives of the sites, whilst also allowing certain fishing activities to continue in areas of the site where designated features are not present.

Description of novel and contentious elements (if any):

- Management measures considered across 43 marine protected areas (MPAs) with significant impacts across the UK and non-UK fishing sectors may be considered as novel, MMO have published information on its MPA management strategy and each of the stages[2].
- The creation of four regional byelaws to incorporate management measures.
- In utilising powers introduced by the Fisheries Act 2020[3], MMO must have regard for UK EU Trade and Cooperation Agreement[4].

Initial assessment of impacts on business:

The main businesses directly impacted are those in the fishing industry, through profit foregone (from the introduction of management measures on the relevant prohibited fishing gears).

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[1] Stage 3 MPA Site Assessments: www.gov.uk/government/publications/stage-3-site-assessments
For more information see: www.gov.uk/government/publications/managing-fisheries-in-marine-protection-areas-call-for-evidence

[2] MMO Guidance - Managing Fishing in Marine Protected Areas. For more information see: www.gov.uk/government/collections/managing-fisheries-in-marine-protected-areas (last accessed 27 September 2024).

[3] For more information see: www.legislation.gov.uk/ukpga/2020/22/contents

[4] The EU-UK Trade and Cooperation Agreement. For more information see: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 (last accessed 27 September 2024).

Available evidence suggests 1,303 UK fishing vessels are likely to be directly affected by the prohibition of bottom towed gear, bottom set nets and traps within the 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.

Brief assessment of regional impact:

Regional analysis showed that the 8 ports with the largest estimated loss of revenue are in different counties, while half of the lost revenue is in the southwest.

Brief assessment of small business impacts:

The main businesses directly impacted would be those in the fishing industry. According to Business Population Estimates for 2023, produced by the Department for Business and Trade, over 99 % of businesses in the UK fishing and aquaculture industries are small or micro (4,690 out of 4,700). The remaining 1% consists of 10 businesses which are either medium or large (Department for Business and Trade, 2023). As a result, these byelaws cannot exempt small businesses and achieve their objectives.

Brief assessment of wider impacts:

A key wider impact is the environmental benefits from these management measures. The ecosystem services associated with this have been monetised as a social benefit of the management measures.

In terms of competition, there would be a primary impact between fishers from displacement to other fishing grounds. If fishers already occupy the alternative sites, there could be increased competition and potential overcrowding.

In terms of innovation, the only potential impact would be on fishing methods, which are well established and unlikely to change (tradition is valued in the fishing profession and there is a mutual understanding between fishers on how fishing is to be carried out). In terms of trade impact, fish caught by UK and non-UK vessels are often exported or imported, however the overall impact of these measures on trade is expected to be negligible.

The estimated overall monetised cost of Stage 3 measures:

The estimated total net present social value across twenty years is expected to be £3.1 billion (2019 prices and 2020 present value).

The estimated monetised total cost to UK businesses over twenty years is expected to be £7.8 million (2019 Price Base and 2020 present value). The equivalent annual net direct cost to business (EANDCB) is £530,000 (2019 Price Base and 2020 present value). These figures do not account for possible recouping of some value by fishers through displacement (for example fishing alternative grounds), or for potential downstream costs (for example to fish processors).

An appraisal period of twenty years has used. This appraisal period has been chosen to consider some of the features within MPAs recover at different rates, and that some benefits may take more than 10 years to be realised after management is in place.

The estimated monetised costs for each of the regional byelaws are:

The Eastern Channel Marine Protected Areas Fishing Gear Byelaw 2024

The estimated total net present social value across twenty years is expected to be £260 million. The estimated monetised total cost to UK businesses over twenty years is expected to be £800,000 (2019 Price Base and 2020 Present Value). The equivalent annual net direct cost to business (EANDCB) is £54,000 (2019 Price Base 2020 and Present Value). This byelaw includes 7 sites.

The Irish Sea Marine Protected Areas Fishing Gear Byelaw 2024

The estimated total net present social value across twenty years is expected to be £48 million. The estimated monetised total cost to UK businesses over twenty years is expected to be £34,000 (2019 Price Base and 2020 and Present Value). The equivalent annual net direct cost to business (EANDCB) is £2,300 (2019 Price Base and 2020 Present Value). This byelaw includes 4 sites, and incurs the smallest cost compared to the other three byelaws.

The North Sea Marine Protected Areas Fishing Gear Byelaw 2024

The estimated total net present social value across twenty years is expected to be £920 million. The estimated monetised total cost to UK businesses over twenty years is expected to be £2.2 million (2019 Price Base and 2020 Present Value). The equivalent annual net direct cost to business (EANDCB) is £150,000 (2019 Price Base and 2020 Present Value). This byelaw includes 12 MPAs.

The Western Channel and Southwest Marine Protected Areas Fishing Gear Byelaw 2024

The estimated total net present social value across twenty years is expected to be £1.9 billion. The estimated monetised total cost to UK businesses over twenty years is expected to be £4.8 million (2019 Price Base and 2020 Present Value). The equivalent annual net direct cost to business (EANDCB) is £330,000 (2019 Price Base and 2020 Present Value). This byelaw includes 20 MPAs, therefore covers the largest area and incurs the highest cost out of all four byelaws.

Non-monetised costs:

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 associated with displacement to other fishing grounds. Although displacement resulting from the introduction of management measures put in place may result in higher levels of fishing pressure on areas outside of MPAs, the location (and thus the associated environmental costs) of displaced fishing activity is unclear. Non-monetised costs also include social costs from MPAs associated with commercial fishing, such as potential loss of jobs and wellbeing impacts.

Estimated monetised benefits:

Expected benefits come from the provision of ecosystem services including goods, services and cultural benefits derived from the marine environment. These benefits have been monetised and are estimated to be £3.2 billion (2019 Price Base and 2020 Present Value) over twenty years.

The only monetised benefit from the prohibition of relevant 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 (20 years), is £3.1 billion (2020 present value, 2019 prices). The estimated net present social value of £3.1 could be an overestimate as this figure does not account for the negative impacts (and thus associated environmental costs) from displaced fishing activities as a result of management measures.

Summary of monetised impacts:

The following were the key monetised impacts (rounded to 2 significant figures) using 2019 Price Base and 2020 Present Value:

- Estimated Net Present Value: £3.1 billion.
- Estimated Business Net Present Value: -£7.8 million.
- Estimated Equivalent Annualised Net Direct Costs to Business: £530,000.
- Appraisal period: 20 years.
- The Price Base Year and Present Value Base Year: 2019 and 2020.

The proposal is a Regulatory Provision as it relates to business activity (commercial fishing); it has a regulatory effect by prohibiting certain types 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.

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

The de-minimis assessment 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.

Monitoring and evaluation

These management measures are a result of a re-focus on policies and an iterative approach to the management of MPA networks to ensure site integrity. Defra work with MMO to monitor and evaluate policies such as HPMA designations and the MPA network. Similarly, MMO will work alongside Defra to develop bespoke evaluations pertinent to the effectiveness of MPA management measures.

This may include the potential review and/ or development of detailed comprehensive evaluations using socio-economic information as it emerges and guidance from HMT Green and Magenta Books. Any review or evaluation undertaken, will consider new relevant socio-economic information including updated fishing activity data (i.e. landings data) and evidence on the impacts of MPAs on fisheries management and compliance - and vice versa.

Previous MMO MPA fisheries management measures

This DMA only refers to Stage 3 MPA measures. For completeness and maximum transparency please find the figures for all previous MMO MPA fisheries management that are in force in **Table**

14 in the Annex. Note: For Stage 1 and Stage 2 operating profit has been provided for the headline figures. For pre-Stage 1, landings figures have been provided, these are a significant overestimate of actual impact compared to operating profit.

Will this policy have a Post Implementation Review (PIR): **No**	If applicable, set review date:			
Are these organisations in scope?	**Micro** **Yes**	**Small** **Yes**	**Medium** **Yes**	**Large** **Yes**

Marine Management Organisation (MMO) De Minimis Assessment: Marine Protected Areas Prohibited Fishing Gears Byelaw 2025 (Draft)

Contents

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)[5]. MMO also has powers to manage fishing in order to conserve marine flora, fauna and habitats[6].

MMO is implementing necessary management in offshore MPAs in a number of stages (**Figure 1** shows the stages of the Marine Protected Areas Project).

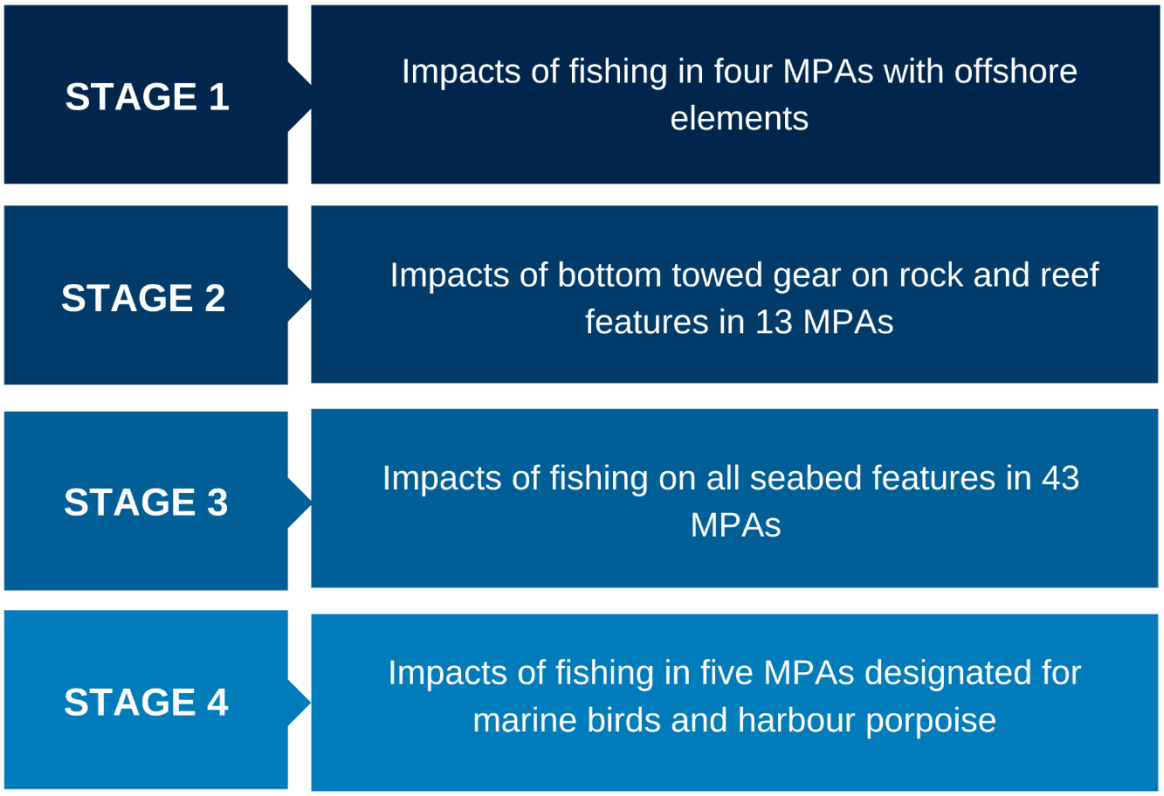

Figure 1. Marine Protected Areas Project.

[5] 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. For more information see: www.legislation.gov.uk/ukpga/2009/23/section/125.
[6] Sections 129A and 129B of the Marine and Coastal Access Act 2009. For more information see: www.legislation.gov.uk/ukpga/2009/23/section/129.

As part of Stage 3 of this work, MMO has undertaken draft assessments[1] of the impact of using certain types of fishing gears (demersal trawls, demersal seines, dredges, bottom-set nets and lines, pots and traps) in 43 MPAs. These draft assessments have determined that the use of certain types of fishing gear may not be compatible with the conservation objectives of the MPAs. Management measures are therefore required to ensure that the sites' conservation objectives can be met.

For Stage 3, management measures will be split into four regional byelaw areas: Eastern Channel, Irish Sea, North Sea and, Western Channel and Southwest.

The Eastern Channel byelaw includes seven sites, within this byelaw only bottom towed fishing gear is prohibited. The Irish Sea byelaw includes four sites, within this byelaw only bottom towed fishing gear is prohibited. The North Sea byelaw includes twelve sites, all sites are subject to bottom towed fishing gear management and three sites have additional bottom set nets and lines, and traps prohibitions.

The Western Channel and Southwest byelaw includes 20 sites. All sites are subject to bottom towed fishing gear management and three sites have additional bottom set nets and lines, and traps prohibitions. The removal of spiny lobster (*Palinurus elephas*) is also prohibited in Skerries Bank and Surrounds MCZ, this site is within the Western Channel and Southwest byelaw region (**Table 19** and **Table 20**). These four regional byelaws will subsume existing MMO MPA byelaws in these areas and further details of revocation is provided within Section 2 of this DMA: 'Policy intervention and intended effects'.

The Marine Management Organisation Stage 2 Marine Protected Areas Bottom Towed Fishing Gear Byelaw 2023 will be revoked, with the management measures from Stage 2 being incorporated into these four regional byelaws.

In some instances, MMO has altered the boundaries of specified areas defined in previous MMO byelaws when replacing them to apply a consistent approach to determining buffer distances around designated features to both improve effectiveness of buffer areas in protecting features and minimise the area of prohibitions as much as possible.

Table 1 lists the MPAs that have been assessed as part of Stage 3, the designated features that the byelaws intend to protect and the management measures (gear restrictions) for each MPA. **Figure 2** displays the location of those MPAs in the English marine area.

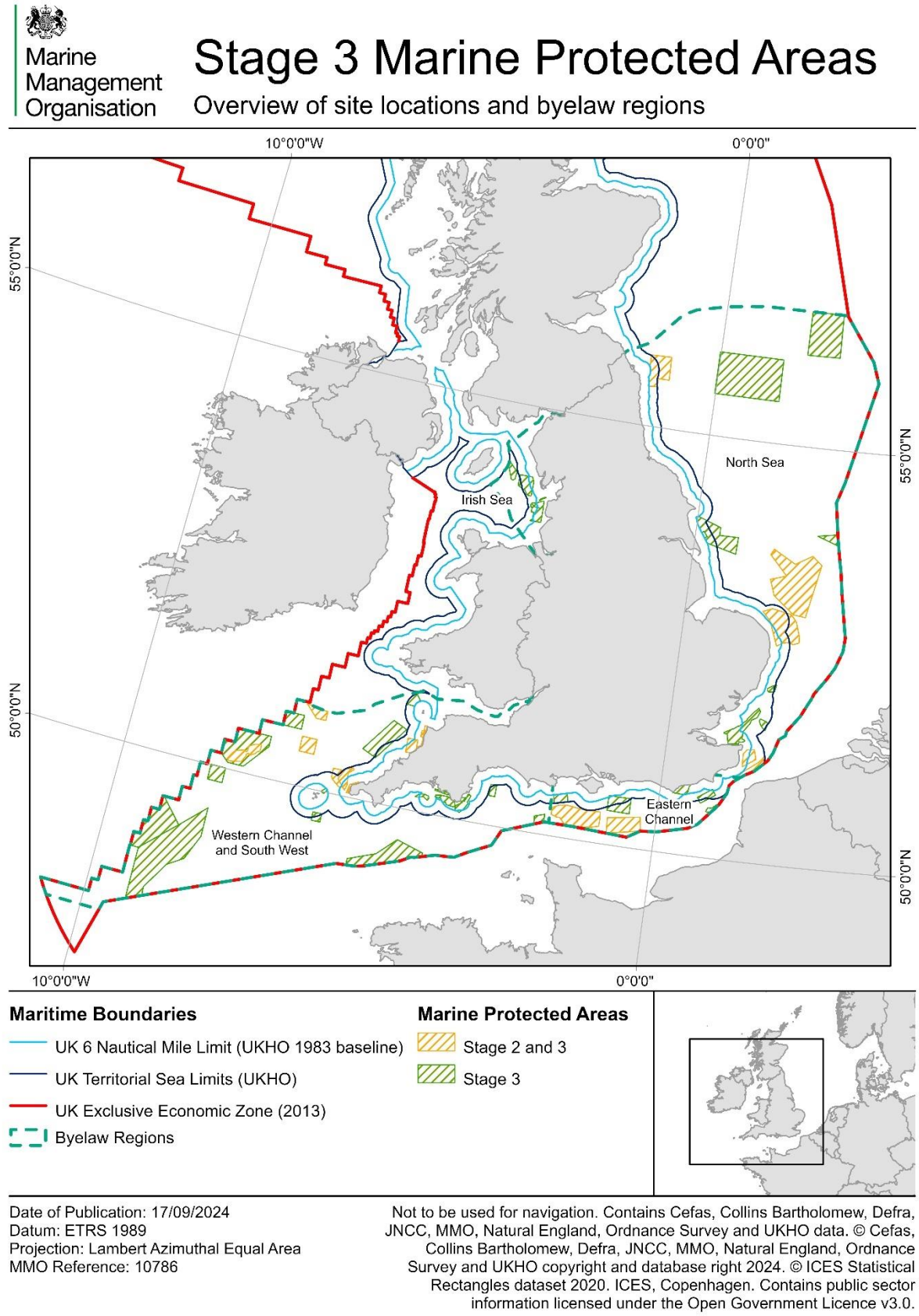

Figure 2. MPAs included in Stage 3.

Table 1. Site specific information for the 43 MPAs considered in Stage 3 (includes information on management options, designated features and gear prohibitions). For most sites, MMO management measures only apply offshore of 6 nautical miles (nm), including some sites extending inshore of 6 nm. '*' MMO is managing within the 6 nm limit. '' Management area buffer is within the 6 nm limit.**

Byelaw region	MPA	Managed designated features	Gear prohibitions
Eastern Channel	Albert Field MCZ	Subtidal coarse sediment	Bottom towed gear
		Subtidal mixed sediments	
	Bassurelle Sandbank SAC	Annex 1 sandbank	
	Beachy Head East MCZ (site straddles the 6nm limit)	Subtidal sand	
		High/ moderate energy circalittoral rock	
	Inner Bank MCZ*	Subtidal sand	
		Subtidal coarse sediment	
		Subtidal mixed sediments	
	Offshore Brighton MCZ	Subtidal coarse sediment	
		Subtidal mixed sediments	
		High/ moderate energy circalittoral rock	
	Offshore Overfalls MCZ*	Subtidal sand	
		Subtidal coarse sediment	
		Subtidal mixed sediments	
	Wight-Barfleur Reef SAC	Annex 1 reef	Bottom towed gear (Stage 2)
Irish Sea	Fylde MCZ*	Subtidal sand	Bottom towed gear
		Subtidal mud	
	Shell Flat and Lune Deep SAC *MMO managing inside 6 nm limit (Shell Flat only)	Annex 1 sandbank	
		Annex 1 reef	
	West of Copeland MCZ	Subtidal sand	
		Subtidal coarse sediment	
		Subtidal mixed sediments	
	West of Walney MCZ*	Subtidal sand	
		Subtidal mud	
		Seapen and burrowing megafauna communities	
North Sea	Farnes East MCZ**	Subtidal sand	Bottom towed gear
		Subtidal coarse sediment	
		Subtidal mixed sediments	
		Subtidal mud	

Byelaw region	MPA	Managed designated features	Gear prohibitions
North Sea (cont.)	Farnes East MCZ** (cont.)	Seapen and burrowing megafauna communities	Bottom towed gear
		Ocean quahog	
		Moderate energy circalittoral rock (S2)	Bottom towed gear (Stage 2)
	Foreland MCZ*	Subtidal sand	Bottom towed gear
		Subtidal coarse sediment	
		High/ moderate energy circalittoral rock (S2)	Bottom towed gear (Stage 2)
	Fulmar MCZ	Subtidal sand	Bottom towed gear
		Subtidal mixed sediments	
		Subtidal mud	
		Ocean quahog	
	Goodwin Sands MCZ	Subtidal sand	
		Subtidal coarse sediment	
		Moderate energy circalittoral rock (S2)	Bottom towed gear (Stage 2)
		Biogenic reef (*Sabellaria* spp.) (S2, S3)	Bottom-set nets and lines, traps, bottom towed gear (Stage 2)
	Haisborough, Hammond and Winterton SAC	Annex 1 sandbank	Bottom towed gear
		Annex 1 reef (S2, S3)	Traps, bottom towed gear (Stage 2)
	Holderness Offshore MCZ**	Subtidal sand	Bottom towed gear
		Subtidal coarse sediment	
		Subtidal mixed sediments	
		Ocean quahog	
	Kentish Knock (East) MCZ	Subtidal sand	
		Subtidal coarse sediment	
		Subtidal mixed sediments	
	Margate and Long Sands SAC	Annex 1 sandbank	
	Markham's Triangle MCZ	Subtidal sand	
		Subtidal coarse sediment	
		Subtidal mixed sediments	
		Subtidal mud	
	North Norfolk Sandbanks and Saturn Reef SAC	Annex 1 sandbank	
		Annex 1 reef (S2, S3)	Traps, bottom towed gear (Stage 2)
	Orford Inshore MCZ	Subtidal mixed sediments	Bottom towed gear
	Swallow Sand MCZ	Subtidal sand	
		Subtidal coarse sediment	

Byelaw region	MPA	Managed designated features	Gear prohibitions
Western Channel and Southwest	Bristows to the Stones MCZ (site straddles the 6nm limit)	Subtidal coarse sediment	Bottom towed gear
		High/ moderate energy circalittoral rock	
		Fragile sponge and anth. communities on subtidal rocky habitats	
		Pink sea fan (*Eunicella verrucosa*)	
	Cape Bank MCZ	Moderate energy circalittoral rock (S2)	Bottom towed gear (Stage 2)
	East of Haig Fras MCZ	High/ moderate energy circalittoral rock (S2)	
	East of Start Point MCZ	Subtidal sand	Bottom towed gear
	Greater Haig Fras MCZ	Subtidal sand	
		Subtidal coarse sediment	
		Subtidal mixed sediments	
		Subtidal mud	
		Seapen and burrowing megafauna communities	
	Haig Fras SAC	Annex 1 reef (S2)	Bottom towed gear (Stage 2)
	Hartland Point to Tintagel MCZ	Subtidal sand (S2)	
		Subtidal coarse sediment (S2)	
		High/ moderate energy circalittoral rock (S2, 3)	Traps, bottom towed gear (Stage 2)
		Fragile sponge and anth. communities on subtidal rocky habitats (S2, 3)	
		Pink sea fan (*Eunicella verrucosa*) (S2, 3)	
	Land's End and Cape Bank SAC	Annex 1 reef (S2)	Bottom towed gear (Stage 2)
	North East of Haig Fras MCZ	Subtidal sand	Bottom towed gear
		Subtidal coarse sediment	
		Subtidal mud	
	North West of Lundy MCZ**	Subtidal coarse sediment	
	North-West of Jones Bank MCZ	Subtidal sand	
		Subtidal coarse sediment	
		Subtidal mixed sediments	
		Subtidal mud	
		Seapen and burrowing megafauna communities	

Byelaw region	MPA	Managed designated features	Gear prohibitions
Western Channel and Southwest (cont.)	Skerries Bank and Surrounds MCZ (site straddles the 6nm limit)	Subtidal sand	Bottom towed gear
		Subtidal coarse sediment	
		Moderate energy circalittoral rock	
		Spiny lobster *(Palinurus elephas)*	No take zone
	South of Celtic Deep MCZ	Subtidal sand	Bottom towed gear
		Subtidal coarse sediment	
		Subtidal mixed sediments	
		Moderate energy circalittoral rock (S2)	Bottom towed gear (Stage 2)
	South of the Isles of Scilly MCZ	Subtidal sand	Bottom towed gear
		Subtidal coarse sediment	
		Subtidal mixed sediments	
		Fan mussel	
	South West Approaches to Bristol Channel MCZ	Subtidal sand	
		Subtidal coarse sediment	
	South West Deeps (East) MCZ	Subtidal sand	
		Subtidal coarse sediment	
		Deep-sea bed	Bottom-set nets and lines/ bottom towed gear
	South-West Deeps (West) MCZ	Subtidal sand	Bottom towed gear
		Subtidal coarse sediment	
		Subtidal mixed sediments	
		Subtidal mud	
		Fan mussel	
	Start Point to Plymouth Sound and Eddystone SAC	Annex 1 reef	Traps, Bottom towed gear (pre-Stage 1)
	Western Channel MCZ	Subtidal sand	Bottom towed gear
		Subtidal coarse sediment	
	West of Wight-Barfleur MCZ	Subtidal coarse sediment	
		Subtidal mixed sediments	

Note: Land's End and Cape Bank MPA and Cape Bank MPA partially overlap, therefore one management zone covers both sites. Haig Fras MPA and Greater Haig Fras MPA partially overlap, therefore one management zone covers both sites.

1.2 Rationale for intervention and intended effects

Fishing activity has the potential to hinder the conservation objectives of MPAs. The conservation objectives are set for each designated feature of an MPA, to either maintain or restore a designated feature of the protected site. These objectives are based on the best available evidence, which include condition assessments which have been undertaken for the MPAs. MMO draft MPA fisheries assessments have been carried out for the 43 MPAs considered in Stage 3 of MMO's offshore MPA fisheries management work, to determine whether ongoing fishing activities are compatible with the conservation objectives for each of these MPAs.

The 43 draft Stage 3 MPA fisheries assessments have concluded that ongoing fishing activities (either bottom towed gear[7], bottom-set nets and lines[8], and traps[9]) are not compatible with the conservation objectives of the majority of the Stage 3 sites.

These four byelaws intend to ensure conservation objectives of the Stage 3 sites are furthered, conserving marine flora, fauna and habitats by prohibiting the relevant fishing activities within specified areas.

Unregulated fishing activities have the potential to cause negative outcomes for society as a result of 'market failures'. These market failures have led to the overconsumption and under protection of our marine environment.

These failures can be described as public goods and negative externalities:

Negative externalities

Negative externalities are present within fisheries when the activity of fishing creates a cost to wider society which is not paid by the fishers. Fishing can cause severe

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[7] For the purpose of these byelaws, 'bottom-towed fishing gear' means any trawls, seines, dredges, or similar gear, including trawls towed on or very close to the seabed, which are actively moved in the water by one or more fishing vessels or by any other mechanised system and in which any part of the gear is designed or rigged to operate on, and be in contact with, the seabed in order to take any sea fisheries resource.

[8] For the purpose of these byelaws, 'bottom set nets and lines' means any nets, including but not limited to gillnets, entangling nets and trammel nets, or hooks and lines where, during use, any part of the gear, including weights or anchors is in contact with the seafloor or may come into contact with the seafloor, but does not include a rod and line used for fishing.

[9] For the purpose of these byelaws, 'traps' means any traps, pots, creels or similar gear designed, adapted or intended for deployment on the seafloor to capture and take any sea fisheries resources.

damage to fragile habitats which can reduce biodiversity and productivity and take many years to recover (Turner *et al.*, 2001). When fishing damages the marine environment the cost is not fully borne by the fishers causing that damage. Instead, that cost is faced by all of society, including through the reduction in ecosystem services that the marine environment provides. As fishers who damage the marine environment do not directly face the cost of their damage, they may not consider these costs when determining their effort levels, leading them to fish above the socially desirable level. Government intervention is needed through the creation of marine protected areas with relevant gear prohibitions to reduce damage to the marine environment, and therefore, protect the ecosystem service benefits that can be provided. Currently MPAs with quotas and seasonal gear restrictions are not providing enough protection to allow the designated features within these sites to recover to a healthy state known as favourable condition, and as a result of this government intervention is needed.

Public goods

A number of goods and services provided by the marine environment, such as biological diversity, are ‘public goods’ (no-one can be excluded from enjoying them and their consumption 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.

Fisheries are a common pool resource, without government intervention no-one can be excluded from benefiting from them, but the extraction and consumption of these goods diminishes their availability to others. This can lead to the overexploitation of fish (Rickels, Dovern and Quaas, 2016). Fishers may act in their own self-interest, extracting a quantity of fish which is most profitable to themselves, which is likely to be above the level of extraction that is optimal for society. This can lead to a reduction and potential collapse of fish stocks. Government intervention may be necessary to prevent this.

Fishing is however highly regulated and does not continue unchecked. Technical conservation measures and annual quotas are used to avoid collapse of fish stocks. Measures in MPAs seek to protect marine habitats, species and biological diversity. The current network of MPAs play an important role in conserving species and habitats, however there are some areas which require a higher level of protection to restore them to a better condition.

Byelaws are statutory (regulated by law) rules and regulations. These byelaws aim 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, and public goods are protected.

1.3 Marine Plan Assessment

The development of MMO byelaws to manage activities for the protection of MPAs requires consideration of the marine plans, in line with section 58 of the Marine and Coastal Access Act 2009[10]. The marine plan assessment is detailed below for each Stage 3 MPA according to the Marine Plan Area.

MMO East Plan Area

Haisborough, Hammond and Winterton MPA, Holderness Offshore MPA, Kentish Knock (East) MPA, Margate and Long Sands MPA, Markham's Triangle MPA, Orford Inshore MPA and North Norfolk Sandbanks and Saturn Reef MPA lie within the East Marine Plan Area. The East Marine Plan[11] 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:

- Aquaculture
  - E-AQ-1
- Biodiversity
  - E-BIO-1, E-BIO-2
- Climate change
  - E-CC-1, E-CC-2
- Cumulative impacts
  - E-ECO-1, E-ECO-2
- Defence
  - E-DEF-1
- Economic productivity
  - E-EC-1, E-EC-2
- Fishing
  - E-FISH-1, E-FISH-2
- 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
  - E-SOC-1, E-SOC-2, E-SOC-3

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

[10] For more information see: www.legislation.gov.uk/ukpga/2009/23/section/58.
[11] East Marine Plan: www.gov.uk/government/publications/east-inshore-and-east-offshore-marine-plans (last accessed on 26 September 2024).

MMO South West Plan Area

Bristows to the Stones MPA, Cape Bank MPA, East of Haig Fras MPA, Greater Haig Fras MPA, Haig Fras MPA, Hartland Point to Tintagel MPA, Land's End and Cape Bank MPA, North East of Haig Fras MPA, North West of Jones Bank MPA, North West of Lundy MPA, Skerries Bank and Surrounds MPA, Start Point to Plymouth Sound and Eddystone MPA, South of Celtic Deep MPA, South of the Isles of Scilly MPA, South West Approaches to the Bristol Channel MPA, South West Deeps (East) MPA, South-West Deeps (West) MPA, and Western Channel MPA lie within the South West Marine Plan Area. The South West Marine Plan[12] 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:

- Access
  - SW-ACC-1
- Air Quality and Emissions
  - SW-AIR-1
- Aquaculture
  - SW-AQ-1
- Biodiversity
  - SW-BIO-1, SW-BIO-2, SW-BIO-3
- Cables
  - SW-CAB-3
- Cross-border co-operation
  - SW-CBC-1
- Climate Change
  - SW-CC-1, SW-CC-2, SW-CC-3
- Cumulative Effects
  - SW-CE-1
- Co-existence
  - SW-CO-1
- Defence
  - SW-DEF-1
- Disturbance
  - SW-DIST-1
- Employment
  - SW-EMP-1
- Fisheries
  - SW-FISH-1, SW-FISH-2, SW-FISH-3
- Heritage Assets
  - SW-HER-1
- Invasive non-native species
  - SW-INNS-1, SW-INNS-2
- Marine Litter
  - SW-ML-1, SW-ML-2
- Marine Protected Areas
  - SW-MPA-1, SW-MPA-2, SW-MPA-4
- Seascapes and Landscapes
  - SW-SCP-1
- Social Benefits
  - SW-SOC-1
- Tourism and Recreation
  - SW-TR-1
- Underwater Noise
  - SW-UWN-1, SW-UWN-2
- Water Quality
  - SW-WQ-1

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

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[12] South West Marine Plan: www.gov.uk/government/publications/the-south-west-marine-plans-documents (last accessed on 26 September 2024).

MMO North East Plan Area

Farnes East MPA, Fulmar MPA, and Swallow Sand MPA lie within the North East Marine Plan Area. The North East Marine Plan[13] 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:

- Access
  - NE-ACC-1
- Air Quality and Emissions
  - NE-AIR-1
- Aquaculture
  - NE-AQ-1
- Biodiversity
  - NE-BIO-1, NE-BIO-2, NE-BIO-3
- Cables
  - NE-CAB-3
- Cross-border co-operation
  - NE-CBC-1
- Climate Change
  - NE-CC-1, NE-CC-2, NE-CC-3
- Cumulative Effects
  - NE-CE-1
- Co-existence
  - NE-CO-1
- Defence
  - NE-DEF-1
- Disturbance
  - NE-DIST-1
- Employment
  - NE-EMP-1
- Fisheries
  - NE-FISH-1, NE-FISH-2, NE-FISH-3
- Heritage Assets
  - NE-HER-1
- Invasive non-native species
  - NE-INNS-1, NE-INNS-2
- Marine Litter
  - NE-ML-1, NE-ML-2
- Marine Protected Areas
  - NE-MPA-1, NE-MPA-2,
- Seascapes and Landscapes
  - NE-SCP-1
- Social Benefits
  - NE-SOC-1
- Tourism and Recreation
  - NE-TR-1
- Underwater Noise
  - NE-UWN-1, NE-UWN-2
- Water Quality
  - NE-WQ-1

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

[13] North East Marine Plan: www.gov.uk/government/publications/the-north-east-marine-plans-documents (last accessed on 26 September 2024).

MMO North West Plan Area

Flyde MPA, Shell Flat and Lune Deep MPA, West of Copeland MPA, and West of Walney MPA lie within the North West Marine Plan Area. The North West Marine Plan[14] was adopted in 2021. The decision to propose management for these sites 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:

- Access
  - NW-ACC-1
- Air Quality and Emissions
  - NW-AIR-1
- Aquaculture
  - NW-AQ-1
- Biodiversity
  - NW-BIO-1, NW-BIO-2, NW-BIO-3
- Cables
  - NW-CAB-3
- Cross-border co-operation
  - NW-CBC-1
- Climate Change
  - NW-CC-1, NW-CC-2, NW-CC-3
- Cumulative Effects
  - NE-CE-1
- Co-existence
  - NW-CO-1
- Defence
  - NW-DEF-1
- Disturbance
  - NW-DIST-1
- Employment
  - NW-EMP-1
- Fisheries
  - NW-FISH-1, NW-FISH-2, NW-FISH-3
- Heritage Assets
  - NW-HER-1
- Invasive non-native species
  - NW-INNS-1, NW-INNS-2
- Marine Litter
  - NW-ML-1, NW-ML-2
- Marine Protected Areas
  - NW-MPA-1, NW-MPA-2, NW-MPA-4
- Seascapes and Landscapes
  - NW-SCP-1
- Social Benefits
  - NW-SOC-1
- Tourism and Recreation
  - NW-TR-1
- Underwater Noise
  - NW-UWN-1, NW-UWN-2
- Water Quality
  - NW-WQ-1

[14] North West Marine Plan: www.gov.uk/government/publications/the-north-west-marine-plans-documents (last accessed on 26 September 2024).

MMO South Plan Area

Albert Field MPA, Bassurelle Sandbank MPA, Beachy Head East MPA, East of Start Point MPA, Foreland MPA, Inner Bank MPA, Offshore Brighton MPA, Offshore Overfalls MPA, Skerries Bank and Surrounds MPA, West of Wight-Barfleur MPA, and Wight-Barfleur Reef MPA lie within the South Marine Plan Area. The South Marine Plan[15] 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:

- Aquaculture
  - S-AQ-1, S-AQ-2
- Biodiversity
  - S-BIO-1, S-BIO-2, S-BIO-3, S-BIO-4
- Climate change
  - S-CC-1, S-CC-2, S-CC-3, S-CC-4
- Co-existence
  - S-CO-1
- Defence
  - S-DEF-1
- Disturbance
  - S-DIST-1
- Employment
  - S-EMP-2
- Fishing
  - S-FISH-1, S-FISH-2, S-FISH-4, S-FISH-4-HER
- Heritage
  - S-HER-1
- Marine litter
  - S-ML-1
- Marine Protected Area Network
  - S-MPA-1, S-MPA-2, S-MPA-4
- Non-indigenous species
  - S-NIS-1
- Seascape
  - S-SCP-1
- Social and Cultural
  - S-SOC-1
- Tourism and Recreation
  - S-TR-1, S-TR-2
- Underwater noise
  - S-UWN-1, S-UWN-2
- Water quality
  - S-WQ-1, S-WQ-2

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

[15] South Marine Plan: www.gov.uk/government/publications/the-south-marine-plans-documents (last accessed on 26 September 2024).

MMO South East Plan Area

Foreland MPA, Goodwin Sands MPA, and Margate and Long Sands MPA lie within the South East Marine Plan Area. The South East Marine Plan[16] 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:

- Access
  - SE-ACC-1
- Air Quality and Emissions
  - SE-AIR-1
- Aquaculture
  - SE-AQ-1
- Biodiversity
  - SE-BIO-1, SE-BIO-2, SE-BIO-3
- Cables
  - SE-CAB-3
- Cross-border co-operation
  - SE-CBC-1
- Climate Change
  - SE-CC-1, SE-CC-2, SE-CC-3
- Cumulative Effects
  - SE-CE-1
- Co-existence
  - SE-CO-1
- Defence
  - SE-DEF-1
- Disturbance
  - SE-DIST-1
- Employment
  - SE-EMP-1
- Fisheries
  - SE-FISH-1, SE-FISH-2, SE-FISH-3
- Heritage Assets
  - SE-HER-1
- Invasive non-native species
  - SE-INNS-1, SE-INNS-2
- Marine Litter
  - SE-ML-1, SE-ML-2
- Marine Protected Areas
  - SE-MPA-1, SE-MPA-2, SE-MPA-4
- Seascapes and Landscapes
  - SE-SCP-1
- Social Benefits
  - SE-SOC-1
- Tourism and Recreation
  - SE-TR-1
- Underwater Noise
  - SE-UWN-1, SE-UWN-2
- Water Quality
  - SE-WQ-1

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

All marine plans have been considered and policies relevant to Stage 3 MPA fisheries management are presented above. Some marine plan policies require further discussion in relation to the Stage 3 management measures, for example Climate Change, Employment, and Cumulative Effects.

[16] South East Marine Plan: www.gov.uk/government/publications/the-south-east-marine-plan-documents (last accessed on 26 September 2024).

MPA byelaws have the potential to provide climate change mitigation benefits by reducing the amount of stored ‘blue’ carbon that is disturbed by bottom towed gear within the management areas (Laffoley and Baxter, 2022). The restrictions may also reduce greenhouse gas (GHG) emissions through reducing the number of vessels in the MPAs; however, this should be considered on a case-by-case basis as there could also be a negative impact through vessels having to travel further to other fishing grounds.

In terms of socio-economic marine plan policies, MPA management measures are likely to provide employment opportunities in areas such as marine monitoring and enforcement. Conversely, the proposed management measures have the potential to result in reduction of employment opportunities within a particular geographic location for certain sectors such as the fishing and fish processing industries. There is a potential for displacement from the management measures introduced, the issue of displacement is discussed in the non-monetised costs section of this DMA. Impacts through displacement from MPA management measures may result in commercial areas being reduced and therefore increased competition in other areas, which could impact yields per vessels, and could increase the risk of boat collisions. These impacts have been minimised through an evidence-based approach and only excluding access to the areas of the MPAs where evidence dictated impacts to the designated features and therefore impacts to the conservation objectives of the MPAs.

MPA management measures will have a cumulative effect on the restriction of access from commercial fisheries in MPAs alongside existing restrictions from other marine developments such as offshore wind developments. The restrictions are also contributing to the management of cumulative effects from commercial fishing on protected species and habitats.

Ultimately MPA management measures will restrict fishing activity which will have an initial economic impact on the fishing industry, however, the benefits from natural capital and ecosystem services provided as a result of the proposed management measures are expected to provide longer term social and economic benefits. These benefits are discussed in **section 4.8** of this DMA.

1.4 UK Marine Strategy and the biodiversity duty

In proposing the management options for the Stage 3 sites, MMO has considered the UK Marine Strategy, as required by regulation 9 of the Marine Strategy Regulations 2010[17]. MMO has also considered its biodiversity duty[18] in regard to the Environmental Principles Policy Statement[19] under the Environment Act 2021[20].

1.5 Public Sector Equality Duty

In proposing these byelaws, MMO has conducted an equality impact assessment and has had due regard to the public sector equality duty under section 149 of the Equality Act 2010[21].

MMO has a duty under section 125 the Marine and Coastal Access Act 2009[5] to exercise its functions to further the conservation objectives of the MPAs. MMO has complied with this duty by making byelaws to control fishing in areas designated as MPAs. Some people with protected characteristics may be more impacted by the byelaws but MMO considers these impacts are justified.

2 Policy objectives and intended effects

The policy objective of the byelaws is to further the conservation objectives of the Stage 3 sites. This will be achieved by prohibiting certain fishing gears in specific areas (bottom towed gear including beam trawls, otter trawls, bottom otter trawls, otter twin trawls, nephrops trawls, pair trawls, boat dredges, hand dredges, mechanized dredges, Danish seines, Scottish seines, beach seines; bottom-set nets and lines including trammel nets, driftnets, gillnets, longlines; and traps including pots, traps and creels) and the removal of spiny lobster within specified areas of the sites.

In all specified areas where gear types have been prohibited there is a requirement to have all relevant gears inboard, lashed and stowed when transiting specified areas (where use of those gears are prohibited) as defined within these byelaws.

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[17] For more information see: www.legislation.gov.uk/uksi/2010/1627/regulation/9.
[18] Defra guidance - Complying with the biodiversity duty: www.gov.uk/guidance/complying-with-the-biodiversity-duty (last accessed 24 September 2024).
[19] Defra policy paper - Environmental principles policy statement: www.gov.uk/government/publications/environmental-principles-policy-statement (last accessed 24 September 2024).
[20] For more information see: www.legislation.gov.uk/ukpga/2021/30/contents
[21] For more information see: www.legislation.gov.uk/ukpga/2010/15/section/149

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

The North Sea Marine Protected Areas Fishing Gear Byelaw 2024 revokes the following byelaws:

- “The Dogger Bank Special Area of Conservation (Specified Area) Bottom Towed Fishing Gear Byelaw 2022” made by the MMO on 8 April 2022.
- “The Inner Dowsing, Race Bank and North Ridge Special Area of Conservation (Specified Areas) Prohibited Fishing Gears Byelaw 2022” made by the MMO on 8 April 2022.
- “The Margate and Long Sands European Marine Site (Specified Areas) Bottom Towed Fishing Gear Byelaw 2017” made by the MMO on 2 August 2017.
- “The Marine Protected Areas Bottom Towed Fishing Gear Byelaw 2023” made by the MMO on 16 October 2023.

The Irish Sea Marine Protected Areas Fishing Gear Byelaw 2024 revokes the following byelaw:

- “The West of Walney Marine Conservation Zone (Specified Area) Bottom Towed Fishing Gear Byelaw 2018” made by the MMO on 4 September 2018.

The Western Channel and Southwest Marine Protected Areas Fishing Gear Byelaw 2024 revokes the following byelaws:

- “The Canyons Marine Conservation Zone (Specified Area) Prohibited Fishing Gears Byelaw 2022” made by the MMO on 8 April 2022.
- “The South Dorset Marine Conservation Zone (Specified Area) Bottom Towed Fishing Gear Byelaw 2022” made by the MMO on 8 April 2022.
- “The Start Point to Plymouth Sound and Eddystone European Marine Site (Specified Areas) Bottom Towed Fishing Gear Byelaw” made by the MMO on 11 December 2013.

The existing management measures in the revoked byelaws have already been assessed in previous regulatory impact assessments, therefore, they are not included in the calculations in this DMA. The provisions (management measures/ decisions) that are in place as a consequence of these revoked byelaws will be included within the four new regional byelaws.

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. If this option was chosen, the conservation objectives in the MPAs would not be met. The draft MPA fisheries assessments that have been undertaken have determined the need for management measures which go beyond existing fisheries management approaches such as quotas. This is to ensure that the conservation objectives are met within the 43 Stage 3 MPAs. These draft MPA fisheries assessments are based on the best available evidence. Ultimately, if this option was chosen, the risks from damaging activities would not be addressed and that MMO legal duties would not be met. 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 The Better Regulation Framework[22], 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 (Defra, 2013). This is because the introduction of a voluntary measure would not provide assurance that sufficient protection would be achieved and is unlikely to address any of the market failures targeted by this policy as a result.

For a non-regulatory or voluntary agreement to work, stakeholders would need to unanimously agree to cease activities relating to bottom towed gears, bottom set nets and lines, and traps within relevant MPAs. Once this was agreed, stakeholders would cease activity in the relevant sites, but it would not be formally designated or enforced. This option is not preferred as gaining unanimous stakeholder agreement would not be possible, and the stopping of stakeholder activity would not be guaranteed.

Option 2: Removal of pressures from specified management areas of designated features via prohibition of certain types of fishing activity (including bottom towed gear, bottom-set nets and lines, and traps). This may

[22] Department for Business and Trade guidance - Better Regulation Framework: www.gov.uk/government/publications/better-regulation-framework (last accessed 25 September 2024).

include a prohibition across the whole site where sensitive designated features are distributed throughout the whole site or a zonal approach where such features only apply in certain areas (preferred option).

Prohibiting the use of certain types of fishing gears within specified management areas of the sites containing designated features will protect these features from the impacts of bottom towed gear, bottom-set nets and lines, and trap fishing activity. This option will conserve the sites' marine habitats and fauna and further the conservation objectives of the MPAs, whilst allowing certain types of fishing activities to take place in other areas of the sites, where such features are not present.

Where necessary this may involve a whole site closure if the distribution and extent of features justifies this. And where the distribution and extent of the features allow then a zoned management approach has been taken.

Option 3: Removal of pressures via a whole site prohibition across all sites. The use of certain types of fishing gear (bottom towed gear, bottom-set nets and lines, and traps) will be prohibited throughout the MMO section of all sites considered in this assessment.

This option would remove the impact of certain types of fishing activity (bottom towed gear, bottom-set nets and lines, and traps) 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 certain types of fishing activity in areas of the sites where it is not necessary in order to achieve the site's conservation objectives, for example where designated features do not occur.

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

This is the chosen option as it will ensure protection for the designated features from the impacts of certain types of fishing activities (bottom towed gear, bottom-set nets and lines, and traps) whilst also providing proportionality of impacts to industry by allowing activity to continue where designated features are not present.

The boundaries of the management areas include buffer zones. This is to prevent damaging 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 or to the limit of MMO byelaw making powers (for example up to the exclusive economic zone (EEZ) boundary).

As detailed previously, these byelaws revoke and replace previous MMO byelaws. In some instances, MMO has altered the boundaries of specified areas defined in previous MMO byelaws when replacing them to apply a consistent approach to

determining buffer distances around designated features to both improve effectiveness of buffer areas in protecting features and minimise the area of prohibitions as much as possible.

MMO has followed Joint Nature Conservation Committee (JNCC) and Natural England 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 MPAs from the impacts of the relevant fishing activities. This follows a gear warp[23] length to water depth ratio (**Table 2**) whereby the required buffer distance is dependent on the likely warp length being used which is itself dependent upon the water depth in which the fishing is taking place.

Table 2. Gear warp length to water depth ratio and buffer zone for bottom towed fishing gear, bottom-set nets and lines, and traps.

Water depth	Ratio of warp length to depth	Buffer
Shallow waters (≤ 25 m)	4:1	Four times actual depth
Continental shelf (25 m to 200 m)	3:1 for bottom towed gear, and 2:1 or a minimum of 100 m for bottom-set nets and lines, and traps	Three times actual depth
Deep waters (200 m to over 1000 m)	2:1	Two times actual depth

The methodology described above has been used to calculate the minimum buffer extent for spatial prohibitions within the Stage 3 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.

We have applied discretion to the buffer methodology for certain static gear management areas:

- For compliance purposes the Hartland Point to Tintagel MPA and Start Point to Plymouth Sound MPA traps management zones will follow the same boundaries as the existing bottom towed gear prohibitions for these sites.

[23] Gear warps are the ropes/ cable or other material which is used to attach towed gear to a fishing vessel.

4 Expected level of business impact

All costs analysed are compared to Option 0. As reflected above, Option 2 is the preferred 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 option. Given the evidence available, certain assumptions have been made in the development of this assessment:

- Vessel monitoring system (VMS) data assume fishing activity from speed of travel. Speeds of up to six knots are considered fishing speed. Some vessels can tow certain fishing gears 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.
- Vessel operating profits are estimated using the landings obtained by vessels from the management zones and the average profit ratios for fishing in the site provided by Seafish. The operating profits 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. These estimates assume that the costs incurred by 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.
- Landings for non-VMS (under 12 m length) vessels are available at International Council for the Exploration of the Seas (ICES) rectangle (approximately 30 by 30 nautical miles or 55 by 55 km^2) level. MMO has estimated the landings from, and number of, under 12 m vessels impacted by the proposed management measures as a proportion of ICES rectangle level landings, based on the percentage area of a given ICES rectangle intersected by the management area. The estimate of economic impact to, and number of, under 12 m vessels impacted are therefore likely to be overestimated, as most of the proposed management areas are 6 nautical miles or more offshore, and under 12 m fishing vessel activity tends to be more concentrated nearer to the shore.
- Estimates of the economic impact on all fishing vessels are likely to be a significant overestimate as fishers are likely to offset some of the lost landings by fishing elsewhere. Similarly, removal of certain fishing gears (for example bottom towed gears) may result in increased fishing opportunities for other fishing gears (for example traps or bottom set nets and lines). However this displacement is difficult to quantify, and it is impossible to predict where exactly activities may be displaced to.
- It is possible that the improved environmental status within the management areas could result in more abundant fishing grounds beyond the management

areas as a result of spillover (Defra, 2022; Brander *et al.*, 2023), this will be addressed in the monetised benefits section of this DMA.

- Estimated costs to business for the prohibition of static gears (bottom-set nets and lines, and traps) within Goodwin Sands MPA are likely to be an overestimate. Following internal review and discussions with the relevant IFCA (Kent and Essex IFCA), the management area proposed within the byelaw has been refined 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 Goodwin Sands MPA has an area of approximately 58 square kilometres (km^2), whereas the refined management area has an area of approximately 26 km^2 – a reduction in area of approximately 55%.

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, and 2021 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 2019 and 2021[24];
- expert opinion from all 6 MMO coastal teams and Fisheries Monitoring Centre team; and
- information gathered from stakeholders by MMO during the call for evidence[25] held 17 January 2023 to 28 March 2023.

UK Sea Fisheries Statistics: Unscheduled Corrections

MMO, along with all UK Fisheries Authorities (FAs), recently investigated a discrepancy in the 2018 to 2022 landing data it manages and reports for all UK Fishing Authorities. MMO have published corrections to the landing data, including a description of the changes in the UK Sea Fisheries Statistics: Unscheduled Corrections[26]. Overall impact on annual MMO statistics was small and within an accepted level of tolerance for operational data. In relation to the Stage 3 project,

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[24] Seafish Fleet Enquiry Tool: public.tableau.com/profile/seafish#!/vizhome/FleetEnquiryTool/1Overview (last accessed: 25 September 2024).

[25] For more information see: www.gov.uk/government/publications/managing-fisheries-in-marine-protection-areas-call-for-evidence

[26] UK Sea Fisheries Statistics: Unscheduled Corrections - https://www.gov.uk/government/statistics/uk-sea-fisheries-unscheduled-corrections (last accessed: 02 December 2024).

MMO has analysed the impact of the unscheduled corrections and has determined that this does not change conclusions or decisions made for the Stage 3 management measures.

However, to ensure maximum transparency and account for changes resulting from the unscheduled corrections, UK landings values and operating profits for the years 2018 to 2021 have been updated for the Stage 3 MPA management areas. Values have been uplifted by the percentage change in the landings of the ICES rectangle that the MPA sits within that has resulted from the unscheduled corrections. Please see **Table 33** in **Annex 2** for more information on the value uplifts applied to the UK landings values for years 2018 to 2021 in this document. For detailed explanation of the unscheduled corrections in the 2018 to 2022 data and the approach applied to the published data please see section 'Methodology and Quality' in the UK Sea Fisheries Statistics: Unscheduled Corrections[26].

Value updates were also applied to the operating profit figures provided by Seafish. The updates applied were based on the same percentage increase used to update the UK landings figures for 2018 to 2021. All figures detailed in this de-minimis assessment will be reviewed post-consultation when new data will be available. New data will be reviewed and considered ahead of any final management decisions and published accordingly.

Prohibition of the use of certain types of fishing gear (bottom towed gear, bottom-set nets and lines, and traps) in the management areas may result in the following costs:

- downstream costs on fish processors;
- 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;
- environmental impacts related to possible increased damage to habitats in other areas due to displacement; and
- compliance assurance costs.

Costs to the fishing industry have been monetised and these estimated values have been collated and presented as part of this DMA (**Table 15** to **Table 18**).

Environmental costs due to possible increased damage to habitats outside of the management areas as a result of displacement of fishing activity from the management areas to other areas are difficult to value, as it is unclear where such activity will be displaced to, and these are therefore described here as non-monetised costs.

Prohibition of the use of certain types of fishing gear (bottom towed gear, bottom-set nets and lines, and traps) 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.

4.1 Small and micro business assessment

The main businesses directly impacted would be those in the fishing industry. According to Business Population Estimates for 2023, produced by Department for Business and Trade, over 99 % of businesses in the UK fishing and aquaculture industries were considered small or micro (4,690 out of 4,700). There are 10 remaining businesses which are either medium or large (Department for Business and Trade, 2023). As a result, these byelaws cannot exempt businesses of smaller sizes and achieve their objectives.

4.2 Vessel Monitoring Systems (VMS) maps

A WebApp displaying VMS activity for vessels using relevant fishing gears around the 43 MPAs considered in this assessment has been produced. Access the WebApp here[27].

4.3 Costs to the UK fishing industry

The existing management measures in the revoked byelaws have already been assessed in previous DMAs, therefore, they are not included in the calculations in this DMA, for completeness, please find previous MMO MPA management measure costs in **Table 14**. 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, bottom-set nets and lines, and traps within the management areas were analysed. The most recent five years of relevant VMS data and landings available (2016 to 2019, and 2021) 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 occurred in each of the four regional byelaw areas from 2016 to 2021 are displayed in **Table 3**. VMS records for non-UK

[27] Stage 3 Consultation Marine Protected Areas - https://defra.maps.arcgis.com/apps/dashboards/fa41bdcae9d749d1961b371ae4d11fb8 (last accessed 30 September 2024).

vessels are displayed in **Table 4**. In **Table 3** and **Table 4**, the individual year values do not match the total, this is due to the same vessels returning to fish each year, therefore these values are controlled for double counting. The overall total (2016 to 2019, and 2021) is the count of unique vessels in those years rather than a sum of all of the year totals which would include double counting.

Please see **Table 21** in **Annex 1** for a breakdown of gear type to estimated number of vessels in each byelaw area.

Table 3. Estimated number of unique UK vessels using relevant fishing gears from VMS fishing reports within management areas from 2016 to 2021.

Byelaw Region	Vessel Size	2016	2017	2018	2019	2020	2021	Total (2016 to 2019 and 2021)
Eastern Channel	Under 12 m*	142	144	107	108	101	109	224
	Over 12 m	24	23	25	26	20	34	72
Eastern Channel Total		**166**	**167**	**132**	**134**	**121**	**143**	**296**
Irish Sea	Under 12 m*	33	29	24	24	17	22	54
	Over 12 m	5	4	1	2	2	5	12
Irish Sea Total		**38**	**33**	**25**	**26**	**19**	**27**	**66**
North Sea	Under 12 m*	242	261	200	180	157	163	385**
	Over 12 m	49	59	57	71	57	43	160
North Sea Total**		**291**	**320**	**257**	**251**	**214**	**206**	**530**
Western Channel and Southwest	Under 12 m*	278	262	211	217	184	190	455
	Over 12 m	106	110	95	96	73	65	170
Western Channel and Southwest Total		**384**	**372**	**306**	**313**	**257**	**255**	**624**
Grand Total		**816**	**823**	**671**	**679**	**581**	**595**	**1,303**

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

**This figure could potentially increase due to feature data changes for the North Norfolk Sandbanks and Saturn Reef trap management zone.

Table 4. Estimated number of non-UK unique vessels using relevant fishing gear from VMS fishing reports within management areas from 2016 to 2021.

Country	2016	2017	2018	2019	2020	2021	Total (2016 to 2019 and 2021)
Belgium	50	48	49	52	48	49	67
Germany	5	7	10	8	12	5	15
Denmark	7	14	11	11	10	6	28
Spain	30	29	29	27	23	32	57
France	193	187	177	171	172	185	285
Faroe Islands	0	0	0	1	0	0	1
Ireland	53	50	58	66	46	53	99
Lithuania	1	0	0	0	0	0	1
Netherlands	60	67	73	67	64	66	107
Norway	15	5	5	4	2	0	28
Portugal	0	0	0	1	0	0	1
Sweden	0	0	1	0	0	0	1
Grand Total	**411**	**405**	**411**	**408**	**377**	**396**	**681**

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

4.3.1 Relevant fishing activity within Stage 3 management areas

This section discusses the relevant fishing activity within the proposed Stage 3 management areas. Only the relevant fishing gears impacted by the proposed measures are considered. Additionally, only fishing within the management areas is considered rather than fishing within the MPA (for some sites this is the same as the MPA, smaller, or in some cases, larger due to buffering outside the MPA boundaries). Some sites have pre-existing management which has been highlighted where relevant.

To note, the relevant fishing activity is only discussed below in relation to Stage 3 measures. There are numerous sites which have already been assessed as part of the Stage 2 Marine Protected Areas Bottom Towed Fishing Gear Byelaw 2023 and the paragraphs below do not include fishing activity relevant to these Stage 2 restrictions.

Landings associated with VMS for UK vessels within the management areas for most recent six years of landings available (2016 to 2021) are displayed in **Table 9, Table 15** and **Table 16**. For context, non-UK vessels' VMS activity (2016 to 2021) is displayed in **Table 8, Table 26** and **Table 27**. The costs associated with existing management measures in the revoked byelaws have already been assessed in

previous DMAs, therefore, they are not included in the calculations in this DMA. For completeness, costs associated with previous MMO MPA management measures can be found in **Table 14**.

As the use of bottom towed fishing gear is already prohibited within Wight Barfleur Reef MPA, there are no landings for this site. As there are no additional economic impacts as a result of this byelaw, the site is not listed within the paragraphs below and the tables presented.

Eastern Channel

Relevant fishing activity in Albert Field MPA management area was conducted exclusively by non-UK vessels. French vessels were the only nation fishing within the site, using bottom otter trawls.

Relevant fishing activity in Bassurelle Sandbank MPA management area mainly consisted of non-UK vessels (96 %) including Belgian, German, Danish, French, Irish and Dutch vessels. Out of these nations, VMS records indicate that French, Dutch and Belgian vessels were most prevalent. The most used gear types by these nations were beam trawls (19%), bottom otter trawls (48 %), Danish (12 %) and Scottish seines (13 %). For UK vessels the main activity in the site was from the use of boat dredges (88 %) and Scottish seines (12%).

Relevant fishing activity in Beachy Head (East) MPA management area consisted of both UK (33 %) and non-UK vessels (66 %) with beam trawls and boat dredges being the most used gear types.

Relevant fishing activity in Inner Bank MPA management area was almost exclusively by non-UK vessels (97 %) from France (18 %) and Belgium (82 %) using beam trawls and bottom otter trawls. The limited fishing activity from UK vessels (3 %) was from dredging and bottom otter trawling.

Relevant fishing activity in Offshore Brighton MPA management area consisted mainly of non-UK vessels (95 %) from a range of nations including, Belgium, Germany, Denmark, France, Faroe Islands, Ireland, Lithuania, the Netherlands, and Norway. The majority of non-UK activity was from French vessels (95 %) using bottom otter trawls and dredges. There was some activity from UK vessels (5 %) using boat dredges and beam trawls.

Relevant fishing activity in Offshore Overfalls MPA management area consisted of mainly non-UK activity (94 %). Non-UK nations which were active within the MPA include vessels from Belgium, Germany, Denmark, France, Ireland, Lithuania, the Netherlands, and Norway. The majority of non-UK activity was from French vessels (92 %) using bottom otter trawls and boat dredges. The limited amount of UK activity (6 %) was predominantly dredging, with some demersal trawling activity.

There was minimal relevant fishing activity in Wight Barfleur Reef MPA management area related to Stage 3 management measures. The relevant activity was split relatively evenly between non-UK and UK vessels.

Irish Sea

Relevant fishing activity in Flyde MPA management area was conducted exclusively UK vessels (100 %). The most prevalent gear type used within the site was dredging followed by demersal trawling.

Relevant fishing activity in Shell Flat and Lune Deep MPA management area was conducted exclusively by UK vessels using bottom otter trawls.

Relevant fishing activity in West of Copeland MPA management area was conducted almost exclusively by UK vessels (90 %) using bottom otter trawls and beam trawls. The limited amount of non-UK activity (10 %) was from Irish and Belgian vessels using demersal trawls.

Relevant fishing activity in West of Walney MPA management area consisted of both non-UK vessels (72 %) and UK vessels (28 %) using beam trawls. Non-UK activity was from the Belgian fleet.

North Sea

Relevant fishing activity in Farnes East MPA management area was conducted almost exclusively by UK vessels (99 %). The most prevalent gear types used were boat dredges, otter twin trawls and bottom otter trawls. The limited amount of non-UK (1 %) activity was from Dutch vessels using otter twin trawls.

Relevant fishing activity in Foreland MPA management area was conducted almost exclusively by non-UK vessels (97 %) with French vessels being the most prevalent nation using bottom otter trawls and Danish seines. Vessels from Belgium and the Netherlands were also active in the site using beam trawls and bottom otter trawls. The limited UK activity was from the use of Scottish seines and bottom otter trawls.

Relevant fishing activity in Fulmar MPA management area was split relatively evenly between non-UK and UK vessels with Dutch and UK vessels being the most active. The most prevalent gears used were bottom otter trawls for both nations.

Relevant fishing activity in Goodwin Sands MPA management areas consisted of mainly non-UK vessels from France, and Belgium, there was also some limited activity from vessels from the Netherlands. The most prevalent gears used were bottom otter trawls, followed by Scottish seines and Danish seines and beam trawls, trammel nets and set gillnets. There was some activity from UK vessels with the most prevalent gear types being Scottish seines.

Relevant fishing activity in Haisborough, Hammond and Winterton MPA management areas was conducted almost exclusively by non-UK vessels (99 %). Dutch beam trawlers were most prevalent, however there has also been limited use of bottom otter trawls by German, French and Belgian vessels, and beam trawls by German and Belgian vessels. The limited amount of activity from UK vessels was from beam and bottom otter trawlers.

Relevant Fishing activity in Kentish Knock East MPA management area mainly consisted of non-UK (99 %) vessels from Belgium, France, and the Netherlands. Bottom otter trawls and beam trawls were the most prevalent fishing gears used within the site. The limited activity from UK vessels (1 %) was also from bottom otter trawls and beam trawls.

Relevant fishing activity in Margate and Long Sands MPA management areas consisted of mainly non-UK vessels (94 %), with Belgian beam trawlers being the most prevalent. The limited amount of UK activity (6 %) was from bottom otter trawls.

Relevant fishing activity in Markham's Triangle MPA management area mainly consisted of non-UK vessels (96 %), of which Netherlands and France were the most prevalent using bottom otter trawls, beam trawls and Danish seines. There was also some activity from Belgian vessels using beam trawls. The limited amount of UK activity (4 %) was from beam trawls.

Relevant fishing activity in North Norfolk Sandbanks and Saturn Reef MPA management areas consisted of both UK and non-UK vessels with bottom towed gear predominately being used by non-UK vessels (98 %), whilst UK vessels focusing on static gear (100 %). In this site, vessels from the Netherlands were the most prevalent using beam trawls. There was also some limited activity from Belgian and German beam trawls. In terms of UK activity, traps were the most prevalent gear type used for UK vessels.

Relevant fishing activity in Orford Inshore MPA management area was conducted exclusively by non-UK vessels. Belgium (72 %) was the most active nation, followed by France (22 %) and the Netherlands (6%). The most used gear types were beam and bottom otter trawls.

Relevant fishing activity in Swallow Sand MPA management area consisted of both UK (20 %) and non-UK activity (80 %). The majority of non-UK activity was from Danish bottom otter trawls and the majority of UK activity was from bottom otter and otter twin trawls.

Western Channel and Southwest

Haig Fras MPA management area was overlapped entirely by Greater Haig Fras MPA management area, and therefore was considered within the relevant paragraph on Greater Haig Fras MPA below.

There was no relevant fishing activity being conducted in Bristow to the Stones MPA management area.

Relevant fishing activity in Cape Bank MPA management area consisted of mainly non-UK vessels (94 %), with some limited activity from UK vessels (6 %). French and Belgian vessels were the only non-UK nations fishing within this site with bottom otter trawls being the most prevalent gear type, followed by beam trawls. For UK vessels, beam trawls were the most used fishing gears within the site.

Relevant fishing activity in East of Haig Fras MPA management area consisted of both UK (25 %) and non-UK vessels (75 %). UK and French vessels were the most prevalent within the site, there was also some activity from Irish vessels. Most of the activity within the site was from beam trawls, bottom otter trawls and twin otter trawls.

Relevant fishing activity in East of Start Point MPA management area includes vessels from UK, Belgium, Germany, Denmark, France, Ireland, and the Netherlands. VMS records indicate that UK vessels were most prevalent (96%). The most prevalent gears operating within the site were boat dredges, bottom otter trawls, otter twin trawls, and beam trawls.

Relevant fishing activity in Greater Haig Fras MPA management area was almost exclusively by non-UK vessels (96 %) with French and Irish vessels recorded as the most prevalent. Bottom otter trawls and bottom twin trawls were the most used gears within this site, followed by Danish seines, pair seines, beam trawls, nephrops trawls and Scottish trawls.

Relevant fishing activity in Hartland Point to Tintagel MPA management area was conducted exclusively by UK vessels with traps being the only gear type used within this site.

Relevant fishing activity in North East of Haig Fras MPA management area mainly consisted of non-UK vessels (95 %) from France and Ireland using beam trawls, bottom otter trawls and otter twin trawls. The limited amount of UK activity (5 %) was from beam trawlers.

Relevant fishing activity in North West of Lundy MPA management area consisted of both non-UK (65 %) and UK activity (35 %). The majority of non-UK activity within the site was from Belgian beam trawlers. For UK vessels, boat dredges were most prevalent gear types used within the site.

Relevant fishing activity in North-West of Jones Bank MPA management area consisted of both non-UK (94 %) and UK activity (6 %). The majority of UK activity within the site was from bottom otter trawls and otter twin trawls. In terms of non-UK activity, Ireland, Spain and France were the most prevalent nations using bottom otter trawls, otter twin trawls, Scottish seines and pair seines.

Relevant fishing activity in Skerries Bank and Surrounds MPA management area mainly consisted of UK vessels (92 %), with some limited activity from non-UK vessels (6 %), with France being the only non-UK nation fishing within the site, using bottom otter trawls. In terms of UK vessels, the most prevalent gears used were boat dredges, beam trawls and bottom otter trawls. Spiny lobster were landed within this management area and UK vessels were the most active (99 %) compared to non-UK vessels (2 %).

Relevant fishing activity in South of Celtic Deep MPA management area consisted of both non-UK (89 %) and UK activity (11 %). The majority of UK activity within the site was from beam trawls. Non-UK activity within the site was from Belgium, French, Irish and Dutch vessels and mainly consisted of beam trawls, bottom otter trawls and boat dredges.

Relevant fishing activity in South of Isles of Scilly MPA management area consisted of both non-UK (70 %) and UK vessels (10 %). French vessels were the most prevalent of the non-UK nations, followed by Belgian and Irish vessels. For non-UK vessels the most used gear type was bottom otter trawls and beam trawls. UK activity consisted of bottom otter trawls, beam trawls, twin otter trawls and boat dredges.

Relevant fishing activity in South West Approaches to the Bristol Channel MPA management area consisted of both UK (15 %) and non-UK vessels (85 %). The most prevalent gear type used for UK vessels was beam trawls followed by dredges. For non-UK activity, France, Belgium, Ireland and the Netherlands were the most active nations, using beam trawls, bottom otter trawls, and dredges.

Relevant fishing activity in South West Deeps (East) MPA management areas mainly consisted of non-UK vessels (98 %) for bottom towed gears and bottom-set nets and lines (99 %). The most used gear types were bottom otter trawls, twin otter trawls and gillnets from French vessels, and set longlines and bottom otter trawls from Spanish vessels. The limited amount of UK activity was from the use of bottom otter trawls and gillnets.

Relevant fishing activity in South-West Deeps (West) MPA management area mainly consisted of non-UK vessels (97 %) with France, Spain and Ireland being the most active nations within the site. Bottom otter trawls were the main fishing gear used by UK vessels within the site. For non-UK vessels bottom otter trawls and twin otter trawls were the most used fishing gears within the site.

Relevant fishing activity Start Point to Plymouth Sound and Eddystone MPA management area consisted exclusively of UK vessels using traps and boat dredges.

Relevant fishing activity in Western Channel MPA management area consisted of mainly non-UK vessels (99 %) from France using bottom otter trawls, and Nephrops trawls. There was also some limited activity from Spain, the Netherlands, Denmark and Germany. The limited UK activity within the site was from beam trawlers.

Relevant fishing activity in West of Wight-Barfleur MPA management area consisted of mainly non-UK vessels (99 %), of which French trawlers were the most prevalent, there was also some limited activity from Netherlands, Ireland and Germany. The limited UK activity (1 %) within the site was from vessels using Scottish seines.

During the Stage 2 formal consultation economic data for 2022/2023 was provided for a small number of vessels fishing within ICES rectangle 31F1, which contains Goodwin Sands MPA and Foreland MPA. The data indicated a potentially high-value squid fishery. This data is not considered within this DMA, and therefore may represent an underestimate, however the vessels do not appear to have been fishing significantly within the management areas, and therefore the vast majority of this activity would not be directly affected by the proposal and should not be considered within this DMA.

Box 1. Non-UK fishing vessels

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

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 management areas (**Table 8**). For vessels larger than 12 m in length, landings were estimated using the proportion of EUMS VMS relevant gears fishing activity occurring in the management areas versus the ICES rectangles (**Table 8**). For vessels less than 12 m in length, landings were estimated by apportioning ICES rectangle level landings data 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 2016 to 2021. Landings estimates for under 12 m vessels are likely to be a significant overestimate as the methodology described above assumes fishing activity of under 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.

Removing 2020 due to the impacts of COVID-19, between 2016 and 2019, and 2021 an annual average of £15,705,300 was estimated to be derived from the management areas by EUMS vessels using bottom towed gear, bottom-set nets and lines, and traps. Annual landings derived from the management areas by EUMS vessels using bottom towed gear, bottom-set nets and lines, and traps were £16,139,500 in 2016, £18,068,600 in 2017, £16,816,400 in 2018, £14,830,100 in 2019 and £12,672,300 in 2021 (**Table 8**).

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. The potential impacts presented to EUMS vessels in this DMA are best estimates based on historic fishing activity.

For completeness, **Table 24** presents best and worst-case landings scenarios where the best-case scenario assumes no landings from prohibited gears from within the ICES rectangles were derived from the management areas and the worst-case scenario assumes all prohibited gears landings from the ICES rectangles were derived from within the management areas.

Using the methodology presented in **section 4.4** below, total familiarisation costs to non-UK vessels is £36,610 at a cost of £53.76 per vessel (including an EU non-wage labour uplift of 24% (Regulatory Policy Committee, 2019)). During the Call for Evidence phase for Stage 3 measures, data was received in relation to Spanish, French, and Dutch fleet activity. This data has been considered, however due to the years provided, this could not be apportioned in the same way as the data we have presented in this DMA, therefore; it is not reflected in the figures within this DMA.

4.4 Familiarisation costs

The familiarisation cost is the cost to fishers of reading the byelaw. MMO have estimated that 1,303 UK vessels will be affected by the byelaws, and that one fisher per vessel will be required to read the document, the assumption being made is that the byelaw will be read by the vessel's master or skipper. The total word count for the four draft byelaws is currently 5,408 words. We have calculated that there would be a read time of 108 minutes per vessel assuming the speed of reading technical text to be 50 words per minute (Regulatory Policy Committee, 2019)[28]. This means the total time spent reading the document across all 1,303 UK vessels will be 140,932 minutes, or approximately 2,349 hours. Fishers normally receive a crew share rather than a fixed salary, so incomes can vary dramatically across different vessel sizes and types. However, the mean average hourly wage for full time employees in fishing and aquaculture in 2023 was £24.05 (Office for National Statistics, 2023).

At £24.05 per hour, the 2,349 hours spent reading the document across all vessels would generate a cost of £56,490. A 22 % uplift has been added for UK non-wage labour hourly costs, such as employers' National Insurance contributions. These costs need to be included to ensure that the full cost to the employer of an employee's time is accounted for. After considering the uplift, a total familiarisation cost of £68,918 at a cost of £52.89 per UK vessel was generated (Regulatory Policy Committee, 2019). The total familiarisation cost of implementing the byelaw will be £68,918.

There is a possibility that the familiarisation costs figures are an overestimate as the most precautionary figures are being used. Although, the 60th percentile hourly rate value for the fishing and aquaculture industry is £20.51, this figure is less than the mean hourly rate (Office for National Statistics, 2023), however as we expect the vessel's master or skipper to read the byelaws the higher figure of £24.05 has been used.

Table 5. Familiarisation costs (£) split by byelaw region.

Byelaw	Familiarisation Cost (£)
Eastern Channel Byelaw	29,945
Irish Sea Byelaw	3,491
North Sea Byelaw	28,032
Western Channel and Southwest Byelaw	33,004

[28] The lower technical reading limit as described in Business Impact Target: appraisal of guidance - assessments for regulator-issued guidance has been selected as a precautionary figure to avoid underestimating the total value.

4.5 Monitoring and compliance

The MMO compliance action is intelligence-led and risk-based in accordance with the National Intelligence Model[1] (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 and present in the headline figures of this DMA as they are requested on an *ad hoc* basis and costs can vary, however estimates are provided below based on an initial compliance strategy**.** 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 2006[29] and the Regulators' Compliance Code[30] and aim to ensure that MMO is proportionate, accountable, consistent, transparent and targeted in any compliance action it takes.

MMO 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. However, enforcement of management measures for newly designated areas has the potential to reduce resources available elsewhere and if significant compliance issues occur there could be a considerable monetary cost required to address these incursions.

4.5.1 Initial compliance strategy costs

The level of resource required to assure compliance with new MPA management measures will depend on numerous factors including (but not limited to) the suite of prohibitions being introduced and whether they can be effectively monitored remotely or not, the risk of non-compliance for a particular MPA, the potential for displacement, and the remoteness/accessibility of an MPA (which affects fuel costs, staff time required for travel). The MMO compliance strategy will therefore be adaptive to counter unexpected trends in compliance rates.

Compliance costs have been set out below, based on the assumptions that the fisheries patrol vessels will visit on average one MPA a week. However, this is changeable due to unexpected call outs and the position of these call outs, whilst the vessel is in a particular area it may visit MPAs which are close. The amount of MPAs patrolled within a month is also changeable due to the location of some MPAs, as it

[29] For more information see: www.legislation.gov.uk/ukpga/2006/51.
[30] The Regulators' Code: www.gov.uk/government/publications/regulators-code (Last accessed on: 24 July 2023).

may mean that multiple MPAs can be monitored in one day if they are in close proximity.

In terms of compliance assurance cost estimates, for patrol vessels the 2022/2023 costs (expected to be higher for 2024) were: £6,300 per day for contracted use of the ship itself, £333 per day for “foreseeable and miscellaneous” costs as part of the contract, and £25 victualling per MMO staff (three or four) per day. There are two ships available to carry out MPA monitoring and compliance activities.

In terms of staffing costs £142 average per day each for four MMO staff members at HEO: (£518 during the working week plus £476 weekend overtime) divided by seven. There is a £14.96 per day hard lying allowance each for four MMO staff, and a £23.19 average daily stand by allowance each for four MMO staff (based on £15.13 per weekday and £43.34 per weekend day).

Fuel estimates are precautionary as fuel rates are subject to potentially large changes over time, and there are even large differences depending on the ports the fuel is received from. On average the cost is £1,300 per tonne of marine diesel. There is a large variation in usage per day, depending on distance travelled, speed, and weather conditions. The average fuel usage and cost per day is 1.5 tonnes at £1,950.

Aerial monitoring takes place but currently this is undertaken through an unwritten memorandum of understanding between MMO and the Joint Maritime Security Centre (JMSC). MMO will join flights being used for other operations. Average cost from take-off to landing is estimated to be £3,000, this cost has not been included in the compliance assurance estimates.

There are no additional costs for using the desk monitoring software which is already used by the compliance team. However, there is some additional personnel costs for liaison between operations and MCT regarding MPAs. To consider these in the cost estimates there has been an inclusion of an Executive Officer, Higher Executive Officer and 0.5 of a Senior Executive Officer salary.

Based on the figures provided above, the total monthly monitoring and compliance assurance costs were valued at £25,346. Yearly monitoring and compliance assurance costs were valued at £304,153. There is also potential for some costs which are currently unknown to emerge as enforcement for these measures could reduce resources elsewhere.

These estimates are not included within the headline figure calculations in this DMA as they are precautionary figures as they largely depend on fuel use, weather limiting activity, and large amounts of overtime on a busy patrol. Additionally, some of these costs are business as usual costs, and are absorbed by existing compliance systems, and therefore cannot be directly attributed to these byelaws.

4.6 Regional analysis – UK fishing ports

The Department for Food, Environment and Rural Affairs (Defra) provided regional analysis of the impact of the Stage 3 management measures on UK Fishing Ports.

This analysis considered the impact of the proposed management on extant landings estimates for UK ports, using figures for the years 2016 to 2019, and 2021. Results showed that the eight ports with the highest loss of revenue were all in different counties. For all UK ports considered, the analysis showed that among these the combined losses of ports in Devon and Cornwall (dominated by Brixham and Newlyn) made up 50 % of the total predicted revenue lost. These figures are based on the estimated landings derived from each of the management areas and are therefore likely to represent a significant over-estimate as many fishers will offset their revenue by fishing in alternative locations.

Each table shows the total average lost revenue by port, the percentage of the total landings lost at each port and the percentage of the port's annual landings that the loss is estimated to be.

Table 6. Top UK ports impacted by revenue.

Port	Average annual landings impacted (2016 to 2019, and 2021) (£)	Percentage of total landings impacted across UK ports (%)	Percentage of impacted annual landings into port (%)
Brixham	980,000	28%	2%
Newlyn	530,000	15%	2%
Hartlepool	430,000	12%	9%

Table 7. Top UK ports affected by percentage (%) of impacted landings.

Port	Average annual landings impacted (2016 to 2019, and 2021) (£)	Percentage of total landings impacted across UK ports (%)	Percentage of impacted annual landings into port (%)
Great Yarmouth	8,000	<1%	10%
Hartlepool	430,000	12%	9%
Milford Haven	220,000	6%	7%
Wivenhoe	7,000	0%	7%

These figures are for UK vessels only, estimated revenue loss from 2016 to 2021, not including 2020. This includes the revenue relevant to all restriction types, but the impacted ports are estimated based upon where fish caught using bottom towed gear were landed.

4.7 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 to 2021 (excluding 2020 due to Covid-19) Seafish data on the profitability of fishing[24]. 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 provided by MMO for vessels fishing within the management areas.

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, bottom-set nets and lines, and traps landings from 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, bottom-set nets and lines, and traps landings derived from the management areas by under 12 m vessels MMO have apportioned ICES rectangle landings data to management areas based on the percentage of the relevant ICES rectangle(s) covered by each management area. 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.

Operating profits for all management areas are presented in **Table 9**.

Seafish operating profit data were not available for Markham's Triangle MPA in the years 2019 and 2021 because there were too few vessels operating in the management area for operating profit figures to be shared without risk of vessels being identifiable. To estimate operating profit for these years, the operating profit ratios for the whole of ICES rectangle 36F2 were applied to any landings for this site.

An estimate of £667,700 has been made for the total annual average operating profit for UK landings for all management areas (**Table 9**).

A discount rate of 3.5 % was applied to calculate the net present value and 2019 was used as the price base year. The best estimate of highest net 2020 present value cost over twenty years to the UK fishing industry of introducing management is £7,800,000 (rounded to two significant figures).

Table 8. EU member state vessel landings by value (£) for all management areas combined.

Byelaw Region	Vessel size	2016	2017	2018	2019	2020	2021	Total (2016 to 2019, and 2021)	Annual average (2016 to 2019, and 2021)
Eastern Channel	Under 12*	13,800	9,600	13,800	14,100	6,900	10,700	62,000	12,400
	Over 12	1,722,400	2,155,500	1,911,400	1,613,900	1,322,700	1,707,400	9,110,600	1,822,100
Total		1,736,200	**2,236,600**	**1,925,200**	**1,628,000**	**1,329,600**	**1,718,100**	**9,172,600**	**1,834,500**
Irish Sea	Under 12*	0	0	0	400	0	100	500	100
	Over 12	3,300	0	0	18,800	9,900	5,300	27,300	5,500
Total		**3,300**	**0**	**0**	**19,200**	**9,900**	**5,400**	**27,900**	**5,600**
North Sea	Under 12*	6,300	5,800	13,800	43,100	176,800	108,800	177,900	35,600
	Over 12	4,208,900	4,859,700	5,099,600	3,917,900	4,118,00	1,695,100	19,781,200	3,956,200
Total		**4,215,300**	**4,865,500**	**5,113,500**	**3,961,000**	**4,294,800**	**1,803,900**	**19,959,000**	**3,991,800**
Western Channel and Southwest	Under 12*	100	500	200	2,700	1,100	1,000	4,500	900
	Over 12	10,184,300	11,037,400	9,777,600	9,219,200	10,499,600	9,143,800	49,362,400	9,872,500
Total		**10,184,500**	**11,037,900**	**9,710,800**	**9,221,900**	**10,500,700**	**9,144,800**	**49,366,900**	**9,873,400**
Grand Total		**16,139,300**	**18,068,600**	**16,816,400**	**14,830,100**	**16,135,000**	**12,672,300**	**78,526,500**	**15,705,300**

*Figures represent all under 12 m vessels with recorded landings within the ICES rectangles in which the management areas fall and therefore likely to be an over-estimate. Where figures are in £1,000s, values have been rounded to the nearest £100. Values of less than 50 have been included as <50 to demonstrate activity within the site.

Table 9. Estimated UK landings values (£) and operating profit (£) for vessels using prohibited gears in all management areas. Operating profit figures 2016-2021 are based on Seafish economic data.

	Byelaw region	2016	2017	2018	2019	2020	2021	Total (2016 to 2019, and 2021)	Annual average (2016 to 2019, and 2021)
Operating profit (£)	Eastern channel	**68,600**	**77,700**	**47,200**	**49,200**	**43,800**	**88,000**	**330,700**	**66,200**
	Irish Sea	**4,500**	**3,700**	**400**	**700**	**1,300**	**4,000**	**13,300**	**2,600**
	North Sea	**188,600**	**370,700**	**149,800**	**144,600**	**36,700**	**92,500**	**946,200**	**189,200**
	Western Channel and Southwest	**481,100**	**657,400**	**303,000**	**399,000**	**159,400**	**207,600**	**2,048,100**	**409,600**
Total		**742,800**	**1,109,500**	**500,400**	**593,500**	**241,300**	**392,100**	**3,300,000**	**667,700**
Total landed value (£)	Eastern channel	281,100	287,800	301,100	345,600	177,700	679,600	**1,895,100**	**379,00**
	Irish Sea	23,900	20,800	16,600	13,000	7,800	33,900	**108,200**	**21,600**
	North Sea	902,000	1,474,900	1,564,900	1,089,500	588,700	735,800	**5,767,100**	**1,153,400**
	Western Channel and Southwest	1,682,400	2,529,100	1,715,600	2,358,200	1,184,000	1,667,800	**9,953,100**	**1,990,600**
Total		**2,889,400**	**4,312,600**	**3,598,100**	**3,806,300**	**1,958,100**	**3,117,100**	**17,723,600**	**3,544,800**

Where figures are in £1,000s, values have been rounded to the nearest £100. Values of less than 50 have been included as <50 to demonstrate activity within the site.

4.8 Monetised benefits

Some of the most valuable species and habitats can be found within marine protected areas which have been designated for the enhancement of marine biodiversity (Marine Conservation Society, 2023). Placing a value on the ecosystem goods and services that these species and habitats provide can help to inform decision makers of the broader benefits to society of putting in place management. Anthropogenic disturbances can negatively impact the designated features in MPAs, which can affect the integrity of a site and its conservation objectives. In addition to failing to meet conservation objectives, the impacts on protected features can also lead to a reduction in the benefits that can be realised due to the relationship between the state of the protected features and their ability to function fully and supply services that society benefits from.

The primary monetised benefit of introducing management measures to MPAs will be the increase in the value of the ecosystem services provided by the range of habitats and species within the areas of the sites being protected (the byelaw areas). 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, 2001), and increase the opportunities for cultural services like recreational opportunities for SCUBA diving, whilst also increasing the non-use values associated with the existence of biodiversity and the value of this to future generations (bequest value). Depending on the provisions of the byelaws, there may also be some capacity for extractive activities associated with provisioning services, such as food provision (for example, where some forms of fishing are prohibited, but others allowed).

To calculate the likely monetised benefits that could be realised from implementing Stage 3 MPA management measures, a valuation was undertaken based on an adapted version of the original approach for the Defra CRO380 contract (Moran *et al.*, 2007; later published as (Moran *et al.*, 2008)). The Moran et al. (2007) approach has been applied across a number of MPA valuation studies where different scenarios of protection in MPAs are considered, including in Scotland by Gonzalez-Alvarez, et al. (2012), for the EU MPA network (Davies, Kiberd and Williams, 2021), and by the Marine Conservation Society for the UK offshore MPA network (Marine Conservation Society, 2023). In the following sections the approach used to value the benefits is described and results covered following a series of steps:

1. Calculating the area over which we expect benefits to be realised following implementation of management in each MPA (**section 4.8.1**)
2. Calculating the total economic benefit that could be realised across all ecosystem services in a given year, within each MPA (**section 4.8.2**)

3. Adjusting total benefit per MPA based on the features present in the MPA, and impact codes that describe the relative increase in supply of each service, which varies between features and services (**section 4.8.3**)
4. Summing the value in each year over a 20-year period (benefits accrued, 2020 Price Year, undiscounted), across MPAs in each byelaw area, which is also affected by feature-specific recovery times within MPAs (**section 4.8.4**)
5. Calculating the estimated total benefit present value and net present social value of each byelaw area, applying a 3.5 % discount rate (**section 4.8.5**)

4.8.1 Calculating the area over which we expect benefits to be realised following implementation of management in each MPA

In order to estimate the area to which any benefit can be assumed from each MPA, swept area ratio[31] (SAR) data were used. Swept area ratio data are available for c squares[32] and are based on VMS data for UK and non-UK over 12 m vessels[33]. C squares with a SAR value of less than 1 but more than 0 were clipped to the area of the MPA, and the sum of all c squares with SAR value of greater than 1 was calculated. A SAR value greater than 1 indicates that the whole c square has been swept by bottom towed gear. The years considered were 2016 to 2020 inclusive. Where byelaws will not apply to the whole area of an MPA the total disturbed area was adjusted to include only the byelaw area where SAR showed disturbance from bottom towed gear. For example, if the total area of an MPA is 100 km^2, but the byelaw area covers only 78 km^2 of this, the area within this byelaw area where disturbance from bottom towed gears was indicated based on SAR was calculated. All areas were adjusted to hectares since values for ecosystem services are provided per hectare.

4.8.2 Calculating the total economic benefit that could be realised across all ecosystem services in a given year, within each MPA

A set of ecosystem goods and services to base this economic valuation on was taken from those proposed in Moran *et al.* (2007) originally published by (Beaumont *et al.*, 2008), and which has since been applied by Gonzalez-Alvarez et al. (2012), Davies et al. (2021) and by The Marine Conservation Society (2023) (**Table 10**). A

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[31] Swept area is the cumulative area contacted by fishing gear within a grid cell over one year. Swept Area Ratio (SAR) (also defined as fishing intensity) is the swept area divided by the surface area of one grid cell (ICES, 2016, OSPAR, 2018).
[32] C-squares (concise spatial query and representation system) is a system of geocodes (a type of global grid) that provides a basis for simple spatial indexing of geographic features or data.
[33] It is possible that omitting effort from under 12m vessels means that larger disturbed areas are in fact found but given that most of the MPAs are more than 6 nm offshore, this is less likely to be an issue.

monetised value was extracted for a hectare of habitat for each ecosystem service. Economic values used and shown in **Table 10** are based on an extraction of studies from the economic service valuation database (ESVD)[34], as described in Davies et al. (2021), and the approach is based on benefit transfer, where values from studies most suited to the ecosystem service and location in question are used[35]. In all cases, the more conservative values have been selected, including for the value of recreation and leisure, where original studies include values up to $30,000 per hectare per annum.

Using the areas calculated following the methodology outlined in **section 4.8.1** above, and the value per hectare shown in **Table 10**, a total potential economic benefit was calculated for each MPA, by multiplying the value per hectare for each ecosystem service by the total area where benefits could arise and summing across all ecosystem services. In doing this, it is assumed that economic benefits will arise when: (1) there has been disturbance from bottom towed gears in the area considered in the period 2016 to 2020, and (2) where the supply of the service is predicted to increase to full potential following implementation of the byelaw. In the next step (**section 4.8.3**) an adjustment is made that accounts for the fact that not all benefits will be fully realised, even with protection in place.

[34] Ecosystem Services Valuation Database. Please see more: www.esvd.net/ (last accessed 16 February 2024).

[35] For further information on the derivation of values used, including the sources used for each service and an explanation of the approach taken where original values varied for a service across studies, please see MCS (2023).

Table 10. Ecosystem Services: Marine Conservation Society (2023), Moran *et al.* (2007) and the service matched to this from the ecosystem services valuation database (ESVD) (2020 Price Base Year).

Moran *et al.* (2008)	Ecosystem Service Valuation Database	€/ha/y	£/ha/y[36]
Provisioning services			
Food provision	Food	46.26	39.78
Raw materials	Raw materials	7.31	6.29
Regulating services			
Gas and climate regulation	Climate regulation/ carbon sequestration	91.77	78.92
Disturbance prevention and alleviation	Moderation of extreme events	1.85	1.59
Bioremediation of waste	Waste treatment	180.41	155.15
Cultural services			
Cultural heritage and identity	Aesthetic information; inspiration for culture, art and design; spiritual experience	1.91	1.64
Cognitive values	Information for cognitive development	1.91	1.64
Leisure and recreation	Opportunities for recreation and tourism	359.30	309.00
Non-use values – bequest and existence	Existence/ bequest values	46.23	39.76
Option use value	Existence/ bequest values	46.23	39.76
Supporting services			
Nutrient cycling	Nutrient cycling	157.44	135.40
Resilience and resistance	Moderation of extreme events	1.85	1.59
Biologically mediated habitat	Biodiversity protection	7.24	6.23

4.8.3 Adjusting total benefit per MPA based on the features present in the MPA, and impact codes that describe the relative increase in supply of each service, which varies between features and services

Values derived under the step described in **section 4.8.2** assume that all habitat features protected contribute to supply of each ecosystem service in the same way, and that management measures put in place will lead to an instant recovery of the full benefits that can be achieved from such a habitat. In reality, there is variation between habitat features in terms of their contributions to supply of ecosystems services and in terms of how quickly they would recover their essential structure and functions needed to supply different services at full capacity. Following the

[36] Values have been converted to pounds sterling using the Bank of England January 2024 average exchange rate of 0.86 GBP to EUR.

methodology from Moran *et al.* (2007), the relative impact of applying the management proposed to each MPA feature was assessed, within each Stage 3 MPA. The 'Maintenance of Conservation Status (MCS)' scenario from Moran *et al.* (2007) was used rather than the 'Highly Restricted (HR)' scenario, because the HR scenario assumes that all activity is prohibited more in line with a Highly Protected Marine Area (HPMA). Since Stage 3 Byelaws are being implemented for specific combinations of fishing activity and features, this was more similar to Moran et al.'s MCS scenario.

Protected features included in the Stage 3 MPAs were mapped to the closest JNCC marine landscape category(s) used in the Moran *et al.* (2007) approach and the impact coding from there then used to extract an impact score for each feature/ecosystem service combination. In Moran *et al.* (2007) impact codes combine information on the extent to which service supply will increase following implementation of management for each habitat type (what we call the impact score here), the recovery time needed for this increase in supply to be realised, and the shape of response likely in terms of the likely recovery trajectory. Moran *et al.* (2007) include a full Annex of the evidence underlying the coding for each habitat type.

For each ecosystem service and feature combination, the potential monetised benefit per MPA byelaw area (**section 4.8.1**) was multiplied by the impact score for the service. For example, if the calculated monetised benefit was £200 for an ecosystem service and the impact score 70% for that feature/service combination, the final benefit was £140. Impact scores used for each service-feature combination can be found in **Table 30** in **Annex 2**. The realised economic benefit is therefore a combination of the value per hectare (**Table 10**) and the application of the impact score to this value. This means that whilst the per hectare value for some services (e.g. leisure and recreation) is high, if the impact score is very small, the realised monetary benefit would also be relatively small.

Benefits were summed over all services for each MPA. Since many of the MPAs include multiple features, benefits were calculated for each feature and an average was taken across features. This value represented the annual benefit that could be realised due to the combination of features present, and the area protected by the byelaw in each MPA. To ensure consistency throughout this DMA, only benefits derived from Stage 3 measures were included in these calculations. It was not possible to include the species features because there was no equivalent impact coding available for these.

4.8.4 Summing the value in each year over a 20-year period, across MPAs in each byelaw area, which is also affected by feature-specific recovery times within MPAs

The feature-specific recovery times (5, 8, 10 or 15 years; from Moran et al (2007) impact codes) were used to set when the annual benefit would start to accrue within each MPA byelaw area. The most conservative estimate for this was used in each case. For example, if for one feature, benefits from services would start to be realised by year five, but in the other feature benefits would start to be realised from eight years, we would use the most conservative recovery period of eight years for benefits to be realised.

The overall benefit (non-discounted) per site (**Table 32**) was calculated across the 20-year period by taking the annual value for each site and summing this depending on what year the benefit would be realised. To provide the total benefit for the four byelaw areas (**Table 11**), the total benefits from each site were summed (**Table 31** in **Annex 2**, figures not adjusted to the 3.5 % discount rate). **Table 11** provides the estimated value of ecosystem services benefits accrued for each byelaw area over a 20-year period. The difference in values for each byelaw area is related to the area being managed (which is directly related to the number and size of MPAs within each byelaw area) and the complement of features being protected in the areas (since some features will recover faster and/or contribute more to more valuable services).

Table 11. Estimated value (£) from ecosystem services per byelaw area, as a result of the implementation of Stage 3 management measures, also showing the number of MPAs included per byelaw area and total area managed in hectares (HA).

Byelaw	Estimated total benefit present value (2019 Price Base) over 20 years (£) **	Estimated net present social value over 20 years (£) 2019 Price Base**	Number of MPAs included in valuation*	Total area managed (HA)
Eastern Channel Byelaw	512,259,000	510,906,000	6	**162,670.7**
Irish Sea Byelaw	89,647,000	89,591,000	4	**90,265.4**
North Sea Byelaw	1,782,574,000	1,778,761,000	12	**1,512,188.7**
Western Channel and Southwest Byelaw	3,768,929,000	3,760,704,000	14	**1,296,729.3**
Grand Total (across all MPAs)	**6,153,409,000**	**6,139,987,000**	**36**	**3,061,854.0**

*Only sites with proposed bottom towed gear restrictions were used in this valuation. Figures have been adjusted to the 2020 Price Base Year, and 2025 Present Value Year, the 3.5% discount rate has not been applied. **Figures have been rounded to the nearest 1,000.

4.8.5 Calculating the estimated total benefit present value, and Net Present Social Value of each byelaw area, applying a 3.5% discount rate (2019 Price Base and 2020 Present Value) (Please see Table 32 in Annex 2 for breakdown of benefits per MPA, and Table 31 for year-by-year breakdown of benefits per byelaw region).

To calculate the estimated total benefit present value (**Table 12**, column 2), the Green Book advised discount rate of 3.5% was applied to the annual benefit accrued values per byelaw area (**Table 11**). To calculate the Net Present Social Value, the Estimated Business Net Present Value (**Table 13**) was subtracted from the estimated total benefit present value per byelaw area. A summary of the total benefits, appraised over a 20-year period and using the Green Book advised discount rate of 3.5 %, is included in **Table 12**. The benefits derived from the recovery of habitats as a result of the Stage 3 management measures (**Table 12**, column 2) significantly outweigh the costs (**Table 13**). This is reflected in the fact that the net present social value (NPSV) (**Table 12**, column 3, which subtracts the total costs (Estimated Business Net Present Value) from the total benefits), is almost identical to the estimated total benefit present value (**Table 12**). A sensitivity analysis can be completed post formal consultation on monetised benefits and costs of the Stage 3 management measures when new data has been received.

Table 12. Estimated benefits present value (£) and Net Present Social Value (NPSV) from ecosystem services per byelaw area as a result of Stage 3 measures (2019 Price Base Year, 2020 Present Value, 3.5% discount rate applied).

Byelaw	Estimated total benefit present value (£) (2019 Price Base)	Net Present Social Value (£) across 20 years (2019 Price Base)
Eastern Channel Byelaw	258,050,876	257,254,672
Irish Sea Byelaw	47,811,738	47,778,115
North Sea Byelaw	922,115,923	919,884,684
Western Channel and Southwest Byelaw	1,923,852,404	1,919,016,240
Grand total (across all MPAs)	**3,151,830,941**	**3,143,982,496**

Table 13. Estimated Business Net Present Value (£) over 20-year appraisal period (2019 prices, 2020 present value) of Stage 3 management measures.

Byelaw	Estimated Business Net Present Value (£)
Eastern Channel Byelaw	-796,203
Irish Sea Byelaw	-33,622
North Sea Byelaw	-2,231,238
Western Channel and Southwest Byelaw	-4,836,159
Grand total (across all MPAs)	**-7,848,445**

4.9 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. 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).

MPAs were chosen to protect rare and representative habitats, species, and geological features that contribute to an ecologically coherent network. The potential impact of displacement to areas outside of MPAs does not remove the requirement to introduce management in order 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, which could in-turn reduce profits of those currently fishing outside of the MPAs where activity is displaced to.

4.10 Wider impacts

The costs and benefits of the proposed management measures are likely to be distributed unevenly across differently groups. The costs are likely to directly impact people involved in the fishing industry, and the benefits will be realised across wider society.

There are also likely to be additional indirect costs to people involved or connected with the fishing industry. For example:

Economic impacts

- Upstream supply chain – e.g., boat maintenance service providers, gear suppliers, suppliers of business and financial services;

- Downstream supply chain – e.g., processing, distribution, wholesale, seafood retail and seafood service providers;
- Employment – e.g., changes to employment, a reduction in landings and sales of fish have the potential to result in a reduction in employment in other industries such as tourism.

Social and cultural impacts

- Health and wellbeing – e.g., stress related to fishing; increased time spent away from family, impacts on relationships;
- Community impacts – e.g., fishing as part of a community's social fabric;
- Identity – e.g., fishing contributes to a sense of place of a coastal community;
- Tradition – e.g., fishing reinforces cultural heritage and contributes to family heritage and legacy.

MMO has estimated the monetised costs and benefits for these management measures based on the assumption that there will be no displacement of effort. However, a large amount of the impacted fishing is likely to be displaced to different areas, and possibly to different target species and gear types. This displacement is likely to partially offset several of the monetised and non-monetised costs and benefits estimated. Displacement may also introduce additional costs for example longer time spent away from families and communities, and wellbeing, health and safety impacts related to increased travel to alternative fishing grounds. It is, however, not currently possible to confidently predict the location and nature of displaced fishing activity from the proposed measures.

A key wider impact is the environmental benefits from these management measures. The ecosystem services associated with this have been monetised as a social benefit of the management measures.

There are also potential inequality impacts from these management measures. The regional analysis undertaken for this DMA highlighted Brixham, Newlyn and Hartlepool as the top UK ports most affected by lost revenue. The regional analysis also identified Great Yarmouth, Milford Haven, Wivenhoe and Hartlepool as the top ports affected by % of lost landings. The Index of Multiple Deprivation explorer (2019)[37] shows the relative deprivation of neighbourhoods for selected areas according to the indices of deprivation 2019 and indices of deprivation 2015. This tool highlights Brixham as among the top 20% of most deprived neighbourhoods in the country, and Great Yarmouth, Hartlepool and Newyln as amongst the top 10%

[37] The Index of Multiple Deprivation Explorer - English Indices of Deprivation 2019: www.gov.uk/guidance/english-indices-of-deprivation-2019-mapping-resources (last accessed: 30 September 2024).

most deprived neighbourhoods in the country. The IMD explorer highlights Wivenhoe to be amongst the top 10% least deprived neighbourhoods in the country.

4.10.1 Competition

There would be a primary impact on competition between fishers, from displacement to other fishing grounds. If fishers already occupy the alternative sites, there would be increased competition and potential overcrowding.

4.10.2 Innovation

The only potential innovation impact would be on fishing methods, which are well established and unlikely to change (tradition is valued in the fishing profession and there is a mutual understanding between fishers on how fishing is to be carried out).

4.10.3 Trade

Fish caught by UK and non-UK vessels are often exported or imported. For example, Seafish[38] reported that in in 2022 almost 80% of fish caught by UK vessels in UK waters was exported.

In the context of the overall seafood trade, the management measures set out in this DMA are likely to have a negligible impact. Figures published by Seafish showed that in 2022, UK vessels fishing landed 410,563 tonnes of fish from UK waters with a value of £757 million. In comparison, the estimated value for UK landings from fishing in the management zones outlined in this DMA totalled £3,117,100 for 2021. This includes data VMS data for over 12 m vessels and landings apportioned to ICES rectangle level for under 12 m vessels.

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 and bottom-set nets and lines, and traps, and prohibition of removal of spiny lobster. This may include a prohibition over the entirety of the site where sensitive designated features are distributed throughout the whole site, or zoned management where sensitive designated features have been identified in a particular area of a site.

This will be achieved through implementation of four byelaws:

- The Eastern Channel Marine Protected Areas Fishing Gear Byelaw 2024
- The Irish Sea Marine Protected Areas Fishing Gear Byelaw 2024

[38] Seafish Guidance: Seafood in Numbers - www.seafish.org/seafood-in-numbers/ (last accessed 30 September 2024).

- The North Sea Marine Protected Areas Fishing Gear Byelaw 2024
- Western Channel and Southwest Marine Protected Areas Fishing Gear Byelaw 2024

The byelaws will include an appropriate buffer to ensure bottom towed fishing, and bottom-set nets and lines and traps activities occurring adjacent to highly sensitive designated features do not negatively impact those features. The recommended option would ensure adequate protection to deliver healthier marine ecosystems and the ecosystem services they provide, whilst minimising any unnecessary costs to business that fishers will incur.

6 Monitoring and evaluation

These management measures are a result of a re-focus on policies and an iterative approach to the management of MPA networks to ensure site integrity. Defra work with MMO to monitor and evaluate policies such as HPMA designations and the MPA network. Similarly, MMO will work alongside Defra to develop bespoke evaluations pertinent to the effectiveness of MPA management measures.

This may include the potential review and/ or development of detailed comprehensive evaluations using socio-economic information as it emerges and guidance from HMT Green and Magenta Books. Any review or evaluation undertaken, will consider new relevant socio-economic information including updated fishing activity data (i.e. landings data) and evidence on the impacts of MPAs on fisheries management and compliance - and vice versa.

The policy will be reviewed internally by MMO. This review will take place after 5 years or sooner if significant new information becomes available. The review will include a review of all site assessments included in the Stage 3 management measures.

7 References

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8 Annexes

Annex 1: Tables and figures

For all tables where figures are in £1,000s, values have been rounded to the nearest £100. Values of less than £50 have been included as <50 to demonstrate activity within the site. Equivalent annualised net direct cost to business (EANDCB).

Table 14. Previous MMO MPA fisheries management measures.

	Management Measure		Operating Profit (£)			Landings Value (£)	
			Annual Average	Total	EANDCB	Annual Average	Total
Pre-stage 1	Haisborough, Hammond and Winterton EMS Bottom Towed Gear Byelaw	UK			GVA 28.76	82.24/87.61 (2 figures in IA)	328.96/350.44
		EU				44,659	178,637
	Start Point to Plymouth Sound and Eddystone EMS Bottom Towed Gear Byelaw	UK			GVA 505	1,428	5,712
		EU				3,369	13,477
	Margate and Long Sands EMS Bottom Towed Gear Byelaw 2017	UK			7,448	8,308	58,156
		EU				54,537	327,222
	West of Walney MCZ Bottom Towed Gear Byelaw 2018	UK			95,046	106,021	530,105
		EU				5,884	29,420
Stage 1	The Canyons MCZ Byelaw 2022	UK	3,557	14,230	3,557	25,440	101,758
		EU				1,029,314	4,117,256
	Dogger Bank SAC Bottom Towed Gear Byelaw 2022	UK	479,558	1,918,232	479,558	2,920,463	11,681,853
		EU				3,532,185	14,128,742
	The Inner Dowsing, Race Bank and North Ridge SAC Byelaw 2022	UK	12,329	49,318	12,329	35,610	142,438
		EU				40	162
	South Dorset MCZ Bottom Towed Gear Byelaw 2022	UK	5,780	23,119	5,780	17,646	70,584
		EU				15,463	61,852
Stage 2	Marine Protected Areas Bottom Towed Fishing Gear Byelaw 2023	UK	36,442	182,210	37,921	252,363	1,261,816
		EU				1,615,795	8,078,976

Table 15. Estimated UK landings by value (£) for byelaw region and management area (under and over 12 m vessels combined). Values of less than £50 but more than 0 have been included as <50 to indicate activity within the site.

Byelaw Region	Management Area	2016	2017	2018	2019	2020	2021	Total (2016 to 2019 and 2021)	Average (2016 to 2019 and 2021)
Eastern Channel	Albert Field MPA	16,100	15,500	14,600	17,800	18,500	24,200	88,300	17,700
	Bassurelle Sandbank MPA	27,500	30,000	67,900	68,100	34,300	30,900	224,500	44,900
	Beachy Head East MPA	1,000	1,300	1,700	1,300	700	1,100	6,400	1,300
	Inner Bank MPA	65,200	83,400	118,500	159,700	48,200	161,400	588,200	117,600
	Offshore Brighton MPA	82,400	94,600	21,700	41,600	33,600	127,700	368,000	73,600
	Offshore Overfalls MPA	88,900	62,900	76,600	57,200	42,400	334,200	619,700	123,900
	Wight-Barfleur Reef MPA	0	<50	<50	<50	<50	<50	<50	<50
Eastern Channel Total		**281,100**	**287,800**	**301,100**	**345,600**	**177,700**	**679,600**	**1,895,100**	**379,000**
Irish Sea	Fylde MPA	6,300	3,300	2,900	2,400	800	3,200	18,100	3,600
	Shell Flat and Lune Deep MPA	3,600	1,700	1,900	2,200	400	1,200	10,700	2,100
	West of Copeland MPA	11,600	13,400	9,600	7,100	4,300	20,700	62,400	12,500
	West of Walney MPA	2,400	2,400	2,200	1,300	2,400	8,700	16,900	3,400
Irish Sea Total		**23,900**	**20,800**	**16,600**	**13,000**	**7,800**	**33,900**	**108,200**	**21,600**
North Sea	Farnes East MPA	113,200	452,300	149,300	268,400	56,700	74,400	1,057,500	211,500
	Foreland MPA	151,800	39,600	37,600	186,700	157,000	104,300	520,200	104,000
	Fulmar MPA	11,500	2,300	21,500	16,400	1,100	1,700	53,300	10,700
	Goodwin Sands MPA (Static)	27,700	27,000	23,100	34,400	35,600	28,300	140,500	28,100
	Goodwin Sands MPA (BTG)	62,500	38,300	40,000	123,300	105,200	76,600	340,800	68,200
	Haisborough, Hammond and Winterton MPA (BTG)	4,800	10,500	7,700	11,200	23,100	15,400	49,600	9,900
	Haisborough, Hammond and Winterton MPA (T)	44,300	70,300	37,100	75,200	43,600	47,500	274,400	54,900
	Holderness Offshore MPA	194,500	640,000	1,031,400	135,800	52,600	297,300	2,299,100	459,800
	Kentish Knock East MPA	18,100	10,800	20,800	32,300	9,400	18,100	100,100	20,000
	Margate and Long Sands MPA	23,700	21,200	40,000	66,300	20,500	37,100	188,400	37,700
	Markham's Triangle MPA	16,000	9,100	136,400	78,700	2,300	9,300	249,400	49,900
	North Norfolk Sandbanks and Saturn Reef MPA (BTG)	212,800	128,200	200	28,300	21,700	1,700	371,200	74,200
	North Norfolk Sandbanks and Saturn Reef MPA (T)	12,200	11,200	12,700	17,500	21,300	11,400	65,000	13,000
	Orford Inshore MPA	2,500	2,300	3,000	3,400	3,800	1,400	12,600	2,500
	Swallow Sand MPA	6,400	12,000	4,100	11,600	34,700	11,100	45,200	9,000
North Sea Total		**902,000**	**1,474,900**	**1,564,900**	**1,089,500**	**588,700**	**735,800**	**5,767,100**	**1,153,400**

Byelaw Region	Management Area	2016	2017	2018	2019	2020	2021	Total (2016 to 2019 and 2021)	Average (2016 to 2019 and 2021)
Western Channel and Southwest	Bristows to the Stones MPA	0	0	<50	0	0	0	<50	<50
	Cape Bank MPA	800	900	700	700	1,200	1,300	4,400	900
	East of Haig Fras MPA	4,900	1,000	<50	0	0	<50	5,900	1,200
	East of Start Point MPA	734,200	1,362,500	990,400	1,197,600	606,500	665,500	4,950,200	990,000
	Greater Haig Fras MPA	15,700	21,600	6,600	1,600	0	400	45,900	9,200
	Hartland Point to Tintagel MPA	36,800	31,000	27,900	26,400	30,400	30,500	152,600	30,500
	North-East of Haig Fras MPA	13,500	52,000	34,700	10,600	100	0	110,800	22,200
	North-West of Jones Bank MPA	51,000	89,900	69,400	92,900	2,600	97,300	400,400	80,100
	North West of Lundy MPA	33,400	25,500	18,600	25,200	27,200	23,700	126,500	25,300
	Skerries Bank and Surrounds MPA	34,900	35,800	29,400	22,000	15,500	24,200	146,400	29,300
	South of Celtic Deep MPA	53,200	54,600	43,600	23,600	9,400	2,000	176,900	35,400
	South of the Isles of Scilly MPA	96,400	63,200	76,100	61,900	49,500	52,000	349,500	69,900
	South West Approaches to Bristol Channel MPA	227,400	483,200	192,300	513,700	273,000	332,900	1,749,600	349,900
	South West Deeps (East) MPA	115,600	175,500	130,700	198,200	60,700	235,600	855,500	171,100
	South West Deeps (East) MPA (BSNL)	117,100	9,700	5,500	1,500	0	0	133,800	26,800
	South-West Deeps (West) MPA	53,400	95,100	58,800	133,400	73,300	144,200	484,900	97,000
	Start Point to Plymouth Sound and Eddystone MPA (BTG)	3,900	3,200	3,700	2,200	1,700	5,100	18,200	3,600
	Start Point to Plymouth Sound and Eddystone MPA (T)	2,900	2,700	2,900	11,100	25,500	30,900	50,600	10,100
	West of Wight-Barfleur MPA	14,100	3,900	10,700	8,900	4,900	11,600	49,100	9,800
	Western Channel MPA	73,100	17,900	13,600	26,600	2,500	10,800	142,000	28,400
Western Channel and Southwest Total		**1,682,400**	**2,529,100**	**1,715,600**	**2,358,200**	**1,184,000**	**1,667,800**	**9,953,100**	**1,990,600**
Grand Total		**2,889,400**	**4,312,600**	**3,598,100**	**3,806,300**	**1,958,100**	**3,117,100**	**17,723,600**	**3,544,700**

Table 16. Estimated UK landings by value (£) for byelaw region and management area (under and over 12 m vessels). Values of less than 50 have been included as <50 to demonstrate activity within the site.

Byelaw Region	Management Area	Vessel Size	2016	2017	2018	2019	2020	2021	Total (2016 to 2019 and 2021)
Eastern Channel	Albert Field MPA	<12 m	16,100	15,500	14,600	17,800	18,500	24,200	88,300
		>12 m	0	0	0	0	0	0	0
	Bassurelle Sandbank MPA	<12 m	12,300	15,500	22,100	16,900	8,900	12,600	79,400
		>12 m	15,200	14,500	45,900	51,200	25,400	18,300	145,100
	Beachy Head East MPA	<12 m	1,000	1,300	1,700	1,300	700	1,000	6,300
		>12 m	0	0	0	0	0	100	100
	Inner Bank MPA	<12 m	64,500	82,700	117,800	86,100	46,900	63,100	414,200
		>12 m	700	700	700	73,600	1,200	98,300	174,100
	Offshore Brighton MPA	<12 m	300	300	<50	600	0	6,100	7,400
		>12 m	82,200	94,300	21,600	41,000	33,600	121,600	360,600
	Offshore Overfalls MPA	<12 m	54,400	49,000	29,700	42,200	29,300	60,800	236,200
		>12 m	34,500	13,900	46,800	14,900	13,000	273,400	383,500
	Wight-Barfleur Reef MPA	<12 m	0	<50	<50	<50	<50	<50	<50
		>12 m	0	0	0	0	0	0	0
Eastern Channel Total			**281,100**	**287,800**	**301,100**	**345,600**	**177,700**	**679,600**	**1,895,100**
Irish Sea	Fylde MPA	<12 m	6,300	2,700	2,800	2,300	800	3,200	17,400
		>12 m	0	500	100	100	0	0	700
	Shell Flat and Lune Deep MPA	<12 m	2,300	1,000	1,000	900	300	1,200	6,400
		>12 m	1,300	700	800	1,400	100	<50	4,300
	West of Copeland MPA	<12 m	10,400	10,600	9,600	5,800	2,500	8,300	44,800
		>12 m	1,100	2,900	0	1,300	1,800	12,400	17,700
	West of Walney MPA	<12 m	2,400	2,400	2,200	1,300	600	1,900	10,200
		>12 m	0	0	0	0	1,800	6,800	6,800
Irish Sea Total			**23,900**	**20,800**	**16,600**	**13,000**	**7,800**	**33,900**	**108,200**
North Sea	Farnes East MPA	<12 m	28,000	54,600	50,800	44,100	19,600	39,200	216,600
		>12 m	85,200	397,700	98,500	224,200	37,100	35,200	840,900
	Foreland MPA	<12 m	17,800	17,800	18,700	16,400	44,300	41,500	112,300
		>12 m	134,000	21,900	18,900	170,300	112,700	62,900	407,900
	Fulmar MPA	<12 m	0	0	0	0	0	0	0
		>12 m	11,500	2,300	21,500	16,400	1,100	1,700	53,300

Byelaw Region	Management Area	Vessel Size	2016	2017	2018	2019	2020	2021	Total (2016 to 2019 and 2021)
North Sea (cont.)	Goodwin Sands MPA (BTG)	<12 m	11,200	11,100	11,700	10,300	27,700	25,900	70,200
		>12 m	51,400	27,200	28,300	113,000	77,500	50,700	270,600
	Goodwin Sands MPA (Static)	<12 m	27,700	27,000	23,100	34,400	35,600	28,300	140,500
		>12 m	0	0	0	0	0	0	0
	Haisborough, Hammond and Winterton MPA (BTG)	<12 m	4,800	9,700	4,300	10,200	23,000	14,400	43,500
		>12 m	0	700	3,400	1,000	100	1,000	6,200
	Haisborough, Hammond and Winterton MPA (T)	<12 m	44,300	70,300	37,100	75,200	43,600	47,500	274,400
		>12 m	0	0	0	0	0	0	0
	Holderness Offshore MPA	<12 m	1,300	2,500	2,800	2,200	1,700	22,600	31,400
		>12 m	193,200	637,500	1,028,600	133,600	51,000	274,700	2,267,700
	Kentish Knock East MPA	<12 m	11,100	10,200	19,500	32,300	9,400	18,100	91,200
		>12 m	7,000	600	1,200	0	0	0	8,900
	Margate and Long Sands MPA	<12 m	22,700	20,900	40,000	66,300	19,300	37,100	187,100
		>12 m	1,000	300	0	0	1,100	0	1,200
	Markham's Triangle MPA	<12 m	0	0	0	300	0	300	600
		>12 m	16,000	9,100	136,400	78,400	2,300	9,000	248,800
	North Norfolk Sandbanks and Saturn Reef MPA (BTG)	<12 m	300	0	200	2,400	900	900	3,800
		>12 m	212,600	128,200	<50	25,900	20,800	800	367,400
	North Norfolk Sandbanks and Saturn Reef MPA (T)	<12 m	12,200	11,200	12,300	16,000	13,200	10,400	62,000
		>12 m	0	0	400	1,500	8,100	1,100	3,000
	Orford Inshore MPA	<12 m	2,500	2,300	3,000	3,400	3,800	1,400	12,600
		>12 m	0	0	0	0	0	0	0
	Swallow Sand MPA	<12 m	<50	100	<50	<50	<50	<50	100
		>12 m	6,400	11,900	4,100	11,600	34,700	11,100	45,100
North Sea Total			**902,000**	**1,474,900**	**1,564,900**	**1,089,500**	**588,700**	**735,800**	**5,767,100**
Western Channel and Southwest	Bristows to the Stones MPA	<12 m	0	0	<50	0	0	0	<50
		>12 m	0	0	0	0	0	0	0
	Cape Bank MPA	<12 m	500	900	700	700	400	600	3,400
		>12 m	300	0	0	0	800	600	1,000
	East of Haig Fras MPA	<12 m	0	0	<50	0	0	0	<50
		>12 m	4,900	1,000	<50	0	0	<50	5,900
	East of Start Point MPA	<12 m	82,600	146,400	89,500	115,100	82,100	108,900	542,500
		>12 m	651,600	1,216,100	900,900	1,082,500	524,500	556,600	4,407,700
	Greater Haig Fras MPA	<12 m	0	0	0	0	0	0	0
		>12 m	15,700	21,600	6,600	1,600	0	400	45,900

Byelaw Region	Management Area	Vessel Size	2016	2017	2018	2019	2020	2021	Total (2016 to 2019 and 2021)
Western Channel and Southwest (cont.)	Hartland Point to Tintagel MPA	<12 m	12,300	19,400	20,400	25,500	14,400	6,300	83,900
		>12 m	24,600	11,500	7,500	800	16,000	24,200	68,700
	North-East of Haig Fras MPA	<12 m	0	0	0	0	0	0	0
		>12 m	13,500	52,000	34,700	10,600	100	0	110,800
	North-West of Jones Bank MPA	<12 m	0	0	0	0	0	0	0
		>12 m	51,000	89,900	69,400	92,900	2,600	97,300	400,400
	North West of Lundy MPA	<12 m	14,000	12,800	18,600	25,200	22,100	23,700	94,400
		>12 m	19,400	12,800	0	0	5,100	0	32,100
	Skerries Bank and Surrounds MPA	<12 m	9,400	16,600	10,200	13,500	9,300	12,100	61,800
		>12 m	25,600	19,200	19,300	8,400	6,200	12,100	84,600
	South of Celtic Deep MPA	<12 m	0	0	0	0	0	0	0
		>12 m	53,200	54,600	43,600	23,600	9,400	2,000	176,900
	South of the Isles of Scilly MPA	<12 m	800	100	200	300	<50	0	1,400
		>12 m	95,600	63,000	75,900	61,600	49,500	52,000	348,200
	South West Approaches to Bristol Channel MPA	<12 m	2,800	7,700	2,200	5,400	49,100	5,000	23,100
		>12 m	224,700	475,500	190,100	508,300	224,000	327,900	1,726,500
	South West Deeps (East) MPA	<12 m	0	0	0	0	0	0	0
		>12 m	115,600	175,500	130,700	198,200	60,700	235,600	855,500
	South West Deeps (East) MPA (BSNL)	<12 m	0	0	0	0	0	0	0
		>12 m	117,100	9,700	5,500	1,500	0	0	133,800
	South-West Deeps (West) MPA	<12 m	0	0	0	0	0	0	0
		>12 m	53,400	95,100	58,800	133,400	73,300	144,200	484,900
	Start Point to Plymouth Sound and Eddystone MPA (BTG)	<12 m	2,300	2,900	2,600	2,200	1,400	1,600	11,500
		>12 m	1,700	400	1,100	<50	300	3,500	6,700
	Start Point to Plymouth Sound and Eddystone MPA (T)	<12 m	2,900	2,700	2,900	3,000	1,900	3,100	14,600
		>12 m	100	0	0	8,100	23,600	27,800	36,000
	West of Wight-Barfleur MPA	<12 m	2,200	3,900	7,600	8,900	4,900	11,200	33,800
		>12 m	11,900	0	3,100	0	0	300	15,300
	Western Channel MPA	<12 m	30,800	7,000	4,300	16,200	2,400	8,100	66,400
		>12 m	42,400	10,900	9,300	10,400	100	2,700	75,600
Western Channel and Southwest Total			**1,682,400**	**2,529,100**	**1,715,600**	**2,358,200**	**1,184,000**	**1,667,800**	**9,953,100**
Grand Total			**2,889,400**	**4,312,600**	**3,598,100**	**3,806,300**	**1,958,100**	**3,544,700**	**17,723,600**

Table 17. Estimated UK landings by value (£) for byelaw region and gear type (under and over 12 m vessels). *Unknown gear types are counted as mobile gears which are likely to be attributed to bottom towed gears. Values of less than 50 have been included as <50 to demonstrate activity within the site.

Byelaw Region	Gear Group	2016	2017	2018	2019	2020	2021	Total (2016 to 2019 and 2021)	Average (2016 to 2019 and 2021)
Eastern Channel	Demersal Seine	88,000	86,600	5,200	47,900	52,800	62,700	290,400	58,100
	Demersal Trawl	132,300	139,100	203,200	176,500	71,000	110,900	762,000	152,400
	Dredge	60,800	61,800	92,300	120,600	52,300	502,600	838,100	167,600
	Unknown	0	200	300	600	1,600	3,400	4,600	900
Eastern Channel Total		**281,100**	**287,800**	**301,100**	**345,600**	**177,700**	**679,600**	**1,895,100**	**379,000**
Irish Sea	Demersal Trawl	20,500	19,400	16,600	11,800	7,800	33,900	102,100	20,400
	Dredge	1,800	1,400	<50	1,200	<50	0	4,400	900
	Unknown	1,700	0	0	0	0	0	1,700	300
Irish Sea Total		**23,900**	**20,800**	**16,600**	**13,000**	**7,800**	**33,900**	**108,200**	**21,600**
North Sea	Anchored Line	0	<50	0	0	0	0	<50	<50
	Anchored Net	9,100	9,200	10,400	5,900	4,800	7,100	41,800	8,400
	Demersal Seine	185,400	58,100	6,500	230,300	121,300	109,200	589,400	117,900
	Demersal Trawl	410,100	337,500	358,200	476,100	224,400	165,800	1,747,700	349,500
	Dredge	222,400	970,800	1,127,300	254,700	120,100	355,800	2,930,800	586,200
	Traps	75,100	99,300	62,500	121,100	95,700	80,100	438,100	87,600
	Unknown	0	<50	0	1,400	22,400	17,800	19,200	3,800
North Sea Total		**902,000**	**1,474,900**	**1,564,900**	**1,089,500**	**588,700**	**735,800**	**5,767,100**	**1,153,400**
Western Channel and Southwest	Anchored Net	117,100	9,700	5,500	1,500	0	0	133,800	26,800
	Demersal Seine	12,000	<50	3,100	0	0	300	15,400	3,100
	Demersal Trawl	1,235,500	1,991,400	1,579,200	1,907,900	931,300	1,503,600	8,217,600	1,643,500
	Dredge	278,100	493,800	95,300	408,900	194,100	101,500	1,377,600	275,500
	Traps	39,700	33,700	30,800	37,500	55,900	61,400	203,100	40,600
	Unknown	0	700	1,700	2,400	2,700	900	5,700	1,100
Western Channel and Southwest Total		**1,682,400**	**2,529,100**	**1,715,600**	**2,358,200**	**1,184,000**	**1,667,800**	**9,953,100**	**1,990,600**
Grand Total		**2,889,400**	**4,312,600**	**3,598,100**	**3,806,300**	**1,958,100**	**3,117,100**	**17,723,600**	**3,544,700**

Table 18. Estimated UK operating profit value (£) for each byelaw region and management area (rounded to the nearest 100).

Byelaw Region	Management Area	2016	2017	2018	2019	2020	2021	Average (2016 to 2019 and 2021)
Eastern Channel	Albert Field MPA	3,600	2,300	1,600	2,500	4,200	2,000	2,400
	Bassurelle Sandbank MPA	6,700	8,700	6,800	5,500	6,700	4,200	6,400
	Beachy Head East MPA	300	400	400	300	300	100	300
	Inner Bank MPA	21,400	27,300	24,900	24,700	17,100	500	19,800
	Offshore Brighton MPA	14,900	25,900	2,000	7,100	5,000	15,600	13,100
	Offshore Overfalls MPA	21,600	13,100	11,600	9,200	10,600	65,600	24,200
	Wight-Barfleur Reef MPA	0	<50	<50	<50	<50	<50	<50
Eastern Channel Total		**68,600**	**77,700**	**47,200**	**49,200**	**43,800**	**88,000**	**66,200**
Irish Sea	Fylde MPA	1,000	200	<50	<50	100	<50	100
	Shell Flat and Lune Deep MPA	600	200	<50	200	<50	<50	200
	West of Copeland MPA	2,500	2,800	500	500	700	3,000	1,900
	West of Walney MPA	500	500	100	<50	500	1,300	500
Irish Sea Total		**4,500**	**3,700**	**400**	**700**	**1,300**	**4,000**	**2,600**
North Sea	Farnes East MPA	22,800	109,000	18,500	38,400	10,000	6,700	39,100
	Foreland MPA	37,600	11,200	9,000	17,500	<50	<50	12,500
	Fulmar MPA	1,700	400	<50	<50	100	200	<50
	Goodwin Sands MPA (BTG)	15,400	11,200	5,300	9,700	14,500	1,800	8,700
	Goodwin Sands MPA (Static)	12,100	10,300	6,200	6,100	9,100	8,400	8,600
	Haisborough, Hammond and Winterton MPA (BTG)	800	1,700	1,100	<50	7,100	4,000	1,000
	Haisborough, Hammond and Winterton MPA (T)	14,500	24,800	7,600	18,800	12,000	9,900	15,100
	Holderness Offshore MPA	41,600	151,600	83,500	21,900	9,600	60,300	71,800
	Kentish Knock East MPA	4,500	2,400	5,000	7,500	3,500	3,100	4,500
	Margate and Long Sands MPA	7,400	4,700	9,400	15,400	7,500	6,300	8,600
	Markham's Triangle MPA*	2,000	1,200	<50	1,500	300	200	1,000
	North Norfolk Sandbanks and Saturn Reef MPA (BTG)	21,600	35,200	100	7,100	<50	400	12,900
	North Norfolk Sandbanks and Saturn Reef MPA (T)	4,500	4,100	4,400	5,700	5,300	3,300	4,400
	Orford Inshore MPA	700	600	1,000	500	1,300	<50	500
	Swallow Sand MPA	1,300	2,100	100	1,300	3,700	1,000	1,200
North Sea Total		**188,600**	**370,700**	**149,800**	**144,600**	**36,700**	**92,500**	**189,200**

Byelaw Region	Management Area	2016	2017	2018	2019	2020	2021	Average (2016 to 2019 and 2021)
Western Channel and Southwest	Bristows to the Stones MPA	0	0	<50	0	0	0	<50
	Cape Bank MPA	200	200	100	200	300	200	200
	East of Haig Fras MPA	1,000	200	<50	0	0	<50	200
	East of Start Point MPA	229,700	419,800	210,000	236,400	79,500	118,000	242,800
	Greater Haig Fras MPA	3,300	3,400	800	200	0	<50	1,500
	Hartland Point to Tintagel MPA	9,100	6,400	7,900	7,800	6,800	6,200	7,500
	North-East of Haig Fras MPA	3,300	9,800	4,600	1,900	<50	0	3,900
	North-West of Jones Bank MPA	9,800	8,400	1,300	4,100	100	1,500	5,000
	North West of Lundy MPA	9,500	6,900	3,200	6,200	8,000	5,700	6,300
	Skerries Bank and Surrounds MPA	10,200	10,400	5,500	5,000	3,700	4,600	7,100
	South of Celtic Deep MPA	10,300	11,700	4,600	1,800	<50	200	5,700
	South of the Isles of Scilly MPA	24,600	20,300	20,800	15,200	6,000	4,700	17,100
	South West Approaches to Bristol Channel MPA	49,500	126,400	32,600	86,400	44,200	51,600	69,300
	South West Deeps (East) MPA	44,200	17,100	3,200	14,600	1,500	5,000	16,800
	South West Deeps (East) MPA (BSNL)	32,400	1,300	700	200	0	0	6,900
	South-West Deeps (West) MPA (BTG)	21,000	8,800	2,300	10,000	2,400	1,300	8,700
	Start Point to Plymouth Sound and Eddystone MPA (BTG)	1,000	700	700	400	400	700	700
	Start Point to Plymouth Sound and Eddystone MPA (T)	1,100	900	900	2,800	4,900	4,600	2,000
	West of Wight-Barfleur MPA	3,600	1,000	2,100	2,100	1,300	2,300	2,200
	Western Channel MPA	17,200	3,600	1,800	3,900	400	900	5,500
Western Channel and Southwest Total		**481,100**	**657,400**	**303,000**	**399,000**	**159,400**	**207,600**	**409,600**
Grand Total		**742,800**	**1,109,500**	**500,400**	**593,500**	**241,300**	**392,100**	**667,700**

*Due to limited vessels fishing in the site/ ICES rectangle operating profit could not be shared due to confidentiality concerns. For 2019 and 2021 operating profit figures for Markham's Triangle MPA were estimated by applying the operating profit ratios for the ICES rectangle 36F2 to any landings for these sites. Values of less than 50 have been included as <50 to demonstrate activity within the site.

Table 19. UK spiny lobster landings (£) – Skerries Bank and Surrounds MPA

Management Area	Vessel Size	2016	2017	2018	2019	2020	2021	Total (2016 to 2019 and 2021)	Average (2016 to 2019 and 2021)
Skerries Bank and Surrounds MPA	Under 12 m	4.71	3.86	11.40	0.61	4.04	40.27	60.84	12.17
	12 m and over	8.67	1.59	8.23	1.25	3.65	0.77	20.50	4.10
Grand Total		**13.37**	**5.44**	**19.63**	**1.86**	**7.69**	**41.04**	**81.34**	**16.27**

Table 20. Non-UK spiny lobster landings (£) – Skerries Bank and Surrounds MPA

Management Area	Vessel Size	2016	2017	2018	2019	2020	2021	Total (2016 to 2019 and 2021)	Average (2016 to 2019 and 2021)
Skerries Bank and Surrounds MPA	12 m and over	0	0.16	0.23	0	0.21	0	0.39	0.08
Grand Total		**0**	**0.16**	**0.23**	**0**	**0.21**	**0**	**0.39**	**0.08**

Table 21. Non-UK prohibited gear VMS records per year by byelaw region and management area.

Byelaw region	Management area	2016	2017	2018	2019	2020	2021	Total (2016 to 2019 and 2021)
Eastern Channel	Albert Field MPA	0	1	4	4	0	0	9
	Bassurelle Sandbank MPA	821	816	837	908	717	2,168	5,550
	Beachy Head East MPA	0	0	1	1	0	0	2
	Inner Bank MPA	1,605	1,635	1,484	1,482	1,187	1,261	7,467
	Offshore Brighton MPA	1,646	1,305	700	1,281	919	4,506	9,438
	Offshore Overfalls MPA	3,357	1,710	1,094	1,123	2,244	2,667	9,951
	Wight-Barfleur Reef MPA	0	0	0	0	0	0	0
Eastern Channel Total		**7,429**	**5,467**	**4,121**	**4,799**	**5,067**	**10,602**	**32,418**
Irish Sea	Fylde MPA	0	0	0	0	0	0	0
	Shell Flat and Lune Deep MPA	0	0	0	0	0	0	0
	West of Copeland MPA	2	0	0	1	6	0	3
	West of Walney MPA	3	0	0	7	17	8	18
Irish Sea Total		**5**	**0**	**0**	**8**	**23**	**8**	**21**
North Sea	Farnes East MPA	0	11	3	0	7	0	14
	Foreland MPA	1,853	1,333	2,668	2,515	3,355	666	9,035
	Fulmar MPA	0	20	56	16	12	0	92
	Goodwin Sands MPA (Static)	0	0	1	7	19	0	8
	Goodwin Sands MPA (BTG)	181	139	84	168	188	42	614
	Haisborough Hammond Winterton MPA (BTG)	888	1,279	1,079	820	629	594	4,660
	Holderness Offshore MPA	112	113	13	122	86	38	398
	Kentish Knock East MPA	467	288	327	173	314	193	1,448
	Margate and Long Sands MPA	62	43	27	5	12	0	137
	Markham's Triangle MPA	601	432	589	766	618	537	2,925
	North Norfolk Sandbanks and Saturn Reef MPA (BTG)	3,504	3,969	4,262	3,265	2,897	832	15,832
	North Norfolk Sandbanks and Saturn Reef MPA (T)*	0	0	0	0	0	0	0
	Orford Inshore MPA	17	2	6	3	1	4	32
	Swallow Sand MPA	7	50	73	60	21	20	210
North Sea Total		**7,692**	**7,679**	**9,188**	**7,920**	**8,159**	**2,926**	**35,405**

Western Channel and Southwest	East of Start Point MPA	46	68	59	76	48	15	264
	Greater Haig Fras MPA	4,394	4,889	2,504	2,627	1,477	2,881	17,295
	Harland Point to Tintagel MPA (T)	0	0	0	0	0	0	0
	North-East Haig Fras MPA	731	1,069	1,224	1,140	1,029	1,059	5,223
	North-West of Jones Bank MPA	1,916	2,258	1,189	2,014	461	1,169	8,546
	North West of Lundy MPA	39	31	78	32	67	37	217
	Cape Bank MPA	16	2	7	3	1	3	31
	East of Haig Fras MPA	7	4	8	12	6	5	36
	Skerries Bank and Surrounds MPA	11	6	15	8	5	4	44
	South Isles of Scilly MPA	240	224	235	206	240	453	1,358
	South of Celtic Deep MPA	383	364	724	649	885	1,120	3,240
	Start Point to Plymouth Sound and Eddystone MPA (BTG)	0	0	0	0	1	0	0
	Start Point to Plymouth Sound and Eddystone MPA (T)	0	0	0	0	0	0	0
	South West Approaches to Bristol Channel MPA	5,315	3,293	4,976	4,450	5,600	5,428	23,462
	South West Deeps East MPA (BSNL)	1,417	2,310	2,201	2,388	2,033	1,840	10,156
	South West Deeps East MPA (BTG)	5,756	8,463	8,499	8,036	9,368	10,105	40,859
	South-West Deeps West MPA	1,891	3,291	2,052	2,454	3,293	4,102	13,790
	Western Channel MPA	9,447	9,006	9,308	6,211	9,547	6,931	40,903
	West of Wight-Barfleur MPA	286	193	201	272	194	251	1,203
Western Channel and Southwest Total		**31,898**	**35,479**	**33,292**	**30,589**	**34,255**	**35,403**	**166,661**
Grand Total		**47,021**	**48,617**	**46,588**	**43,305**	**47,504**	**48,959**	**234,470**

*This figure could potentially increase due to feature data changes for the North Norfolk Sandbanks and Saturn Reef trap management zone.

Table 22. Number of unique vessels by byelaw region including gear category for UK vessels under 12 m and over 12 m in length.

Byelaw Region	Dataset	Category	2016	2017	2018	2019	2020	2021	Total (2016 to 2019 and 2021)
Eastern Channel	<12	Demersal trawl	68	69	42	41	40	49	114
		Dredge	88	86	70	72	68	72	146
		Unknown*	0	2	1	2	1	2	4
	<12 Total		**142**	**144**	**107**	**108**	**101**	**109**	**224**
	>12	Demersal Seine	4	5	4	6	8	9	12
		Demersal trawl	5	4	6	4	5	4	13
		Dredge	15	14	15	16	7	21	48
	>12 Total		**24**	**23**	**25**	**26**	**20**	**34**	**72**
Eastern Channel Total			**166**	**167**	**132**	**134**	**121**	**143**	**296**
Irish Sea	<12	Demersal trawl	31	28	24	23	17	22	52
		Dredge	2	3	1	3	1	0	6
		Unknown*	1	1	0	0	0	0	1
	<12 Total		**33**	**29**	**24**	**24**	**17**	**22**	**54**
	>12	Demersal trawl	4	3	1	2	2	5	10
		Dredge	1	1	0	0	0	0	2
	>12 Total		**5**	**4**	**1**	**2**	**2**	**5**	**12**
Irish Sea Total			**38**	**33**	**25**	**26**	**19**	**27**	**66**
North Sea	<12	Anchored Line	0	1	0	0	0	0	1
		Anchored Net	75	70	56	43	34	41	106
		Demersal trawl	126	136	75	81	67	69	195
		Dredge	13	23	15	15	12	10	36
		Traps	91	96	92	72	71	74	154
		Unknown	0	1	0	1	2	2	3
	<12 Total		**242**	**261**	**200**	**180**	**157**	**163**	**385**
	>12	Demersal Seine	4	4	2	7	11	11	13
		Demersal trawl	36	33	32	50	37	25	92
		Dredge	9	22	22	12	8	7	39
		Traps	0	0	1	2	2	2	4
	>12 Total		**49**	**59**	**57**	**71**	**57**	**43**	**145**
North Sea Total			**291**	**320**	**257**	**251**	**214**	**206**	**530**

Byelaw Region	Dataset	Category	2016	2017	2018	2019	2020	2021	Total (2016 to 2019 and 2021)
Western Channel and Southwest	<12	Demersal Seine	4	1	0	0	0	0	4
		Demersal trawl	157	124	91	88	79	85	229
		Dredge	66	76	54	45	33	37	132
		Traps**	115	113	82	86	68	84	219
		Unknown*	0	7	11	23	21	14	34
	<12 Total		**278**	**262**	**211**	**217**	**184**	**190**	**455**
	>12	Anchored Net	1	1	1	1	0	0	3
		Demersal Seine	2	0	1	0	0	1	3
		Demersal trawl	77	87	78	74	59	49	128
		Dredge	25	22	17	24	13	16	52
		Traps	5	4	3	2	3	3	7
	>12 Total		**106**	**110**	**95**	**96**	**73**	**65**	**170**
Western Channel and Southwest Total			**384**	**372**	**306**	**313**	**257**	**255**	**624**
Grand Total of unique vessels (2016 to 2019 and 2021)			**816**	**823**	**671**	**679**	**581**	**595**	**1,303**

*Unknown gear types are counted as mobile gears which are likely to be attributed to bottom towed gears

**This figure could potentially increase due to feature data changes for the North Norfolk Sandbanks and Saturn Reef traps management zone.

Table 23. UK 2016 - 2021 best-case and worst-case landings by value (£). The best-case scenario assumes that no landings attributed to the ICES rectangles (for relevant prohibited gears) were derived from the management areas. The worst-case scenario assumes that all landings from relevant prohibited gears from within the ICES rectangles were derived from the management areas. Both scenarios contrast with Table 14 and Table 15 (landings estimated using the proportion of VMS fishing activity in the management area versus the rectangle). Values represent landings by relevant prohibited gears.

Byelaw Region	Best / Worst Case	2016	2017	2018	2019	2020	2021	Total (2016 to 2019 and 2021)	Average (2016 to 2019 and 2021)
Eastern Channel	Worst	7,350,064	9,453,909	9,088,527	11,621,722	8,336,204	12,833,588	50,347,811	10,069,562
	Best	0	0	0	0	0	0	0	0
Irish Sea	Worst	3,607,629	2,388,354	2,045,866	2,110,110	1,442,264	2,368,924	12,520,883	2,504,177
	Best	0	0	0	0	0	0	0	0
North Sea	Worst	23,724,538	25,196,555	24,681,509	37,323,294	28,075,294	21,185,629	132,111,525	26,422,305
	Best	0	0	0	0	0	0	0	0
Western Channel and Southwest	Worst	48,617,917	60,275,874	52,430,261	55,061,038	40,386,175	46,085,692	262,470,783	52,494,157
	Best	0	0	0	0	0	0	0	0
Grand Total	**Worst**	**83,300,149**	**97,314,692**	**88,246,163**	**106,116,164**	**78,239,937**	**82,473,833**	**457,451,001**	**91,490,200**
	Best	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Table 24. EU27 2016 - 2021 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 relevant prohibited gears) were derived from the management areas. The worst-case scenario assumes that all landings from relevant prohibited gears from within the ICES rectangles were derived from the management areas. Both scenarios contrast with Table 25 and Table 26 (landings estimated using the proportion of VMS fishing activity in the management area versus the rectangle). Values represent landings by relevant prohibited gears for all EU member states. Landings values were not available for European Free Trade Association member states.

Byelaw Region	Best / Worst Case	2016	2017	2018	2019	2020	2021	Total (2016 to 2019 and 2021)	Average (2016 to 2019 and 2021)
Eastern Channel	Worst	20,183,200	23,847,400	22,866,600	20,457,400	15,952,800	20,653,500	108,008,100	21,601,600
	Best	0	0	0	0	0	0	0	0
Irish Sea	Worst	Worst	167,300	47,500	102,700	770,900	1,619,000	337,300	1,429,800
	Best	0	0	0	0	0	0	0	0
North Sea	Worst	36,344,600	57,832,200	52,955,600	40,217,700	43,172,900	31,944,300	219,582,200	43,916,400
	Best	0	0	0	0	0	0	0	0
Western Channel and Southwest	Worst	61,353,900	60,406,500	57,541,900	56,934,300	52,724,700	50,067,000	286,303,700	57,260,700
	Best	0	0	0	0	0	0	0	0
Grand Total	**Worst**	**118,049,000**	**142,113,600**	**133,466,800**	**118,380,300**	**112,012,300**	**57,941,800**	**615,323,800**	**123,064,800**
	Best	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Table 25. Estimated number of non-UK unique vessels using relevant fishing gear from VMS fishing reports within management areas from 2016 to 2021. 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.

Byelaw Region	Country	2016	2017	2018	2019	2020	2021	Total (2016 to 2019 and 2021)
Eastern Channel	Belgium	43	39	42	38	35	41	57
	Germany	1	1	1	1	1	0	1
	Denmark	0	1	1	0	0	0	2
	France	83	75	67	70	68	86	137
	Ireland	3	2	2	4	2	1	6
	Netherlands	10	15	19	19	17	18	22
	Norway	0	0	1	0	0	0	1
Eastern Channel Total		**146**	**143**	**145**	**140**	**130**	**153**	**225**
Irish Sea	Belgium	1	0	0	3	4	1	3
	Ireland	2	0	0	0	1	0	2
Irish Sea Total		**3**	**0**	**0**	**3**	**5**	**1**	**5**
North Sea	Belgium	35	21	25	24	25	17	54
	Germany	5	6	9	8	11	4	14
	Denmark	6	14	10	11	10	6	27
	Spain	1	0	0	0	0	1	2
	France	29	26	30	37	35	24	48
	Faroe Islands	0	0	0	1	0	0	1
	Netherlands	55	58	64	60	61	57	101
	Norway	15	5	4	3	2	0	26
	Portugal	0	0	0	1	0	0	1
	Sweden	0	0	1	0	0	0	1
North Sea Total		**145**	**130**	**142**	**145**	**144**	**109**	**274**
Western Channel and Southwest	Belgium	26	26	24	28	30	30	39
	Germany	1	1	1	1	0	1	2
	Denmark	1	1	1	1	0	1	1
	Spain	29	29	29	27	23	31	55
	France	122	124	121	112	113	109	180
	Ireland	52	49	57	62	44	52	98
	Lithuania	1	0	0	0	0	0	1
	Netherlands	2	0	1	3	3	7	11
	Norway	0	0	0	1	0	0	1
Western Channel and Southwest Total		**218**	**218**	**217**	**226**	**202**	**217**	**383**
Grand Total		**411**	**405**	**411**	**408**	**377**	**396**	**681**

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

Table 26. Estimated non-UK total landings value (£) per management area (under 12 and over 12 vessels). (Rounded to nearest 100, values less than 50 are displayed as <50).

Byelaw region	Management area	2016	2017	2018	2019	2020	2021	Total (2016 to 2019 and 2021)	Average (2016 to 2019 and 2021)
Eastern Channel	Albert Field MPA	0	500	700	600	100	0	1,900	400
	Bassurelle Sandbank MPA	222,000	411,200	392,000	406,800	229,000	485,900	1,917,900	383,600
	Beachy Head East MPA	100	<50	1,100	700	100	<50	2,000	400
	Inner Bank MPA	830,300	1,005,100	1,131,200	771,700	648,300	579,700	4,318,000	863,600
	Offshore Brighton MPA	280,500	289,500	163,800	229,700	136,000	353,800	1,317,400	263,500
	Offshore Overfalls MPA	403,300	458,800	236,300	218,400	316,100	298,700	1,615,500	323,100
	S2 Wight Barfleur Reef MPA	0	<50	0	0	0	0	<50	0
Eastern Channel Total		**1,736,200**	**2,165,100**	**1,925,100**	**1,627,900**	**1,329,600**	**1,718,100**	**9,172,700**	**1,834,600**
Irish Sea	Fylde MPA	0	0	0	300	0	100	400	100
	Shell Flat Lune Deep MPA	0	0	0	100	0	<50	100	<50
	West of Copeland MPA	0	0	0	2,300	2,000	0	2,300	500
	West of Walney MPA	3,300	0	0	16,400	7,800	5,300	25,000	5,000
Irish Sea Total		**3,300**	**0**	**0**	**19,200**	**9,900**	**5,400**	**27,900**	**5,600**
North Sea	Foreland MPA	511,000	393,400	1,140,000	992,000	956,700	170,800	3,207,300	641,500
	Fulmar MPA	0	4,000	22,100	7,200	4,000	0	33,200	6,600
	Goodwin Sands MPA (Static)	6,100	5,800	7,300	14,800	10,100	4,200	38,300	7,700
	Goodwin Sands MPA (BTG)	61,900	37,600	36,200	77,000	68,700	10,200	223,000	44,600
	Haisborough Hammond and Winterton MPA (BTG)	584,000	886,400	711,000	440,500	323,100	397,500	3,019,300	603,900
	Haisborough Hammond and Winterton MPA (T)	0	0	0	0	300	0	0	0
	Holderness Offshore MPA	18,800	29,000	14,100	21,500	50,600	7,000	90,500	18,100
	Kentish Knock East MPA	122,200	74,000	122,500	69,700	120,100	59,600	447,900	89,600
	Margate and Long Sands MPA	22,300	18,400	12,900	2,400	4,500	<50	55,900	11,200
	Markhams Triangle MPA	491,100	618,400	398,200	324,000	290,900	157,200	1,988,800	397,800
	North Norfolk Sandbanks and Saturn Reef MPA (BTG)	2,360,400	2,624,600	2,505,200	1,972,400	2,419,100	993,900	10,456,600	2,091,300
	North Norfolk Sandbanks and Saturn Reef MPA (T)	0	0	0	0	<50	0	0	0
	Orford Inshore MPA	19,100	<50	2,600	500	0	2,600	24,900	5,000
	Swallow Sand MPA	18,400	173,900	141,300	38,800	46,600	900	373,300	74,700
North Sea Total		**4,215,300**	**4,865,500**	**5,113,500**	**3,961,000**	**4,294,800**	**1,803,900**	**19,959,000**	**3,991,800**

Byelaw region	Management area	2016	2017	2018	2019	2020	2021	Total (2016 to 2019 and 2021)	Average (2016 to 2019 and 2021)
Western Channel and Southwest	S2 Cape Bank MPA	3,400	400	1,300	600	0	1,900	7,500	1,500
	East of Start Point MPA	20,400	30,400	26,600	32,500	14,500	3,100	113,000	22,600
	S2 East of Haig Fras	1,300	800	1,500	3,900	1,400	1,100	8,600	1,700
	Greater Haig Fras MPA	1,376,100	1,306,200	743,800	879,400	460,000	764,200	5,069,600	1,013,900
	Hartland Point to Tintagel MPA (T)	0	0	0	0	0	0	0	0
	North-East Haig Fras MPA	139,700	185,600	226,500	216,100	207,200	177,000	944,900	189,000
	North-West of Jones Bank MPA	454,000	479,900	305,300	599,600	219,000	434,800	2,273,600	454,700
	North West of Lundy MPA	12,600	18,100	78,100	19,200	23,100	7,000	135,100	27,000
	Skerries Bank and Surrounds MPA	2,100	1,300	2,900	1,700	1,100	800	8,800	1,800
	South Isles of Scilly MPA	45,100	44,500	40,500	34,700	56,800	122,300	287,000	57,400
	South of Celtic Deep MPA	88,500	97,200	177,900	166,800	210,900	235,800	766,200	153,200
	Start Point to Plymouth Sound and Eddystone MPA (BTG)	0	0	0	0	200	0	0	0
	Start Point to Plymouth Sound and Eddystone MPA (T)	0	0	0	0	0	0	0	0
	South West Approaches to Bristol Channel	2,320,000	1,495,700	2,012,500	2,142,600	2,842,100	1,713,400	9,684,200	1,936,800
	South West Deeps East MPA (BNSL)_	973,100	1,765,900	1,097,000	987,300	1,680,400	870,200	5,693,400	1,138,700
	South West Deeps East MPA (BTG)	1,955,700	2,346,700	2,226,800	1,948,000	2,027,300	2,230,300	10,707,600	2,141,500
	South West Deeps West MPA	858,800	1,251,100	955,400	684,900	886,500	962,300	4,712,500	942,500
	West of Wight Barfleur MPA	51,000	41,000	40,900	57,300	43,600	51,300	241,500	48,300
	Western Channel MPA	1,882,700	1,972,900	1,840,900	1,447,400	1,826,800	1,569,400	8,713,300	1,742,700
Western Channel and Southwest Total		**10,184,500**	**11,037,700**	**9,777,900**	**9,222,000**	**10,500,900**	**9,144,900**	**49,366,800**	**9,873,300**
Grand Total		**16,138,300**	**18,068,600**	**16,816,400**	**14,830,100**	**16,135,000**	**12,672,300**	**78,526,500**	**15,705,300**

Table 27. Estimated annual landed value (£) from management areas by non-UK under 12 m and over 12 m vessels. Values of less than £50 have been included as <50 to demonstrate activity within the site.

Byelaw region	Vessel nationality/ Management area	2016		2017		2018		2019		2020		2021	
		>12 m	<12 m	>12 m	<12 m	>12 m	<12 m	>12 m	<12 m	>12 m	<12 m	>12 m	<12 m
Eastern Channel	France	0	0	0	200	0	700	0	400	0	0	0	0
	Albert Field MPA Total	**0**	**0**	**300**	**200**	**<50**	**700**	**200**	**400**	**100**	**0**	**0**	**0**
	Belgium	0	102,200	0	75,300	0	72,900	0	86,800	0	49,600	0	55,500
	Germany	0	0	0	0	0	200	0	0	0	1,700	0	0
	Denmark	0	0	0	300	0	0	0	0	0	0	0	0
	France	0	66,800	0	97,600	0	117,200	0	106,500	0	97,500	0	328,600
	Ireland	0	0	0	0	0	16,200	0	0	0	2,500	0	800
	Netherlands	0	49,200	0	235,500	0	182,900	0	210,900	0	76,000	0	98,600
	Bassurelle Sandbank MPA Total	**3,800**	**218,200**	**2,600**	**408,700**	**2,600**	**389,400**	**2,600**	**404,200**	**100**	**227,200**	**2,500**	**483,500**
	Belgium	0	0	0	0	0	1,000	0	600	0	0	0	0
	Beachy Head East MPA Total	**100**	**0**	**<50**	**0**	**<50**	**1,000**	**100**	**600**	**100**	**0**	**<50**	**0**
	Belgium	0	798,200	0	943,600	0	1,056,400	0	679,300	0	626,400	0	546,700
	Germany	0	0	0	0	0	500	0	0	0	0	0	0
	France	0	24,900	0	56,600	0	67,500	0	84,800	0	18,200	0	28,000
	Netherlands	0	500	0	1,200	0	2,900	0	1,200	0	0	0	1,500
	Inner Bank MPA Total	**6,700**	**823,600**	**3,800**	**1,001,300**	**3,900**	**1,127,300**	**6,500**	**765,300**	**3,700**	**644,600**	**3,500**	**576,200**
	Belgium	0	40,800	0	53,300	0	41,300	0	41,500	0	28,200	0	10,800
	Germany	0	600	0	900	0	700	0	400	0	0	0	0
	Denmark	0	0	0	0	0	200	0	0	0	0	0	0
	France	0	189,500	0	202,600	0	106,700	0	148,700	0	91,500	0	311,200
	Ireland	0	0	0	500	0	0	0	400	0	0	0	0
	Netherlands	0	47,800	0	30,500	0	12,100	0	36,100	0	15,600	0	29,300
	Offshore Brighton MPA Total	**1,800**	**278,700**	**1,700**	**287,900**	**2,800**	**161,000**	**2,600**	**227,100**	**700**	**135,300**	**2,600**	**351,200**
	Belgium	0	26,400	0	48,400	0	77,000	0	80,500	0	43,500	0	115,600
	Germany	0	1,400	0	200	0	6,000	0	4,700	0	0	0	0
	France	0	373,700	0	407,500	0	147,700	0	127,300	0	272,100	0	181,000
	Ireland	0	400	0	1,400	0	1,000	0	3,600	0	0	0	0
	Netherlands	0	0	0	0	0	0	0	300	0	0	0	0
	Offshore Overfalls MPA Total	**1,400**	**401,900**	**1,300**	**457,500**	**4,400**	**231,900**	**2,100**	**216,300**	**600**	**315,600**	**2,100**	**296,600**
	Wight Barfleur Reef MPA Total	**0**	**0**	**<50**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Eastern Channel Total		**13,800**	**1,722,400**	**9,700**	**2,155,500**	**13,700**	**1,613,900**	**14,080**	**1,613,900**	**5,300**	**1,322,700**	**8,200**	**1,707,400**

Byelaw region	Vessel nationality/ Management area	2016		2017		2018		2019		2020		2021	
		>12 m	<12 m	>12 m	<12 m	>12 m	<12 m	>12 m	<12 m	>12 m	<12 m	>12 m	<12 m
Irish Sea	Belgium	0	0	0	0	0	0	0	2,300	0	1,400	0	0
	Ireland	0	0	0	0	0	0	0	0	0	700	0	0
	West of Copeland MPA Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2,300**	**0**	**2,000**	**0**	**0**
	Shell Flat and Lune Deep MPA Total	**0**	**0**	**0**	**0**	**0**	**0**	**100**	**0**	**0**	**0**	**<50**	**0**
	Fylde MPA Total	**0**	**0**	**0**	**0**	**0**	**0**	**300**	**0**	**0**	**0**	**100**	**0**
	Belgium	0	3,300	0	0	0	0		16,400	0	7,800	0	5,300
	West of Walney MPA Total	**0**	**3,300**	**0**	**0**	**0**	**0**	**0**	**16,400**	**0**	**7,800**	**0**	**5,300**
Irish Sea Total		**0**	**3,300**	**0**	**0**	**0**	**0**	**0**	**18,700**	**0**	**9,800**	**0**	**5,300**
North Sea	Netherlands	0	0	0	0	0	0	0	0	0	0	0	0
	Farnes East MPA Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	Belgium	0	5,100	0	18,100	0	90,100	0	110,900	0	182,400	0	36,600
	Germany	0	0	0	0	0	0	0	0	0	400	0	0
	France	0	499,700	0	373,900	0	1,041,900	0	873,200	0	763,400	0	105,500
	Netherlands	0	6,100	0	1,400	0	7,500	0	7,800	0	10,200	0	28,600
	Foreland MPA Total	**100**	**510,900**	**0**	**393,400**	**500**	**1,139,500**	**100**	**991,900**	**300**	**956,400**	**<50**	**170,800**
	Belgium	0	0	0	0	0	0	0	0	0	0	0	0
	Germany	0	0	0	0	0	600	0	0	0	0	0	0
	Denmark	0	0	0	4,000	0	1,800	0	0	0	2,700	0	0
	Netherlands	0	0	0	0	0	19,600	0	0	0	1,300	0	0
	Portugal	0	0	0	0	0	0	0	7,200	0	0	0	0
	Fulmar MPA Total	**0**	**0**	**0**	**4,000**	**100**	**22,000**	**0**	**7,200**	**0**	**4,000**	**0**	**0**
	Belgium	0	0	0	0	0	0	0	0	0	0	0	0
	France	0	0	0	0	0	0	0	0	0	0	0	0
	Goodwin Sands MPA (Static) Total	**6,100**	**0**	**5,800**	**0**	**7,300**	**0**	**14,800**	**<50**	**10,100**	**0**	**4,200**	**0**
	Belgium	0	800	0	300	0	1,600	0	27,500	0	41,700	0	300
	France	0	61,000	0	37,400	0	34,400	0	49,500	0	23,400	0	9,400
	Netherlands	0	0	0	0	0	0	0	0	0	3,300	0	600
	Goodwin Sands MPA (BTG) Total	**100**	**61,800**	**0**	**37,600**	**300**	**36,000**	**100**	**77,000**	**200**	**68,500**	**<50**	**10,200**
	Belgium	0	37,800	0	9,000	0	2,700	0	0	0	0	0	2,000
	Germany	0	700	0	0	0	0	0	0	0	12,700	0	0
	Spain	0	0	0	0	0	0	0	0	0	0	0	0
	France	0	0	0	100	0	0	0	0	0	500	0	100
	Netherlands	0	545,500	0	877,300	0	708,300	0	440,300	0	308,400	0	390,500
	Haisborough Hammond Winterton MPA (BTG) Total	**0**	**584,000**	**0**	**886,400**	**0**	**711,000**	**100**	**440,400**	**1,500**	**321,600**	**4,900**	**392,600**

Byelaw region	Vessel nationality/ Management area	2016		2017		2018		2019		2020		2021	
		>12 m	<12 m	>12 m	<12 m	>12 m	<12 m	>12 m	<12 m	>12 m	<12 m	>12 m	<12 m
North Sea (cont.)	**Haisborough Hammond Winterton MPA (T) Total**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**300**	**0**	**0**	**0**
	Belgium	0	0	0	0	<50	300	0	0	0	200	0	5,500
	Germany	0	0	0	0	0	0	0	15,600	0	3,300	0	200
	Denmark	0	300	0	0	0	0	0	100	0	200	0	0
	Spain	0	0	0	0	0	0	0	0	0	0	0	0
	France	0	18,500	0	29,000	0	1,300	0	3,200	0	8,200	0	11,200
	Netherlands	0	0	0	0	0	12,500	0	1,800	0	35,900	0	0
	Holderness Offshore MPA Total	**0**	**18,800**	**0**	**29,000**	**<50**	**14,100**	**800**	**20,800**	**2700**	**47,900**	**200**	**6,800**
	Belgium	0	74,000	0	52,300	0	66,300	0	25,300	0	56,700	0	53,400
	Germany	0	0	0	0	0	0	0	0	0	2,300	0	0
	France	0	4,900	0	1,300	0	2,000	0	900	0	1,600	0	5,000
	Netherlands	0	43,200	0	20,300	0	54,000	0	43,500	0	59,500	0	1,200
	Kentish Knock East MPA Total	**0**	**122,200**	**<50**	**74,000**	**100**	**122,300**	**0**	**69,700**	**0**	**120,100**	**<50**	**59,600**
	Belgium	0	22,300	0	18,400	0	12,600	0	2,400	0	4,500	0	0
	Margate and Long Sands MPA Total	**0**	**22,300**	**<50**	**18,400**	**300**	**12,600**	**0**	**2,400**	**0**	**4,500**	**<50**	**0**
	Belgium	0	177,500	0	57,000	0	6,800	0	11,400	0	3,700	0	18,900
	Germany	0	6,500	0	7,400	0	1,300	0	3,500	0	15,200	0	1,000
	Denmark	0	0	0	1,000	0	4,900	0	2,800	0	5,800	0	1,100
	France	0	40,100	0	63,400	0	74,800	0	186,700	0	86,200	0	63,100
	Netherlands	0	267,000	0	489,600	0	310,000	0	119,600	0	176,400	0	71,300
	Markham's Triangle MPA Total	**0**	**491,100**	**0**	**618,400**	**400**	**39,800**	**<50**	**324,000**	**3,700**	**287,300**	**1,800**	**155,400**
	Belgium	0	53,300	0	81,400	0	29,800	0	7,400	0	0	0	13,700
	Germany	0	5,900	0	55,600	0	94,000	0	52,500	0	62,400	0	17,500
	Denmark	0	3,200	0	5,700	0	200	0	3,600	0	0	0	3,200
	France	0	2,300	0	1,500	0	400	0	1,400	0	200	0	100
	Netherlands	0	2,295,700	0	2,480,400	0	2,376,100	0	1,880,300	0	2,198,400	0	861,600
	NNSSR MPA (BTG) Total	**0**	**2,360,400**	**0**	**2,624,600**	**4700**	**2,500,500**	**27,200**	**1,945,300**	**158,100**	**2,261,000**	**97,700**	**896,200**
	NNSSR (T) Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**<50**	**0**	**0**	**0**
	Belgium	0	18,000	0	0	0	2,600	0	400	0	0	0	300
	France	0	0	0	0	0	0	0	0	0	0	0	2,300
	Netherlands	0	1,100	0	0	0	0	0	200	0	0	0	0
	Orford Inshore MPA Total	**0**	**19,100**	**0**	**0**	**0**	**2,600**	**0**	**600**	**0**	**0**	**0**	**2,600**
	Germany	0	0	0	0	0	40,000	0	0	0	9,900	0	0
	Denmark	0	11,800	0	173,900	0	78,300	0	3,900	0	36,800	0	900

Byelaw region	Vessel nationality/ Management area	2016		2017		2018		2019		2020		2021	
		>12 m	<12 m	>12 m	<12 m	>12 m	<12 m	>12 m	<12 m	>12 m	<12 m	>12 m	<12 m
North Sea (cont.)	Spain	0	6,600	0	0	0	0	0	0	0	0	0	0
	France	0	0	0	0	0	16,900	0	0	0	0	0	0
	Netherlands	0	0	0	0	0	0	0	0	0	0	0	0
	Sweden	0	0	0	0	0	6,000	0	0	0	0	0	0
	Swallow Sand MPA Total	**0**	**18,400**	**0**	**173,900**	**<50**	**141,200**	**0**	**38,800**	**0**	**46,600**	**0**	**900**
North Sea Total		**6,300**	**4,208,900**	**5,800**	**4,841,300**	**12,900**	**4,729,000**	**43,000**	**3,915,600**	**176,300**	**4,113,400**	**108,800**	**1,695,100**
Western Channel and Southwest	Belgium	0	18,700	0	25,500	0	21,100	0	26,300	0	8,400	0	0
	Germany	0	1,100	0	400	0	0	0	200	0	0	0	0
	Denmark	0	0	0	0	0	1,200	0	0	0	0	0	0
	France	0	600	0	200	0	0	0	4,200	0	2,400	0	3,100
	Ireland	0	0	0	4,200	0	4,300	0	1,900	0	3,100	0	0
	Netherlands	0	0	0	0	0	0	0	0	0	700	0	0
	East of Start Point MPA Total	**0**	**20,400**	**0**	**30,400**	**0**	**26,600**	**0**	**32,500**	**0**	**14,500**	**0**	**3,100**
	Belgium	0	0	0	300	0	0	0	0	0	0	0	0
	Spain	0	100	0	0	0	0	0	0	0	0	0	500
	France	0	1,297,600	0	1,240,400	0	686,200	0	734,400	0	296,700	0	488,500
	Ireland	0	78,400	0	65,500	0	57,600	0	144,900	0	163,200	0	275,100
	Greater Haig Fras MPA Total	**0**	**1,376,100**	**0**	**1,306,200**	**0**	**743,800**	**0**	**879,400**	**<50**	**460,000**	**<50**	**764,200**
	France	0	68,900	0	81,100	0	52,400	0	101,300	0	104,900	0	61,300
	Ireland	0	70,800	0	104,500	0	174,100	0	114,800	0	102,300	0	115,700
	North-East Haig Fras MPA Total	**0**	**139,700**	**0**	**185,600**	**0**	**226,500**	**0**	**216,100**	**100**	**207,200**	**0**	**177,000**
	Spain	0	700	0	500	0	0	0	600	0	2,700	0	38,800
	France	0	275,400	0	271,000	0	146,200	0	212,000	0	138,800	0	54,900
	Ireland	0	178,000	0	208,400	0	159,100	0	387,000	0	77,400	0	341,200
	North-West of Jones Bank MPA Total	0	**454,000**	**0**	**479,900**	**0**	**305,300**	**0**	**599,600**	**0**	**219,000**	**0**	**434,800**
	Belgium	0	12,200	0	18,100	0	78,100	0	19,200	0	23,100	0	7,000
	France	0	500	0	0	0	0	0	0	0	0	0	0
	North West of Lundy MPA Total	0	**12,600**	**0**	**18,100**	**0**	**78,100**	**0**	**19,200**	**0**	**23,100**	**0**	**7,000**
	Belgium	**0**	0	0	0	0	0	0	0	0	0	0	1,900
	France	0	3,400	0	400	0	1,300	0	600	0	0	0	0
	Cape Bank MPA Total	0	**3,400**	**0**	**400**	**0**	**1,300**	**0**	**600**	**0**	**0**	**0**	**1,900**
	France	0	1,300	0	800	0	1,500	0	3,600	0	1,400	0	700
	Ireland	0	0	0	0	0	0	0	300	0	0	0	400

Byelaw region	Vessel nationality/ Management area	2016		2017		2018		2019		2020		2021	
		>12 m	<12 m	>12 m	<12 m	>12 m	<12 m	>12 m	<12 m	>12 m	<12 m	>12 m	<12 m
Western Channel and Southwest (cont.)	**East of Haig Fras MPA Total**	**0**	**1,300**	**0**	**800**	**0**	**1,500**	**0**	**3,900**	**0**	**1,400**	**0**	**1,100**
	France	0	2,100	0	1,300	0	2,900	0	1,700	0	1,100	0	800
	Skerries Bank and Surrounds MPA Total	0	**2,100**	**0**	**1,300**	**0**	**2,900**	**0**	**1,700**	**0**	**1,100**	**0**	**800**
	Belgium	**0**	4,000	0	1,400	0	3,900	0	1,100	0	43,900	0	66,300
	France	0	41,100	0	43,100	0	36,600	0	33,600	0	12,900	0	55,500
	Ireland	0	0	0	0	0	0	0	0	0	0	0	500
	South Isles of Scilly MPA Total	0	**45,100**	**0**	**44,500**	**0**	**40,500**	**0**	**34,700**	**0**	**56,800**	**0**	**122,300**
	Belgium	0	0	0	1,000	0	2,300	0	600	0	800	0	9,700
	France	0	41,800	0	29,700	0	18,400	0	60,300	0	50,300	0	76,000
	Ireland	0	46,600	0	66,600	0	157,200	0	105,900	0	159,700	0	150,100
	Netherlands	0	0	0	0	0	0	0	0	0	0	0	0
	South of Celtic Deep MPA Total	0	**88,500**	**0**	**97,200**	**0**	**177,900**	**0**	**166,800**	**0**	**210,900**	**0**	**235,800**
	France	**0**	0	0	0	0	0	0	0	0	200	0	0
	SPPSE MPA (BTG) Total	0	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**200**	**0**	**0**
	SPPSE MPA (T) Total	0	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	Belgium	0	1,635,900	0	1,116,500	0	1,379,500	0	1,687,800	0	1,828,200	0	1,201,600
	Germany	0	0	0	0	0	0	0	0	0	0	0	2,100
	France	**0**	476,500	0	353,700	0	631,900	0	454,800	0	408,600	0	500,900
	Ireland	0	207,700	0	25,500	0	1,000	0	0	0	605,400	0	8,800
	Netherlands	0	0	0	0	0	0	0	0	0	0	0	0
	South West Approaches to Bristol Channel MPA Total	**0**	**2,320,000**	**0**	**1,495,700**	**0**	**2,012,500**	**0**	**2,142,600**	**0**	**2,842,100**	**0**	**1,713,400**
	Spain	0	572,500	0	875,900	0	706,000	0	629,500	0	335,700	0	285,300
	France	0	400,600	0	878,100	0	389,900	0	357,700	0	1,344,700	0	585,000
	Ireland	0	0	0	11,900	0	1,100	0	0	0	0	0	0
	South West Deeps (East) MPA (BSNL) Total	0	**973,100**	**0**	**1,765,900**		**1,097,000**	**0**	**987,300**	**0**	**1,680,400**	**0**	**870,200**
	Denmark	0	0	0	300	0	0	0	0	0	0	100	13,000
	Spain	0	315,400	0	119,900	0	186,500	0	77,200	0	109,500	0	98,500
	France	0	1,640,400	0	2,226,600	0	2,039,000	0	1,700,700	0	1,583,400	0	1,977,100
	Ireland	**0**	0	0	0	0	1,300	0	170,100	0	334,500	0	141,600
	South West Deeps (East) MPA (BTG) Total	0	**1,955,700**	**0**	**2,346,700**	**0**	**2,226,800**	**0**	**1,948,000**	**0**	**2,027,300**	**0**	**2,230,200**
	Germany	0	1,200	0	0	0	0	0	0	0	0	0	0
	Spain	0	255,900	0	141,600	0	232,900	0	70,100	0	104,500	0	97,900

Byelaw region	Vessel nationality/ Management area	2016		2017		2018		2019		2020		2021	
		>12 m	<12 m	>12 m	<12 m	>12 m	<12 m	>12 m	<12 m	>12 m	<12 m	>12 m	<12 m
Western Channel and Southwest (cont.)	France	0	601,700	0	1,109,500	0	722,500	0	536,200	0	650,600	0	682,500
	Ireland	**0**	0	0	0	0	0	0	78,600	0	131,300	0	181,600
	South-West Deeps (West) MPA Total	0	**858,800**	**<50**	**1,251,100**	**0**	**955,400**	**0**	**684,900**	**0**	**886,500**	**300**	**962,000**
	Belgium	0	900	0	800	0	900	0	200	0	0	0	900
	Germany	**0**	0	0	0	0	0	0	0	0	0	0	0
	France	0	47,300	0	40,000	0	39,600	0	54,700	0	41,200	0	49,900
	Ireland	0	0	0	0	0	0	0	0	0	0	0	0
	Netherlands	0	2,800	0	0	0	200	0	0	0	1,800	0	500
	West of Wight-Barfleur MPA Total	**100**	**50,900**	**200**	**40,900**	**200**	**40,700**	**2,400**	**54,900**	**600**	**42,900**	**0**	**51,300**
	Belgium	0	11,000	0	1,900	0	8,900	0	3,800	0	0	0	9,000
	Germany	0	200	0	0	0	0	0	0	0	0	0	0
	Denmark	0	900	0	0	0	0	0	600	0	0	0	600
	Spain	0	0	0	0	0	0	0	0	0	0	0	300
	France	0	1,870,600	0	1,970,700	0	1,831,900	0	1,441,020	0	1,813,700	0	1,538,900
	Lithuania	0	0	0	0	0	0	0	0	0	0	0	0
	Netherlands	0	0	0	0	0	0	0	1,600	0	12,600	0	20,000
	Western Channel MPA Total	**<50**	**1,882,700**	**300**	**1,972,700**	**<50**	**1,840,800**	**200**	**1,447,100**	**500**	**1,826,300**	**600**	**1,568,800**
Western Channel and Southwest Total			**10,184,300**	**500**	**11,037,400**	**200**	**9,777,600**	**200**	**9,219,200**	**1,200**	**10,499,600**	**900**	**9,143,800**

.

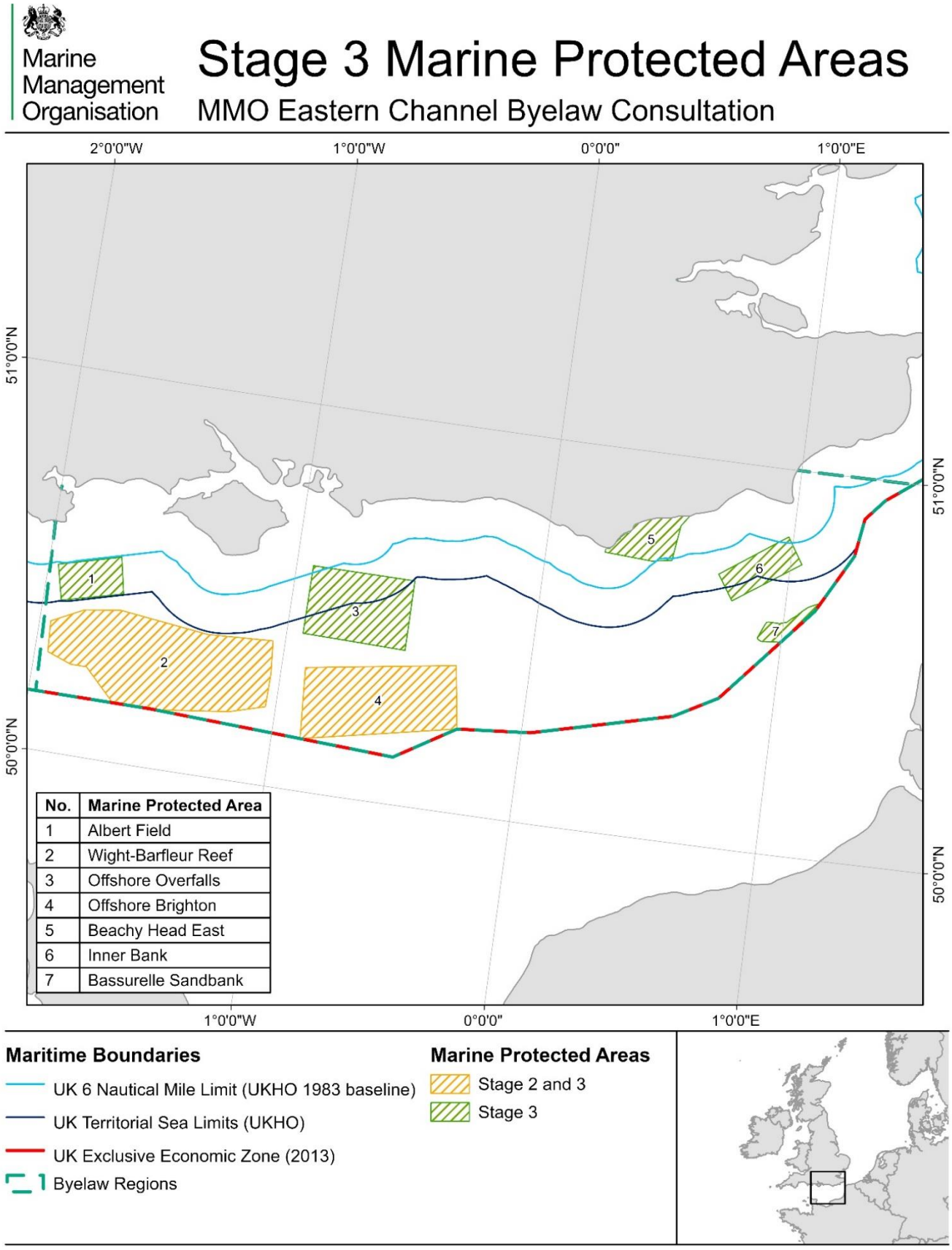

Figure 3. Stage 3 MPAs in Eastern Channel byelaw region.

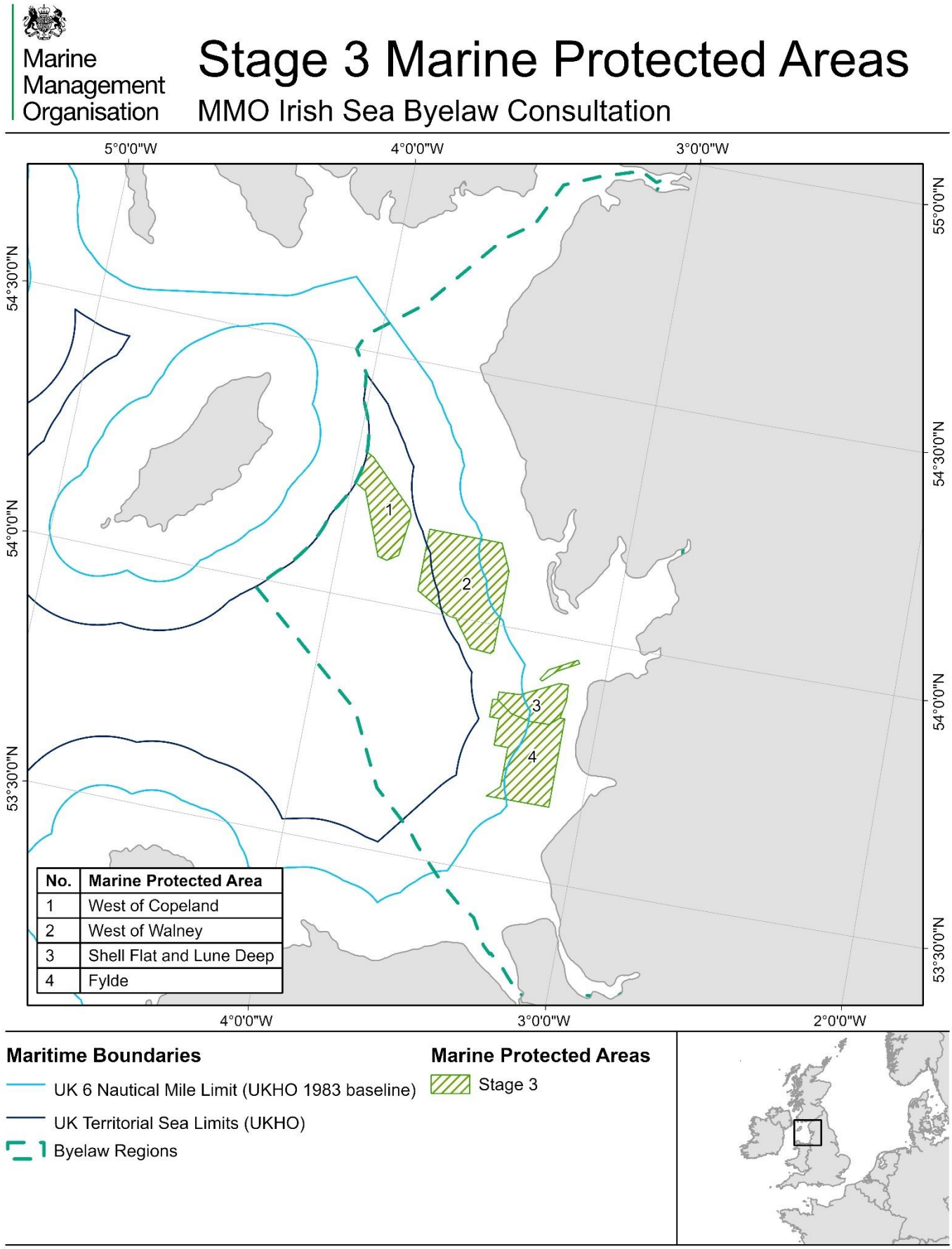

Figure 4. Stage 3 MPAs in Irish Sea byelaw region.

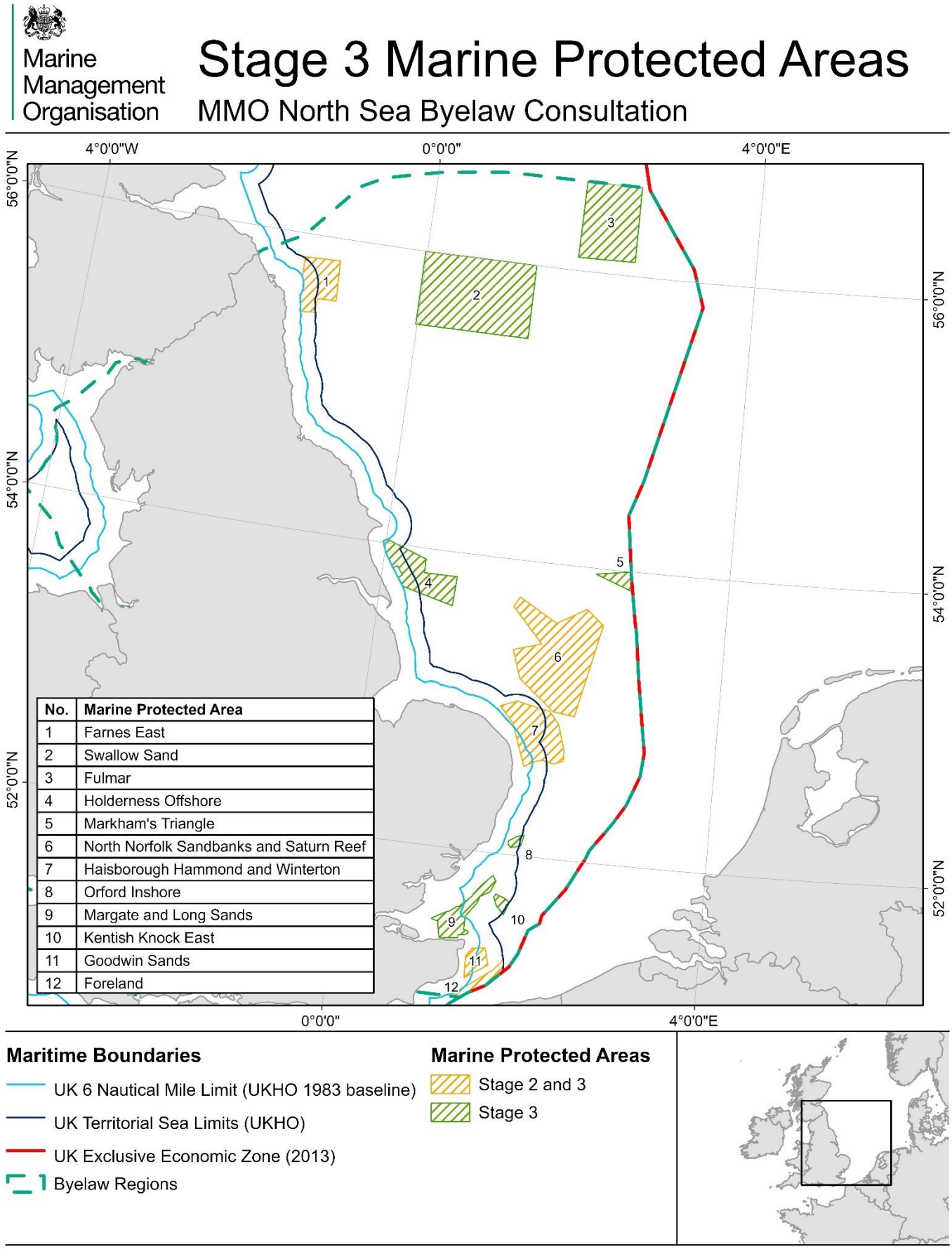

Figure 5. Stage 3 MPAs in North Sea byelaw region.

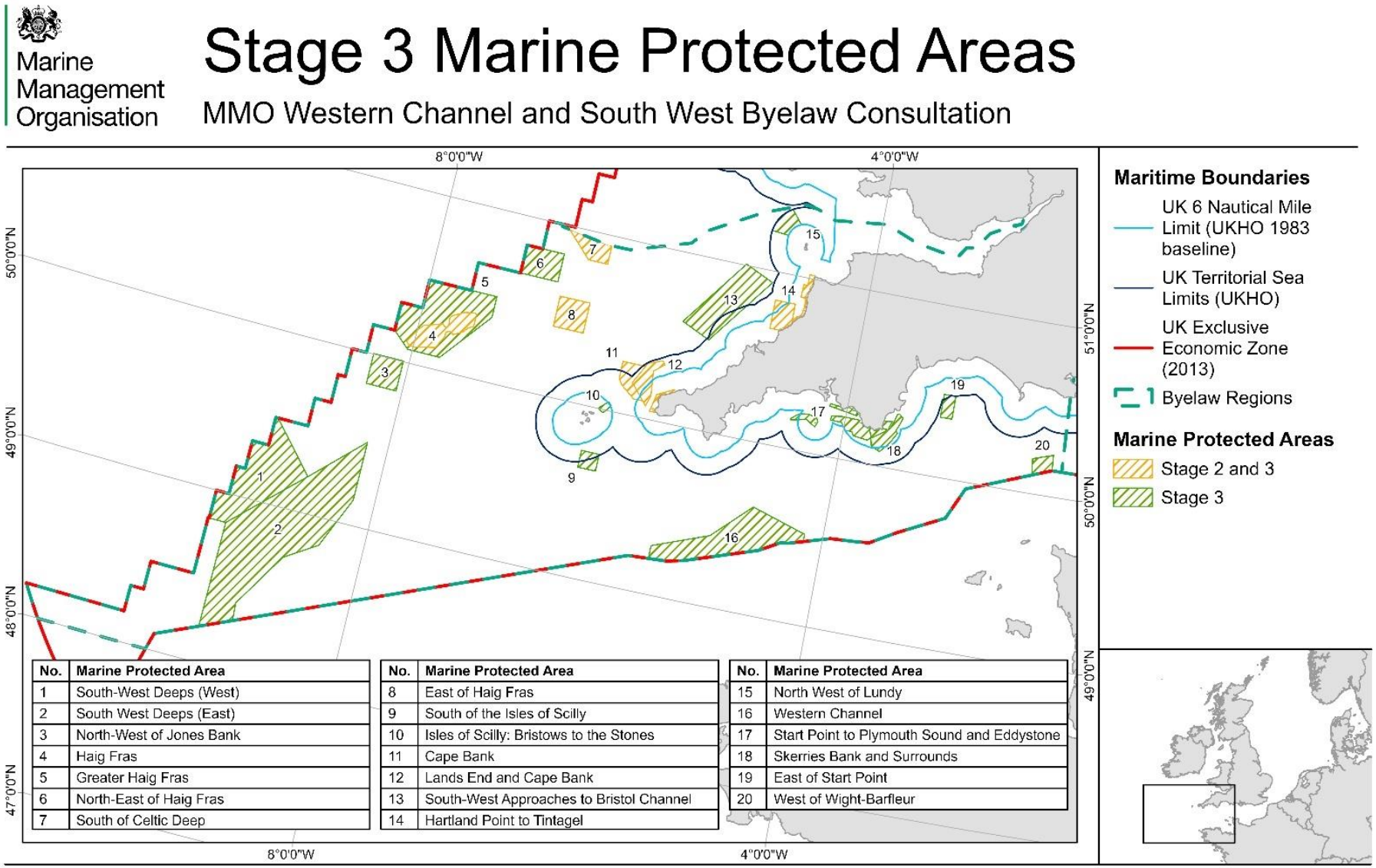

Figure 6. Stage 3 MPAs in Western Channel byelaw region

Annex 2: Tables and figures

Table 28. Coding for extent of impact. The midpoint values used in MCS (2023) have been used to estimate the improvement in benefits observed in a given year.

Level of improvement	Code	Percentage improvement versus BAU [mid-point] (%)
Very high	VH	90-100 [95]
High	H	50-89 [70]
Medium	M	10-49 [30]
Low	L	1-9 [5]
Very Low	VL	0-<1 [0.5]

Table 29. Impact coding for features found in the Stage 3 MPAs, showing which habitat categories were used from Table 10 in Moran et al (2007) for each feature and the impact codes for each of the 13 ecosystem goods and services.

Designated Features (habitats only) Stage 3 MPAs	Eunis Code	Table 10 Moran et al (2008)	Food provision	Raw materials	Gas and climate regulation	Disturbance prevention and alleviation	Bioremediation of waste	Cultural heritage and identity	Cognitive values	Leisure and recreation	Non-use values - bequest and existence	Option use value	Nutrient cycling	Resilience and resistance	Biologically mediated habitat	Recovery time (years)
Subtidal sand	A5.2	Shelf sand	VL 5/20	VL 5/20	H 5/20	VL 0/20	H 5/20	VL 0/20	H 5/20	VL 0/20	H 5/20	H 5/20	H 5/20	H 5/20	H 5/20	0-5
Subtidal coarse sediment	A5.1	Shelf strong tide stress coarse sediment, Shelf moderately tide stress coarse sediment, Shelf weak tide stress coarse sediment	VL 5/20	VL 5/20	M 5/20	VL 0/20	M 5/20	VL 0/20	M 5/20	L 5/20	M 5/20	M 5/20	M 5/20	M 5/20	M 5/20	0-5
Subtidal mixed sediments	A5.4	Shelf strong tide stress mixed sediment, Shelf moderately tide stress mixed sediment, Shelf weak tide stress mixed sediment	VL 5/20	VL 5/20	H 8/20	VL 0/20	H 8/20	VL 0/20	H 8/20	L 5/20	H 8/20	H 8/20	H 8/20	H 8/20	H 8/20	0-8
Subtidal mud	A5.3	Shelf mud	VL 5/20	VL 5/20	H 5/20	VL 0/20	H 5/20	VL 0/20	H 5/20	VL 0/20	H 5/20	H 5/20	H 5/20	H 5/20	H 5/20	0-5
Deep-sea bed	A6	Derived from the Oceanic habitat categories, including Aphotic reef also.	VL 0/20	VL 0/20	H 15/20	VL 0/20	H 15/20	VL 0/20	H 15/20	VL 0/20	H 15/20	H 15/20	H 15/20	H 15/20	H 15/20	0-15
Seapen and burrowing megafauna communities	A5.361/ HOCl_7	Shelf mud	VL 5/20 L	VL 5/20	H 5/20	VL 0/20	H 5/20	VL 0/20	H 5/20	VL 0/20	H 5/20	H 5/20	H 5/20	H 5/20	H 5/20	0-5
Circalittoral rock	A4.2	Aphotic reef	M 5/20	VL 0/20	H 10/20	VL 0/20	H 10/20	VL 0/20	H 10/20	H 10/20	H 10/20	H 10/20	H 10/20	H 10/20	H 10/20	0-10
Infralittoral rock	A3.2	Photic reef	VL 0/20	VL 0/20	H 5/20	VL 0/20	H 5/20	VL 0/20	H 5/20	H 5/20	H 5/20	H 5/20	H 5/20	H 5/20	H 5/20	0-5
High energy circalittoral rock	A4.2	Aphotic reef	M 5/20	VL 0/20	H 10/20	VL 0/20	H 10/20	VL 0/20	H 10/20	H 10/20	H 10/20	H 10/20	H 10/20	H 10/20	H 10/20	0-10
Moderate energy circalittoral rock	A4.1	Aphotic reef	M 5/20	VL 0/20	H 10/20	VL 0/20	H 10/20	VL 0/20	H 10/20	H 10/20	H 10/20	H 10/20	H 10/20	H 10/20	H 10/20	0-10

Table 30. Impact scores (from Table 29) converted to the midpoint value of impact following Table 3 in MCS (2023), (please see Table 28 above for midpoint values) for features found in the MPA sites being considered here for each of the 13 ecosystem goods and services, and also showing the range in recovery times for service supply across the services for each feature.

Designated Features (habitats only) Stage 3 MPAs	Eunis Code	Table 10 Moran et al (2008)	Food provision	Raw materials	Gas and climate regulation	Disturbance prevention and alleviation	Bioremediation of waste	Cultural heritage and identity	Cognitive values	Leisure and recreation	Non-use values - bequest and existence	Option use value	Nutrient cycling	Resilience and resistance	Biologically mediated habitat	Recovery time (years)
Subtidal sand	A5.2	Shelf sand	0.5	0.5	70	0.5	70	0.5	70	0.5	70	70	70	70	70	0-5
Subtidal coarse sediment	A5.1	Shelf strong tide stress coarse sediment, Shelf moderately tide stress coarse sediment, Shelf weak tide stress coarse sediment	0.5	0.5	30	0.5	30	0.5	30	5	30	30	30	30	30	0-5
Subtidal mixed sediments	A5.4	Shelf strong tide stress mixed sediment, Shelf moderately tide stress mixed sediment, Shelf weak tide stress mixed sediment	0.5	0.5	70	0.5	70	0.5	70	5	70	70	70	70	70	0-8
Subtidal mud	A5.3	Shelf mud	0.5	0.5	70	0.5	70	0.5	70	0.5	70	70	70	70	70	0-5
Deep-sea bed	A6	Derived from the Oceanic habitat categories, including Aphotic reef also.	0.5	0.5	70	0.5	70	0.5	70	0.5	70	70	70	70	70	0-15
Seapen and burrowing megafauna communities	A5.361/ HOCI_7	Shelf mud	0.5	0.5	70	0.5	70	0.5	70	0.5	70	70	70	70	70	0-5
Circalittoral rock	A4.2	Aphotic reef	30	0.5	70	0.5	70	0.5	70	70	70	70	70	70	70	0-10
Infralittoral rock	A3.2	Photic reef	0.5	0.5	70	0.5	70	0.5	70	70	70	70	70	70	70	0-5
High energy circalittoral rock	A4.1	Aphotic reef	30	0.5	70	0.5	70	0.5	70	70	70	70	70	70	70	0-10
Moderate energy circalittoral rock	A4.2	Aphotic reef	30	0.5	70	0.5	70	0.5	70	70	70	70	70	70	70	0-10

Table 31. Annual benefit from ecosystem services (2020 Price Base Year, 2025 Present Value) per byelaw region (£) values have not been adjusted using the discount rate of 3.5%.

	Annual benefit per byelaw region (£)				
Year	Eastern Channel	Irish Sea	North Sea	Western Channel and Southwest	Grand total (per year across byelaw area)
1	0	0	0	0	0
2	0	0	0	0	0
3	0	0	0	0	0
4	0	0	0	0	0
5	0	4,615,515	21,492,782	81,446,213	107,554,510
6	0	4,615,515	21,492,782	81,446,213	107,554,510
7	0	4,615,515	21,492,782	81,446,213	107,554,510
8	22,605,671	4,894,780	132,161,168	217,045,196	376,706,815
9	22,605,671	4,894,780	132,161,168	217,045,196	376,706,815
10	42,458,918	6,000,957	132,161,168	217,365,411	397,986,454
11	42,458,918	6,000,957	132,161,168	217,365,411	397,986,454
12	42,458,918	6,000,957	132,161,168	217,365,411	397,986,454
13	42,458,918	6,000,957	132,161,168	217,365,411	397,986,454
14	42,458,918	6,000,957	132,161,168	217,365,411	397,986,454
15	42,458,918	6,000,957	132,161,168	333,945,542	514,566,585
16	42,458,918	6,000,957	132,161,168	333,945,542	514,566,585
17	42,458,918	6,000,957	132,161,168	333,945,542	514,566,585
18	42,458,918	6,000,957	132,161,168	333,945,542	514,566,585
19	42,458,918	6,000,957	132,161,168	333,945,542	514,566,585
20	42,458,918	6,000,957	132,161,168	333,945,542	514,566,585
Grand Total	**512,259,436**	**89,646,633**	**1,782,573,530**	**3,768,929,347**	**6,153,408,947**

Table 32. Total benefit from ecosystem services (2020 Price Base Year, 2025 Present Value) per MPA (£) values have not been adjusted using the discount rate of 3.5%. Only sites with bottom towed gear restrictions have been included in the ecosystem service valuation.

Byelaw region and management area	Total benefit across 20 years (£)
Eastern Channel	**512,259,436**
Albert Field MPA	3,834,023
Bassurelle Sandbanks MPA	23,628,881
Beachy Head East MPA	725,487
Inner Bank MPA	70,129,473
Offshore Brighton MPA	217,660,230
Offshore Overfalls MPA	196,281,342
Irish Sea	**89,646,633**
Fylde MPA	1,785,511
Shell Flat and Lune Deep	12,167,948
West of Copeland MPA	3,630,451
West of Walney MPA	72,062,723
North Sea	**1,782,573,530**
Farnes East MPA	95,308,966
Foreland MPA	92,619,656
Fulmar MPA	124,907,654
Goodwin Sands	39,487,093
Haisborough Hammond and Winterton MPA	143,720,912
Holderness Offshore MPA	148,038,353
Kentish Knock MPA	33,912,340
Margate and Long Sands MPA	22,941,710
Markham's Triangle MPA	73,913,747
North Norfolk Sandbanks and Saturn Reef MPA	936,118,599
Orford Inshore MPA	3,547,643
Swallow Sands MPA	68,056,856
Western Channel and Southwest	**3,768,929,347**
Bristows to the Stones MPA	57,456
East of Start Point MPA	59,649,968
Greater Haig Fras MPA	739,081,472
North-East of Haig Fras MPA	197,527,446
North-West of Jones Bank MPA	150,906,119
North West of Lundy MPA	14,269,949
Skerries Bank and Surrounds MPA	3,464,904
South of Celtic Deep MPA	97,912,040
South of the Isle of Scilly	46,544,487
South West Approaches to Bristol Channel MPA	417,298,164
South West Deeps (East) MPA	699,480,790
South-West Deeps (West) MPA	691,068,162
West of Wight-Barfleur Reef MPA	37,274,504
Western Channel MPA	614,393,888
Grand Total	**6,153,408,947**

Table 33. Change in value (%) for Stage 3 MPAs for years 2018 to 2021.

Byelaw Region	Management Area	2018	2019	2020	2021	Overall % Change
Eastern Channel	Albert Field MPA	0.14	0.66	0.01	0.07	0.22
	Bassurelle Sandbank MPA	12.31	6.67	8.19	5.42	7.62
	Beachy Head East MPA	7.89	6.15	10.04	5.84	7.16
	Inner Bank MPA	12.31	6.67	8.19	5.42	7.62
	Offshore Brighton MPA	6.64	2.72	6.02	4.32	4.62
	Offshore Overfalls MPA	5.03	2.01	4.28	2.88	3.37
	Wight-Barfleur Reef MPA	-0.05	1.83	0.19	0.46	1.10
Irish Sea	Fylde MPA	1.59	2.64	0.12	1.44	1.51
	Shell Flat and Lune Deep MPA	1.59	2.64	0.12	1.44	1.51
	West of Copeland MPA	0.53	-0.03	2.88	-0.29	0.43
	West of Walney MPA	0.53	-0.03	2.88	-0.29	0.43
North Sea	Farnes East MPA	1.80	1.67	1.18	2.25	1.71
	Foreland MPA	6.49	7.85	4.13	4.37	5.84
	Fulmar MPA	1.64	1.49	0.10	0.08	0.83
	Goodwin Sands MPA (BTG)	6.49	7.85	4.13	4.37	5.84
	Goodwin Sands MPA (Static)	10.97	0.66	1.27	0.53	2.73
	Haisborough, Hammond and Winterton MPA (BTG)	1.21	50.00	23.71	6.78	14.47
	Haisborough, Hammond and Winterton MPA (T)	0.08	1.53	0.32	0.00	0.64
	Holderness Offshore MPA	0.53	0.52	-0.03	2.33	0.85
	Kentish Knock East MPA	0.31	1.10	1.24	1.88	1.01
	Margate and Long Sands MPA	0.31	1.10	1.24	1.88	1.01
	Markham's Triangle MPA	2.83	14.70	5.70	10.04	6.61
	North Norfolk Sandbanks and Saturn Reef MPA (BTG)	1.89	31.61	9.21	9.21	11.89
	North Norfolk Sandbanks and Saturn Reef MPA (T)	0.79	2.03	3.32	3.59	2.46
	Orford Inshore MPA	0.00	0.16	4.93	0.04	1.60
	Swallow Sand MPA	2.66	1.10	2.61	0.46	1.75
Western Channel and Southwest	Bristows to the Stones MPA	-0.04	3.03	2.02	0.06	1.28
	Cape Bank MPA	0.22	0.98	1.31	0.80	0.81
	East of Haig Fras MPA	-0.03	1.07	1.81	1.09	0.81
	East of Start Point MPA	0.58	0.82	1.15	1.72	1.04
	Greater Haig Fras MPA	7.22	50.76	12.16	9.38	19.49
	Hartland Point to Tintagel MPA	0.75	0.25	1.00	0.01	0.49
	North-East of Haig Fras MPA	0.88	4.34	4.38	1.60	2.13
	North-West of Jones Bank MPA	12.78	58.15	24.75	21.97	28.00
	North West of Lundy MPA	3.32	2.58	0.40	1.17	1.62
	Skerries Bank and Surrounds MPA	0.66	4.63	1.03	0.16	0.50
	South of Celtic Deep MPA	-0.03	-0.74	1.25	1.45	0.45
	South of the Isles of Scilly MPA	0.88	3.73	0.05	0.44	1.38
	South West Approaches to Bristol Channel MPA	1.70	2.53	3.70	0.14	1.94
	South West Deeps (East) MPA	13.32	41.35	37.05	25.14	27.12
	South West Deeps (East) MPA (BSNL)	25.14	29.20	4.84	-5.47	11.59
	South-West Deeps (West) MPA	11.24	30.31	35.63	21.17	22.89
	Start Point to Plymouth Sound and Eddystone MPA (BTG)	0.49	0.73	1.02	0.99	0.78
	Start Point to Plymouth Sound and Eddystone MPA (T)	-0.03	5.71	1.18	0.19	1.75
	West of Wight-Barfleur MPA	0.83	1.18	2.58	0.75	1.32
	Western Channel MPA	1.53	2.00	0.36	0.27	1.09