

Regulatory Triage Assessment	
Title of Measure	The Canyons Marine Conservation Zone (Specified Area) Prohibited Fishing Gears Byelaw 2022
Lead Department/Agency	Marine Management Organisation (MMO)
Expected Date of Implementation	June 2022
Origin (Domestic or International)	Domestic
Date of Assessment	04/03/2022
Lead Departmental Contact	Marine Conservation Team, Marine Management Organisation, Lancaster House, Hampshire Court, Newcastle, NE4 7YH, conservation@marinemanagement.org.uk
Departmental Triage Assessment	Low-cost regulation (fast track)

Rationale for intervention and intended effects
<p>Fishing activity has the potential to hinder the conservation objectives of The Canyons Marine Conservation Zone (MCZ), particularly in regard to the “recover to favourable condition” general management approach (GMA) assigned to the features of conservation importance (FOCI) coral gardens, cold-water coral reef, and the broadscale habitat of deep-sea bed. Additionally, the FOCI sea-pen and burrowing megafauna communities has a “maintain in favourable condition” GMA. This byelaw aims to ensure the site’s conservation objectives are furthered by prohibiting certain fishing activities in a specified area.</p>
Viable policy options (including alternatives to regulation)
<p>Option 0. Do nothing.</p> <p>Option 1. MMO byelaw to prohibit certain bottom contacting fishing gears over entire site with appropriate buffering (whole site prohibition to certain bottom contacting gears).</p> <p>Option 2. MMO byelaw to prohibit certain bottom contacting fishing gears over a proportion of the site (‘zoned management’).</p> <p>Option 3. Management of activity through a statutory instrument, regulating order or fishing licence condition.</p> <p>Option 4. No statutory restrictions. Introduce a voluntary agreement.</p> <p>Option 2 is the preferred option.</p>
Description of Novel and Contentious Elements (if any)
<ul style="list-style-type: none"> • Use of new powers introduced by the Fisheries Act 2020.

Initial assessment of impacts on business

Fishing activity data (VMS and landings data) indicates that 6 distinct UK fishing vessels have recorded fisheries landings from the management area from 2016 to 2019 via relevant gear types (bottom towed gears (demersal trawls, demersal seines) and certain bottom contacting static gears (anchored nets and lines)), and thus would be directly affected by the management area. On average over this time period 2 distinct UK fishing vessels used the site each year.

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

The estimated monetised total cost to UK businesses over ten years is expected to be £30,617 (2020 present value). The equivalent annual net direct cost to business (EANDCB) is £3,557 (2020 present value). This is based on analysis of fishing activity data (VMS and landings data) from 2016 to 2019. Data from 2020 has not been included in this economic analysis as the COVID-19 pandemic is likely to have suppressed fishing activity in 2020. As a result, 2020 fishing activity is unlikely to be representative of a typical year.

There is potential for all affected fishing businesses to recover a proportion of their costs by fishing elsewhere.

Non-monetised costs include the potential impact of displaced fishing activity on habitats/areas outside of the management area, and indirect costs to the fishing industry associated with displacement to other fishing grounds.

Non-monetised benefits include the protection of the designated features, therefore contributing to the achievement of the conservation objectives of the site; improved provision of ecosystem services by the habitat and its biological communities, including potential indirect benefits to the fishing industry resulting from spillover (movement/spread of marine resources from protected areas to adjacent fishing grounds), and the positive effect this may have for species of seabirds, marine mammals, fish and invertebrates; and potential benefits for endangered and critically endangered species and carbon storage and climate benefits.

Summary of monetised impacts

- Estimated Net Present Value: -£30,617
- Estimated Business Net Present value: -£30,617
- Estimated Equivalent Annualised Net Costs to Business: £3,557
- Appraisal period: ten years
- The Price Base Year and Present Value Base Year: 2019 and 2020
- **BIT status/score: 0.02**

The proposal is a Regulatory Provision as it relates to business activity (the fishing industry); it has a regulatory effect by prohibiting the use of demersal trawls, demersal seines and anchored net and line fishing gears within a specified area; and has effect by virtue of the exercise of a function conferred on a Minister of the Crown or a relevant regulator.

The proposal is a Qualifying Regulatory Provision as it does not fall within any of the administrative exclusions set out in the Business Impact Target written ministerial statement - HCWS574¹.

Rationale for producing an RTA (as opposed to an Impact Assessment)

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

¹ <https://questions-statements.parliament.uk/written-statements/detail/2016-03-03/HCWS574>

Supporting evidence

1. The policy issue and rationale for Government intervention

- 1.1. MMO have legal obligations in relation to Marine Conservation Zones (MCZ). Specifically, under the Marine and Coastal Access Act 2009². MMO has the duty to exercise its functions in a way which best furthers the conservation objectives of MCZs. This includes the implementation of byelaws to manage fishing activities to conserve marine habitats³. This regulatory triage assessment (RTA) considers measures to fulfil this duty, reduce the impacts of externalities and maintain/increase the level of public goods in the marine environment.
- 1.2. MMO has undertaken an assessment of the impact of fishing in The Canyons MCZ (see The Canyons Marine Conservation Zone (MCZ) Marine Management Organisation (MMO) Fisheries Assessment). This assessment determined that demersal trawls, demersal seines and anchored net and line fishing gears may be hindering the conservation objectives of the MCZ. The proposed byelaw will further the conservation objectives of the MCZ by prohibiting the use of bottom towed fishing gears and anchored nets and lines within a specified area within the site.
- 1.3. Figure 1 shows the boundary of The Canyons MCZ and the distribution of the designated features: deep-sea bed, coral gardens, cold-water coral reefs and sea-pen and burrowing megafauna communities.
- 1.4. Fishing activities have the potential to cause negative outcomes in the marine environment as a result of 'market failures'. These failures can be described as:
 - Public goods and services: a number of goods and services provided by the marine environment such as biological diversity are 'public goods' (no-one can be excluded from benefiting from them but use of the goods does not diminish the goods being available to others). The characteristics of public goods, being available to all but belonging to no-one, mean that individuals do not necessarily have an incentive to voluntarily ensure the continued existence of these goods which can lead to under-protection/provision. With regard to bottom towed fishing, this means that fishers can benefit from the biological diversity of marine habitats through sale of sea fisheries resources caught while simultaneously damaging the habitat and reducing its biological diversity. While the habitat continues to provide benefits to fishers through the sales of sea fisheries resources there is no incentive to protect these habitats. A lack of ownership allows the activity to continue unchecked until such time as biological diversity falls to the point where catches are no longer profitable, and fishers move on to more productive grounds.
 - Negative externalities: negative externalities occur when the cost of damage to the marine environment is not fully borne by the users causing the damage. Bottom towed fishing can cause severe damage to fragile habitats which can reduce biodiversity and productivity and take many years to recover. The only cost borne by bottom towed gear fishers of this damage is the eventual reduction in catches and the potential increase in

² Section 125 of the Marine and Coastal Access Act 2009. Where it is not possible to further the conservation objectives, MMO has the duty to least hinder them.

³ Section 129B of the Marine and Coastal Access Act 2009.

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

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

1.6. This byelaw aims to redress these sources of market failure through the following ways:

- Management measures will protect designated habitats of The Canyons MCZ to ensure negative externalities are reduced or suitably mitigated.
- Management measures will support continued existence of public goods in the marine environment, for example conserving the range of biodiversity in the sea area for which the MMO is responsible.
- Management measures will also support continued existence of common goods in the marine environment, for example ensuring the long-term sustainability of fish stocks in the UK exclusive economic zone (EEZ).

1.7. The Canyons MCZ lies within the South West Marine Plan Area. The South West Marine Plan⁴ was adopted in 2021. The decision to introduce The Canyons Marine Conservation Zone (Specified Area) Prohibited Fishing Gears Byelaw 2022 has been made in accordance with the South West Marine Plan.

1.8. In particular the following marine plan policies in the South West Marine Plan are relevant to this decision:

- | | |
|------------|----------------|
| – S-BIO-1 | – S-FISH-4 |
| – S-BIO-2 | – S-FISH-4-HER |
| – S-BIO-3 | – S-MPA-1 |
| – S-CO-1 | – S-MPA-2 |
| – S-EMP-2 | – S-MPA-4 |
| – S-FISH-1 | – S-SOC-1 |
| – S-FISH-2 | – S-TR-1 |
| – S-FISH-3 | – S-TR-2 |

1.9. The remaining policies in the South West Marine Plan are not applicable to this decision.

1.10. In creating this The Canyons Marine Conservation Zone (Specified Area) Prohibited Fishing Gears Byelaw 2022 byelaw, MMO have had regard to the UK Marine Strategy, as required by regulation 9 of the Marine Strategy Regulations 2010⁵.

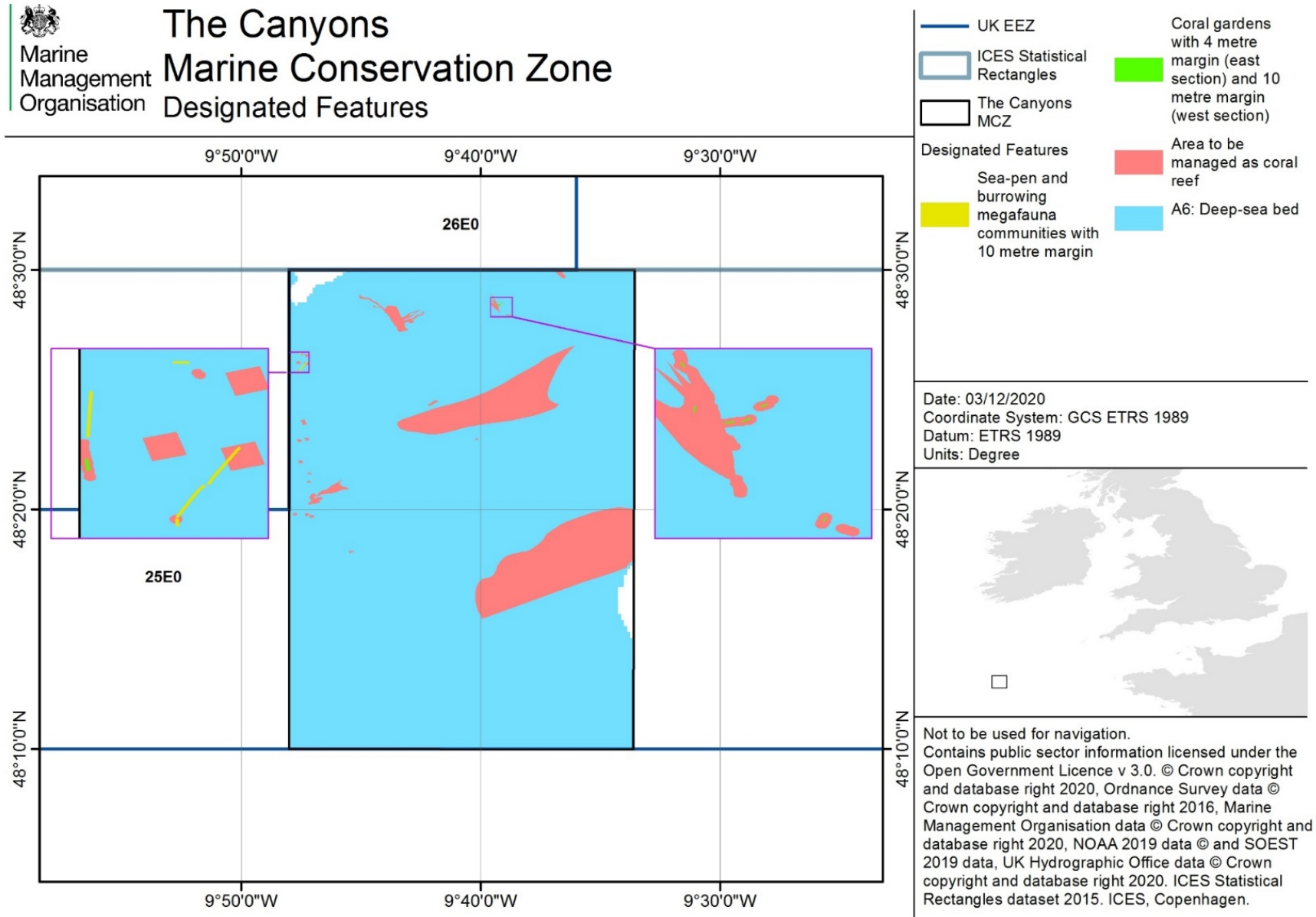
⁴ <https://www.gov.uk/government/collections/south-west-marine-plan>

⁵ <https://www.legislation.gov.uk/uksi/2010/1627/contents/made>

2. Policy objectives and intended effects

- 2.1. The policy objective pertinent to this byelaw is to further the conservation objectives of The Canyons MCZ (Figure 1). This will be achieved by prohibiting certain fishing gears within a specified area of the site (Figure 2).
- 2.2. The intended effects are that the designated features will be returned to favourable condition where the feature condition is deemed unfavourable (deep-sea bed, coral gardens and cold-water coral reefs) and maintained in favourable condition where the feature condition is deemed favourable (sea-pen and burrowing megafauna communities). This will allow compliance with MMO duties under the Marine and Coastal Access Act 2009².
- 2.3. In addition, any negative social and economic impacts of management intervention will be minimised where possible.

Figure 1: The Canyons MCZ Feature map



3. Policy options considered, including alternatives to regulation

3.1. The Canyons Marine Conservation Zone (Specified Area) Prohibited Fishing Gear Byelaw 2022 will manage certain bottom contacting fishing activities over the designated features within The Canyons MCZ. The options for which are detailed below:

Option 0. Do nothing.

This option would not involve introducing any management measures. This option would mean that the risks to the site from damaging activities would not be addressed and that MMO duties under the Marine and Coastal Access Act 2009 with regard to furthering conservation objectives would not be met. All other options are compared to option 0.

Option 1. MMO byelaw to prohibit demersal trawls, demersal seines and dredges, traps and anchored nets and lines in all areas of the site (whole site prohibition).

This option would remove the impact of these fishing activities from all areas of the site. This will help to achieve the conservation objectives of the site and give the best possible chance of restoring the features to favourable condition. However, it would also prohibit fishing activity from occurring in areas of the site where MMO has concluded fishing can continue without undermining the site's conservation objectives.

Option 2. MMO Byelaw to prohibit demersal trawls, demersal seines and anchored nets and lines over a proportion of the site ("zoned management").

This option would prohibit the use of demersal trawls, demersal seines and anchored nets and lines within a specified area of the site to remove any significant risk to the conservation objectives from fishing activities. This option will conserve the site's marine habitats and further the conservation objectives of the MCZ, whilst allowing fishing activities to take place in areas of the site considered less sensitive.

Option 3. Management of activity through a statutory instrument, regulating order or fishing vessel licence condition.

These mechanisms for management are not appropriate in this instance. MMO byelaws, made under powers in the Marine and Coastal Access Act 2009⁶ (including the powers for the English offshore region introduced by the Fisheries Act 2020⁷) are the most appropriate mechanism, providing the appropriate level of power, flexibility, consultation, and speed.

Option 4. No statutory restrictions. Introduce a voluntary agreement.

This option would involve the development of voluntary codes of practice to protect features. MMO has considered this option in light of Better Regulation principles⁸, which require that new regulation is introduced only as a last resort. However, the government's expectation is that management measures for commercial fishing in marine protected

⁶ <https://www.legislation.gov.uk/ukpga/2009/23/contents>

⁷ <https://www.legislation.gov.uk/ukpga/2020/22/contents/enacted>

⁸

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/317555/betterregulationassessment2014.pdf

areas (MPAs) should be implemented through statutory regulation to ensure adequate protection is achieved.

3.2. Option 2 is the preferred option as all other options are not considered appropriate in this instance, as such option 2 is considered in the costs and benefits analysis.

3.3. The boundaries of the management area under option 2 include an appropriate buffer zone. This is to prevent direct damaging physical interactions between adjacent fishing activity and the designated features. Where the sensitive site features exist up to the boundary of the MCZ, the buffer zone extends beyond the boundary of the MCZ within English waters or to the EEZ boundary. The management boundary has also been simplified to aid compliance. The buffer zone therefore extends between 50 and 100 metres (m) from the edge of the feature or to the EEZ boundary.

4. Expected level of business impact

4.1. All costs analysed for option 2 are compared to option 0.

4.2. MMO has used the best available evidence to assess the impact of management option 2, however assumptions have been made in the development of this assessment:

- Estimates of UK landings values derived from within the management area have been provided for the most recent five years available (2016 to 2020). The landings information for relevant gears (bottom towed gears and certain bottom contacting static gears (anchored nets and lines)) is determined from electronic logbooks and apportioned evenly to vessel monitoring system (VMS) fishing records for the corresponding date and ICES rectangle. Therefore, it may not represent the true landings associated with each fishing record.
- VMS data assumes fishing activity from speed of travel. Speeds greater than zero and up to and including six knots are considered fishing speed. This may be an over or underestimate as vessels may tow gear at speeds greater than six knots or may travel at speeds lower than six knots for reasons other than fishing (due to currents, tides etc.).
- All fishing vessels greater than 12 m in length require VMS. There is no evidence to suggest vessels smaller than 12 m in length fish in The Canyons MCZ management area, and the distance from shore makes this unlikely. This assessment therefore assumes that VMS data captures the entirety of the fishing fleet working within The Canyons MZC and therefore costs are estimated only for fishing vessels greater than 12 m.
- Costs estimated for 2020 are unlikely to be representative of typical fishing activity due to the COVID-19 pandemic which likely suppressed fishing activity. As a result, only figures from the years 2016 to 2019 have been used for economic impact calculations.

- Economic costs are estimated using the landings obtained from the MPA and estimated operating profit of those vessels, provided by Seafish. The costs calculated for the management area are therefore determined by the share of the value of landings derived by vessels fishing in the MPA versus overall value of their landings. Due to the few UK vessels fishing via relevant gears in The Canyons MCZ management area, specific operating profits for these vessels could not be provided by Seafish for data protection reasons. Instead, an annual operating profit percentage was calculated for ICES 25E0, and this was applied to the landings derived from The Canyons MCZ management area. The annual operating profit percentage was calculated using the proportion of landings (£) vs operating profit (£) for vessels fishing in ICES Rectangle 25E0 for relevant gears in The Canyons MCZ management area. It should be noted however that these estimates work on the assumption that the costs of vessels are distributed the same way as earnings between all individual vessel's fishing grounds. Seafish produces the dataset by combining costs and earnings information from vessel accounts provided by vessel owners to the annual Seafish UK Fleet Survey with official effort, landings and capacity data for all active UK fishing vessels provided by the MMO.
- Displacement is difficult to quantify, and it is impossible to predict where exactly activities will be displaced to.
- Spillover of fish (due to the management measures) to fishing grounds outside of the management area could provide increased opportunities for fishing outside of the MPA over the longer term; thus, further allowing vessels to offset the costs of lost revenue.
- Estimated costs to the fishing industry are likely to be an overestimate, as vessels are likely to offset some of the lost revenue by fishing in other areas.

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

- VMS data for UK and non-UK vessels from 2016 to 2019 taken from entered logbook and sales note data provided to MMO;
- data from Seafish annual economic performance for the UK fishing fleet from 2014 to 2020⁹.
- information gathered from stakeholders by MMO during the pre-consultation call for evidence October to December 2020 and formal consultation from 1 February to 28 March 2021; and
- local marine officer knowledge.

4.4. Prohibition of the use of bottom towed fishing gears and anchored nets and lines in the management area may result in the following costs:

⁹ <https://public.tableau.com/profile/seafish#!/vizhome/FleetEnquiryTool/1Overview>

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

4.5. Direct costs to the UK fishing industry have been monetised and these estimated values have been collated and presented as part of this RTA (Table 2).

4.6. 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 have been estimated from the data available, see Box 1.

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

4.8. Prohibition of the use of bottom towed fishing gears and anchored net and line fishing gears in the management area may result in indirect benefits to the fishing industry resulting from spillover and other environmental benefits related to the restoration of the habitat.

4.9. The benefits associated with the management measures are difficult to value and are therefore described under non-monetised benefits.

Costs to the UK fishing industry

4.10. 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 nautical miles by 30 nautical miles (size varies with latitude due to the spheroid shape of the Earth). The management areas fall within ICES rectangle 25E0 (Figure 1).

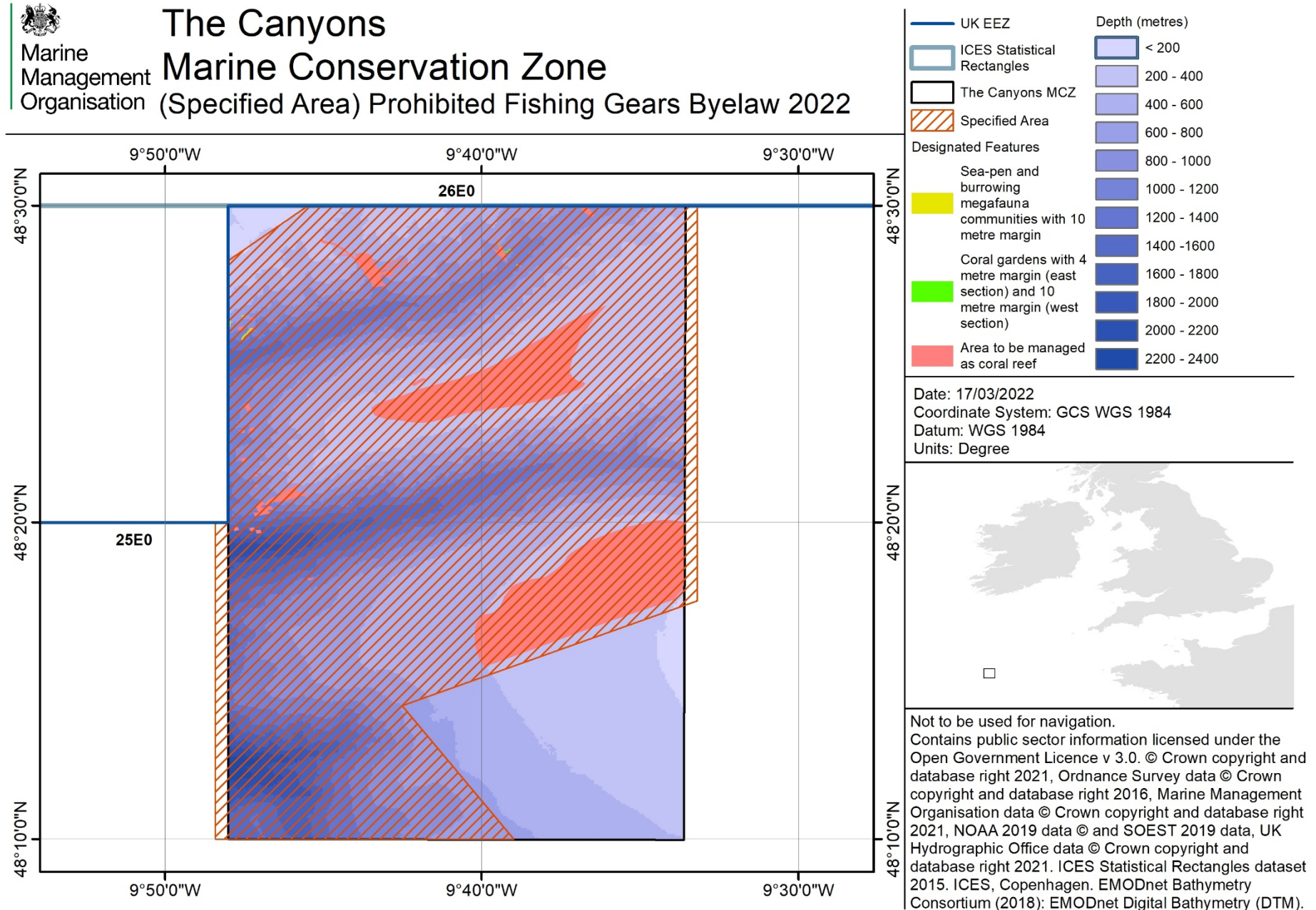
4.11. To estimate the economic impacts of the management, fishing patterns of vessels using bottom towed gear and anchored nets and lines within the management area were analysed. The most recent five years of VMS data and landings available (2016-2020)(Figure 3 – Figure 7) are provided however as detailed previously only years 2016 to 2019 were considered to be suitably representative and therefore are used for the economic analysis.

4.12. The VMS data indicates that limited UK fishing activity has occurred in The Canyons MCZ management area from 2016 to 2020 using bottom towed fishing gear and anchored net and line gears (Figure 3 to Figure 7). Fishing activity throughout the site is mostly bottom towed gear and long lines with the main gear types being bottom otter trawls, anchored lines and set longlines.

4.13. The VMS data show 6 distinct UK bottom towed gear vessels with landings attributed to fishing activity in The Canyons MCZ management area between 2016 and 2019 (Table 3).

- 4.14. The 2016-2020 UK VMS landings data also show a decline in the weight and value of landings derived via bottom towed fishing gear and anchored nets and lines from the management area (Table 1 and Table 2).
- 4.15. The 6 vessels with landings recorded from relevant gears between 2016 and 2019 (Table 3) landed approximately 54 tonnes of fish and shellfish in the management area (Table 1) worth approximately £100,000 (Table 2).
- 4.16. Between 2016 and 2019 UK landings from the management area from bottom towed fishing gear and anchored nets and lines averaged 14 tonnes (£25,440) but have ranged from 0.5 tonnes (£807) in 2018 to 37 tonnes (£81,541) in 2017 (Table 1 and Table 2).
- 4.17. In terms of operating profit, between 2016 and 2019 UK vessels fishing with relevant gear types within The Canyons MCZ management area are estimated to have earned approximately £14,230 with an annual average of £3,557 (Table 2).
- 4.18. The closure of fishing grounds can lead to significant displacement of fishing effort which can result in a range of costs. Displacement is dependent on the intensity and distribution of fishing activities within the site before the closure and on external factors (such as fish distribution, total allowable catch/quota, fuel prices).

Figure 2: The Canyons MCZ management



Box 1. Non-UK fishing vessels

Fishing vessels registered in countries other than the UK ('non-UK vessels') may also have access to fish in The Canyons MCZ.

It is estimated that 78 non-UK vessels fished regularly in The Canyons MCZ management area with relevant gears (bottom towed gears and anchored nets and lines) between 2016 and 2019 (Table 7).

Non-UK landings data are only available for vessels from EU member states. Landings cannot be estimated for other nations, such as European Free Trade Association (EFTA) (Iceland, Liechtenstein, Norway and Switzerland) and have therefore not been included. For non-UK non-EU nations, MMO has no evidence of these nations operating in The Canyons MCZ management area with relevant gears.

Estimates of fisheries landings values by EU vessels using relevant gears were determined using landings data provided by the European Commission Scientific, Technical and Economic Committee for Fisheries (STECF) for the ICES rectangle 25E0 over which The Canyons MCZ overlaps (Figure 1) and the proportion of EU VMS fishing activity (based on the number of VMS reports) occurring in The Canyons MCZ management area for ICES rectangle 25E0 (Table 7). This provided an estimate of EU landings derived from the management area for the years 2016 to 2019 (Table 4 and Table 5). Landings data for 2020 data are not currently available for EU vessels.

Between 2016 and 2019, an annual average of approximately £1,029,314 was estimated to be derived from the management area by EU vessels using relevant gears (Table 5). Using the scenario that 100% of these landings are lost, and applying a discounting rate of 3.5%, the net present value cost over the 10-year life of the RTA to non-UK vessels is estimated to be £8,860,012.

It is important to note that in contrast to the estimated costs to UK fishing vessels, estimated costs to EU vessels are based on the values of fish landed (Table 5), rather than operating profit, which was not available for EU vessels. The costs to EU vessels are therefore considerably overestimated as the costs are based solely on revenue from landings rather than operating profit. Furthermore, as per UK vessels, non-UK vessels are likely to offset some of their lost revenue by fishing in other areas.

For comparison of impacts between UK and EU nations the most appropriate figures are contained in the weight and value columns of Table 1, Table 2, Table 4 and Table 5.)

For completeness, Table 6 presents best and worst-case landings scenarios where the best-case scenario assumes no relevant gear landings from within the ICES rectangles were derived from the management area and the worst-case scenario assumes all relevant gear landings from the ICES rectangles were derived from within the management area.

Figure 3: 2016 VMS Fishing Activity by Gear Type in The Canyons MCZ

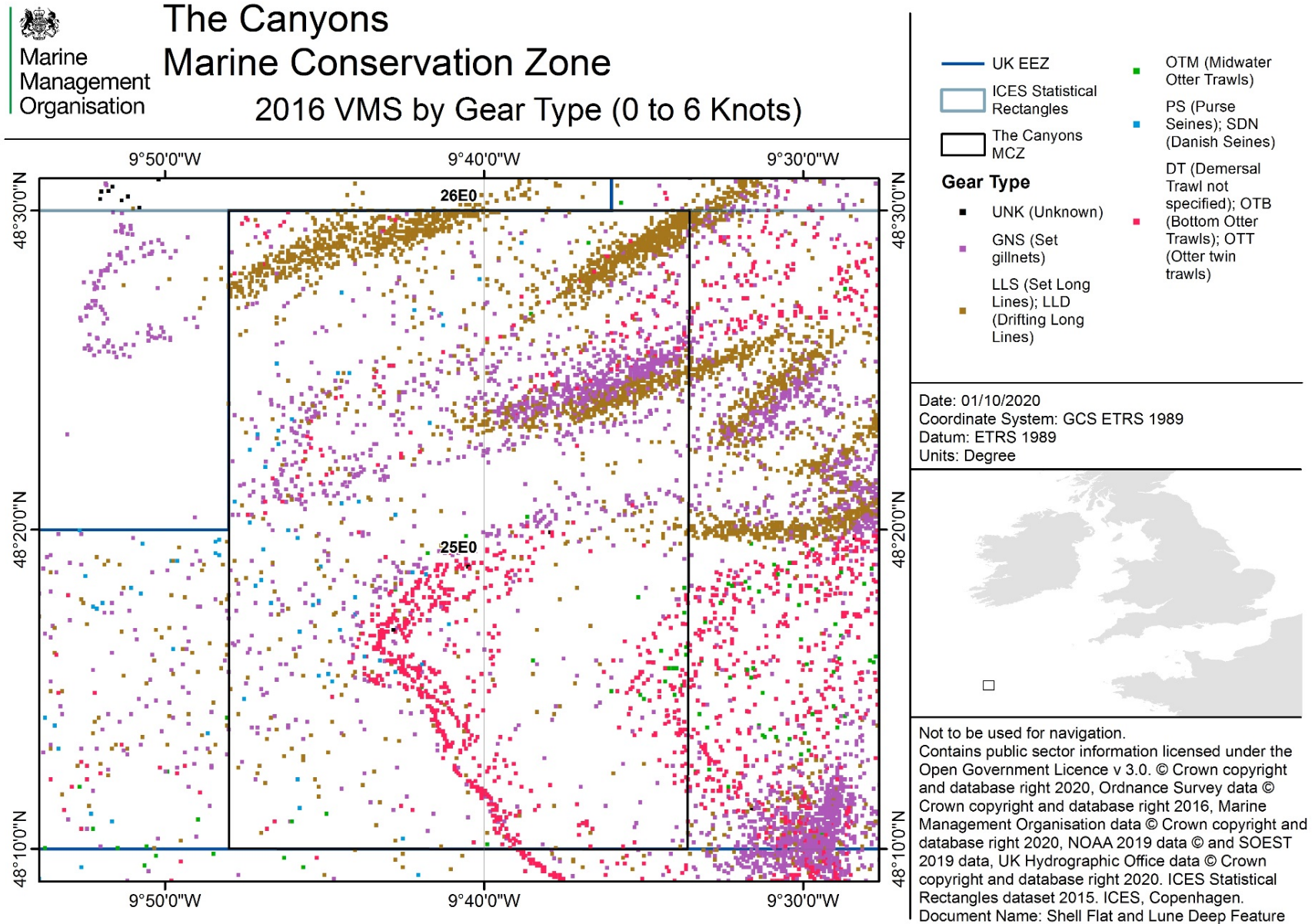


Figure 4: 2017 VMS Fishing Activity by Gear Type in The Canyons MCZ

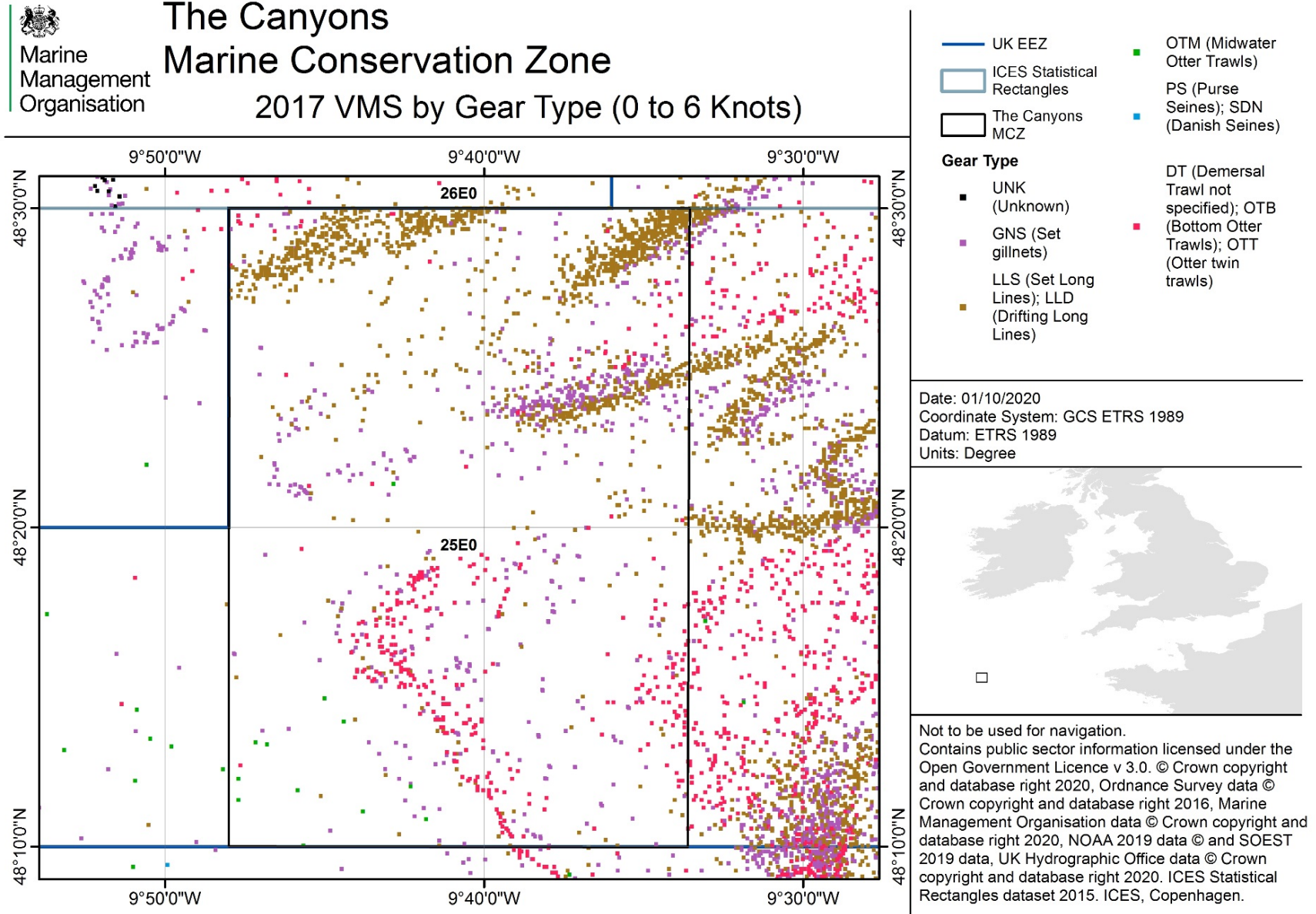


Figure 5: 2018 VMS Fishing Activity by Gear Type in The Canyons MCZ

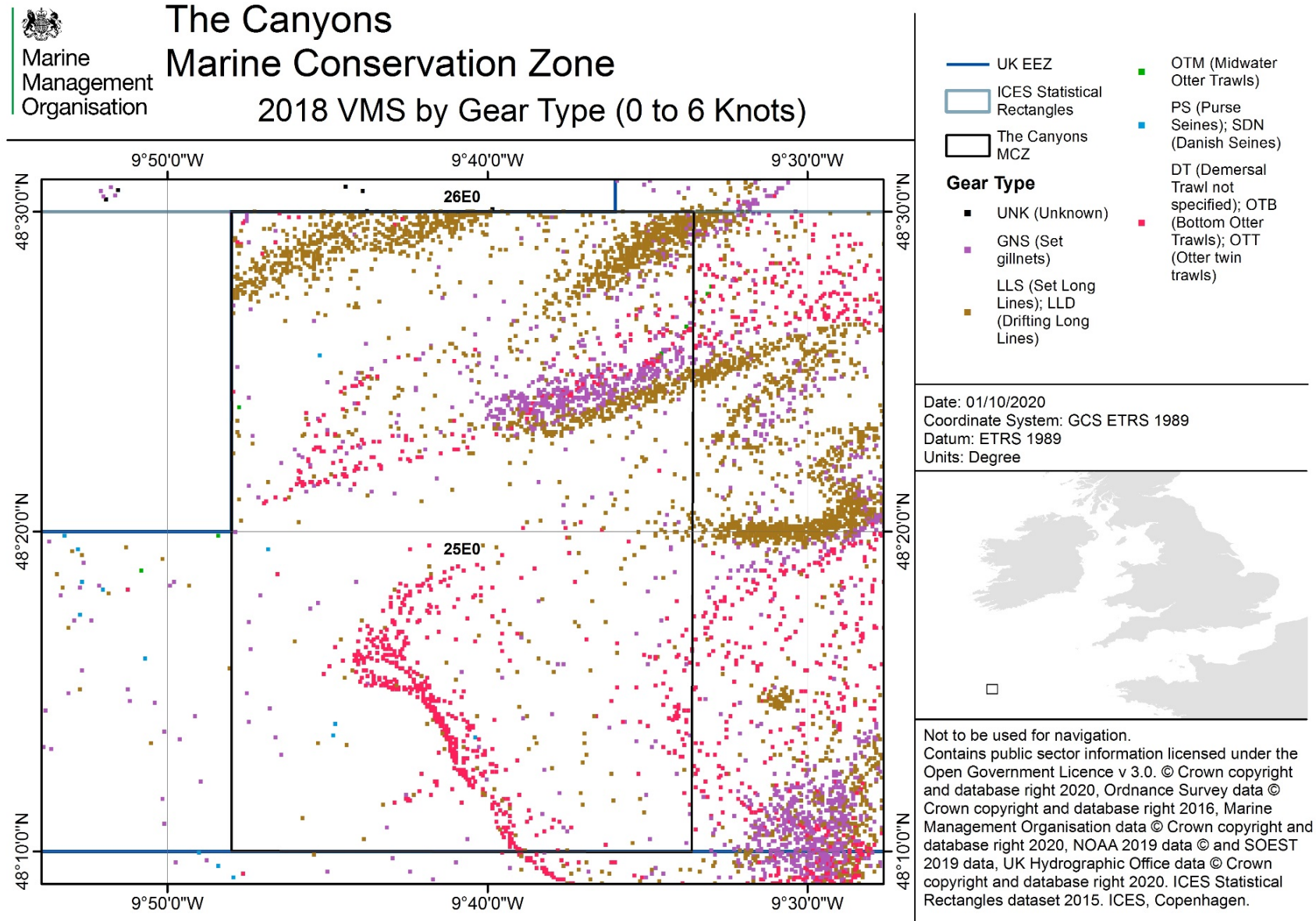


Figure 6: 2019 VMS Fishing Activity by Gear Type in The Canyons MCZ

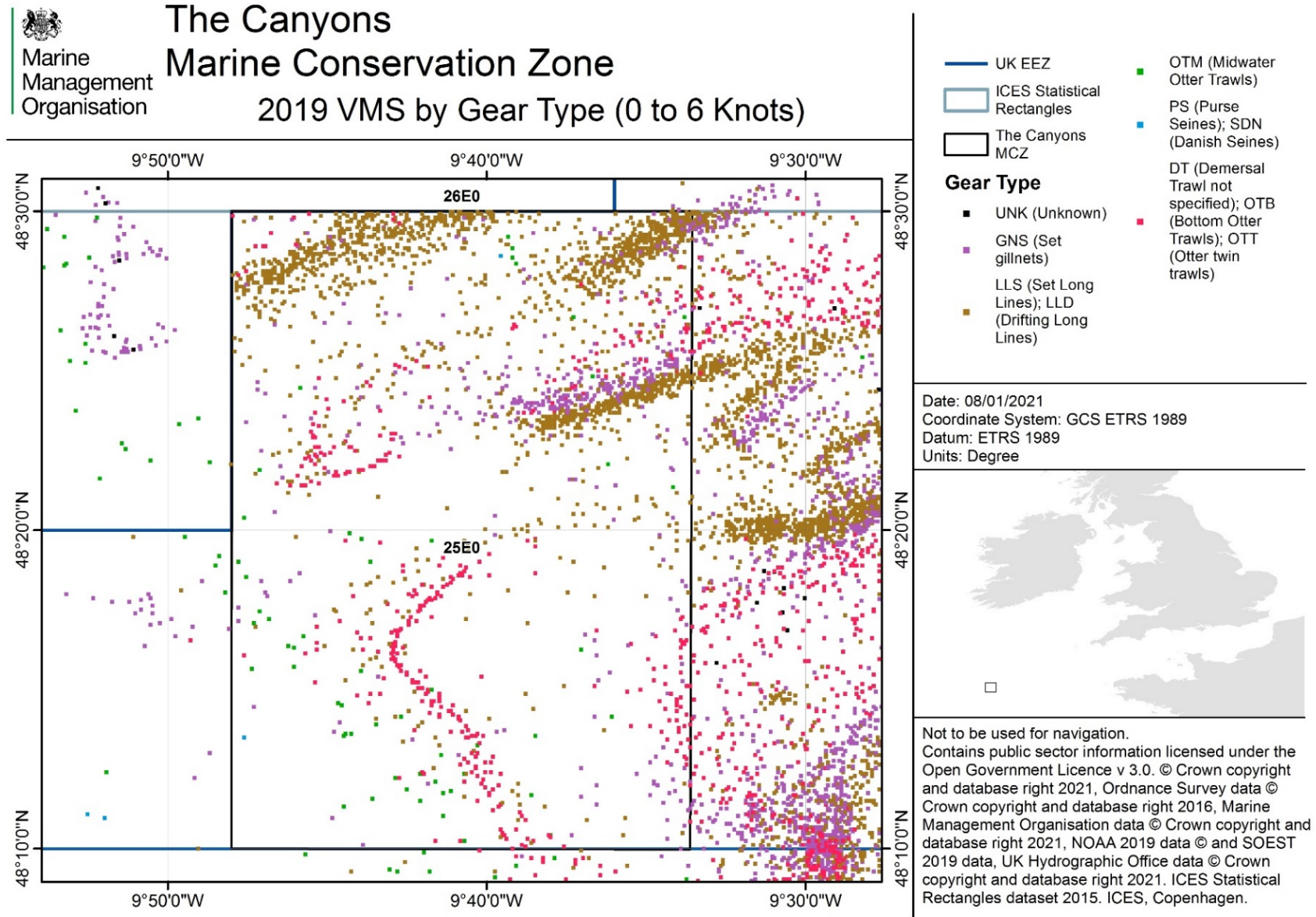


Figure 7: 2020 VMS Fishing Activity by Gear Type in The Canyons MCZ

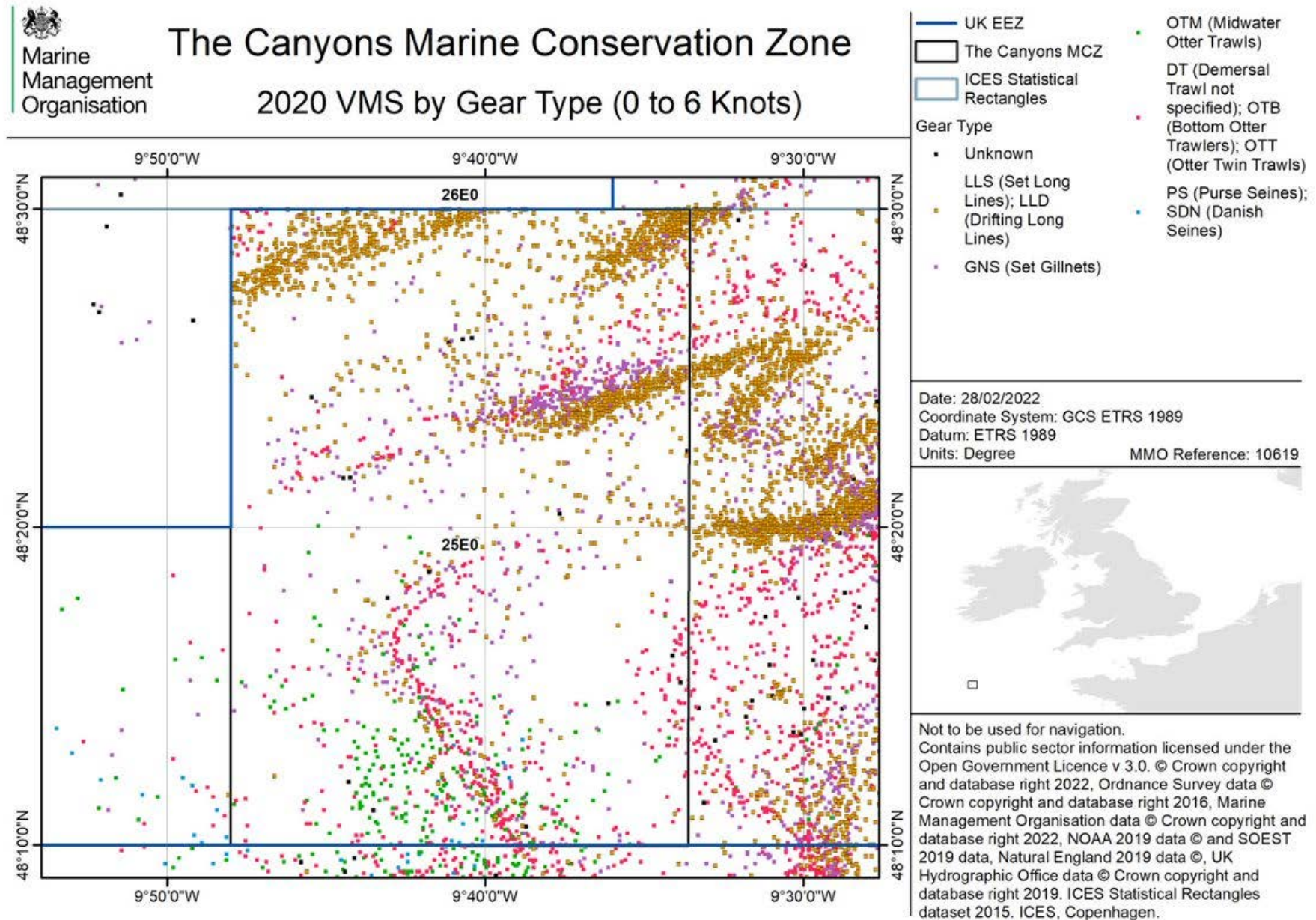


Figure 8: 2016 VMS Fishing Activity by Nationality in The Canyons MCZ

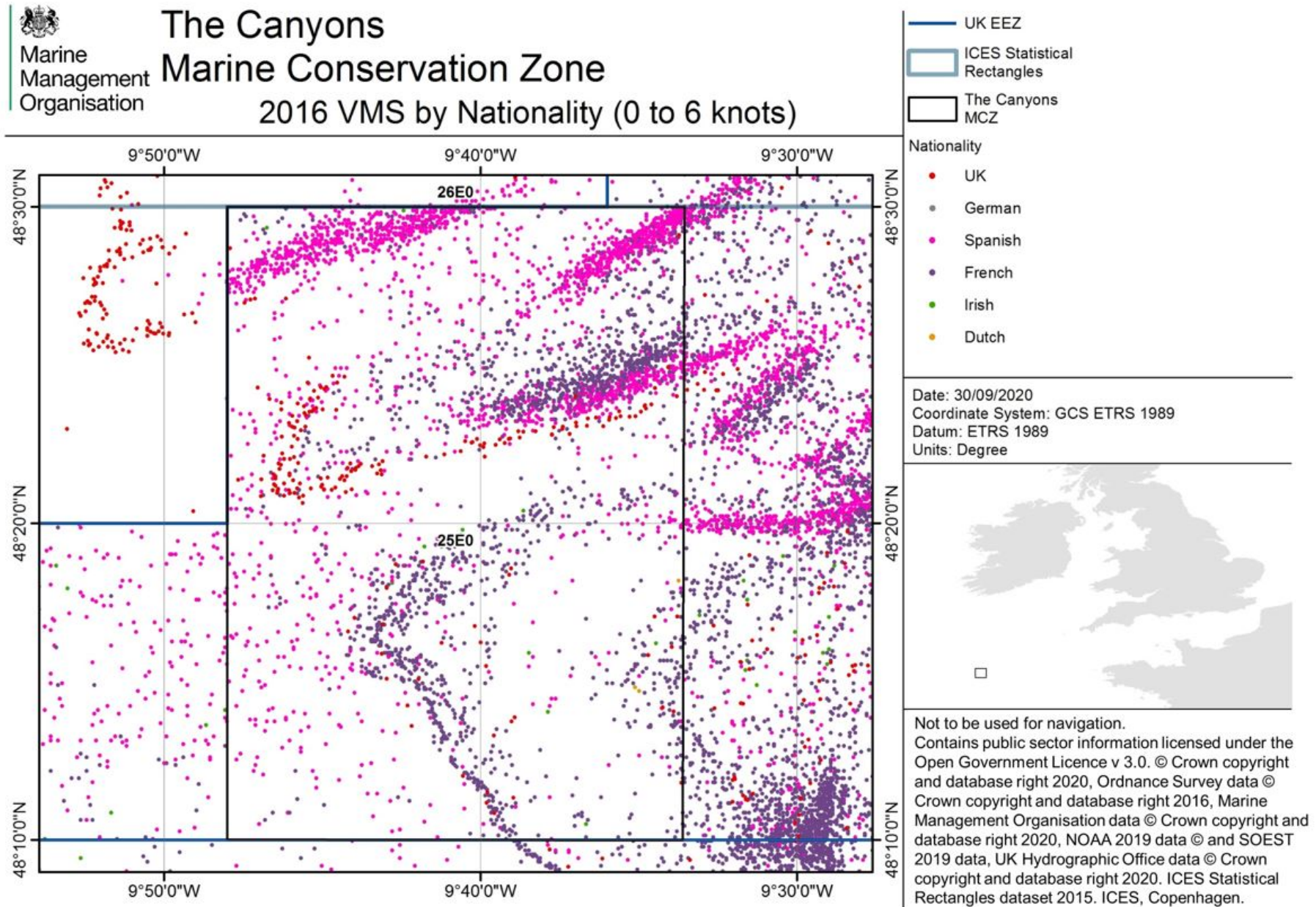


Figure 9: 2017 VMS Fishing Activity by Nationality in The Canyons MCZ

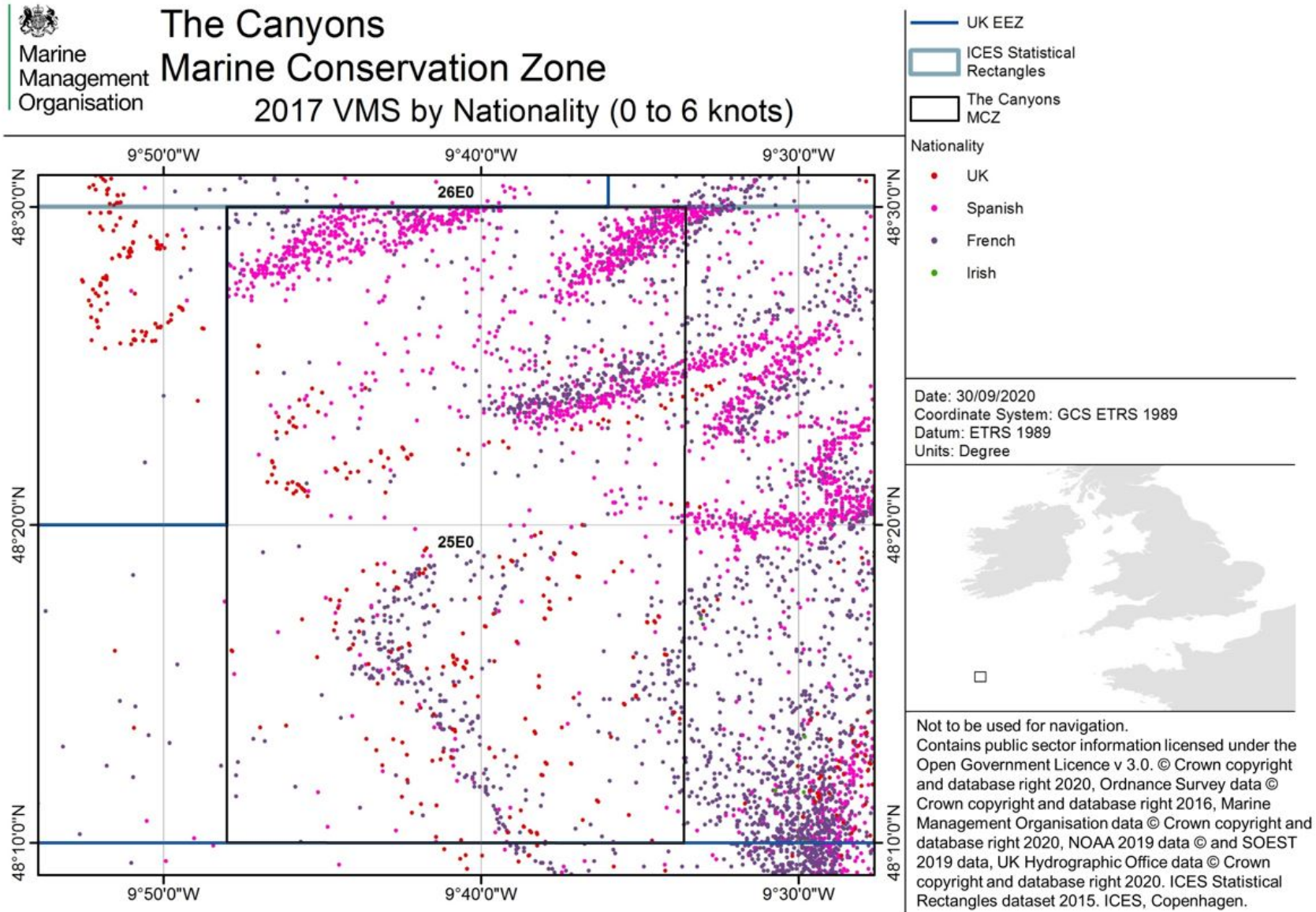


Figure 10: 2018 VMS Fishing Activity by Nationality in The Canyons MCZ

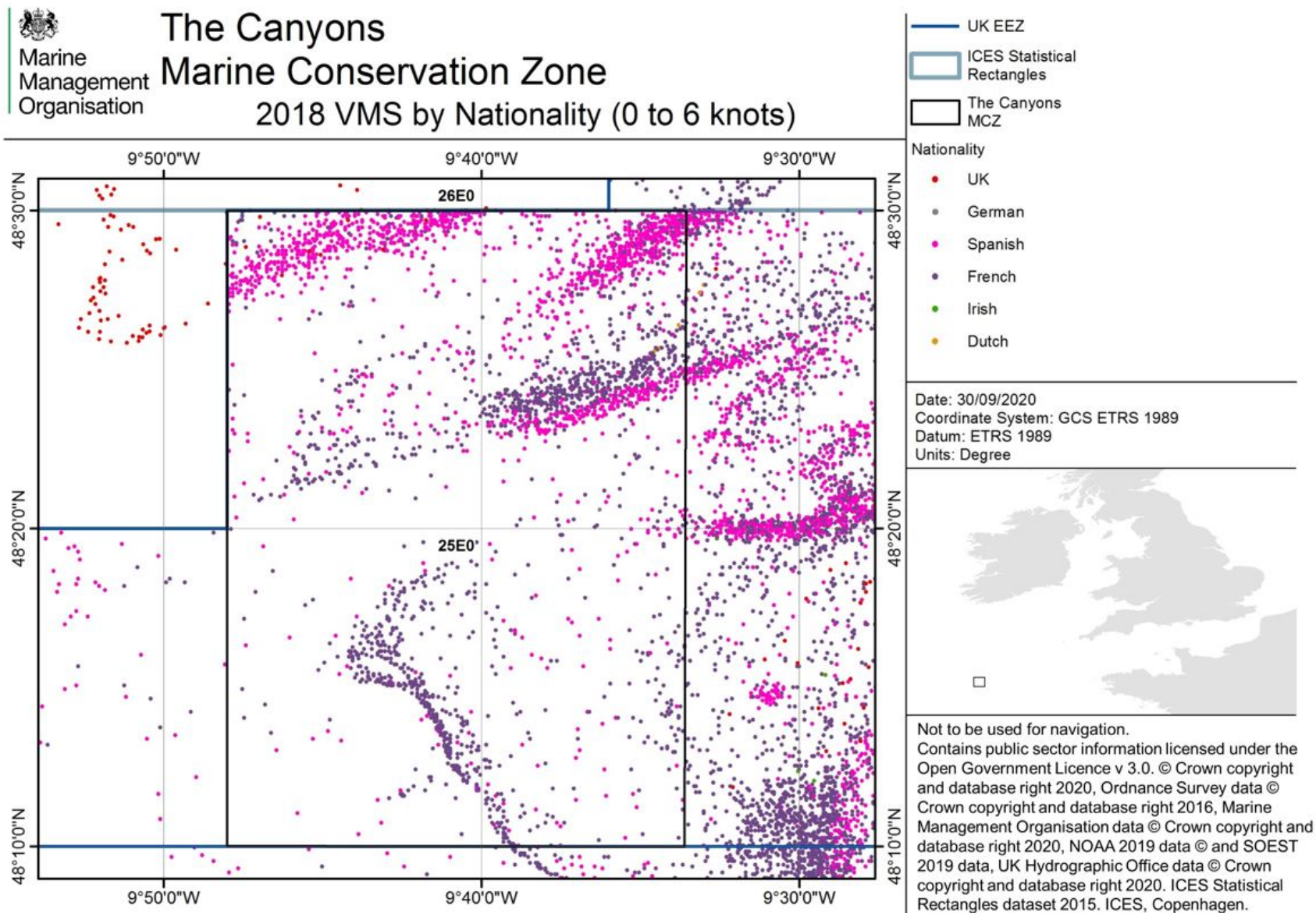


Figure 11: 2019 VMS Fishing Activity by Nationality in The Canyons MCZ

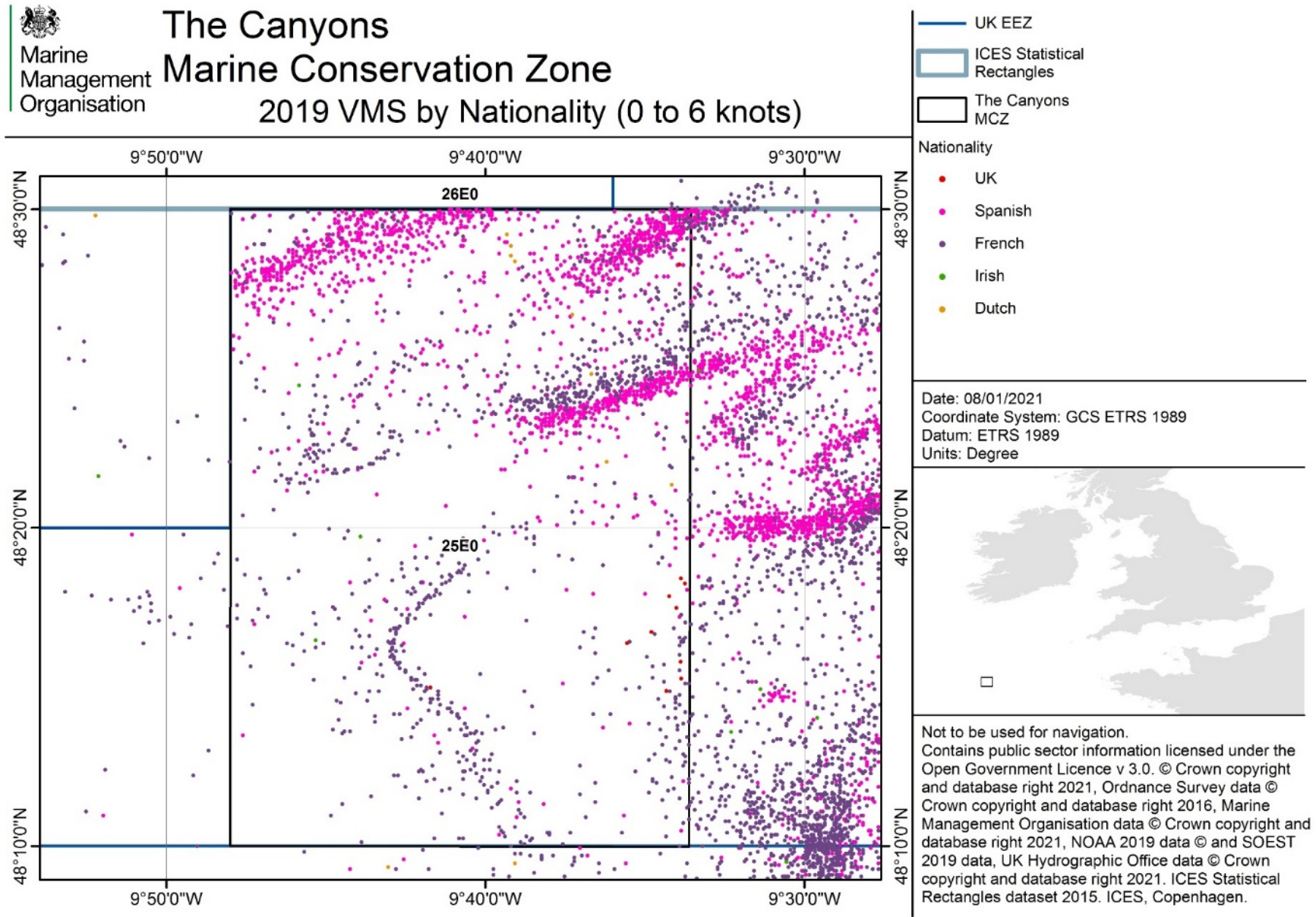
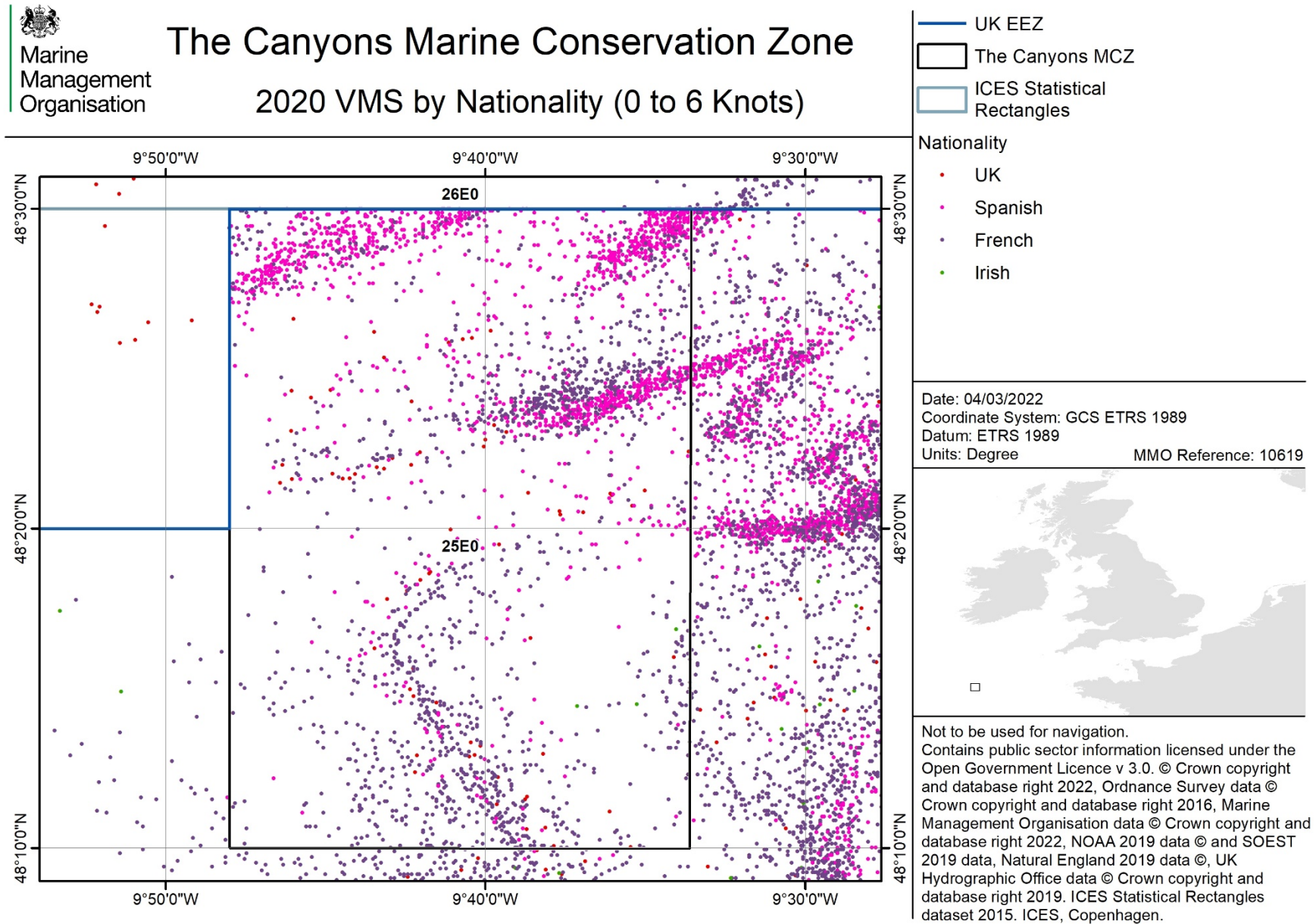


Figure 12: 2020 VMS Fishing Activity by Nationality in The Canyons MCZ



Compliance costs

- 4.19. MMO compliance action is intelligence-led and risk-based in accordance with the National Intelligence Model¹⁰. Where intelligence suggests non-compliance or a risk of non-compliance with the byelaw, compliance resources will be deployed accordingly. This may include a Royal Navy fisheries patrol vessel presence, MMO fisheries patrol vessel presence or joint operations with other agencies (for example the Border Force or the Environment Agency). Joint operations are not monetised here as they are requested on an *ad hoc* basis and costs can vary. MMO will coordinate any joint operations. The principles by which MMO will regulate marine protected areas are set out by the Legislative and Regulatory Reform Act 2006¹¹ and the Regulators' Compliance Code¹² and aim to ensure that MMO is proportionate, accountable, consistent, transparent and targeted in any compliance action it takes.
- 4.20. Compliance costs for the inspection of MPAs and associated byelaws do not represent an additional cost. MPA inspections take place under standard operating procedure of Royal Navy/MMO fisheries patrol vessels. MPA and byelaw inspection costs are therefore absorbed by existing fisheries compliance systems and will not be considered here.

Total monetised costs

- 4.21. The economic impacts of the management area are estimated as the loss of profitability of fishing effort at the site. For UK vessels, this is informed by data on potential activity within the area and from the 2016-2019 Seafish data on the profitability of fishing¹³. This operating profit combines cost and earning information provided by the vessel owners to the annual Seafish UK Fleet Survey with official landings and capacity data for vessels actively fishing within the management area provided by MMO.
- 4.22. To estimate the total monetised cost over ten years for the 6 UK vessels likely to be affected, an estimation has been made of the annual value of their landings (by relevant gear types) derived from the management area (Table 2) and the estimated operating profit earned from these landings as provided by Seafish.
- 4.23. A discount rate of 3.5% was applied to calculate the present value and 2019 was used as the price base year. The best estimate of highest net 2020 present value cost over ten years to the UK fishing industry of introducing management is estimated to be £30,617.

¹⁰ Association of Chief Police Officers (2005) Guidance on the national intelligence model.

¹¹ <https://www.legislation.gov.uk/ukpga/2006/51/contents>

¹² <https://www.gov.uk/government/publications/regulators-code>

¹³ <https://public.tableau.com/profile/seafish#!/vizhome/FleetEnquiryTool/1Overview>

Table 1: 2016 – 2020 UK landings (metric tonnes) from relevant gears in The Canyons MCZ management area (GN – Gill Nets (unspecified), GNS - Set Gill Nets, LLS – Set Longlines, OTB – Bottom Otter Trawl.) No landings were recorded for other bottom-contacting gears (derived from UK VMS). 2020 data has not been included in annual averages as due to the COVID-19 it is unlikely to represent a typical year of fishing activity.

Gear	Year					Annual Average (2016-2019)	Total Landings (2016-2019)
	2016	2017	2018	2019	2020		
GN	0	0	0	1	0	0	1
GNS	16	34	0	0	2	12	50
LLS	0	0	0.5	0	0	0	0
OTB	0	3	0	0	0.1	1	3
Total	16	37	0.5	1	2	14	54

Table 2: 2016 – 2020 UK landings by value (£) and operating profit (£) from relevant gears in The Canyons MCZ management area. (GN – Gill Nets (unspecified), GNS -Set Gill Nets, LLS – Set Longlines, OTB – Bottom Otter Trawl). No landings were recorded for other bottom-contacting gears (derived from UK VMS). 2020 data has not been included in annual averages as due to COVID-19 and the scalloping activity it is unlikely to represent a typical year of fishing activity.

Gear	Year					Annual Average (2016-2019)	Total Landings (2016-2019)
	2016	2017	2018	2019	2020		
GN	0	0	0	3,113	0	778	3,113
GNS	15,994	69,649	0	0	6,255	21,411	85,644
LLS	0	0	807	0	0	202	807
OTB	0	11,892	0	303	0	3,049	12,194
Total	15,994	81,541	807	3,416	6,255	25,440	101,758
Operating Profit*	4,598	9,106	73	453	-116	3,557	14,230

*Operating profit values are recalculated to real 2020 price level. As detailed in section 4.2 operating profits have been calculated by applying an operating profit % (derived from vessels and associated landings using bottom-contacting gears in ICES 25E0) to the VMS landings derived from The Canyons MCZ management area.

Table 3: Number of distinct UK fishing vessels using relevant gears in The Canyons MCZ management area 2016-2020

	Year					Grand Total (2016 – 2019)	Annual average (2016-2019)
	2016	2017	2018	2019	2020		
Number of vessels	1	3	1	2	1	6	2

Table 4: 2016 – 2019 EU landings by weight (metric tonnes) from different nationalities by relevant gears in The Canyons MCZ management area. Landings were estimated using the percentage of VMS fishing activity (number of pings) occurring in the management area versus the ICES rectangle (for a given year and gear type). The estimate assumes all VMS activity data is reported at two hourly intervals. Values represent landings by bottom towed fishing gear and anchored net and line gears in the management area. Gear codes are assigned to EU landings using the primary licence gear listed on the fleet register, thus, the gear listed on the fleet register is assumed to represent the gear type used.

Nationality	Landings (t) by year				Annual average landings (2016 – 2019) (t)	Total landings (2016 – 2019) (t)
	2016	2017	2018	2019		
Germany	0	0	0.16	0	0.04	0.16
Spain	491	236	238	240	301	1,205
France	317	136	251	139	211	843
Ireland	0	0	0	0	0	0.15
All EU	807	372	489	379	512	2,048

Table 5: 2016 – 2019 EU landings by value (£) from different nationalities in The Canyons MCZ management area. Landings were estimated using the percentage of VMS fishing activity (number of pings) occurring in the management area versus the ICES rectangle (for a given year and gear type). The estimate assumes all VMS activity data is reported at two hourly intervals. Values represent landings by relevant gear types (bottom towed fishing gear and anchored net and line gears) in the management area. Gear codes are assigned to EU landings using the primary licence gear listed on the fleet register, thus, the gear listed on the fleet register is assumed to represent the type used. Values were converted from euros (€) to pounds sterling (£) using annual average exchange rates, and are not adjusted for inflation (i.e., landing represent the value of fish at the time of landings).

Nationality	Landings (£) by year				Annual average landings (2016 – 2019) (£)	Total landings (2016 – 2019) (£)
	2016	2017	2018	2019		
Germany	0	0	502	0	125	502
Spain	394,028	179,053	760,895	778,904	528,220	2,112,880
France	697,072	294,005	653,966	358,301	500,836	2,003,345
Ireland	0	0	0	530	132	530
All EU	1,091,100	473,058	1,415,363	1,137,735	1,029,314	4,117,256

Table 6: 2016-2019 best-case and worst-case EU landings by weight (metric tonnes) and value (£). The best-case scenario assumes that no landings attributed to the ICES rectangle (for relevant gears) were derived from The Canyons MCZ management area. The worst-case scenario assumes that all landings from relevant gears from within the ICES rectangles are derived from the management area. Both scenarios contrast with Table 4 and Table 5 (landings estimated using the proportion of VMS fishing activity in the management area versus the rectangle). Values represent landings by bottom towed fishing gear and anchored net and line gears for all EU member states. Landings values were not available for European Free Trade Association member states.

	2016		2017		2018		2019		Annual average landings (2016 – 2019)		Total landings (2016 – 2019)	
	Weight (t)	Value (£)	Weight (t)	Value (£)	Weight (t)	Value (£)	Weight (t)	Value (£)	Weight (t)	Value (£)	Weight (t)	Value (£)
Worst-case	3,083	4,735,962	2,233	3,325,283	2,402	7,095,008	2,032	6,050,050	2,437	5,301,576	9,750	21,206,303
Best-case	0	0	0	0	0	0	0	0	0	0	0	0

Table 7: 2016-2020 Non-UK VMS proportional activity (%) and number of unique vessels with regular fishing activity via relevant gears in The Canyons MCZ management area. Vessels with regular fishing activity are considered as those with more than 12 VMS reports in a year. Proportions were estimated using the (number of pings) occurring in the management area per nationality (for a given year). These differences are why there may be activity proportion figures for nationalities/years but 0 vessels. The estimate assumes all VMS activity data is reported at two hourly intervals. Gear codes are assigned to EU landings using the primary licence gear listed on the fleet register, thus, the gear listed on the fleet register is assumed to represent the type used. There is no VMS evidence of non-UK, non-EU nations fishing in The Canyons MCZ management area. For comparison with UK data, 2020 has not been included in total and the annual average data columns.

Nationality	2016		2017		2018		2019		2020		2016-2019		
	Activity (%)	Number of Vessels	Activity (%)	Number of Vessels	Activity (%)	Number of Vessels	Activity (%)	Number of Vessels	Activity (%)	Number of Vessels	Annual average activity (%)	Total Number of Vessels	Annual Average Number of Vessels
Germany	0	0	0	0	25	0	0	0	0	0	6	0	0
Spain	48	36	48	24	35	24	44	23	47	21	44	53	27
France	52	16	52	8	40	15	50	10	53	14	49	25	12
Ireland	0	0	0	0	0	0	6	0	0	0	1	0	0
Total	-	52	-	32	-	39	-	33	-	35	-	78	39

Non-monetised costs

4.24. The prohibition of bottom towed gears and anchored nets and lines across The Canyons MCZ could lead to the displacement of these fishing activities increasing pressure on habitats outside of the site. Displacement of fishing to other sensitive habitats could therefore reduce the overall conservation benefits of option 2. However, the location (and thus the associated environmental costs) of displaced fishing activity is unclear. The MMO fisheries assessment of The Canyons MCZ indicates that bottom towed gears and anchored nets and lines are adversely affecting the designated features. As such, the potential impact of displacement to areas outside of The Canyons MCZ does not remove the requirement to ensure that fishing is managed to further the conservation objectives of The Canyons MCZ.

Non-monetised benefits

4.25. The site is unique within the context of England's largely shallow seas due to its depth, sea-bed topography and the coral features it contains; the site is the only MCZ designated for coral gardens and cold-water coral reefs. There are two large canyons within the site, which add to its topographic complexity: the Explorer Canyon to the north and the Dangeard (also known as Dangaard) Canyon running east to west along the central part of the site¹⁴. Cold-water coral reefs (*Lophelia pertusa*), an OSPAR threatened and/or declining habitat, have been found on the northernmost wall of the Explorer Canyon, which is the only known example recorded within English waters¹⁵.

4.26. Prohibition of the use of bottom towed fishing gear and anchored lines and nets within the management area will contribute to the protection of a number of features designated in the site. This in turn will support provision of the ecosystem services provided by those features. The deep-sea bed, sea-pens and burrowing megafauna, cold-water coral reef and coral gardens, contribute towards (Fletcher *et al.*, 2012):

- Biogeochemical cycling - Deep-sea beds have a profound involvement in global biogeochemical processes and nutrient regeneration, which in turn sustain primary and secondary oceanic production. At the deep-sea bed there is considerable sedimentation of organic matter. In addition, chemical energy is released and converted into organic matter around hydrothermal vents and cold seeps (van de Velde *et al.*, 2018). Bioturbation is the process of nutrient cycling in deep-sea beds and creates a much more of a productive layer immediately around the beds in comparison with deep-sea pelagic habitats. Waste absorption and detoxification are important processes, as marine organisms store, bury and transform waste materials through assimilation and chemical transformation;
- Food web dynamics – The deep-sea bed has few trophic levels and often relies on primary production that is external to the system. Available energy resources are also increasingly supplemented by fisheries discards, which create carrion for benthic scavengers (Carroll *et al.*, 2017).;
- Species diversification and formation of species habitat – The seabed itself is not thought to be associated with high species diversity but has errant megafauna dominated by echinoderms and to a lesser extent decapoda, or bottom-dwelling fish. At the top of

¹⁴ <https://jncc.gov.uk/our-work/the-canyons-mpa/#summary>

¹⁵ https://webarchive.nationalarchives.gov.uk/20101014085102/http://www.searchmesh.net/PDF/SWCanyons_Final_Report_v1.4_final.pdf

seamounts, corals, sea pens, sponges, and brachiopods flourish. Pelagic and benthopelagic fish species are found at seamounts as are gorgonian sea fans and there is often significant endemism in seamount fauna. The biological diversity of cold-water coral reef communities can be three times as high as the surrounding soft sediment. For example, studies of the biodiversity of cold-water coral reefs indicate increased megafaunal diversity occurs “on-reef” compared to “off-reef” (Jensen and Frederiksen 1992 cited in Roberts *et al.*, 2008).;

- Genetic diversification - Novel and uncultured bacterial lineages dominate deep-sea beds. Deep-sea genetic diversity is being exploited by the new blue biotechnology industry (Pfannkuche *et al.*, 2009);
- Climate regulation - The deep-sea bed acts as an unrivalled reservoir (up to 30%) for sequestration of CO₂. Gas and climate regulation provided by the deep sea includes the maintenance of the chemical composition of the atmosphere and the oceans, for example via the “biological pump”, which transports carbon absorbed during photosynthesis into the deep seas. Methanotrophic microbes in the ocean floor and waters control almost all of the oceanic methane emission (Reeburgh, 2007);
- Secondary biomass production – the microbial community and the symbiotic macrofauna of hydrothermal vents and cold-seeps are the key components of secondary production, however, the processes that lead to secondary production are poorly understood (Jorgensen and Boetius, 2007);
- Formation of species habitat – cold-water coral reefs create complex three-dimensional structures providing space and refuge for a diverse community of organisms. Cold water *L. pertusa* reefs are thought to act as both breeding grounds for commercially targeted fish species and provide hunting territory for predatory demersal fish species; and
- Formation of physical barriers - similar to warm water coral reefs, *L. pertusa* reefs create structural habitats that alter local hydrology. For example, on the Mingulay Reef Complex of *Lophelia* reefs, located in the Sea of Hebrides off the west coast of Scotland, current speeds and turbidity are spatially structured (i.e. differ between the top and the base of the reef) due to the interplay between reef topography and local hydrography (Davies *et al.*, 2009 cited in Henry *et al.*, 2009).

Recommended Management Option

Following the above assessment, the recommended management option is Option 2: MMO byelaw to prohibit the use of bottom towed fishing gears and anchored nets and lines in a specified area within the site, with an appropriate buffer.

Conclusion

Within this RTA, the MMO have considered the impacts on commercial fishing vessels of the proposed closure to bottom towed gears and anchored nets and lines in a specified area of The Canyons MCZ. Based on operating profits, within The Canyons MCZ management area, the equivalent annual net direct cost to business (EANDCB) for UK vessels is £3,557. Costs to UK vessels were estimated by combining landings data with vessel monitoring system data (for vessels over 12 m in length) and operating profit calculations from Seafish.

Estimates of fisheries landings values by EU vessels using bottom towed gear and anchored nets and lines were determined using landings data provided by the EU STECF. VMS was used to estimate the proportion of VMS reports in the management area compared to the ICES rectangle which intersects The Canyons MCZ and the management area. The 2016 to 2019 annual average of landings value from EU vessels using bottom towed gear and anchored nets

and lines was estimated to be £1,029,314. It should be noted that the costs presented for EU vessels are not directly comparable to the costs presented for UK vessels, and are likely to be an overestimate, as they are based on total value landed rather than operating profit. For comparison of impacts between UK and EU nations the most appropriate figures are contained in the weight and value columns of Table 1, Table 2, Table 4 and Table 5.

As outlined in sections 1.1 and 1.2, the MMO have legal responsibilities to further, or least hinder, the conservation objectives of MCZs. The MMO assessment of fishing activities within The Canyons MCZ determined that management measures to prohibit the use of bottom towed gears and anchored nets and lines across a specified area of the site are required to further the conservation objectives of the site.

Given the conservation objectives of the MCZ, MMO has concluded that the proposed measures are the most appropriate way to manage fishing in the MCZ. As outlined in section 4.7, prohibition of the use of bottom towed fishing gear and anchored nets and lines in the management area may result in indirect benefits to the fishing industry resulting from spillover and opportunities for other fisheries, as well as other environmental benefits related to the restoration of the habitat.

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