NORTH-EAST ATLANTIC FISHERIES COMMISSION

Managing Fisheries in the North-East Atlantic

Submission by the North-East Atlantic Fisheries Commission

To the report of the Secretary-General of the United Nations on the actions of States and regional fisheries management organizations and arrangements addressing the impacts of bottom fishing on vulnerable marine ecosystems and the long-term sustainability of the deep sea fish stocks.

The following is the contribution by the North-East Atlantic Fisheries Commission (NEAFC) to the preparation of the report of the Secretary-General of the United Nations on the actions of States and regional fisheries management organizations and arrangements addressing the impacts of bottom fishing on vulnerable marine ecosystems and the long-term sustainability of the deep sea fish stocks. This is pursuant to paragraphs 209, 211, 212 and 213 of UN General Assembly (UNGA) resolution 76/71 of 9 December 2021 (and resolutions 75/89 of 8 December 2020 and 74/18 of 10 December 2019). This is as requested in a letter from the Director of the Division for Ocean Affairs and the Law of the Sea, originally dated 8 January 2020 and now updated for the renewed request of 6 January 2022.

The Contribution consists of a summary of the evolution of NEAFC's measures related to bottom fisheries in particular since 2016 (Part 1), along with a more detailed explanation (Part 2) of NEAFC's bottom fisheries regulations in the context of the organisation's management of fisheries in light of the relevant UN General Assembly Resolutions. The relevant UNGA resolutions are 61/105, 64/72, 66/68 and 71/123.

Part 1: Introduction; brief history and the latest developments on NEAFC's measures on bottom fisheries and the protection of Vulnerable Marine Ecosystems since 2016

Introduction.

NEAFC's measures on bottom fisheries and protection of Vulnerable Marine Ecosystems (VMEs) are set out in comprehensively in Part 2 of this submission. This section (Part 1) of the submission introduces NEAFC's work and also covers more recent developments on both bottom fisheries and on the protection of VMEs since the last UNGA review in 2016. This submission aims to provide evidence on behalf of the NEAFC to inform the 2020 UNGA review process.

Brief history of NEAFC Measures on Vulnerable marine ecosystems

In the early 2000s, NEAFC started to implement measures to address the possible adverse impacts of bottom fisheries for deep-sea species. These measures were directed at conserving target and bycatch deep-sea fish species, whilst also addressing the effects of bottom fisheries on other components of the marine ecosystem. The basis of the approach was scientific advice to NEAFC on probable and actual locations of VMEs provided by the International Council for Exploration of the Seas. The Commission adopted from 2005 onwards the necessary measures to ensure protection of VMEs from any possible significant adverse impacts caused by fishing with bottom gears. The details of these developments are set out in Part 2. The measures currently in force ensure that the only areas where bottom fisheries can legally take place in the Regulatory Area, apart from the potential for restricted exploratory fisheries, are in areas that are established bottom fishing areas where the best available scientific advice has suggested that VMEs do not, or are unlikely to, occur. As the possible fishing areas where VMEs are known or likely to occur have either been closed to bottom fishing or lie in 'new' bottom fishing areas (nowadays called restricted bottom fishing areas) that will probably remain largely unfished, fishing vessels are not expected to encounter VMEs. The areas open to commercial bottom fishing (only around 2% of the total Regulatory Area) are therefore those areas where the best available scientific information indicates that there are unlikely to be significant adverse impacts by bottom fishing on VMEs.

Areas within both 'existing' and 'new' (now 'restricted') bottom fishing areas have been closed to bottom fishing to prevent significant adverse impacts on VMEs. The parts of 'existing' bottom fishing areas that are not closed are subject to various measures, including reporting duties and encounter protocols. A reported encounter with a VME results in a temporary closure of the relevant area. An extensive review of NEAFC's actions concerning protection of VMEs was carried out in 2012 (NEAFC, 2012) following instruction from the Annual Meeting in 2011. This led to the adoption of a new comprehensive measure in 2014 (Recommendation 19/2014), which replaced previous measures to protect VMEs.

The 2014 VME Recommendation.

The adoption of Recommendation 19:2014 by the Commission by a written procedure in 2014 followed the fundamental review of the regulations NEAFC had in place to protect Vulnerable Marine Ecosystems. The 2012 review process included a seminar, a review of the relevant UN General Assembly (UNGA) resolutions and FAO guidelines, consultation with stakeholders, input from ICES, as well as views from the Contracting Parties. As a result of this process Recommendation 19:2014 was elaborated to include closure of areas to bottom fishing, move on rules, definition of existing and new bottom fisheries areas, exploratory fishing protocols and lists of VME indicator species. The new Recommendation also underlined a process of annual advice from ICES, including the possibility of advice on revision of the closed areas. Subsequent amendments in 2015 and 2018 refined some elements of the Recommendation. Other NEAFC measures such as the Scheme of Control and Enforcement were also amended at the time of the initial adoption. These amendments introduced reporting requirements for Contracting Parties on bottom fishing activities in the Regulatory Area. In addition, the Secretariat was required to report on bottom fishing activity to the Annual Meeting.

The 2018 Renewals of Areas.

Apart from the annual ICES advice process, the VME Recommendation also includes a requirement to renew the closed areas every 5 years. The last time this occurred was in the update to the Recommendation in 2018, the closures being due to end by 31 December 2017. ICES in 2017 had advised NEAFC to renew all the closures as the need for protection of the VMEs in the areas remained valid. The 2017 Annual Meeting therefore renewed to 31 December 2022 all closures under the Recommendation. At the same time one of the areas, "Area (I) Hatton–Rockall Basin" was significantly enlarged following advice from ICES to extend it to encompass new records of deep-sea sponge aggregations found at 1200 metres.

The 2019 Review of the Recommendation.

In 2019 NEAFC reviewed its binding Recommendation 19:2014 on the protection of Vulnerable Marine Ecosystems. The requirements and objective for such a review is set out in Article 10.1 of the Recommendation itself:

"The Commission shall every 5 years from the date of this Recommendation entering into force examine the effectiveness of this Recommendation in protecting VMEs from significant adverse impacts. In addition, this review process shall be supplemented by modifications required as a result of new scientific advice."

The Scope of the Article 10 review is clearly stated to be on the effectiveness of the Recommendation in protecting VMEs [from bottom fisheries activities]. This can be stated in another way; how effective is the Recommendation in preventing [new] damage to the VMEs by fishing activity since 2014? This question was explored in detail in the 2019 review by examining what bottom fisheries had occurred in the closed areas since 2014, and if any activities had occurred, whether NEAFC had any information on likely/actual damage? Was there any information on the effectiveness of the elements of the Recommendation pertaining to VMEs in the existing fisheries areas or in exploratory fisheries areas outside the closed areas? Both NEAFC's monitoring and compliance committee and ICES were able to produce evidence on these questions. The Secretariat also had provided evidence from an automated system triggered if vessels were noted in the closed areas steaming at low enough speeds for fishing and carrying bottom gear (according to the current once a year gear notifications process). Analysis highlighted the fact that the vast majority of the alerts were in fact false positives. Nevertheless two apparent infringements in the 5 year period were followed up via NEAFC compliance reporting. The cases were subsequently dismissed by national authorities.

An ICES review of its advice on the VMEs and NEAFC activities described the annual scientific advice process. ICES noted no reductions in protections to the closed areas. Over the last 5 years ICES had recommended one increase in coverage to the current closed areas, which had been accordingly been extended in 2018 (see above). ICES advice also highlighted the ongoing issue false positive signals indicating presumed bottom fishing in some areas outside existing bottom fishing areas. A solution to this would be providing up-to-date information on the gear used at the time of the activity which would be offered by implementing the new NEAFC Electronic Reporting System (see section below).

Following the review, PECMAS considered there was sufficient evidence presented at its October 2019 meeting to make an assessment of Recommendation 19: 2014. It concluded that NEAFC has been, and continues to be, advised effectively by ICES on all issues pertinent to the protection of VMEs against significant adverse impacts from bottom fisheries including on areas that should be closed. NEAFC has closed most of the areas that ICES has advised should be closed, and ICES has confirmed that actions were appropriate.

From a combination of information from Contracting Parties on national enforcement activities, from the NEAFC Secretariat on alerts on potential bottom fisheries activities, and from ICES analysis of fishing activity, PECMAS assessed that compliance with the closures had been effective. Some records of fishing in the new fishing areas indicated that some unauthorised fishing had occurred but the scale

was limited. The vast majority of bottom fishing activity had been carried out inside existing bottom fishing areas.

PECMAS believed the review of the information presented to it indicated the Recommendation was effective in its aim to protect VMEs as well as areas outside defined existing fishing areas in the Regulatory Area from bottom fisheries. Nevertheless, the performance of the Recommendation could be improved and therefore several actions (below) were suggested to improve performance of the Recommendation.

2020 and subsequent 2021 Actions:

The 2019 NEAFC Commission agreed the following actions (the text includes 2022 updates):

1. NEAFC's Management and Science Committee (PECMAS) would consider the outcomes of the UNGA 2020 (now delayed to 2022) review of implementation of Resolution 61/105 and subsequent resolutions (bottom fisheries/VME protection). It would furthermore, consider UNGA resolution 71/123 on further actions on management of bottom fisheries impacts on VMEs. In addition, PECMAS would revisit any earlier ICES advice on closures which had not been acted on by NEAFC. PECMAS would report back on the progress to the 2020 NEAFC Annual Meeting. ICES advised the 2021 Annual Meeting after revisiting earlier advice not acted on regarding closures. No new closures were recommended. PECMAS will report back to the 2022 Annual Meeting regarding the delayed UNGA review.

2. NEAFC's Monitoring and Compliance Committee (PECMAC) would consider further options for Contracting Parties to improve transparency of investigations into the (mostly false positive) alerts on bottom fishing outside existing bottom fishing areas and also to address more effective gear identification. In addition, it would assess if reporting on encounters with VMEs is functioning effectively. PECMAC would report back on the progress to the 2020 NEAFC Annual Meeting. Following the implementation in due course of the new NEAFC Electronic Reporting Systems across all the Contracting Parties, PECMAC would investigate all opportunities to enhance monitoring of compliance with Recommendation 19:2014. PECMAC reported back that there had been a significant reduction in false positive alerts allowing Contracting Parties to focus on compliance issues.

3. The NEAFC Secretariat has now significantly reduced the number of false positive bottom fisheries alerts. This was done through new analysis approaches which included detailed data on catch to determine if bottom gear were likely to have been used. The Secretariat continues to monitor and analyse bottom fishing activity in the Regulatory Area to support Contracting Parties as requested following NEAFC's performance review in 2014. The Secretariat is also working with the ICES Secretariat to address data issues to ensure common understanding of bottom fishing activity.

4. In terms of scientific advice, ICES is carrying out a benchmarking on the method used by ICES when providing advice on VMEs. It will be informing NEAFC on progress on improving the use of VME indicators to develop management advice. ICES has also being invited to consider completeness of VME habitats and indicators in the ICES database. NEAFC had already noted in 2018 that, while the effect of the Rockall haddock box closure where only long lining is allowed, may be useful in protecting VMEs in the area, the box was in fact created for protection of juvenile haddock. In response to a request, advice was sought from ICES to see if protection of the same area as the existing haddock box would be required if the protections related to juvenile haddock were removed at some stage. The advice from ICES (in 2021) was that no closure was necessitated by the assessment of VME habitats and indicators. Advice is currently being finalised on the effectiveness of the current closure to all but long lining gear in protecting juvenile haddock.

Developments in deep sea fishing regulations:

In 2016 the Commission adopted the *NEAFC approach to deep-sea fisheries conservation and management.* This document enabled NEAFC to place individual species/stocks into one of four categories requiring different character and level of regulations. These categories included stocks with specific measures, stocks in which directed fisheries are not authorised, others which were currently unexploited or lightly exploited, as well as stocks primarily in EEZ. Building on this, NEAFC in 2018 updated its 2016 Recommendation on deep-sea fisheries. This moved the approach from one based only on effort limitation related to previous years' maximum effort to one based on the precautionary approach. This requires Contracting Parties to effectively manage the deep-sea fisheries stocks not subject to other conservation and management measures established by NEAFC (such as specific catch limits). Requirements include ensuring that these fisheries only expand gradually and that any new or expanding fisheries provide relevant data to assess sustainability, based on best available scientific information. To support this process the Secretariat is also required to provide an up-to-date overview each year of catches of deep-sea species in the Regulatory Area to enable the NEAFC Management and Science Committee (PECMAS) to consider catches over a period of years.

ICES (the International Council for Exploration of the Sea), as NEAFC's independent scientific adviser is also required to take into account the 2016 NEAFC approach so needs to clearly categorise its advice according to the four NEAFC deep sea stock categories. It also is required to include information on new and rapidly expanding fisheries, even if no stock-specific advice can be provided. This is in addition to ICES' own assessment of the data-limited stocks which determines the level of conservative approach it applies to its precautionary advice. Taking account of all the above inputs PECMAS is able to formulate proposals for precautionary stock specific conservation and management measures for deep-sea species/stocks where appropriate.

Developments on Scientific advice on Ecosystems and Climate Change.

The need to take into account the broader perspectives of the ecosystem in management are also highlighted in the various UNGA resolutions. As set out in Part 2, in carrying out its objectives, NEAFC does not undertake any scientific work but rather relies on the ICES for scientific advice. ICES has explicit objectives with regard to the integration of ecosystems perspectives in its scientific advice, as set out in the ICES Strategic Plan. Following its most recent Performance Review, the NEAFC Commission agreed in 2015 that steps should be taken to improve cooperation between NEAFC and ICES. This included setting up regular meetings with ICES to discuss long-term development, such as possible multispecies advice, possible climate effects and other ecosystem considerations. ICES can therefore develop appropriate research programs to meet longer-term issues raised by NEAFC, and take these issues into account in presenting its advice to NEAFC. Complementary changes were also made to the Terms of Reference of NEAFC's Permanent Committee on Management and Science. The 2019 update to the Memorandum of Understanding between ICES and NEAFC again underlined the need for advice to include science related to multispecies issues, ecosystem changes and climate change effects for the stocks relevant to NEAFC, and includes ecosystem overviews and fisheries overviews for the region as a whole.

Capacity Building.

None of NEAFC's Contracting Parties are developing countries, and NEAFC's core activities do not include capacity building in developing countries or other types of development cooperation. Nevertheless, NEAFC does take part in various projects aimed at capacity building in developing countries. This is primarily done by sharing NEAFC's knowledge and experience regarding fisheries management; fisheries monitoring, control and surveillance Electronic Port State Control, Electronic Reporting Systems, and related fields. The NEAFC Secretariat also continues to share experience in other regions in support of capacity building and cross-sectoral engagement at the level of regional intergovernmental organisations and bodies. This is for instance done through its MOU with the General Fisheries Commission of the Mediterranean. Additionally, since the establishment of the Southern Indian Ocean Fisheries Organization Headquarters in La Réunion in 2016, the NEAFC Secretariat (as a sister RFMO with deep-sea fisheries) worked closely with the SIOFA Secretariat in the

set-up of their website.

NEAFC has been an active participant in the deep seas and biodiversity element of the Global sustainable fisheries management and biodiversity conservation in the Areas Beyond National Jurisdiction Program (the Common Oceans ABNJ Program). The 2014-2019 programme is now finalized having been funded by the Global Environment Facility and coordinated by the UN Food and Agriculture Organization in close collaboration with two other GEF agencies, the United Nations Environment Programme and the World Bank. A second stage of an ABNJ Deep-Sea Fisheries Project is currently being developed.

Monitoring Control and Surveillance and Enforcement.

NEAFC's binding recommendations are backed up by a comprehensive Scheme of Control and Enforcement (the Scheme). This includes measures to ensure all fishing vessels are notified and authorised to fish in the Regulatory Area. The fishing vessels must have suitable vessel position reporting equipment and also report catches of regulated species while in the Regulatory Area. By means of inspections at sea as well as Port State Control, NEAFC regulations can therefore be enforced using the monitoring and catch information generated under the Scheme. Additionally, the NEAFC Secretariat is tasked with sending alerts to Contracting Parties should any vessel enter the Regulatory Area but outside existing fishing areas and exhibit behaviour that may be consistent with bottom fishing. The Scheme is being updated and improved each year, with the Committee on Monitoring and Compliance (PECMAC) as the guardian of the Scheme. Since the 2016, the process of continual improvement includes some important milestones. One is on transparency in that the annual NEAFC compliance reports are now published. These show how well the vessels of Contracting Parties are complying with NEAFC regulation, including those on bottom fisheries and VMEs. Additional transparency has also been achieved by the publication of NEAFC authorised fishing vessel lists, starting in 2020. The second improvement is an ongoing move from the current system of fish catch reporting to an electronic reporting system based on electronic logbooks kept by the vessels. This will improve the accuracy and timeliness of data exchanged between Contracting Parties and the NEAFC Secretariat. One aspect in particular that has been highlighted in the 2019 review of the VME recommendation is to have up to date and accurate knowledge of which fishing gear has been used on a particular fishing operation. This will help avoid false positive notifications of bottom fisheries outside existing fishing areas, and indeed target enforcement if any such activity were to take place. Even without the expected changes being implemented on haul-by-haul gear identification, the Secretariat recently has developed analysis to identify likely gear use from catch reports. This is reported above under improvements following the 2019 review of the VME Recommendation.

Part 2: Background; NEAFC's bottom fisheries regulations in the context of the organisation's management of fisheries.

NEAFC and the Bottom Fisheries resolutions

The United Nations General Assembly from 2006 onwards adopted resolutions that progressively committed States to act, both individually and through RFMOs, to manage bottom fisheries in areas beyond national jurisdiction to prevent significant adverse impacts on deep-sea species, ecosystems and biodiversity (61/105 (2006) followed by resolutions 64/72 (2009), and 66/68 (2011). The resolutions called on States and RFMOs to: conduct impact assessments of individual bottom fisheries and cumulative impacts of bottom fishing; close areas to bottom fishing where VMEs are known or likely to occur unless the fishing can be managed to prevent significant adverse impacts on VMEs, and; to ensure sustainable levels of catch and bycatch of deep-sea species, including the rebuilding of depleted stocks or else not to authorize bottom fisheries to proceed.

Accompanying these resolutions has been a process to assess progress in implementation of the resolution. The last UNGA bottom fisheries review was in 2016 and followed an UNGA request (paragraph 162) in resolution 69/109. In its conclusions, the 5 year review highlighted, that despite steady progress over the years in the growth of RFMOS and the implementation of measures addressing the impacts of bottom fishing on vulnerable marine ecosystems and the long-term sustainability of the deep sea fish stock, issues remained, including:

- Status of knowledge on VMEs/assessment of deep sea stocks remained limited;
- Information on cumulative impacts remained limited; there was limited protection via impact assessments within existing footprints;
- Problems remained on whether or not existing encounter protocols, including threshold levels, are providing sufficient protection for VMEs, and this should be further investigated.

Overall, the review concluded that efforts globally remained uneven and further efforts were needed. Nevertheless, it was concluded that the resolutions 64/72 and 66/68 and the FAO International Guidelines for the Management of Deep-Sea Fisheries continued to provide a good basis for protecting VMEs from significant adverse impacts resulting from bottom fishing and to ensure the long-term sustainability of deep-sea stocks.

The UNGA resolution 71/123 of December 2016 reflected on the above review and decided to conduct a further review in 2020 of the actions taken by States and RFMOs in response to paragraphs 113, 117 and 119 to 124 of resolution 64/72, paragraphs 121, 126, 129, 130 and 132 to 134 of resolution 66/68 and paragraphs 156, 171, 175, 177 to 188 and 219 of resolution 71/123. This was with a view to ensuring effective implementation of the measures and to make further recommendations. The Review would be preceded by a two-day workshop.

The 2019 NEAFC Annual Meeting considered an internal review of the performance of NEAFC on its binding Recommendation 19:2014 on the protection of Vulnerable Marine Ecosystems. This provides a timely opportunity to provide that information to the UNGA, reflecting the latest work within NEAFC. In addition, the 2019 NEAFC conclusions included a specific action for NEAFC's Permanent Committee on Management and Science to consider in its further work outcomes of the UNGA 2020 review of implementation of the resolutions on bottom fisheries/VME protection.

Of note, NEAFC now produces a report of NEAFC Measures and the UNGA Fisheries Resolutions. This sets out how NEAFC's measures and actions meet the applicable fisheries management objectives set out in the paragraphs of the United Nations General Assembly resolutions on fisheries. It lists each relevant UNGA resolution, with the corresponding actions, measures and recommendations, follow up arrangements and responsible bodies within NEAFC. The document is based on the UNGA resolution adopted in the previous year.

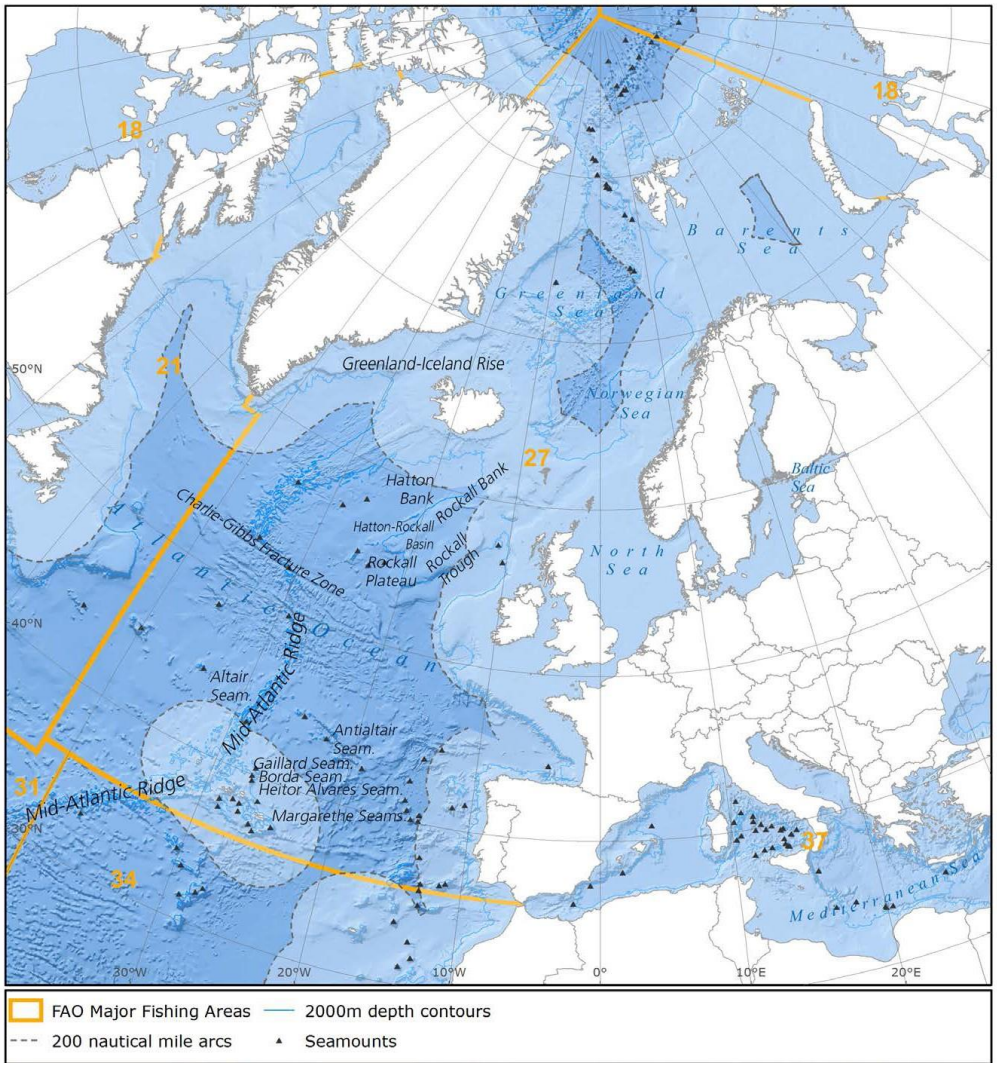
This part of the submission aims to provide detailed evidence on behalf of the NEAFC to inform the 2022 review process. It will include text that was prepared by NEAFC and published in an FAO Fisheries Technical Paper 595; *Vulnerable Marine Ecosystems: Processes and Practices in the High Seas*, in 2016[1].

NEAFC Geography

The northeast Atlantic lies within FAO Major Fishing Area 27, which includes the eastern part of the North Atlantic Ocean (to the east of the meridian corresponding to the southern tip of Greenland, and north of the latitude of Gibraltar). Also included is the oceanic area between Iceland, Norway, and Greenland comprising the Greenland and Norwegian Seas. Some comparatively shallow continental shelf areas (marginal seas) of the northeast Atlantic are included (Irish, North, Baltic, and Barents Seas). In the extreme north the NEAFC Convention Area covers a portion of the Arctic Ocean.

FIGURE 1

Northeast Atlantic Ocean showing the FAO fishing major areas, larger seamounts, 2 000 m depth contour and 200 nm arcs



Geomorphological features of the northeast Atlantic include the major ocean basins with their vast abyssal plains, the Mid-Atlantic Ridge (MAR), and the generally wide continental shelves of the Eurasian continent and Greenland (Figure 1). The continental shelves are mostly within Exclusive Economic Zones (EEZs). The subareas beyond national jurisdiction comprise 3 000–4 000 m deep

[1] The NEAFC section was authored by Stefán Ásmundsson, Odd Aksel Bergstad, Terje Lobach, and Anthony Thompson,

basins and portions of the MAR in the north Atlantic proper and in the Norwegian-Greenland Seas. Other major features of the MAR are the ridge-associated seamount complexes and islands (Azores, Iceland, Jan Mayen), and the transverse fracture zones such as the west-east running Charlie-Gibbs fracture zone half-way between Iceland and the Azores. The depths of ridge-associated seamounts vary, and many have peaks that are shallower than 1 000 m. The fracture zones may form deep abyssal troughs through the MAR which on average is around 2 000 m deep. Interesting off-ridge features are the relatively shallow Greenland-to-Scotland ridges that run across the MAR via Iceland. Very different features from those associated with the MAR are the multitude of seamounts and knolls rising from the abyssal plains in the major ocean basins, for instance, the Altair and Antialtair seamounts on either side of the MAR, and many seamounts north and east of the Azores archipelago in the south.

Further prominent features of the northeast Atlantic area, largely beyond national jurisdiction, are the very extensive Hatton and Rockall Banks to the west of the British Isles. These features are separated from the European continental shelf by channels that are 1 100–1 500 m deep. The Greenland and Norwegian Seas have no similar features beyond national jurisdiction, also no seamounts similar to those found south of the Greenland-Scotland ridges. The limited subareas beyond national jurisdiction in the Norwegian Sea comprises a minor portion of the MAR north of Jan Mayen, and abyssal subareas, and a small shelf sea area in the Barents Sea.

NEAFC Mandate and Regulatory capacity

The NEAFC is an RFMO established under Article 118 of the United Nations Convention on the Law of the Sea to promote cooperation of States in the conservation and management of living marine resources in the high seas. There are currently six Contracting Parties (Denmark in respect of the Faroe Islands and Greenland, the European Union, Iceland, Norway, the Russian Federation and the United Kingdom), and three Cooperating Non-Contracting Parties (Bahamas, Canada and Panama). NEAFC's objective is "to ensure the long-term conservation and optimum utilisation of the fishery resources in the Convention Area, providing sustainable economic, environmental and social benefits". To this end, NEAFC adopts management measures for various fish stocks, and control measures to ensure that they are properly implemented. NEAFC also adopts measures to protect other parts of the marine ecosystem from potential negative impacts by fisheries.

NEAFC was originally established in 1959, but in 1982 a new Convention, with broadly similar objectives, entered into force. Amendments to the 1982 Convention adopted in 2004 and 2006 formed the "New" Convention, which, among other things, modernised the 1982 Convention to bring it in line with current approaches to managing fisheries, including applying an ecosystem approach to fisheries. It specified that conservation and management measures could be taken to minimize harmful impacts on marine ecosystems. To date, the 2004 amendment regarding dispute settlement procedures has not yet entered into force, whereas the 2006 amendments, which include all the other changes and had been implemented on a provisional basis since their adoption, entered into force in 2013.

NEAFC can adopt legally binding measures for the conservation and management of fisheries resources under its mandate in all parts of its Convention Area. However, management of areas under national jurisdiction is conditional on the relevant coastal State proposing and supporting such measures, and in practice NEAFC is largely focused on the portions of the Convention Area that are beyond national jurisdiction, collectively known as the Regulatory Area. The Regulatory Area comprises four separate areas (Figure 2) but the northernmost (Arctic) area is almost permanently ice-covered, and there are no fisheries there. There are therefore three high-seas areas where NEAFC regulates the fisheries: one in the Atlantic Ocean between Iceland and the Azores (RA1: Reykjanes Ridge), one in the Norwegian Sea (RA2: Banana Hole), and one in the Barents Sea (RA3: Loophole). However, all measures that apply generally, rather than to particular fisheries, also apply to the Arctic area. This includes measures for the protection of VMEs.

NEAFC can consider measures for, among others, fishing gears, net mesh sizes, size limits for fish in the catch, closed seasons and areas, total allowable catches (TACs), and effort. The decisions seek to be consistent with measures applied by Contracting Parties within areas under their jurisdiction and,

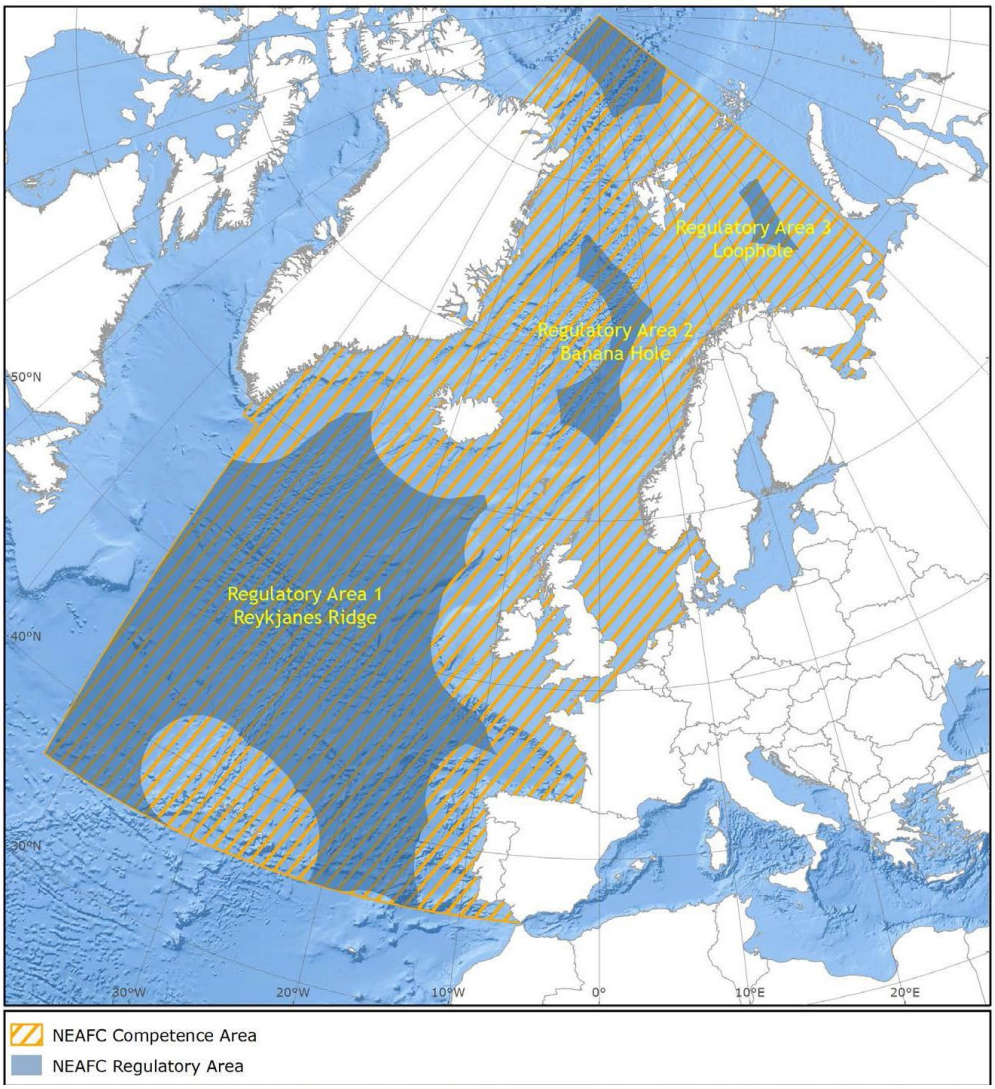
upon request from a Contracting Party, NEAFC may also adopt measures for such areas. Measures become binding after 50 days, subject to an objection procedure that can result in the measure not being binding on the objecting Contracting Party. Each Contracting Party is also required to provide the Commission with the scientific and statistical information needed for the purposes of implementing the Convention.

The amended NEAFC Convention clarifies the aspects that need to be considered by the Commission when making its decisions on the fishery and the fisheries resources. Specifically, these decisions are to: (a) be based on the best scientific evidence available;

(b) apply the precautionary approach; (c) take account of the impact of fisheries on other species and marine ecosystems, and minimise harmful impacts on living marine resources and marine ecosystems; and (d) take account of the need to conserve marine biological diversity.

FIGURE 2

NEAFC Competence and Regulatory Areas in the northeast Atlantic Ocean



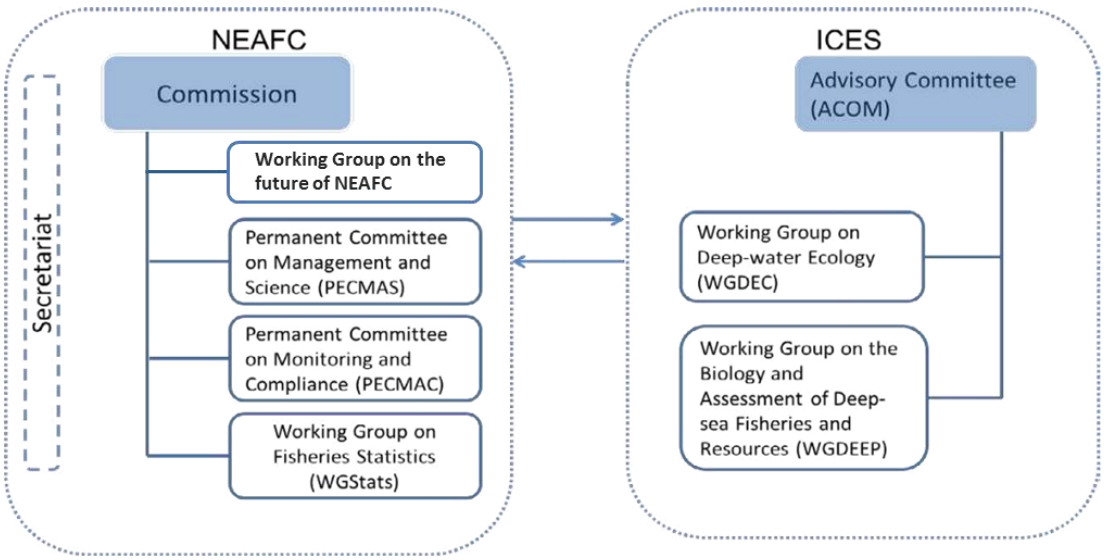
Science input and NEAFC decision making bodies

Unlike most other RFMO/As, NEAFC has not established an internal scientific body but, in line with its Convention, seeks information and advice from the International Council for the Exploration of the Seas (ICES), with which NEAFC has a Memorandum of Understanding (MoU). The Permanent Committee on Management and Science (PECMAS) liaises with ICES and proposes and reviews measures, informs the Commission of new relevant advances in science, and advises the Commission on measures related to area management, including the closing of areas to fishing. The Working Group on Fisheries Statistics (WG Stats) is responsible for the collection and communication of statistics relating to the fisheries regulated by NEAFC, to ensure that NEAFC has timely information on fishing activities and quota utilization. The Permanent Committee on Monitoring and Compliance (PECMAC) is responsible for the work on monitoring, control, enforcement, and compliance also related to area management (Figure 3). The Working Group on the Future of NEAFC is also currently considering the relationship between global oceans developments and NEAFC's measures.

ICES is a global intergovernmental science organization that conducts and facilitates scientific research and assessments and provides advice to support the sustainable use of the oceans. The main objective of ICES is to increase scientific knowledge of the marine environment and its living resources, and to use this knowledge to provide unbiased, non-political advice to competent authorities. It was established in 1902 by an exchange of letters between the participating countries, but a formal Convention that gave ICES a legal foundation and full international status did not enter into force until 1964. ICES provides NEAFC with scientific information and assessments of fish stocks exploited in the Regulatory Area, and the environment in which they occur. The ICES Advisory Committee provides scientific advice to NEAFC based on assessments carried out by expert working groups and an internal peer-review and drafting process. The assessments most relevant to VME issues are undertaken by the ICES–NAFO (Northwest Atlantic Fisheries Organization) Joint Working Group on Deep Water Ecology (WGDEC). Other relevant expert groups dealing with deep-sea and bottom fisheries partly conducted in the Regulatory Area are the Working Group on the Biology and Assessments of Deep-sea Fisheries Resources (WGDEEP), and groups mandated to assess for example, deep-sea fisheries on redfish, Greenland halibut, shrimp, and Rockall haddock.

Figure 3

Structure diagram showing the main NEAFC and ICES Committees responsible for vulnerable marine ecosystems in the high seas portion of the northeast Atlantic Ocean. Note that ICES is an independent organization



Decision process

Proposals for action by the Commission are submitted to the Commission by a Contracting Party or a subsidiary body. The action could be the adoption of a conservation and management measure, which as a rule is based on scientific advice from ICES, or an administrative decision. Proposals are either submitted in advance of a meeting or developed at a meeting in the light of discussions. Proposals are also regularly made intersessionally for decisions by correspondence.

Requests for scientific advice take one of two forms: requests for recurring advice (mostly included in the MoU) and requests for non-recurring advice. The former are usually the same, or similar, each year, whereas the latter are typically ad hoc and address new items or exceptional circumstances. Requests are formally submitted to ICES by the Commission; ICES reviews these requests and submits its advice back to NEAFC and publishes it in its annual ICES Advice publication and makes it publicly available on its website. ICES also presents the advice to PECMAS and the Commission. An example of recurring advice is the annual advice on VMEs in the Regulatory Area; an example of non-recurring advice is the advice on deep sea sharks, rays and chimaeras recently requested jointly by NEAFC and OSPAR (see below).

PECMAS, on receiving the advice from ICES, discusses it and, if necessary, makes a proposal to the Commission for appropriate action. PECMAS proposals may include drafts of conservation and management measures, proposals for TACs for assessed stocks, or simple references to the advice requiring further consideration by the Commission, which then takes the necessary decisions.

Relationships with other bodies

NEAFC works collaboratively with the NAFO, its counterpart in the Northwest Atlantic Ocean. All NEAFC Contracting Parties are also parties of NAFO. These two RFMOs formed a joint advisory group on data management and agreed to a joint Deployment Plan to coordinate control and inspection activities. Some NEAFC Contracting Parties are also members of the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR). OSPAR is a regional body whose Contracting Parties cooperate to protect the marine environment of the northeast Atlantic. OSPAR does not have the mandate to adopt any program or measures related to the management of fisheries, but it cooperates with NEAFC in the context of area management. In 2008, NEAFC and OSPAR entered into formal cooperation through an MoU; this was expanded in 2014, when they agreed a Collective Arrangement, which strengthened coordination and cooperation with regard to area-based management in particular. The Contracting Parties continue to meet annually under the Collective Arrangement, not only cooperating on area-based management (for instance current consultation on a proposed OSPAR High Seas MPA) but also on species of common interest such as deep sea sharks. NEAFC also has an MOU in place with the General Fisheries Council of the Mediterranean.

There are other international marine conservation and management bodies operating in the Northeast Atlantic: the International Commission for the Conservation of Atlantic Tuna, the International Whaling Commission, the North Atlantic Marine Mammal Commission and the North Atlantic Salmon Conservation Organization. NEAFC does not assess or manage any of the species managed by these other bodies. Activities managed by other international bodies, such as the International Maritime Organization and the International Seabed Authority, may also have an impact on marine ecosystems, and initiatives have been taken to formalise cooperation among all relevant international organizations operating in the northeast Atlantic Ocean.

NEAFC Bottom fisheries

NEAFC divides its fisheries into those that target pelagic species (including redfish, mackerel, herring, and blue whiting) which use pelagic gears, and those for haddock and “deepsea species” (listed in NEAFC, 2016) which use demersal fishing gears. Demersal gears include not only gears that touch the bottom during normal operation, but also benthopelagic gears targeting grenadier (mainly roundnose grenadier Coryphaenoides rupestris) and alfonsino (Beryx splendens and B. decadactylus) that may not touch the bottom but catch fish resources just off the seabed. As defined by NEAFC,

deep-sea fisheries are those that land species appearing on the NEAFC list of deep-sea species, regardless of fishing method. However, some bottom fishing not satisfying this definition of deep-sea fisheries also occurs in the NEAFC Regulatory Area, e.g. the fisheries targeting Rockall haddock, and shrimps and crabs in the Barents Sea.

The total catch of deep-sea species in 2018 in the Regulatory Area, as recorded by NEAFC, was 3 199 tonnes, including significant catches of Greenland halibut and roughhead grenadier. For the entire Convention Area (Regulatory Area and national waters), landings of deep-sea species in 2018 were 181 000 tonnes; the landings from the Regulatory Area were therefore a small proportion (1.8 percent) of the total landings from the northeast Atlantic.

A major review of deep sea fisheries in the Regulatory Area was carried out by a NEAFC working group, reporting in 2017. The report was a compilation of the available data on fisheries for deep-sea species in the NEAFC Regulatory Area. It was based on analysis of data provided to NEAFC by its Contracting Parties covering a period from 1973 to 2016, and in particular on data from 2003 - 2016.

All species of deep-sea fish regulated by NEAFC were covered including 25 bony fishes, 23 sharks, rays, and chimaeras and the deep-sea red crab. The report does not cover discarded fish and noted in some cases it has been difficult to exclude data from Exclusive Economic Zones (EEZ). The report used catch data, as well as time-series derived from information on fisheries effort relevant to deep-sea species fishing. This represented mostly trawl and longline data, but also data from gears such as gillnets and pots.

The Key findings of the report were that for most NEAFC Contracting Parties the landings and effort in the Regulatory Area has declined significantly in the most recent years in the period 1973-2016. Some Contracting Parties that previously fished deep-sea species in the Regulatory Area have barely fished there in the last decade or so. The combined landings of deep-sea species for all Contracting Parties in the NEAFC Regulatory Area for the period 2003-2015 (Figure 4) suggest a declining trend after around 2008 to less than 2000 t in 2011-2012. The increase in landings from 2014 and 2015 only reflects enhanced fishing for grenadiers on the mid-Atlantic Ridge by the European Union which was the predominant fishing party for these species throughout the period 2003-2015.

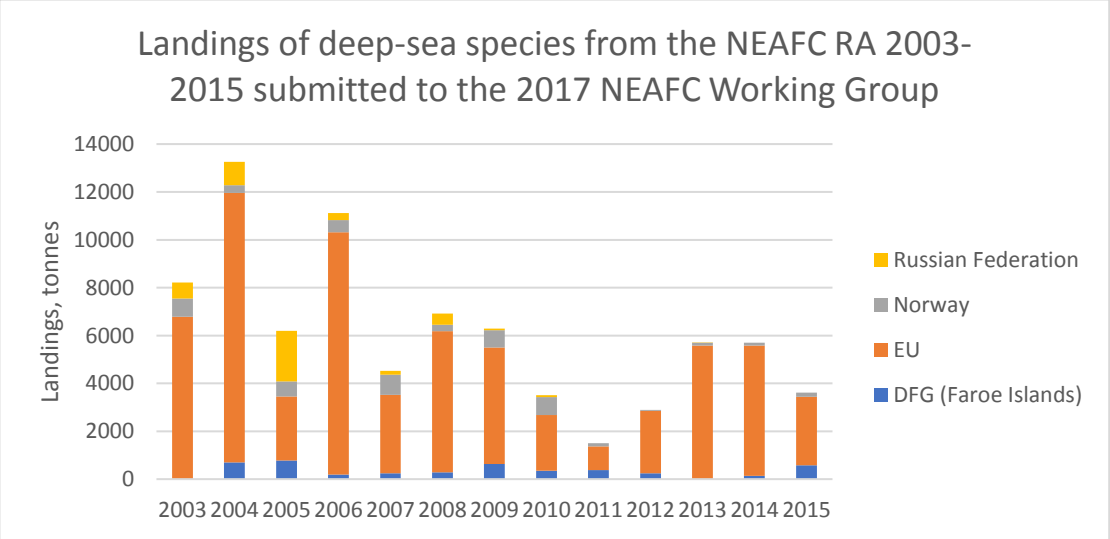


Figure 4. Annual landings of deep-sea species from the NEAFC Regulatory Area in the years 2003-2015.

Landings data from earlier years combined with the 2003-present data series is presented in Figure 5. This includes Russian/USSR only landings from the mid-Atlantic prior to 1988 and international landings from 1988-2003. Prior to 1988, the Russian/USSR fisheries from 1973 onwards were most probably dominant in what would become the NEAFC Regulatory Area; mid-Atlantic Ridge landings of roundnose grenadier alone in a number of years in the 1970-1980s exceeded the total annual

international landings observed for the entire Regulatory Area in subsequent years. The combined series illustrates fisheries increasing again in the NEAFC Regulatory Area from around 1995 onwards reaching a maximum about a decade later, followed by a decline.

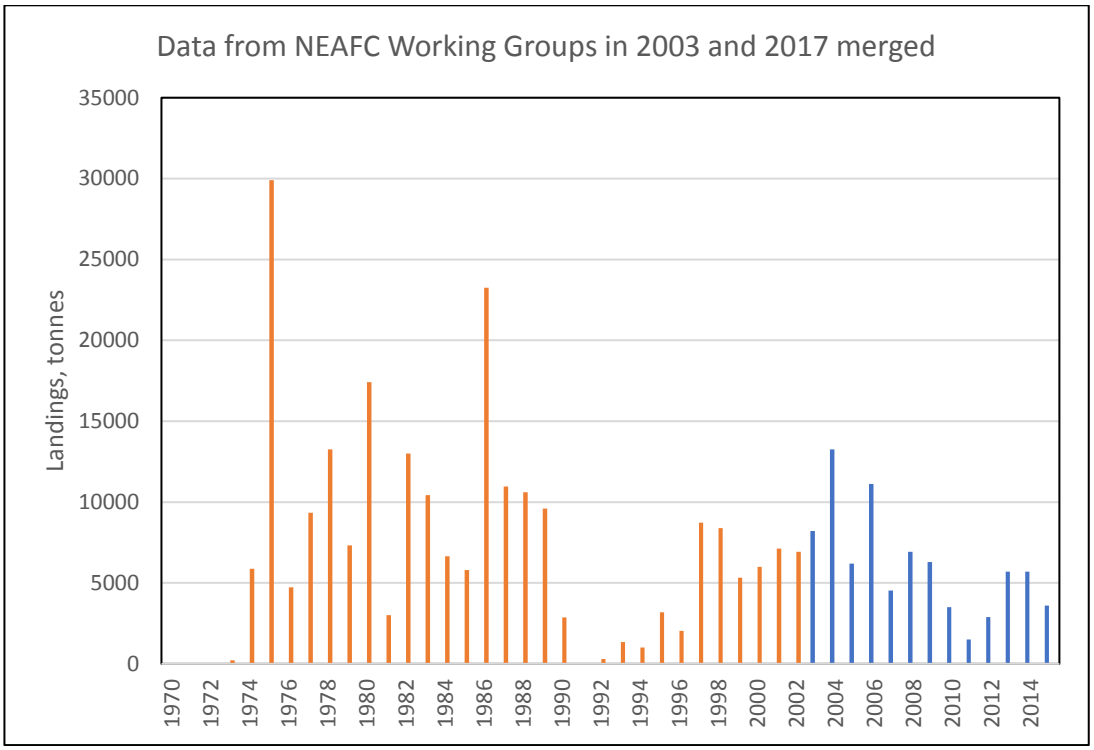


Figure 5. Time series of annual landings of deep-sea species from the NEAFC Regulatory Area by all contracting parties, as compiled by NEAFC 2003 (yellow bars) and in 2017 (blue bars).

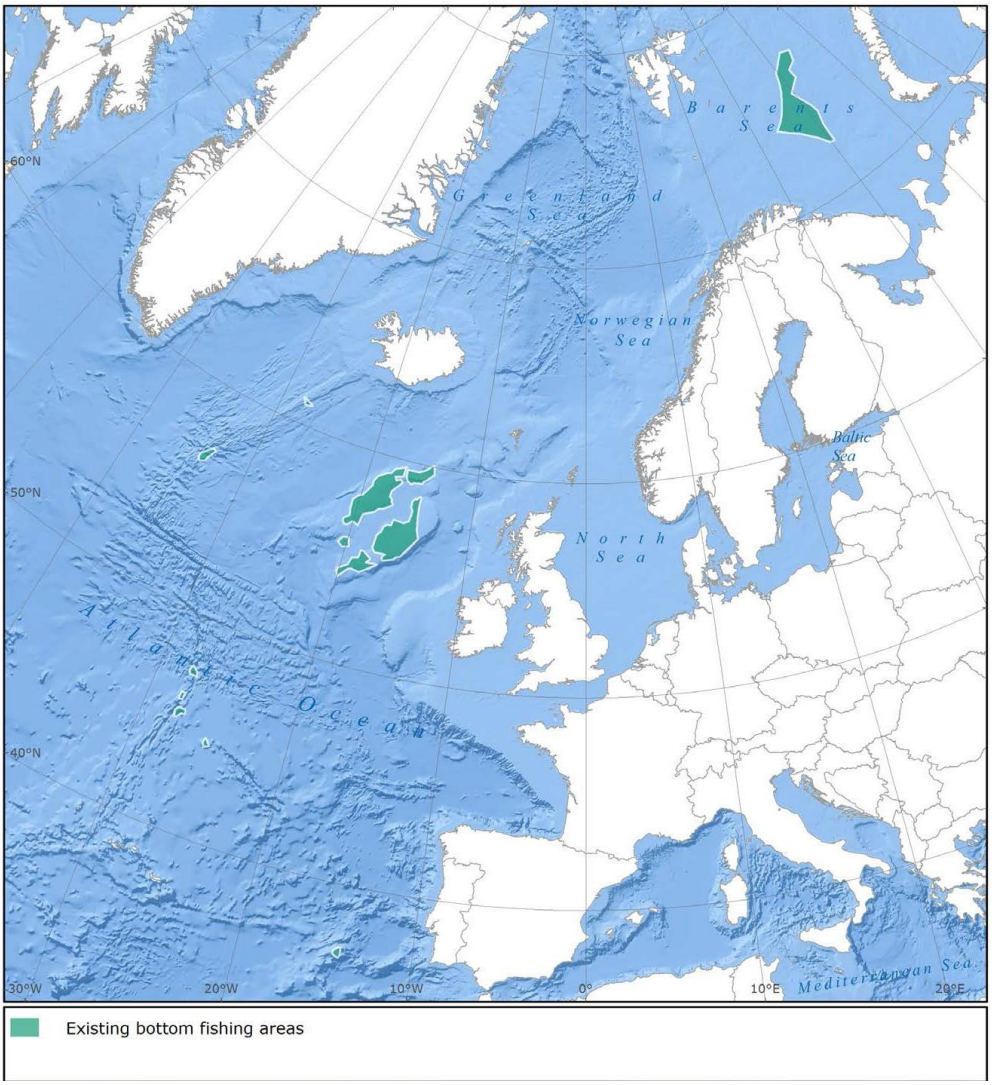
Independently of NEAFC, ICES compiles national landings statistics for use in assessments and management advice, and there are often discrepancies between figures submitted to NEAFC by individual Contracting Parties and the ICES figures derived from national sources. The NEAFC Working Group noted these discrepancies between landings data coming from different sources, some of which was related to poor identification of ICES areas or national jurisdictions. Nevertheless, disregarding the two years (2012/2013) for which the NEAFC data are likely too low, it may provisionally be assumed that Figures 4 and 5 represent the best available information on the landings history of deep sea stocks in the NEAFC Regulatory Area.

REGULATIONS AND MEASURES: Bottom fishing areas

The mapping of bottom fishing areas commenced with discussions in PECMAS in June 2008, when certain broad concepts were proposed, including the clarification that a fished area would mean that fishing had taken place at least twice in a two- year period. The Commission held an extraordinary meeting in July 2008 to discuss NEAFC's approach in response to UNGA Resolution 61/105, especially with regard to bottom fishing areas and encounter protocols, and at its annual meeting later in 2008 it adopted a resolution that led to NEAFC's first general measures on bottom fishing in its Regulatory Area (Recommendation 13/2009). This resolution defined the terms "bottom fishing activities", "existing bottom fishing areas", and "new bottom fishing areas", and required Contracting Parties to submit, by 1 September 2009, data on their bottom fishing activities during 1987–2007, at a resolution of 5' latitude x 10' longitude, for the following gear categories: bottom trawls, longlines, gillnets, benthopelagic (i.e. grenadier and alfonsino fishery), and others (i.e. other gears that have bottom contact during normal operation). The Secretariat also compiled maps of bottom fishing from VMS records, although it was not always possible to identify the type of fishery from those records. The first map of existing bottom fishing areas was adopted in 2009, and improved and modified in 2010 and 2014; the current map is shown in Figure 6. The current measure (Recommendation 19/2014) does not define or use the term "new fishing area", but refers to fishing "outside area closures and existing bottom fishing areas".

FIGURE 6

Current existing bottom fishing areas in the NEAFC Regulatory Area



REGULATIONS AND MEASURES: Exploratory fishing protocols

An exploratory fishing protocol was first adopted in 2008 related to fishing in "new bottom fishing areas" (i.e. outside the "existing bottom fishing areas"). Since 1 January 2009, all bottom fishing activities in new bottom fishing areas (since 2021, known as restricted bottom fishing areas), or with bottom gear not previously used in the area concerned, are considered exploratory fisheries and must be conducted in accordance with an Exploratory Bottom Fisheries Protocol. An interim protocol was adopted as part of that measure, and established that exploratory fisheries cannot commence unless a harvesting plan, mitigation plan, catch-monitoring plan, and data collection plan have been submitted. Vessels involved in exploratory fisheries must also carry an observer, who must follow the interim VME data collection protocol. Exploratory fisheries are assessed by ICES and PECMAS after two years, and the Commission takes a decision regarding the future of the fishery. The current measure, adopted in 2014 (Recommendation 19/2014), clarified and expanded the exploratory bottom fishing measures. Contracting Parties are still required to submit a "Notice of Intent" for any fishing they wish to undertake within restricted bottom fishing areas, or within an existing bottom fishing area if there are significant changes in the conduct and technology of bottom fishing activities within existing bottom fishing areas. As noted above, the term "new fishing area" is no longer used and restricted bottom fishing area is used since the amendment of the VME Recommendation in 2021. In addition to the four plans required by the 2008 measure, vessels are required to collect information on a fine spatial scale, preferably by tows or sets, and to use additional technology on the vessel (e.g. sea-bed mapping programmes using echo- or multi-beam sounders) or on the gear

(e.g. cameras) to identify where VMEs do, or are likely to, occur. The assessment process is specified in detail; ICES provides guidance to PECMAS on how to undertake the assessment, and the Commission makes the final decisions as to whether the proposed bottom fishing should proceed.

Continuing developments on Vulnerable Marine Ecosystems up to 2014

NEAFC's work to protect VMEs began a few years before the adoption of UNGA Resolution 61/105 in 2006. However, both the UNGA Resolution and the FAO Deep-sea Fisheries Guidelines were important for the continued development of NEAFC's regulations From 2005 to 2014, the stated purpose of the NEAFC bottom closures to protect benthic habitats was the protection of VMEs, with the exception that in 2007 and 2008 the closures on and around the Hatton and Rockall Banks were originally to protect deep-water corals. Depending on the wording in the regulation, the closures applied to either: (1) bottom trawling and fishing with static gear, including bottom gillnets and longlines, or (2) fishing with gear that is likely to contact the seafloor during the normal course of fishing operations. The current measure (Recommendation 19/2014, as amended) uses the latter definition, terming them "bottom fishing activities". This definition protects VMEs by closing areas to bottom-contact fishing gears regardless of target species, but allows fishing with pelagic and benthopelagic gears, and also fishing targeting deep-sea species, to continue.

NEAFC, on the advice of ICES, has regularly reviewed the boundaries of its closed areas, and has modified them as appropriate to protect newly identified VMEs. The first set of closures in 2005 was precautionary, with very little biological information available to support the decision. However, further information has been collected by Contracting Parties, mainly through surveys, and provided to ICES. The WGDEC reviews this information annually, and ICES provides advice to NEAFC. WGDEC has developed a central portal for data on the distribution and abundance of VMEs across the North Atlantic, and contains observations of VME indicators and habitats.

Area closures have been seen as a primary tool to protect VMEs, but also as an integrated element of a more general comprehensive approach. This approach includes: 1) defining 'existing' bottom fishing areas, i.e. areas that have been recently fished and where fisheries could continue relatively unrestricted, and 2) ensuring that bottom fishing outside these areas (i.e. in restricted bottom fishing areas) are only exploratory fisheries subject to various restrictive conditions. These conditions now include a pre-assessment of the proposed activities; proposed exploratory bottom fisheries can commence only after having been assessed by PECMAS and approved by the Commission.

Following the initial closures in 2005, and some additions in the following years, NEAFC's biggest step in adopting area closures to protect VMEs was taken in 2009, when several new closures were adopted, including very large areas on the MAR.

NEAFC has now closed the areas where it has concluded, on the basis of the best available scientific information, that VMEs occur or are likely to occur. No bottom fisheries should therefore be taking place in the Regulatory Area that will result in significant adverse impacts on VMEs. Furthermore, the provisions on restricted bottom fishing areas ensure that bottom fisheries only expand into previously unfished areas on the basis of exploratory fisheries that are subject to various conditions, including pre-assessments, and that can only commence after having been assessed by PECMAS and approved by the Commission. Additionally, several of NEAFC's closures are not based on the identification of specific individual VMEs, but rather on the likelihood of there being VMEs, e.g. the large closed areas on the MAR.

However, NEAFC continues to develop its management in this context, and has a recurring request for scientific advice from ICES regarding any new information on the occurrence of VMEs in the Regulatory Area.

Similarly, from 2009 to 2013 measures established that VMEs should be identified on a case-by-case basis through assessment by relevant bodies: ICES for the advice, and PECMAS for the recommendation. The current measure specifies that area closures for the protection of VMEs must be based on advice from ICES and the procedures set out in NEAFC measures regulating fisheries in

the Regulatory Area. VMEs can be identified by either current or historical research survey work, or through an examination of the temporary closures following encounters and the subsequent assessment and advice from ICES.

Currently, NEAFC protects VMEs, and areas likely to have VMEs, by regulations that include bottom fishing closures, and in this way significant adverse impacts from bottom fisheries are mitigated. The closed areas are defined by a set of coordinates that delineate a boundary within which bottom fishing activities are prohibited. Most recent developments are covered in Part 1 above.

Encounter protocols

One of the tools used for protecting unidentified VMEs from significant adverse impacts are encounter protocols for vessels actively fishing with bottom-contact gears within the Regulatory Area. The first encounter protocol in 2008 required Contracting Parties to require their flag vessels to cease bottom fishing in a prescribed area following an encounter. In essence the obligation was for the vessel, regardless of its fishing gear, to move two nautical miles radius around the most likely position of the encounter. Encounter protocols have been expanded and clarified several times since then, and now require a temporary closure to be applied in all instances of encounters above a threshold level. The size of the closed area is dependent on the gear used: for bottom trawls it is 2 nm on each side of the trawl track, and for other gears it is 2 nm radius around the most likely position of the encounter. The position of the encounter and extent of the possible VME is assessed using sea-bed mapping, and the results submitted to ICES for evaluation. Subsequent management action, and the possible lifting of the temporary closure or notification of a VME closure, is based on the subsequent advice by ICES and recommendations by PECMAS. The temporary closure remains in place until such action has been decided.

Vulnerable marine ecosystem indicators

VME indicators, which indicate the occurrence or likely occurrence of VMEs, have evolved within NEAFC since 2008 as measures have developed. Initially, the measures did not include VME indicators. In 2009, VME indicators were included, and defined as species of coral identified as antipatharians, gorgonians, cerianthid anemone fields, Lophelia, and sea pen fields or other VME elements; however, VME elements were not defined in that measure (Recommendation 13/2009). Sponges were included in square brackets, indicating that not all Parties were in agreement with their inclusion as VME indicators, but by 2010 sponges had been accepted as indicator organisms (Recommendation 11/2010).

The list of VME indicator species and taxa was modified and expanded in 2014 (Recommendation 19/2014), and representative taxa were assigned to VME habitat types and physical elements (Table 1).

Thresholds

Threshold levels for encounters with a possible VME were first established by NEAFC in 2009, and have been regularly revised since (Table 2). The current thresholds, as advised by ICES, are:

a) for a trawl tow, and fishing gear other than longlines: the presence of more than 30 kg of live coral and/or 400 kg of live sponge of VME indicators; and

b) for a longline set: the presence of VME indicators on 10 hooks per 1 000-hook segment or per 1 200-m section of longline, whichever is the shorter.

TABLE 1

VME indicator species (taxa) and elements adopted by NEAFC in 2014

VME Habitat type	Representative Taxa
Cold-water coral reef	
Lophelia pertusa reef	*Lophelia pertusa*
Solenosmilia variabilis reef	*Solenosmilia variabilis*
Coral garden	
Hard-bottom garden	
Hard-bottom gorgonian and black coral gardens	Anthothelidae, Chrysogorgiidae, Isididae, Keratoisidinae, Plexauridae, Acanthogorgiidae, Coralliidae, Paragorgiidae, Primnoidae, Schizopathidae
Colonial scleractinians on rocky outcrops	*Lophelia pertusa, Solenosmilia variabilis*
Non-reefal scleractinian aggregations	*Enallopsammia rostrata, Madrepora oculata*
Soft-bottom coral gardens	
Soft-bottom gorgonian and black coral gardens	Chrysogorgiidae
Cup-coral fields	Caryophylliidae, Flabellidae
Cauliflower coral fields	Nephtheidae
Deep-sea sponge aggregations	
Other sponge aggregations	Geodiidae, Ancorinidae, Pachastrellidae
Hard-bottom sponge gardens	Axinellidae, Mycalidae, Polymastiidae, Tetillidae
Glass sponge communities	Rossellidae, Pheronematidae
4. Sea pen fields	Anthoptilidae, Pennatulidae, Funiculinidae, Halipteridae, Kophobelemnidae, Protoptilidae, Umbellulidae, Vigulariidae
5. Tube-dwelling anemone patches	Cerianthidae
6. Mud- and sand-emergent fauna	Bourgetcrinidae, Antedontidae, Hyocrinidae, Xenophyophora, Syringamminidae
7. Bryzoan patches	

VME indicator elements

Physical elements	Explanation
Isolated seamounts	Non-MAR seamounts
Steep slopes and peaks on mid-ocean ridges	Steep ridges and peaks support coral gardens and other VME species in high density
Knolls	A topographic feature that rises less than 1 000 m from the sea floor
Canyon-like features	A steep-sided "catchment" feature not necessarily associated with a shelf, island or bank margin
Steep flanks >6.4°	From Murillo, 2011

TABLE 2

VME indicator species encounter threshold levels in the NEAFC Regulatory Area

Year	Unit	VME indicator	Measure
2008	Catch	Evidence of VMEs	
2009	Catch per set[1]	Corals: 100 kg live; Sponges: [1 000 kg live][2]	Rec. 13/2009
2010-2012	Catch per set	Corals: 60 kg live; Sponges: 800 kg live	Rec. 11/2010
2013	Catch per set	Corals: 30 kg live; Sponges: 400 kg live	Rec. 12/2013
2014-	Trawl tow, other gears	Corals: 30 kg live; Sponges: 400 kg live	Rec. 19/2014
	Longline set[3]	10 present per 1 000 hooks or 1 200 m line	Rec. 19/2014

[1] "set" defined as trawl tow, longline set, or gillnet set.

[2] Not accepted by all Contracting Parties.

[3] The presence of VME indicators on 10 hooks per 1 000-hook segment or per 1 200-m section of longline, whichever is the shorter.

Impact assessments

The general approach of NEAFC since 2008 has been to identify areas where VMEs are known or likely to occur, and to close these areas to bottom fishing activities to protect the VMEs from significant adverse impacts. Initially, before the VME and bottom fishing measures were fully developed, NEAFC planned to assess all bottom fishing activities and specified a procedure for doing this, whereby Contracting Parties were required to submit their bottom fishing plans for the next

year along with anticipated impacts on VMEs (Recommendation 16/2008). These would then be assessed by ICES and PECMAS, and the Commission would decide whether to allow, prohibit, or restrict such fishing. A more detailed interim protocol for exploratory fishing in new bottom fishing areas was adopted the following year (Recommendation 13/2009), and further developed in 2011, which required that cumulative impacts on VMEs also be considered, as well as a risk assessment to determine whether impacts could be regarded as significantly adverse (Recommendation 15/2011). The same basic procedure applies currently, although more detail is required in the report, which must be completed in part by a scientific observer.

Observers

NEAFC requires that vessels undertaking exploratory fisheries carry an observer on board, who collects data in accordance with the VME Data Collection Protocol (Box 2). This protocol, in force in interim form during 2008–2013, was re-adopted with minor amendments in 2014:

BOX 2

VME Data Collection Protocol

Observers on fishing vessels in the Regulatory Area who are deployed pursuant to Article 6.6 of this Recommendation shall:

(a) Monitor any set for evidence of presence of VMEs and identify coral, sponges and other organisms to the lowest level;
(b) Record on data sheets the following information for identification of VMEs: vessel name, gear type, date, position (latitude/longitude), depth, species code, trip-number, set-number, and name of the observer on data sheets, if possible;
(c) Collect, if required, representative samples from the entire catch (biological samples shall be collected and frozen when requested by the scientific authority in a Contracting Party); and
(d) Provide samples to the scientific authority of a Contracting Party at the end of the fishing trip.

Scientific research

Within closed areas, Contracting Parties intending to conduct scientific investigations (which excludes exploratory fishing), are required to make a notification of their intended research programmes, taking account of Article 206 of the UN Convention on the Law of the Sea, which requires that States "having reasonable grounds for believing that planned activities may cause harmful changes to the marine environment, shall assess the potential effects of such activities on the marine environment and shall communicate reports of the results of such assessments to all members of the competent international organization".

Review procedures

Every five years, the Commission reviews the effectiveness of the regulations on the protection of VMEs from significant adverse impacts, taking into account any new scientific advice (see part 1 for the 2019 review). VME closures are usually, but not always, for a fixed period of between 1 and 5 years, and the measures controlling these closures are reviewed prior to the end date. Closures are normally extended, often with a modification of the boundaries. The most recent review date for most of the current closures was 31 December 2017. ICES in 2017 advised NEAFC to renew all the closures as the need for protection of the VMEs in the areas remained valid. The 2017 Annual Meeting therefore renewed to 31 December 2022 all closures under the Recommendation. At the same time, one of the closures, Edora's bank, was brought into line with the same review date as the other closures. In addition, one of the areas, "Area (l) Hatton–Rockall Basin" was significantly enlarged following advice from ICES to extend it to encompass (and with buffer regions) new records of deep-sea sponge aggregations found at 1200 metres. (See also Part 1).

Other regulations that also protect benthic areas

Gear restrictions and retrieval

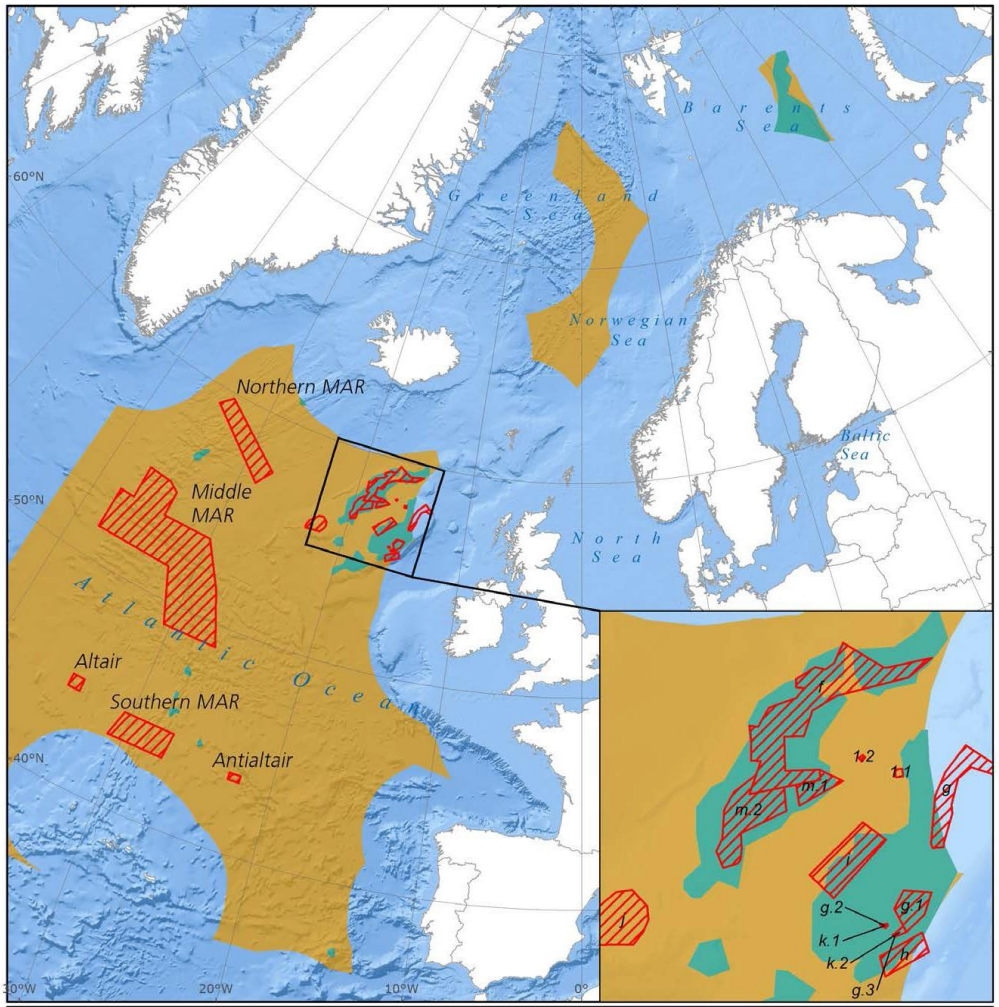
NEAFC has prohibited the deployment of gillnets, entangling nets, and trammel nets in any position where charted depth is greater than 200 m (Recommendation 3/2006). Furthermore, there is an obligation for fishing vessels to have on board equipment to retrieve lost fishing gear, and to attempt to retrieve lost gear as soon as possible (NEAFC 2020 –extended this to all gears not just fixed gears). If the gear cannot be retrieved, the vessel must report the incident, including type of gear and position, to its flag State, and subsequently to all Contracting Parties. Contracting Parties must on a regular basis undertake to retrieve lost gear.

VULNERABLE MARINE ECOSYSTEM CLOSURES AND OTHER REGULATED AREAS

The current area measures adopted by NEAFC to protect VMEs address delineated existing bottom fishing areas, encounters and exploratory fishing inside and outside existing bottom fishing areas, and closures (Figure 7). The development of NEAFC's measures to protect VMEs and other benthic areas from 2005 to present is shown as a map in Figure 8 and in Table 3.

FIGURE 7

Spatial management measures adopted by NEAFC to 2015 for the protection of VMEs. Encounter protocols apply throughout the NEAFC Regulatory Area



Hatton Bank 1	f	South-West Rockall Area	
North west Rockall	g	South-West Rockall Bank Area 1	
Logachev Mounds	h	South-West Rockall Bank Area 2	

West Rockall Mounds	i	Hatton-Rockall Basin Area 1	l.1
Edora's bank	j	Hatton-Rockall Basin Area 2	l.2
South-West Rockall (Empress of Britain Bank) Area 1	g.1	Hatton Bank 2 Area 1	m.1
South-West Rockall Area 2	g.2	Hatton Bank 2 Area 2	m.2

FIGURE 8

The evolution of measures adopted by NEAFC to protect VMEs and other benthic habitats. See Figure 7 for key to closed areas

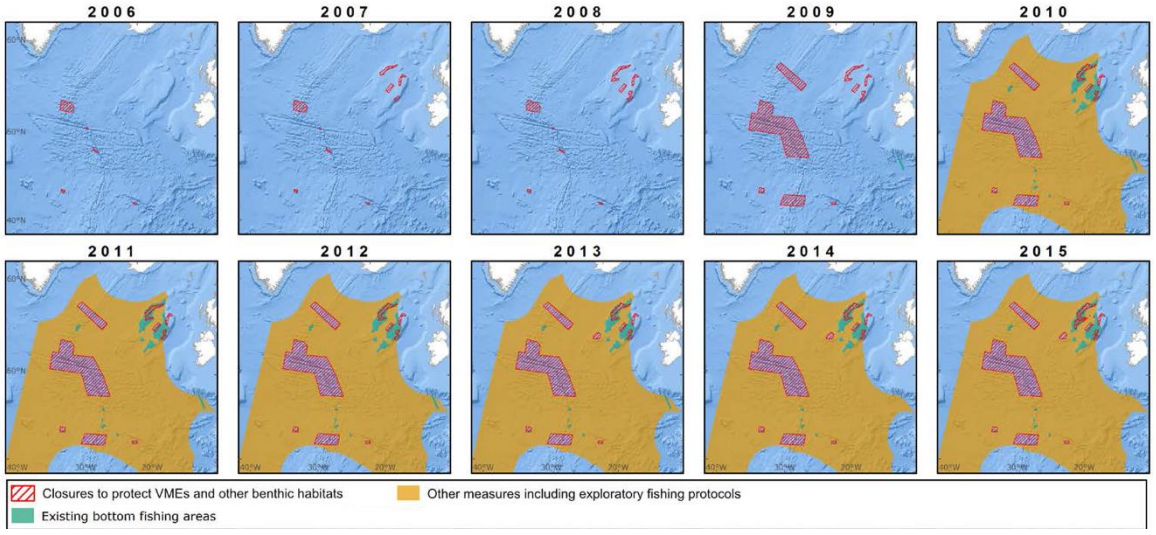


TABLE 3

The chronological development of closed areas to protect VMEs. C denotes a closed area, C1, C2, etc., denotes boundary changes; R is a review; EBB is Empress of Britain Bank

Year	2005	2006	2007	2008	2009[1]	2009[2]	2010	2011	2012	2013	2014	2015–2017
Recommendation	05/2005		09/2007	07/2008 09/2008	14/2009	pv/2009	8/2010	14/2011	08/2012	08/2013 09/2013	19/2014	19/2014
Altair Seamount	C	C	C(R)	C(R)	C(R)	C1	C1	C1	C1	C1	C1(R)	C1
Antialtair Seamount	C	C	C(R)	C(R)	C(R)	C1	C1	C1	C1	C1	C1(R)	C1
Hecate Seamount	C	C	C(R)	C(R)	C(R)[3]							
Faraday Seamount	C	C	C(R)	C(R)	C(R)[3]							
Reykjanes Ridge	C	C	C(R)	C(R)	C(R)[3]							
Hatton Bank			C	C1	C1	C1(R)	C2(R)	C2(R)	C3(R)	C4	C4(R)	C4
Northwest Rockall			C	C1	C1	C1(R)	C1(R)	C1(R)	C1(R)	C1	C1(R)	C1
Logachev Mounds			C	C	C	C(R)	C(R)	C(R)	C(R)	C	C(R)	C
West Rockall Mounds			C	C	C	C(R)	C(R)	C(R)	C(R)	C	C(R)	C
Edora's bank										C	C(R)	C
Southwest Rockall (EBB) Area 1[4]				C	C	C(R)	C(R)	C(R)	C(R)	C	C(R) C	C
Northern MAR Area						C	C	C	C	C	C(R)	C
Middle MAR Area (Charlie-Gibbs Fracture Zone and sub-Polar Frontal Region)						C	C	C	C	C	C(R)	C
Southern MAR Area						C	C	C	C	C	C(R)	C
Southwest Rockall (EBB) Area 2											C(R)	C
Southwest Rockall (EBB) Area 3											C(R)	C
Southwest Rockall Bank Area 1											C	C
Southwest Rockall Bank Area 2											C	C

TABLE 3 (CONTINUED)

Year	2005	2006	2007	2008	2009[1]	2009[2]	2010	2011	2012	2013	2014	2015–2017
Hatton-Rockall Basin Area 1											C	C[5]
Hatton-Rockall Basin Area 2											C	C
Hatton Bank 2 Area 1											C	C
Hatton Bank 2 Area 2											C	C

[1] 1 January 2009-31 March 2009.
[2] 16 July 2009-31 December 2009.
[3] Became part of the new "Middle MAR Area (Charlie-Gibbs Fracture Zone and sub-Polar Frontal Region)" area in 2009.
[4] Became Southwest Rockall (EBB) Area 1 in 2014 with no change of boundary.
[5] Extended significantly under a 2018 amendment to Recommendation 19:2014

SURVEYS

Members of ICES conduct scientific cruises and undertake numerous regular repeat surveys in the northeast Atlantic, some of which provide information for assessing deep-water resources and VMEs in the NEAFC Regulatory Area. These investigations supplement existing published scientific information and databases available for assessments conducted by ICES expert groups such as WGDEC and WGDEEP. Further details of scientific investigations and surveys are available in the ICES expert group reports.

OTHER INFORMATION

Reported encounters

No encounters (i.e. bycatch of VME indicators exceeding threshold levels) have been reported. Several Contracting Parties have, however, reported to ICES data on sub- threshold bycatch of VME indicators, and these records are incorporated in the ICES VME database.

Exploratory fishing

No exploratory fishing using bottom fishing gears has been conducted by Contracting Parties in the Regulatory Area since the exploratory fishing protocol entered into force in 2009. Three "Notices of Intent" for an exploratory fishery for crabs in the Barents Sea was submitted by the EU in 2015. In all three cases, PECMAS concluded that the proposed activity was not likely to result in significant adverse impacts on VMEs. However, the Commission rejected all the proposals on the grounds that the target species was a sedentary species on the continental shelf of a coastal State. It was therefore such jurisdictional issues, and not issues relating to VME protection that caused these proposals for exploratory fishing to be rejected.

Identification guides

There is currently no VME identification guide for the northeast Atlantic that is used in the Convention Area or referred to in the NEAFC Scheme of Enforcement or in the conservation and management measures. ICES assessed the usefulness for NEAFC of the NAFO VME species guides for corals and sponges in the northwest Atlantic, and determined that about half of the species in the guides also occur in the northeast Atlantic (ICES WGDEC, 2012, Item 8.3). PECMAS has recommended that a guide specific to the northeast Atlantic be developed.

Data sharing protocols

Data-sharing in NEAFC operates at a number of levels.
Contracting Parties to NEAFC must provide the following information to NEAFC:

- Daily catch weights (kg, to nearest 100 kg) of at least regulated species (Scheme, Article 12 1b; except EU)

- EU only: weekly catch weights (kg, to nearest 100 kg) of at least regulated species (NEAFC, 2015, Scheme, Article 12 1b; footnote 1)
- Monthly catches of species listed in Annexes I and IV of Recommendation 2/2011
- Catches of VME indicator species above the threshold level (Recommendation 19/2014, Article 8 1biii)
- Exploratory fisheries: an observer report on the VME Data Collection Protocol, and all data derived from exploratory bottom fishing (also to be sent to ICES) (Recommendation 19/2014).

The most important link, beyond the duties of the Contracting Parties, is between NEAFC and ICES. This is achieved through the MoU that states "NEAFC and ICES will work together to arrange for any relevant consolidated data for scientific analysis to be provided to ICES, while ensuring the NEAFC's confidentiality obligations." The main information provided to ICES by NEAFC is what is reported directly to the NEAFC Secretariat pursuant to the NEAFC regulations that permit vessels to fish in the Regulatory Area; this includes catch statistics, observer reports, and VMS information. In general, and in accordance with the MoU, only aggregated information is provided to ICES, as opposed to vessel specific set-by-set information. NEAFC now provides VMS and catch information, in a form that does not identify vessels and/ or flag states, to ICES yearly. ICES also receives information directly from its Member States, and from EuroStat, that can also be used to provide the best scientific advice to NEAFC.

As mentioned earlier, NEAFC also has an MoU with OSPAR, which likewise ensures the free flow of mutually useful information (including data) between the two organizations. This mutual cooperation ensures that the common objectives of the two organizations are realised. The NEAFC WG Stats is responsible for the collection of statistics relating to the fisheries and for monitoring the exchange of information with other organizations.

NEAFC has no protocol for sharing its information with a wider audience. Annual catch information, aggregated by country and area, is available on the NEAFC Web site, as are conservation measures and all its current and historical meeting reports, which include meetings of all committees and working groups. Documents submitted to meetings are normally available on the public pages of the NEAFC Web site, unless restricted for various reasons. ICES has data use and sharing policies, and a large amount of open-access information is available in various databases.

Other activities that might impact vulnerable marine ecosystems

The level of human activity in the Regulatory Area is generally low. Laying and operation of cables for electronic communication and research activities, including exploration of marine genetic resources and minerals, are activities currently ongoing that may potentially impact VMEs. In 2012, OSPAR adopted Guidelines for Best Environmental Practice in cable laying and operation; it had previously adopted a Code of Conduct for scientific research, and in 2015 is investigating whether there is a need for new measures related to the search for and exploitation of marine genetic resources.

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