NEAFC request on Other Effective Area-Based Conservation Measures in relation to long-term biodiversity/ecosystem benefits of NEAFC's closed areas and areas restricted to bottom fishing

Advice summary

Please note: This advice was updated in December 2023 (ICES, 2023c)

ICES advises that the VME closures in NEAFC regulatory areas (RAs) achieve long-term sustained *in situ* biodiversity/ecosystem benefits as long as these closures remain in place. All VME closures in NEAFC RAs contain biodiversity attributes as articulated in the guidance of the Convention on Biological Diversity (CBD), Decision 14/8, Annex III, Section B (CBD, 2018).

ICES advises that the restricted bottom fishing areas in NEAFC RAs achieve *in situ* biodiversity/ecosystem benefits as long as no bottom fishing activities occur. NEAFC RA 1, RA 2, and RA 3 contain biodiversity attributes as articulated in the CBD guidance (CBD, 2018, Annex III, Section B). The restricted bottom fishing areas are potentially opened to exploratory fishing. Any bottom fishing in these areas may preclude them from satisfying sustained governance for long-term biodiversity benefits.

ICES conducted a comprehensive review of the evidence sources available and relevant to evaluate the biodiversity/ecosystem benefits of NEAFC management measures for VME closures and restricted bottom fishing areas. ICES is not aware of any additional information currently available for NEAFC RAs. Other information of relevance may be available for other regions.

ICES advises that the current maximum fishing depth with bottom contacting gears in NEAFC RAs is around 1 400 m. The observed maximum fishing depth is not restricted by current management measures, and it is likely that technical and economic considerations are currently the limiting factor. The potential maximum bottom fishing depth can technically exceed 1 400 m. ICES is not aware of any fisheries resources that would support an economically viable commercial bottom fishery at such depths in NEAFC RAs.

ICES advises that, if physical attributes such as a bottom depth limit are to be used to inform the definition of OECMs, they should be used in conjunction with evidence of biodiversity attributes to achieve long-term biodiversity/ecosystem benefits.

Request

ICES is requested to:

1) advice on the (existing) long-term biodiversity/ecosystem benefits of NEAFC's closed areas and restricted bottom fishing areas according to NEAFC Recommendation (9:2014).

2) advice on other current potential evidence sources to provide further support to the OECM biodiversity benefits narrative, in addition to those provided by NEAFC's MCS evidence.

3) advice on potential maximum depths of bottom fishing.

Elaboration on the advice

Advice on long-term biodiversity/ecosystem benefits of NEAFC's closed areas and restricted bottom fishing areas

To ensure the long-term maintenance of biodiversity benefits, the available evidence indicates that the NEAFC management measures in place to protect VMEs should be maintained. The reopening of the VME closures to bottom fishing would present the risk of significant adverse impacts to VMEs (ICES, 2022b). The VME closures are long-term measures for biodiversity benefits, as long as they remain in place. The five-year review of the appropriateness and effectiveness of VME closures is an important process that could be adapted to include considerations on ecosystem ramifications, climate change and refugia sites, and their effects on the VMEs and other biodiversity attributes present.

Whether restricted bottom fishing areas achieve, or are expected to achieve, positive and sustained outcomes for the *in situ* conservation of biodiversity is contingent on the absence of bottom fishing in these areas. Some or parts of the current restricted bottom fishing areas may be considered 'natural' if no bottom fishing activities or other threats have occurred. The restricted bottom fishing areas are potentially open to exploratory fishing, which may preclude them from satisfying sustained governance for long-term biodiversity benefits.

The dominant pressures (current and anticipated) to the VME closed areas and restricted bottom fishing areas within NEAFC RAs are bottom fishing and climate change.

ICES recommends that cooperation with other competent bodies is important to ensure that other non-NEAFC-regulated activities and cumulative pressures do not undermine the protection of biodiversity attributes offered by the VME closures and the restricted bottom fishing areas.

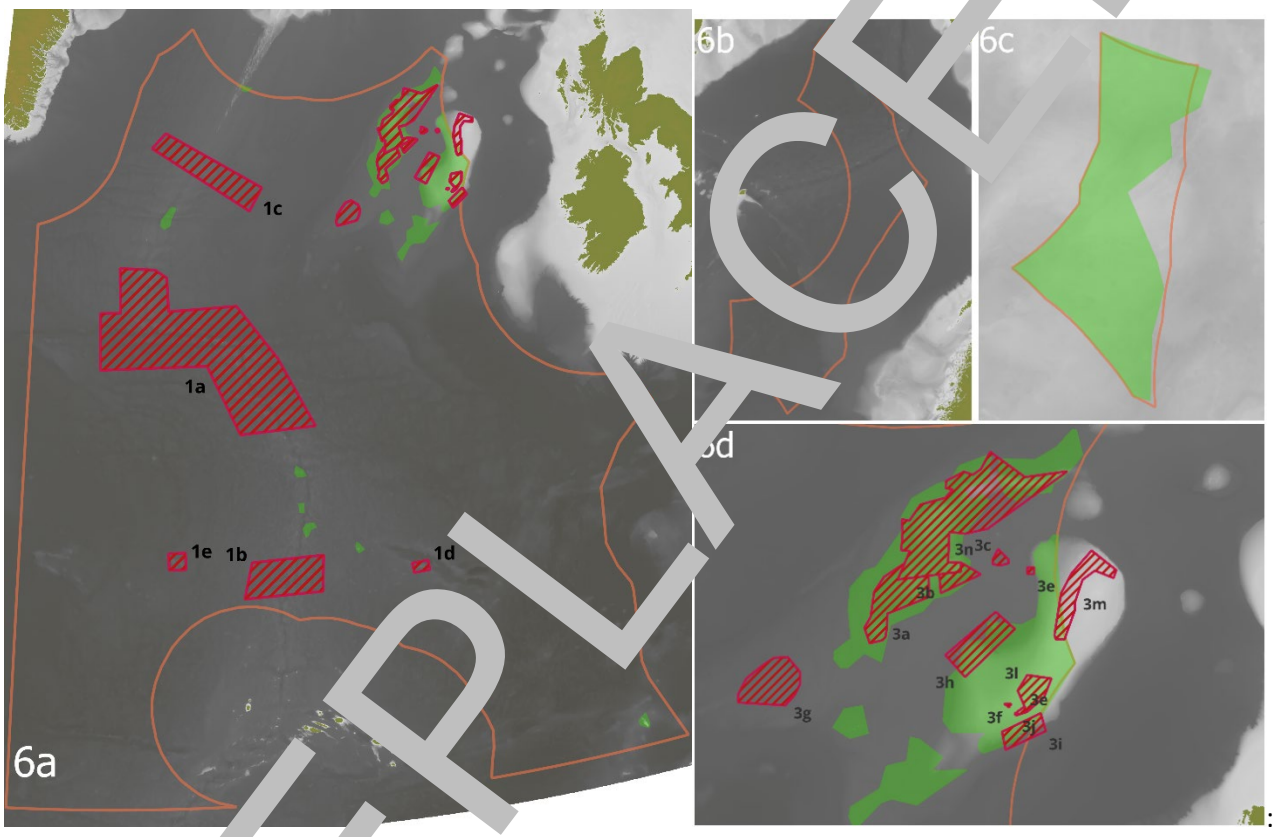

Figure 1 Map of NEAFC regulatory areas (6a, 6b, and 6c; corresponding to RA 1, RA 2, and RA 3, respectively) (orange outline) and closure in the Hatton and Rockall area within RA 1 (6d). Existing bottom fishing areas are shown in grey. Bottom fishing closures for VMEs protection are shown in red. The restricted bottom fishing areas are the parts of NEAFC RAs not identified as VME closures or bottom fishing area (greyscale). The codes 1a–1e and 3a–3n correspond to the locations identified in Table 1. The Rockall Haddock Box and the Irminger Sea Redfish Closure can be viewed at the NEAFC website[1].

Advice on potential maximum depths of bottom fishing

The current maximum fishing depth with bottom-contacting gears in NEAFC RAs is around 1 400 m. The observed maximum fishing depth is not restricted by current management measures, and it is likely that technical and economic considerations are the limiting factors. While it is technically possible to conduct bottom fishing at depths greater than 1 400 m, ICES is

[1] https://www.neafc.org/managing_fisheries/measures/ra_map

not aware of any demersal fisheries resources in NEAFC RAs that could support an economically viable commercial bottom fishery at such depths.

ICES recognizes that a maximum bottom depth limit is one physical attribute that could be used to set OECM boundaries (e.g. all bottom-restricted areas and VME closures down to 1 400 m depth). The available evidence indicates that applying a maximum bottom depth limit would increase the total size of potential OECMs linearly with the increase in the chosen depth limit. An effective OECM should target known significant biodiversity attributes, with corresponding measurable biodiversity benefits at a spatial scale commensurate with the feature in question. ICES therefore suggests that areas containing biodiversity attributes within both the restricted bottom fishing areas and the VME closures could be a good starting point for defining OECMs.

ICES considers that, if physical attributes such as a bottom depth limit are to be used to define the boundaries of OECMs, these should be used in conjunction with evidence of biodiversity attributes to ensure that the OECM will deliver long-term biodiversity/ecosystem benefits.

Suggestions

The continued protection of biodiversity attributes from bottom fishing by the management measures adopted by NEAFC (as the competent authority) aligns with the criterion on effectiveness of OECMs decided by CBD (2018).

The ICES VMS data were used to evaluate the current maximum depth of bottom fishing in NEAFC RAs. The NEAFC VMS data were not used due to uncertain and/or missing information on gear type. Such information is central to estimate the distribution of bottom fishing and assess the effectiveness of NEAFC management measures. ICES reiterates its recommendation from 2022 (ICES, 2022b) on the inclusion of gear code in the catch reports.

Basis of the advice

Basis of the advice on the (existing) long-term biodiversity/ecosystem benefits of NEAFC's closed areas and restricted bottom fishing areas according to NEAFC Recommendation (1:2014) and on the advice on other current or potential evidence sources to provide further support to the OECM biodiversity benefits narrative, in addition to that provided by NEAFC's MCS evidence.

Background
Related to the question on effectiveness of measures under OECMs is how to demonstrate benefits beyond that normally associated with fisheries management, which is focused on the effectiveness of measures in fisheries and assessed in terms of the impacts of the activity through monitoring and enforcing compliance. Is there further evidence available to further support such benefits when first identifying an OECM. What is the likely (minimal) biodiversity monitoring required or already available to occasionally substantiate compliance evidence in terms of ongoing assessment of benefits in the future.

This has been a key issue of sensitivity for the conservation community, due to a misperception that the regular cycle of review in fisheries equates to short term measures. Science questions arise on what evidence and degree of confidence can be attributed to biodiversity benefits by extrapolation of such enforced measures. The science question with regard to the VME closed areas and restricted bottom fishing areas is: If there is sufficient evidence that the pressure of bottom fisheries has largely been removed in these areas, what are the monitored biodiversity benefits? In the absence of sufficient monitoring, is ICES able to extrapolate from other evidence that the removal of bottom fishing pressure will have long term biodiversity benefits and describe these?

To address points 1 and 2 of the request above, ICES compiled information on biodiversity attributes present in the areas restricted to bottom fishing and in the VME closed areas, as well as on existing and potential threats affecting or likely to affect the biodiversity attributes. This information was used to evaluate whether the NEAFC management measures for the VME closures and the restricted bottom fishing areas achieve, or are expected to achieve, positive and sustained outcomes for the *in situ* conservation of biodiversity. This evaluation was performed for all NEAFC RAs. ICES notes that there are regional differences in current pressures between RA 1, RA 2, and RA 3.

Results and conclusions

Biodiversity attributes

A summary of the documentation collated by ICES on the six examples of biodiversity attributes referred to by the CBD in decision 14/8 (CBD, 2018) is provided in Table 1 according to information supporting the presence or likely presence of the attribute. Empty cells indicate that no information was found. Every location has multiple biodiversity attributes. For example, the areas closed to protect VMEs have the biodiversity attributes of VME habitats. NEAFC RAs have seamounts and other features that are known to concentrate biodiversity. The abyssal plain areas have value as representative natural ecosystems.

Additional biodiversity attributes other than those identified by ICES may be present. However, it is unlikely that additional information would change the conclusion that every location has multiple biodiversity attributes.

Table 1 Summary of the documentation collated by ICES indicating the presence of a biodiversity attribute at NEAFC locations following the codes in Figure 1 for the regulated areas. Detailed information on the evidence is available in the ICES WKECOVME report 2023 (ICES 2023). Biodiversity attributes: 1 = collections of rare, threatened or endangered species; 2 = representative natural ecosystems; 3 = range-restricted species; 4 = key biodiversity areas; 5 = areas providing critical ecosystem functions and services; 6 = areas for ecological connectivity.

☑ Biological Attribute Present
☑ Biological Attribute Likely Present based on Expert Opinion

Specific Location Name Following NEAFC (Location Code)	Biodiversity Attribute					
	1	2	3	4	5	6
Mid Atlantic VME Closures (1)	☑	☑		☑	☑	☑
Middle MAR Area (Charlie-Gibbs Fracture Zone and s… Polar Frontal Region) (1a)	☑	☑		☑	☑	☑
Southern MAR Area (1b)	☑	☑			☑	☑
Northern MAR Area (1c)	☑	☑			☑	☑
Antialtair Seamount (1d)	☑	☑			☑	☑
Altair Seamount (1e)	☑	☑		☑	☑	☑
Rockall Haddock box (2)	☑	☑		☑	☑	☑
Hatton Rockall VME Closures …	☑	☑	☑	☑	☑	☑
Hatton Bank 2, Area 2 (3a)	☑	☑		☑	☑	☑
Hatton Bank 2, Area … (3b)	☑	☑		☑	☑	☑
Hatton–Rockall B…in, Area 1 (3c)	☑	☑		☑	☑	☑
Hatton–Rocka… Basin, Ar… 2 (3d)	☑	☑		☑	☑	☑
Southwest Ro… Ban… (3e)	☑	☑		☑	☑	☑
Southwest Rockall … 1 (3f)	☑	☑		☑	☑	☑
Edora'… …g)	☑	☑		☑	☑	☑
Wes… Rockall …ounds (3h)	☑	☑		☑	☑	☑
L… achev Mo…	☑	☑		☑	☑	☑
Ro… Ba…, South-West Rockall (Empress of Britain Bank), Area …	☑	☑		☑	☑	☑
Rockall Ba… South-West Rockall (Empress of Britain Bank) Area 2 (3k)	☑	☑		☑	☑	☑
Rockall Bank; South-West Rockall (Empress of Britain Bank) Area 1 (3l)	☑	☑		☑	☑	☑
Rockall Bank; North West Rockall (3m)	☑	☑		☑	☑	☑
Hatton Bank (3n)	☑	☑		☑	☑	☑
Irminger Sea Redfish Closure (4)		☑	☑		☑	☑

Specific Location Name Following NEAFC (Location Code)	Biodiversity Attribute					
	1	2	3	4	5	6
Other Seamounts* (5)	☑	☑		☑	☑	☑
Restricted Areas (RAs) (6)	☑	☑	☑	☑	☑	☑
NEAFC RA 1 (XRR Reykjanes Ridge) (6a)	☑	☑	☑	☑	☑	☑
NEAFC RA 2, Norwegian Sea (XNS/ Banana Hole) (6b)		☑			☑	☑
NEAFC RA 3, Barents Sea (XBS, Loophole) (6c)	☑	☑		☑	☑	☑

Existing and potential threats affecting or likely to affect the biodiversity attributes

The evidence available indicates that fishing activity within NEAFC RAs and associated pressures currently pose the greatest threats to biodiversity attributes. Locations with restrictions to bottom-contacting fishing gears have a low risk of impact to benthic and demersal biodiversity attributes. There is no evidence of direct impact of pelagic fisheries on benthic and demersal biodiversity attributes in NEAFC RAs. However, there are known indirect impacts on attributes relating to the connectivity of benthic and pelagic habitats. Therefore, risks may be present from pelagic and non-NEAFC-regulated fisheries.

Shipping is assessed as the second-most-important source of pressure in NEAFC RAs. However, this poses minimal risk of impact to benthic and demersal biodiversity attributes.

There are widespread pressures from climate change and marine litter. These are unlikely to be threats that can be easily prevented, removed, or eliminated at the NEAFC RA scale.

Biodiversity/ecosystem benefits of NEAFC's closed areas and restricted bottom fishing areas

ICES concludes that the VME closures in NEAFC RAs achieve long-term positive and sustained *in situ* biodiversity/ecosystem benefits as long as these closures remain in place.

For the restricted bottom fishing areas, ICES concludes that they achieve positive *in situ* biodiversity/ecosystem benefits as long as no bottom fishing activities occur in these areas. These areas are open to exploratory fishing, and the potential for bottom fishing to occur may preclude these areas from attaining sustained governance for long-term biodiversity benefits.

Method

Biodiversity attributes

In defining biodiversity attributes, ICES used the examples of biodiversity attributes provided under Criterion C in Annex III, Section B of CBD decision 14/3 (2018):

1. communities of rare, threatened or endangered species
2. representative natural ecosystems
3. rare-restricted species
4. key biodiversity areas
5. areas providing ecosystem functions and services
6. areas for ecological connectivity

The focus was on benthic and demersal attributes, and the attributes were considered at the scale of the NEAFC RA. Marine mammals and birds listed under the IUCN Red List were considered under "communities of rare, threatened, or endangered species".

As shown in Figure 2, these considered biodiversity attributes share strong similarities with both the criteria used by the CBD to identify Ecologically or Biologically Significant marine Areas (EBSAs) (CBD, 2008) and the FAO VME criteria (FAO, 2009).

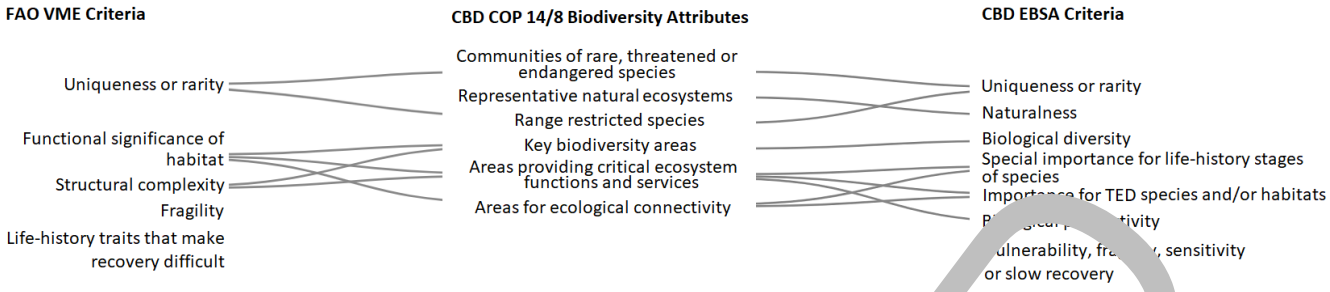

Figure 2 Comparison of the criteria used for VME (FAO 2009) and CBD EBSA (CBD/COP/ /IX/20) identification with those provided as CBD Biodiversity Attributes for OECM descriptions of in situ conservation biodiversity criterion C).

Given the similarities between the biodiversity attributes and the EBSA and VME criteria (Figure 2), ICES drew on documentation for the five EBSAs located in the region (CBD, 2022; CBD Secretariat 202 a–e) and the ICES advice to NEAFC on VMEs, utilizing the ICES VME Database.

Other sources of information considered to assess whether the attributes were present likely to be present included:

- ICES Ecosystem Overviews, in particular that of the Oceanic Northeast Atlantic, which covers most of NEAFC RA 1, and that of the Barents Sea (ICES, 2019, 2021).
- The IUCN Red List of Threatened Species
- OSPAR Status Assessments
- Published scientific literature

Existing and potential threats affecting or likely to affect the biodiversity attributes

Existing and potential threats were assessed based on information available in ICES ecosystem overviews and the published scientific literature.

Biodiversity/ecosystem benefits of NEAFC's closed areas and restricted bottom fishing areas

ICES used the CBD OECM Criterion C "Achieve sustained and effective contribution to in situ conservation of biodiversity" (CBD, 2018), as a guidance to evaluate long-term biodiversity and ecosystem benefits of NEAFC VME closures and restricted bottom fishing areas.

Basis of the advice – current and potential maximum depth for bottom fishing

Background
There is likely to be a policy question regarding the optimal description of NEAFC's VME closed areas and restricted bottom fishing areas as OECMs. Should the entire existing closed areas be described as OECMs, or should a depth limit be set according to likely current bottom fishing depth and potential bottom fishing depths with future technology? In terms of advice, ICES should provide information on potential (future) bottom fishing depths. It should provide VME/OECM closed area coordinates according to its advised depth limit as an option for consideration.

ICES advice on the current and potential maximum depth of bottom fishing in the NEAFC RA is based on analyses of the distribution of bottom fishing and on information on the depth distribution of deep-sea fish species listed in Annex I of the EU Deep Sea Access Regulation (DSAR) (EU, 2016).

Results and conclusions

The majority of fished c-squares in the entire Northeast Atlantic in 2015–2020 are on the continental shelves. Fishing activity continues down the slope for all gear types. For bottom trawling, 99% of c-squares containing fishing activity are shallower than 1 000 m, and 99.9% are shallower than 1 400 m (Figure 3). For the static gears (longline and gillnet), a slightly deeper profile is observed; however, fishing is very limited in c-squares deeper than 1 400 m (Figure 3).

The histogram for bottom trawling in NEAFC RA in 2015–2021 (Figure 4) shows two peaks between 200 m and 400 m, representing the bottom trawl fisheries on Rockall Bank. The other is at bottom depth between 0 m and 1 360 m, representing the deep-sea fisheries.

Around 10% of the current bottom fishing areas in the NEAFC RA have a bottom depth greater than 1 400 m, suggesting that fishing deeper is not restricted by current management measures and that technical and economic considerations may be the limiting factors. The spatial extent of areas located between 1 000 m and 2 000 m depth in the NEAFC RA is shown by 200 m depth intervals in Figure 5. There is a linear increase in the total size of the area circumscribed by isobaths at 200 m intervals between 1 000 m and 2 000 m (Figures 5 and 6).

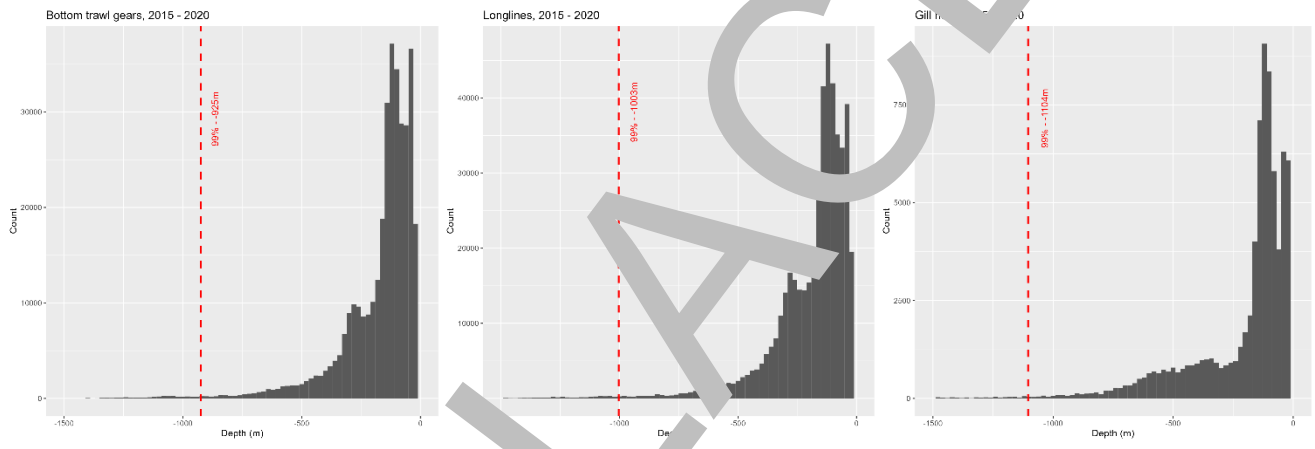

Figure 3 Histograms of mean d -square ished th bottom trawls, long lines and gill nets 2015–2020 in the entire Northeast Atlantic. ean dep above wi 9% of fished c-squares are shown with red lines.

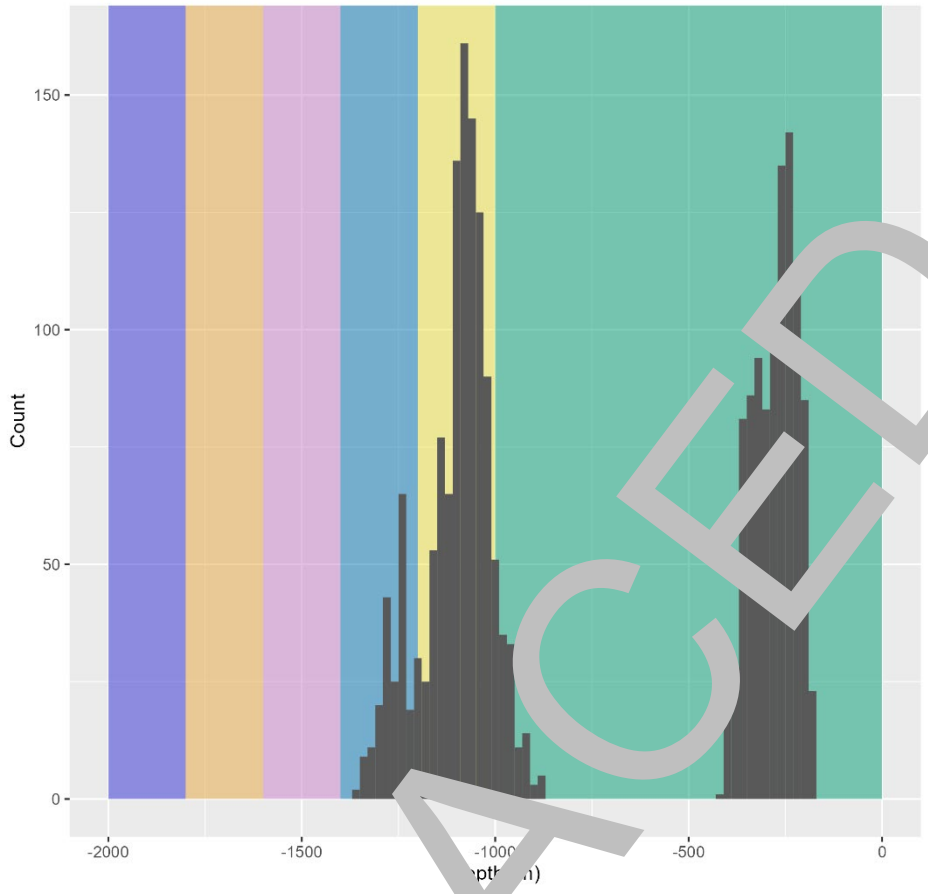

Figure 4 Histograms of mean depth of c-squares fished with bottom trawl gears within the NEAFC RA 1, 2015– 2020. Note the colours correspond to the depth polygons in Figure 5 (below). ICES notes that no deep-sea fisheries were recorded in the ICES VMS data for NEAFC RA 1 in 2021.

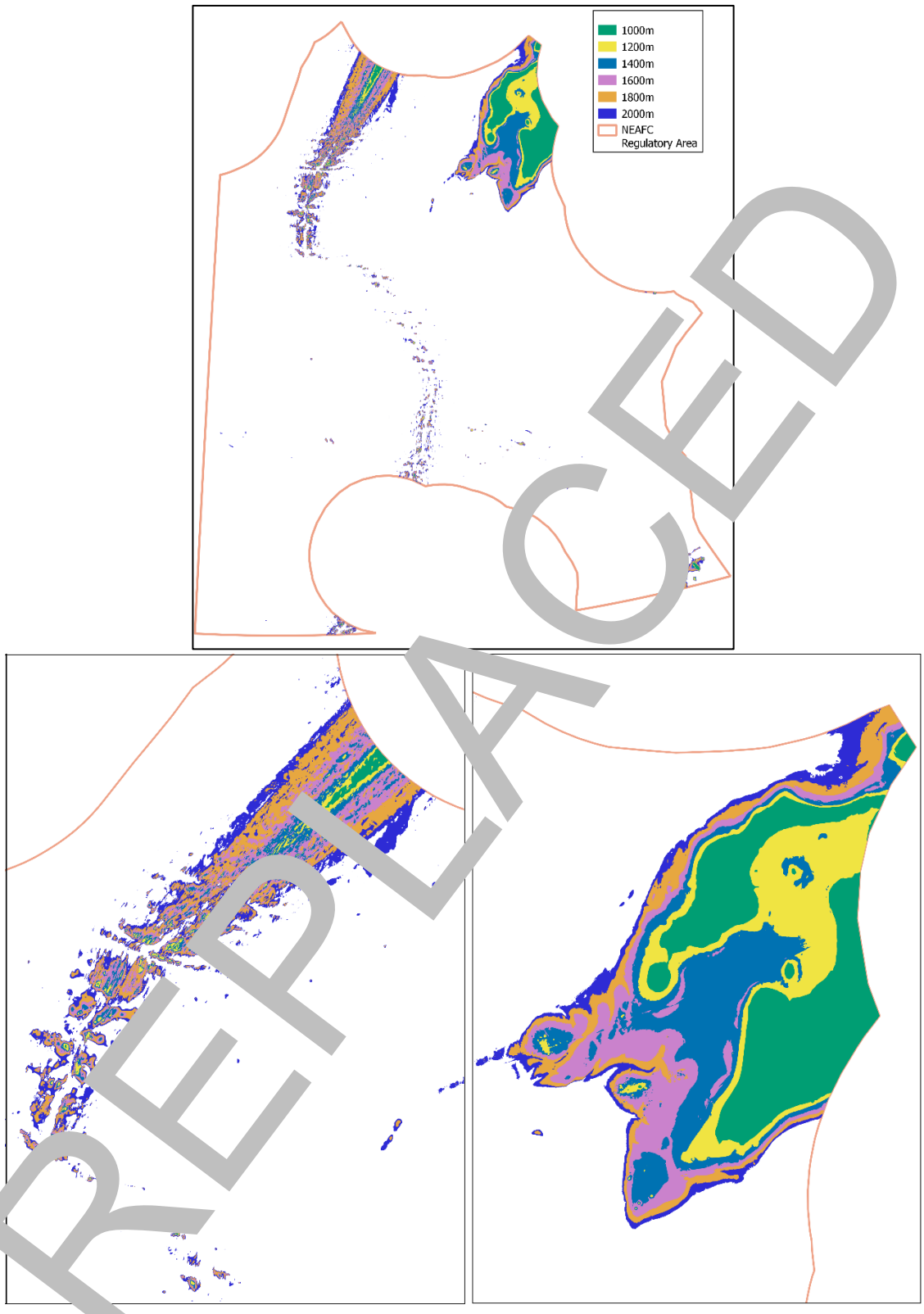

Figure 5 Polygons of areas within the NEAFC RAs between 1 000 m and 2 000 m, at 200 m intervals. Top is the entire RA1. Bottom left is a closeup of the Mid-Atlantic Ridge north of the Charlie–Gibbs fracture zone. Bottom right is a closeup of Rockall and Hatton Banks.

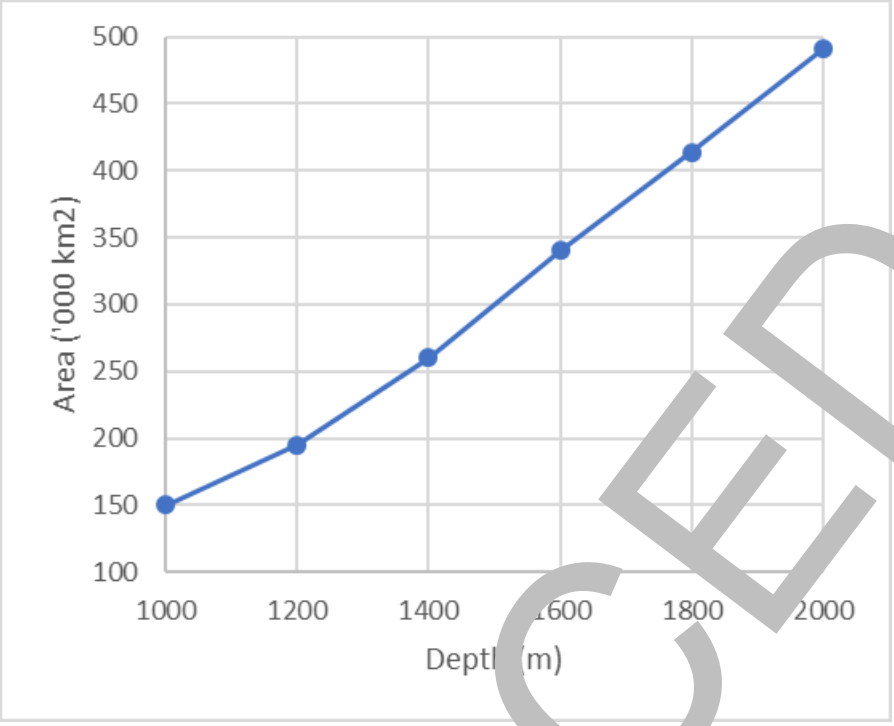

Figure 6 Graph of the area of the NEAFC RAs circumscribed by isobaths at intervals between 1 000 m and 2 000 m.

Methods

Gridded VMS data for vessels using bottom trawls, longlines, and gillnets in the years 2015–2021, submitted in response to the 2022 ICES data call (ICES, 2022a), were downloaded from the ICES database. These data were aggregated at a 0.05° × 0.05° c-square scale (Rees, 2003). Global bathymetry data, at a 15-second resolution, were obtained from the General Bathymetric Chart of the Oceans (GEBCO, 2022). The VMS data were aggregated across countries and months to produce annual 'footprints' for each gear type. To reduce the impact of artefacts caused by slow steaming, dodging weather, and technical breakdowns, c-squares containing less than three hours of effort were filtered out. Average bottom depth in each fished c-square was calculated and histograms were produced showing the depth profile of the area fished by gear and year for the entire Northeast Atlantic and only for the NEAFC RAs.

Additional information

The FAO Handbook for Identifying, Evaluating and Reporting Other Effective Area-based Conservation Measures in Marine Fisheries states: "Gear restrictions applied to large jurisdictions are unlikely to qualify as Fisheries OECMs; however, discretely defined geographically bounded areas may have the potential to qualify" (FAO, 2022).

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