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Oceans and the law of the sea: sustainable fisheries, including through the 1995 Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, and related instruments

Actions taken by States and regional fisheries management organizations and arrangements in response to paragraphs 113, 117 and 119 to 124 of General Assembly resolution 64/72, paragraphs 121, 126, 129, 130 and 132 to 134 of General Assembly resolution 66/68 and paragraphs 156, 171, 175, 177 to 188 and 219 of General Assembly resolution 71/123 on sustainable fisheries, addressing the impacts of bottom fishing on vulnerable marine ecosystems and the long-term sustainability of deep-sea fish stocks

Report of the Secretary-General

Summary

The present report has been prepared pursuant to paragraph 212 of General Assembly resolution 75/89 <https://undocs.org/en/A/RES/73/125>, in which the Assembly requested the Secretary-General to prepare a report, in cooperation with the Food and Agriculture Organization of the United Nations, for consideration by the General Assembly at its seventy-seventh session, on further actions taken by States and regional fisheries management organizations and arrangements 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 since the preparation of the Secretary-General's previous report on the topic (A/75/175), in order to facilitate the further review of the actions taken referred to in paragraph 192 of resolution 71/123.

The report is a follow-up to earlier reports prepared by the Secretary-General (A/61/154, A/64/305, A/66/307, A/71/351, and 75/175). It should also be read in conjunction with earlier interim reports of the Secretary-General on the measures taken by States and regional fisheries management organizations and arrangements to implement resolution 61/105 (A/62/260, paras. 60–96, and A/63/128, paras. 63–78).

* A/77/50.

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Abbreviations

ABNJ	areas beyond national jurisdiction
CCAMLR	Commission for the Conservation of Antarctic Marine Living Resources
CM	Conservation measure
CMM	Conservation and management measure
FAO	Food and Agriculture Organization of the United Nations
GFCM	General Fisheries Commission for the Mediterranean
ICES	International Council for the Exploration of the Sea
NAFO	Northwest Atlantic Fisheries Organization
NEAFC	North East Atlantic Fisheries Commission
NPFC	North Pacific Fisheries Commission
RFMO	regional fisheries management organization
RFMO/As	regional fisheries management organizations and arrangements
SEAFO	South East Atlantic Fisheries Organization
SIOFA	Southern Indian Ocean Fisheries Agreement
SPRFMO	South Pacific Regional Fisheries Management Organization
UNEP	United Nations Environment Programme
VMEs	vulnerable marine ecosystems

I. Introduction

1. Since the adoption of resolution [61/105](#) in 2006, the General Assembly has been monitoring how States and regional fisheries management organizations and arrangements (RFMO/As) address the impact of bottom fishing on vulnerable marine ecosystems (VMEs) and the long-term sustainability of deep-sea fish stocks. It has conducted reviews of actions taken by States and RFMO/As in response to its resolutions on sustainable fisheries of 2009, 2011 and 2016.

2. Following the last review in 2016, the General Assembly, in its resolution [71/123](#), decided to undertake a further review in 2020 of the steps taken by States and RFMO/As 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](#), with a view to ensuring effective implementation of the measures therein and, where necessary, making further recommendations. In resolution [73/125](#)<https://undocs.org/en/A/RES/73/125>, the General Assembly requested the Secretary-General to report to the General Assembly at its seventy-fifth session, which was issued as [A/75/175](#).

3. Thereafter, in resolution [75/89](#), the General Assembly decided, in the light of the impacts of the COVID-19 pandemic, to postpone until 2022 the further review which was to be held in 2020. It also requested the Secretary-General to prepare a report, in cooperation with the Food and Agriculture Organization of the United Nations (FAO), for consideration by the General Assembly at its seventy-seventh session, on further actions taken by States and regional fisheries management organizations and arrangements 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](#) since the preparation of the report referred above. The present report should therefore be read in conjunction with the report of the Secretary-General contained in document [A/75/175](#).

4. In response to a request to States and regional economic integration organizations and regional fisheries management organizations and arrangements to submit updated information to the Secretary-General, submissions were received from eight States (Bulgaria, Canada, Japan, New Zealand, Norway, Spain, Thailand and United States of America), FAO¹ and eight RFMO/As.² The Secretary-General wishes to express his appreciation for the submissions received.

II. Overview of the impact of bottom fisheries on vulnerable marine ecosystems and the long-term sustainability of deep-sea fish stocks

5. The present section provides an update of the previous reports of the Secretary-General on the actions taken to address the impacts of bottom fishing on VMEs and the long-term sustainability of deep-sea fish stocks (see [A/61/154](#), [A/64/305](#), [A/66/307](#), [A/71/351](#), and [A/75/157](#)). It summarises the latest research findings and highlights some of the priority science challenges to further the understanding of VME ecology and the impacts of bottom fisheries on deep-sea ecosystems. Furthermore, it highlights some of the research conducted to support current fisheries impact mitigation approaches and strengthen ecosystem-based fisheries management by RFMO/As.

¹ The contribution of FAO is summarized in section IV.

² CCAMLR, GFCM, NAFO, NEAFC, NPFC, SEAFO, SIOFA and SPRFMO. The International Commission for the Conservation of Atlantic Tunas reported that it did not regulate bottom fisheries.

A. Vulnerable marine ecosystems: an updated review

6. No universally agreed definition of what constitutes a VME exists, however, States and RFMO/As³ are applying the characteristics identified in the FAO's International Guidelines for the Management of Deep-sea Fisheries in the High-Seas (the Guidelines) to identify VMEs in high seas areas and to implement protection measures.⁴ Since the last report (A/75/157), several new studies have presented new findings that could contribute to the enhancement of criteria for identifying VMEs.

7. VMEs, like any other ecosystem, consist of populations, communities, and habitats which functionally interact with one another.⁵ The use of indicator species to determine the presence of VMEs often ignores the relationship of these species with other organisms, and modelling their distribution does not necessarily take into account the entire ecosystem or other vulnerable, but geographically distinct, communities within that ecosystem.^{Error! Bookmark not defined.} Research suggests that it is essential to understand species interactions in order to evaluate the impact of fishing and other anthropogenic activities on a deep-sea ecosystem.^{Error! Bookmark not defined.}

8. In relation to the identification of VMEs, a study conducted in the Ebro Delta area in the northwestern Mediterranean Sea utilised local and indigenous knowledge to enhance understanding of the spatial distribution and temporal trends of vulnerable deep-sea species.⁶ This study demonstrated that local ecosystem knowledge can bridge the gap between the historical and current distribution of VMEs, and help understand the trends and variation of demersal species stocks to determine priority areas for scientific and management actions.^{Error! Bookmark not defined.}

9. The annex to the Guidelines and work by RFMO/As⁷ list certain species which may contribute to forming VMEs and certain topographical, hydrophysical or geological features which potentially support such species. However continuing work has identified that sea pen communities, crinoids, erect bryozoans, sea squirts, chemosynthetic species of molluscs, annelids and arthropods indicative of cold seeps or hydrothermal events, zoanths, basket stars, serpulid worms, tube-dwelling sea anemones, and specific types of foam oyster may also be potential indicators of a VME in certain regions.⁸ In order to promote the identification of bycatch of VME indicator species at the lowest taxonomic level possible by observers, RFMO/As are providing FAO with information to create codes for inclusion in ASFIS,⁹ the FAO list of species for fishery statistics purposes. Studies also ascertain the level of risk of significant adverse impacts from bottom fishing activities by different VME indicator species.^{Error! Bookmark not defined.}

³ As reported in contributions to this report including by Canada, Norway, Spain, United States of America, SEAFO.

⁴ FAO, "International Guidelines for the Management of Deep-sea Fisheries in the High-Seas", (2009).

⁵ Watling, L., and P. J. Auster, "Vulnerable Marine Ecosystems, Communities, and Indicator Species: Confusing Concepts for Conservation of Seamounts", *Frontiers in Marine Science*, vol. 8, art. 6222586, (2021).

⁶ Bastari, A., Y. Mascarell, M. Ortega, M. Coll, "Local fishers experience can contribute to a better knowledge of marine resources in the Western Mediterranean Sea", *Fisheries Research*, vol. 248, art. 106222, (2022).

⁷ ICES, "Assessment of the list of VME indicator species and elements", Advice 2013, Book 1, 1.5.5.3, Special request, Advice June 2013, (2013).

⁸ Buhl-Mortensen L., J. Burgos, P. Steingrund, P. Buhl-Mortensen, S. Ólafsdóttir, S. Ragnarsson, "Vulnerable marine ecosystems (VMEs) Coral and sponge VMEs in Arctic and sub-Arctic waters - Distribution and threats", *TemaNord* 2019:519 (2019); Contribution of GFCM; Contribution of SEAFO; Contribution of NAFO.

⁹ Contribution of NAFO.

B. Deep-sea fish stocks

10. Deep-sea fish can be found in all parts of the global ocean occupying seamounts, water columns, and the seabed of continental slopes.¹⁰ It is estimated that around 90 per cent of the global fish biomass lies in the uppermost layer of the deep-sea, between 200 and 1000-meters depth.¹¹ Fish in this zone play a number of significant roles in the ecosystem^{Error! Bookmark not defined.} and also provide a significant contribution to the ocean food chain, connecting the upper and lower layer of the ocean.^{Error! Bookmark not defined.}

11. Deep-sea fish possess several characteristics such as slow growth, low natural mortality, and long-life expectancy.¹² These characteristics, however, create vulnerability to overexploitation,^{Error! Bookmark not defined.} which could permanently damage deep-sea fish stocks.^{Error! Bookmark not defined.} According to a review of the approximately 50 deep-sea fish stocks conducted under the Sustainable fisheries management and biodiversity conservation of deep-sea living marine resources and ecosystems in the ABNJ” (DS) project, the status of around half remains unknown, while about one quarter were supporting sustainable fisheries (indicating the stock is healthy though not possibly at optimal levels), and the remaining quarter was considered overfished and in need of action to promote recovery.¹³ The north-eastern Atlantic Ocean and the Mediterranean Sea are an example of areas where deep-sea populations have been overexploited.¹⁴

12. Ocean warming, as a result of climate change could have an impact on some deep-water fish stocks.^{Error! Bookmark not defined.} Changes in the marine conditions caused by climate change have increased fish physiological processes and metabolic demand, affecting fish reproduction and growth.^{Error! Bookmark not defined.} It is important to understand how deep-sea fish adapt to anthropogenic activity and sea warming to construct management action and stock rebuilding plans to prevent further depletion of deep-sea fish stocks.^{Error! Bookmark not defined.}

C. Impacts of bottom fishing on vulnerable marine ecosystems and deep-sea fish stocks

13. Bottom trawling is recognised as the most extensive anthropogenic activity which physically disturbs seabed habitats¹⁵ and the ecosystem functions of benthic communities,¹⁶ with a more significant decline of species diversity noted in areas of more

¹⁰ Orlov, A.M. “Contemporary Ichthyological and Fisheries Research of Deepwater Fish: New Advances, Current Challenges, and Future Developments”, *Journal of Marine Science and Engineering*, 10, 166, (2022).

¹¹ Canals, O., I. Mendibil, M. Santos, X. Irigoien, and N. Rodriguez-Ezpeleta, “Vertical stratification of environmental DNA in the open ocean captures ecological patterns and behavior of deep-sea fishes”, *Limnology and Oceanography Letters*, vol. 6, pp. 339-347, (2021).

¹² Baremore, I. E., R. T. Graham, M. J. Witt, Fishing down the reef slope: Characteristics of the nearshore deepwater fisheries of MesoAmerica”, *Ocean & Coastal Management*, vol. 211, art. 105773, (2021).

¹³ FAO contribution.

¹⁴ Lloret, J., A. Serrat, G. Thordarson, K. Helle, A. Jadaud, A., I. Bruno, F. Ordines, P. Sartor, P. Carbonara, and H.-J. Rätz, “The poor health of deep-water species in the context of fishing activity and a warming climate: Will populations of *Molva* species rebuild or collapse?”, *Journal of Fish Biology*, vol. 98, pp. 1572– 1584, (2020).

¹⁵ Hiddink, J.G., S. Jennings, M. Sciberras, S. G. Bolam, G. Cambiè, R. A. McConnaughey, T. Mator, R. Hilborn, J. S. Collie, C. R. Pitcher, Ana M. Parma, P. Suuronen, M. J. Kaiser, and A. D. Rijnsdorp, “Assessing bottom trawling impacts based on the longevity of benthic invertebrates”, *Journal of Applied Ecology*, vol. 56, no. 5, pp. 1075-1084, (2018).

¹⁶ Hinz, H, A. Törnroos, S. de Juan, “Trait-based indices to assess benthic vulnerability to trawling and model loss of ecosystem functions”, *Ecological Indicators*, vol. 126, 107692, (2021).

complex topography and hard sediment.¹⁷ However, large-scale quantification of the risks is lacking in most regions.¹⁸

14. A range of studies and methodologies continue to be developed and refined in order to model the impacts of bottom fishing on VMEs and deep-sea fish stocks. Recently, it has been demonstrated through meta-analysis of experimental and comparative trawling studies that longer-lived species suffer greater reductions of relative abundance than shorter-lived species, however factors other than species longevity may also be responsible for the observed species responses.^{Error! Bookmark not defined.} A species level vulnerability index has been developed to investigate how different communities react and recover to different levels of trawling.^{Error! Bookmark not defined.} Relative benthic status is a quantitative methodology to estimate the biological state of seabed habitats and can be used to address and monitor trawling activities.^{Error! Bookmark not defined.} However, ground-truthing and fine-scale spatial management are considered to be the required methods to properly study the impacts of bottom fishing on VMEs and manage deep-sea fish stocks.¹⁹

15. Despite the effort from several organizations to promote ecosystem restoration,²⁰ the lack of data availability and quality has created a knowledge gap in the understanding of the structure, function, and interaction of these marine ecosystems,^{Error! Bookmark not defined.} and these gaps present a challenge in implementing ecosystem-based fisheries management.²¹ However, research has shown that when underlying factors are controlled the success rate of restoration is improved and that the restoration can be economically beneficial even if the costs are high.^{Error! Bookmark not defined.}

16. Research has shown that the cessation of bottom trawling activities, forced by COVID-19 lockdowns, had a noticeable positive impact on affected ecosystems²² in particular for smaller, faster-growing organisms, however, with lockdowns easing the positive effects quickly disappeared.²³

¹⁷ Takeshige A., M. Miyamoto, Y. Narimatsu, S. Yonezaki, and M. Kiyota, "Evaluation of impacts of bottom fishing on demersal habitats: A case study off the Pacific coast of north-eastern Japan", *Fisheries Research*, vol. 238, art. 105916, (2021).

¹⁸ Pitcher C. R., J. G. Hiddink, S. Jennings, J. Collie, A. M. Parma, R. Amoroso, T. Mazon, M. Sciberras, R. A. McConnaughey, A. D. Rijnsdorp, M. J. Kaiser, P. Suuronen, R. Hilborn, "Trawl impacts on the relative status of biotic communities of seabed sedimentary habitats in 24 regions worldwide", *Proceedings of the National Academy of Sciences*, vol. 119, no. 2, (2022).

¹⁹ Contribution of SEAFO.

²⁰ Chen, W., P. Wallhead, S. Hynes, R. Groeneveld, E. O'Connor, C. Gambi, R. Danovaro, R. Tinch, N. Papadopoulou, C. Smith, "Ecosystem service benefits and costs of deep-sea ecosystem restoration", *Journal of Environmental Management*, vol. 303, art. 114127, (2022).

²¹ Bastari, A., Y. Mascarell, M. Ortega, M. Coll, "Local fishers experience can contribute to a better knowledge of marine resources in the Western Mediterranean Sea", *Fisheries Research*, vol. 248, art. 106222, (2022).

²² Mosbahi N., J.-P. Pezy, J.-C. Dauvin, L. Neifar, "COVID-19 Pandemic Lockdown: An Excellent Opportunity to Study the Effects of Trawling Disturbance on Macrobenthic Fauna in the Shallow Waters of the Gulf of Gabès (Tunisia, Central Mediterranean Sea)", *International Journal of Environmental Research and Public Health*, vol. 19(3), 1282 (2022).

²³ Coll M., M. Ortega-Cerdà, and Y. Mascarell-Rocher, "Ecological and economic effects of COVID-19 in marine fisheries from the Northwestern Mediterranean Sea", *Biological Conservation*, vol. 255, art. 108997 (2021).

III. Actions taken by States and regional fisheries management organizations and arrangements to address the impact of bottom fisheries on vulnerable marine ecosystems and the long-term sustainability of deep-sea fish stocks

A. Actions taken by regional fisheries management organizations and arrangements with competence to regulate bottom fisheries

17. The present section describes further actions taken to give effect to the relevant paragraphs of General Assembly resolutions 64/72, 66/68 and 71/123 by RFMO/As with the competence to regulate bottom fisheries:²⁴ the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), the General Fisheries Commission for the Mediterranean (GFCM), the Northwest Atlantic Fisheries Organization (NAFO), the North East Atlantic Fisheries Commission (NEAFC), the North Pacific Fisheries Commission (NPFC), the South East Atlantic Fisheries Organization (SEAFO), the South Indian Ocean Fisheries Agreement (SIOFA) and the South Pacific Regional Fisheries Management Organization (SPRFMO).

1. Identifying VMEs and assessing significant adverse impacts from bottom fishing

18. A number of RFMO/As reported further on actions to identify VMEs, including related research activities. Some RFMO/As also reported on measures for assessing the impacts of bottom fisheries on VMEs.

19. GFCM developed a database of sensitive benthic habitats and species in 2020 to improve management of its deep-sea fisheries and prevent potential adverse impacts on VMEs. The online platform contains information on the distribution of VME indicator taxa, habitats and features in the Mediterranean Sea and aims to facilitate data analysis for the identification of possible priority areas for conservation purposes and the provision of advice on VMEs. In 2021, GFCM endorsed the establishment of an annual data call to collect data on the occurrence of sensitive species and habitats that may form VMEs, from both scientific surveys and commercial fisheries to populate the new database.

20. The GFCM Scientific Advisory Committee endorsed a roadmap to guide the work needed to analyze the overlap between VMEs and deep water red shrimp fisheries in the eastern-central Mediterranean in 2021.

21. GFCM co-organized a training course on the identification of vulnerable species incidentally caught in Mediterranean and Black Sea fisheries, including macrobenthic invertebrates. It also published “Technical guidelines for scientific surveys in the Mediterranean and the Black Sea Procedures and sampling for demersal (bottom and beam) trawl surveys and pelagic acoustic surveys”.²⁵

22. NAFO identifies and maps VMEs based on the best available scientific information. It is committed to conduct a reassessment of bottom fishing activities every five years, or when new scientific information indicates a VME in a given area and take the necessary actions to protect the VME. NAFO completed its second assessment of the risks of significant adverse impacts from bottom fishing activities on VMEs in its regulatory area in 2021, taking into account the six significant adverse impact criteria from the FAO

²⁴ This section updates the information already reported in A/75/157. The information is drawn from the contributions of the particular RFMO/As to which reference is made, unless otherwise indicated.

²⁵ FAO Fisheries and Aquaculture Technical Papers No. 641, 2020, available at <https://www.fao.org/documents/card/en/c/ca8870en>.

Guidelines.²⁶ NAFO has since taken steps to increase the areas closed to bottom fishing for the protection of VMEs.

23. In 2019, NPFC and PICES adopted a framework for enhanced scientific collaboration in the north Pacific that identified broad areas of interest, including VMEs, over the next five years. The framework also identified mechanisms for implementing enhanced collaboration, including workshops and joint working groups, as well as coordination of science plans.²⁷

24. NPFC developed VME indicator taxa identification guides for the northwestern and northeastern Pacific Ocean and planned to complete a fish identification guide in 2022. NPFC was also continuing work on its combined significant adverse impact assessment. Fishing footprints had been identified at the seamount scale and compilation of more detailed information was ongoing. Current VME indicators were comprised of four coral taxa, however, sponges and hydrocorals were also being considered as indicator taxa.

25. SEAFO reported that the fishing pressure in the SEAFO Convention Area was considered to be very low, as the annual fishing effort had not exceeded five vessels and four contracting parties since 2005. Longline and pot fishing was conducted with maximum catches of 60 tonnes and 196 tonnes, respectively, since 2013. Due to the low level of exploitation, SEAFO reported it was in a data poor situation in terms of stock assessment and ecosystem management.

26. Research surveys were conducted in 2019 for basic mapping and identification of VMEs and fisheries resources in seamounts and seamount complexes, some of which were currently closed to fishing, to obtain bathymetry information, VME indicator species, fisheries resources and evidence of the fishing footprint. The surveys indicated that some knolls near the Valdivia Bank contained features that would likely be classified as VMEs and highlighted the need for ground-truthing and science-based advice underpinning fine-scale spatial management, preferably based on observations. Another survey was planned for 2022 with support from the EAF Nansen programme.

27. SIOFA reported progress in an ongoing VME mapping and bioregionalization effort that involved identifying ecoregions based on key ecological data and distribution of VME indicator taxa. Work was also underway to improve scientific knowledge for managing the significant adverse impacts on VMEs, including a preliminary assessment for parties and participating fishing entities in 2020 and for the Saya del Malha bank area in 2022. A first level risk assessment for bottom fisheries was also conducted for sharks and seabirds.

28. All bottom fishing proposals in SPRFMO are subject to an assessment process based on the best available scientific information and taking into account the history of bottom fishing in the areas proposed and cumulative impacts of past and proposed fishing to determine if such fishing would cause significant adverse impacts on VMEs and to ensure that such impacts are managed or not authorised to proceed. Exploratory fisheries require a data collection plan to identify and describe the data needed and any operational research actions necessary to obtain data to enable an assessment of the stock, the feasibility of establishing a fishery and the impact of fishing activity on non-target, associated or dependent species and the marine ecosystem.

29. In 2019, SPRFMO approved a new bottom fishery impact assessment standard to provide a standardized approach for assessing cumulative impacts of bottom fishing activities on VMEs, deep-sea fish stocks and marine mammals, reptiles, seabirds and other species of concern and for assessing bottom fishing impacts of new and exploratory

²⁶ See FAO Guidelines, para. 18, available at: <https://www.fao.org/documents/card/en/c/b02fc35e-a0c4-545a-86fb-4fc340e13b52>.

²⁷ Available at <https://www.npfc.int/npfc-pices-framework-enhanced-scientific-collaboration-north-pacific-0>.

fisheries. The new standard is subject to review, and update if required, every five years, starting in 2025. New measures adopted by SPRFMO in 2021 on exploratory fisheries and in 2022 on bottom fishing required an assessment that met the new standard using the best available data including consideration of the cumulative impacts of bottom fishing activities, as well as proposed mitigation measures to prevent such impacts.

2. Adopting and implementing conservation and management measures, including development of protocols for encounters with VMEs

30. GFCM adopted a resolution establishing a set of measures to protect VMEs formed by cnidarian (coral) communities in the Mediterranean Sea in 2019. The measures regulate the activities of large vessels (> 15 m length overall) operating bottom contact gear deeper than 300 m or on seamounts, particularly those targeting deep-water shrimp species, to prevent or reduce their impact on certain coral communities.

31. GFCM also endorsed protocols for the protection of VMEs, including regarding observation of encounter rules; exploratory deep-sea bottom fishing in previously unfished areas; collation and analysis of data sources; and volunteer research projects. In addition, the GFCM Working Group on VMEs agreed and revised a number of technical elements for the protection of VMEs, including regarding encounter protocols and VME indicator taxa/features, establishment of exploratory fishing protocols and agreement on a tool for identifying VME indicator hotspots. The Working Group also discussed the response to a resolution requiring the establishment of a network of essential fish habitats.

32. NAFO introduced encounter thresholds with sponges and corals and lists of VMEs to its conservation and enforcement measures, which were updated in 2021. NAFO also reported that it had implemented a precautionary approach framework since 2004 and that precautionary reference points were currently available for 14 of the 23 stocks. It was undertaking an in-depth review of the precautionary approach framework that was expected to result in eventual determination of relevant reference points for all stocks.

33. SEAFO updated information on its marine living resources, including information on catch and effort, stock population, incidental mortality and by-catch of fish and invertebrates. SEAFO also adopted conservation measures for Patagonian Toothfish, Deep-Sea Red Crab, Alfonsino, Orange Roughy and Pelagic Armourhead for 2022 and 2023.

34. SIOFA adopted CMMs for the interim management of bottom fishing to promote the sustainable management of deep-sea fisheries resources, including target fish stocks and non-target species and to protect the marine ecosystem, including prevention of significant adverse impacts on VMEs. The measures contain provisions to limit bottom fishing effort and catch, constrain spatial distribution of bottom fishing effort, establish threshold levels for encounters with VMEs and relative move-on rules, and restrict fishing in closed areas. The measure also calls for the development of a publicly available bottom fishing impact assessment standard, maps of known VMEs, a standard protocol to designate protected areas and guidelines for evaluating and approving electronic observer programs for scientific data collection.

35. SIOFA also adopted CMMs for mitigation of seabirds bycatch and management of demersal stocks, including provision for sustainable technologies and practices on seabird interactions and for limits on catch and effort of target stocks pending the development of scientific advice on those stocks.

36. SPRFMO adopted comprehensive measures in 2022 based on a spatial management approach that aims to ensure the long-term conservation and sustainable use of deep-sea fishery resources including target fish stocks as well as nontarget or associated and dependent species and to safeguard their marine ecosystems, including the prevention of

significant adverse impacts on VMEs. Guidelines for the preparation and submission of notifications of encounters with potential VMEs were also adopted.

37. SPRFMO also defined a VME encounter protocol, comprising threshold levels and indicator species, that includes a biodiversity element in addition to single taxa assessments. Based on scientific advice, the threshold levels and list of indicator taxa were revised in 2020 and 2021.

3. Closing areas containing VMEs to bottom fishing until conservation and management measures are adopted

38. Since 2020, CCAMLR defined four new VME risk areas where bottom fishing was prohibited, one in the Pacific sector and three in the Atlantic sector, as listed in the CCAMLR VME registry, which records the locations and taxa of VMEs and associated areas.

39. GFCM reported that a fisheries restricted area was established in 2021 to protect VMEs and deep-sea habitats in the Bari Canyon in the Adriatic Sea.

40. NAFO identified areas that were vulnerable to bottom contact gears and closed those areas to bottom fishing. In 2022, it expanded the boundaries of its existing closures in seamount areas, added six new seamount closures and extended the application of all seamount closures for a further five years. All seamount areas at fishable depth (i.e., shallower than 4000 metres) are now closed to bottom contacting fishing gears until December 2026.

41. In addition, NAFO reviewed the boundaries of its VME enclosures based on new scientific analysis and on this basis extended all of the existing closures for another five years. Five of these closed areas were also increased in size. A further four new VME closures were established for an interim period of two years pending further scientific analysis. All areas closed to bottom fishing now represented 14 per cent of the regulatory area.

42. NEAFC reported that, after revisiting earlier advice regarding closures, no new closures were recommended by the International Council for the Exploration of the Sea (ICES) at its 2021 annual meeting.

43. In NPFC, two areas were currently closed to fishing and two areas permitted only limited fisheries in order to manage VMEs. NPFC also reported that outside existing bottom fishing areas, fishing was prohibited in the area north of 45N and at depths greater than 1500m. Any attempts to fish in these prohibited areas were subject to the exploratory fishing protocol.

44. Following review of data collected from a research cruise conducted during 2015 and 2019, which indicated that some knolls to the south and southeast of the Valdivia Bank had features that would likely be classified as VMEs, SEAFO closed the area to all fishing gears with the exception of pots and longlines. SEAFO further decided to extend exploratory fishing by Japan, which had been conducted since 2015, based on an assessment of whether bottom fishing in new fishing areas would cause significant adverse impacts on VMEs.

45. SIOFA identified five interim protected areas where bottom fishing was not allowed, excluding line and trap methods. Further work was being prepared to inform the adoption of a dedicated research and management plan for these areas.

4. Establishing mechanisms to promote and enhance compliance with applicable measures

46. NEAFC considered further options to improve transparency of investigations into the mostly false positive alerts on bottom fishing outside existing bottom fishing areas

and to address more effective gear identification. It also assessed whether reporting on encounters with VMEs was functioning effectively. Following implementation of new electronic reporting systems and new analysis approaches, which included detailed data on catch to determine if bottom gear was used, a significant reduction in false positive alerts was reported.

47. NPFC reported that its regional vehicle position monitoring system was launched in 2021.

48. SEAFO played an active role in promoting and setting standards and enhancing the exchange of best practices. In 2019, it conducted trainings for port inspectors in Namibia and South Africa on its port inspection procedures. Observer training for Angolan and Namibian fisheries observers was conducted with sponsorship from the Deep-sea Fisheries Project.

49. In addition to its annual cycle of assessment of member compliance, in 2022 SPRFMO established mechanisms to promote and enhance compliance with applicable measures related to the protection of VMEs including strengthened VMS and fishing location reporting, heightened observer coverage (100% for bottom trawl activities) and immediate reporting of encounters with potential VMEs.

5. Review of identifications, assessments and measures

50. Some RFMO/As reported further on procedures or mechanisms to review and update CMMs, including regarding identification of VMEs and assessment of the impacts of bottom fishing.

51. CCAMLR continued to annually review the management of all fisheries, including the impact of bottom fishing in areas beyond national jurisdiction. On the occasion of its 40th meeting in 2021, CCAMLR Members issued a declaration to reaffirm their commitment to protect VMEs, including seamounts, hydrothermal vents, cold-water corals and sponge fields, including from bottom fishing activities that could have significant adverse impacts on such ecosystems.²⁸

52. NAFO will again review the implementation of measures for the protection of VMEs in 2022. NAFO has also committed to review its bottom fishing activities every five years, or when there is new scientific information indicating a VME in a given area, other new scientific information, or a significant change in the fishery. The last such assessment was conducted in 2021 and the results were publicly available. In preparation for that assessment, NAFO developed methods for the assessment of significant adverse impacts, including the analysis of VME functions, assessing the connectivity between VME closures, modelling the resilience of VME indicator species and determining fishery specific overlaps between VMEs and bottom trawling using the actual area of seabed fished through detailed haul-by-haul fishing effort data.

53. NAFO also reported on non-fishing activities in its regulatory area that had the potential to impact fisheries resources and ecosystems, for example, oil and gas related activities, which continued to be considered in its annual meetings. In 2021, NAFO requested its secretariat and scientific council, together with other international organizations, such as FAO and ICES, to inform its work on the potential impact of activities other than fishing. The NAFO secretariat was also mandated to conduct outreach with other international organizations to ensure that NAFO's efforts to protect marine biodiversity were known. In this context, NAFO reported that it had established an arrangement with a coastal State to exchange information concerning fisheries and oil and gas related activities in its regulatory area.

²⁸ CCAMLR, Report of the Fortieth Meeting of the Commission, CCAMLR-40, 2021, Annex 7, available at <https://www.ccamlr.org/en/system/files/e-cc-40-rep.pdf>.

54. NAFO also participated in regular exchanges and international fora, mediated through the FAO or bilaterally with other RFMOs, to develop and implement best practices. In 2021, it became a partner in the Global Environmental Facility (GEF) project “Deep Sea Fisheries under Ecosystem Approach” managed by the FAO.

55. Following NEAFC’s 2019 review of its binding recommendation on the protection of VMEs, which indicated that ICES continued to advise NEAFC effectively on all issues pertinent to the protection of VMEs, including on area closures, the NEAFC management and science committee (MSC) concluded that performance of the recommendation could nevertheless be improved. At its annual meeting in 2020, NEAFC adopted a work programme to improve the performance of its binding recommendation on the protection of VMEs including by revisiting earlier ICES advice on closures that had not been acted on by NEAFC.²⁹ In this context ICES advised NEAFC in 2021 that no new closures were recommended. The MSC planned to consider the outcomes of the 2022 review by the General Assembly on bottom fisheries. In this regard, NEAFC now produces a report on the implementation of relevant General Assembly resolutions that describes the corresponding actions, measures and recommendations, follow up arrangements and responsible bodies within NEAFC.

56. NEAFC reported that its secretariat continued to monitor and analyse bottom fishing activity to support contracting parties, as requested following NEAFC’s performance review in 2014. The secretariat was also working with the ICES secretariat to address data issues to ensure common understanding of bottom fishing activity. ICES was also carrying out a benchmarking on the method it used when providing advice on VMEs, including by improving the use of VME indicators to develop management advice. ICES had also been invited to consider completeness of VME habitats and indicators in the ICES database.

57. NEAFC continued to update and improve its comprehensive scheme of control and enforcement, including through the publication of annual compliance reports to show how well vessels were complying with regulations. Additional transparency had also been achieved through the publication of authorised fishing vessel lists, starting in 2020. Another improvement was an ongoing move from fish catch reporting to an electronic reporting system based on electronic logbooks.

58. NEAFC was also an active participant in the 2014-2019 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). A second stage of the project was currently being developed.

59. SIOFA reported that its scientific committee was required to provide it with advice and recommendations whenever a substantial change in the fishery occurred or new data warranted changes in measures. A first level risk assessment had been carried out on teleost and chondrichthyan fisheries and would be updated as new information became available. Further work had also been advanced to establish a footprint for bottom fisheries in the SIOFA area, which could be considered by SIOFA when managing bottom fisheries impacts. SIOFA also reported that it had developed a joint tagging protocol and a protocol for data exchange on toothfish with CCAMLR.

60. Ecological risk assessments conducted by SPRFMO in 2019 for chondrichthyans and teleosts identified possible candidate species for stock delineation studies. A tier-based assessment framework for all deep-water stocks was also being developed to allow for recommendations on reference points and management rules for these stocks.

²⁹ NEAFC, Report of the 38th Annual Meeting of the North-East Atlantic Fisheries Commission, 2019, paragraphs 9, 18 and annex O, available at https://www.neafc.org/system/files/Report_AM-2019_FINAL_plus_List-of-Annexes_0.pdf.

61. Comprehensive measures adopted by SPRFMO in 2022 required that bottom fishing assessments were submitted at least every three years, and also when a substantial change in the fishery occurred such that it was likely that the risk or impact of the fishery may have changed. In addition, the SPRFMO scientific committee was required to review all available data and provide advice on the ongoing effectiveness of the management measures to ensure they meet objectives. An intersessional working group was also established to support a review of the new measures in 2023. SPRFMO also reported that all bottom fishing assessments and scientific reviews of such assessments were made public and public comment was invited.

B. Actions taken by States to regulate bottom fisheries

62. Several respondents reported on the implementation of the relevant provisions of General Assembly resolutions 64/72, 66/68 and 71/123, in line with the FAO Guidelines, including by enacting and implementing national laws and regulations.

63. Several respondents also reported on their fishing vessels operating in the areas of RFMO/As with competence to regulate bottom fisheries and that they had addressed the regulation of bottom fisheries by implementing measures adopted by those RFMO/As.

1. Identifying VMEs and assessing significant adverse impacts from bottom fishing

64. Bulgaria reported that its fishing fleet, which is mainly small-scale, does not engage in any form of fishing in the high seas, including bottom fishing. It has not participated in research and collection of data on the impact of deep-sea fishing on VMEs or the long-term sustainability of deep-sea fish stocks in areas beyond national jurisdiction (ABNJ).

65. Canada noted that its domestic legislation and policy framework contains measures for the identification and protection of VMEs, including a Policy for Managing the Impacts of Fishing on Sensitive Benthic Areas and an Ecological Risk Assessment Framework. It reported that, in 2021, it contributed to NAFO's review of the boundaries of its VME. Canada promotes continued research into the identification and protection of VMEs through the NAFO working groups on ecosystems science assessment and an ecosystem approach framework to fisheries management. Through the NPFC, Canada also contributed to efforts in 2021 to develop a quantitative definition for VMEs.

66. Japan stated that it has taken several measures to protect VMEs and to ensure sustainability of deep-sea fish stocks, based on the best available scientific information, including through deployment of vessels for scientific research and patrol/inspection, and capacity building assistance to developing countries.

67. New Zealand reported that it conducted a joint cumulative quantitative bottom fishing impact assessment with Australia based on an updated Bottom Fishing Impact Assessment Standard adopted by SPRFMO in 2021. It also continued to submit annual preliminary impact assessments to CCAMLR using the best available information of the known and anticipated impacts of its bottom fishing activities on VMEs.

68. Spain reported that it continues deep-sea research to identify and protect VMEs, including in collaboration with other countries, which has led to the proposal and implementation of protection measures. For example, in the Barents Sea, Spain has a scientific survey programme, in collaboration with the European Union (EU), that collects stock assessment data and indicators of VMEs in the regulation areas of NAFO and NEAFC.

69. The United States reported that, since the last bottom fishing review, its scientific understanding of the functionality of VMEs and their relationship to supporting healthy fisheries has dramatically improved, including through modelling efforts. It has also taken

several actions to identify VMEs and to reduce the risk of significant adverse effects from deep-sea fishing to such areas during this period. In 2022, it will collaborate with Canada to better understand the distribution of VMEs on northeast Pacific seamounts both within the countries' EEZs and in the NPFC region.

(a) Measures to regulate bottom fishing vessels or prohibit bottom fishing

70. Canada noted that, in 2019, it amended its Oceans Act to strengthen provisions regarding marine-protected areas (MPAs) and its Petroleum Resources Act to, *inter alia*, prohibit bottom trawling in all newly established federal MPAs. Exceptions apply for Indigenous food, social, and ceremonial purposes, as well as for scientific research purposes, where the activities within the MPA do not pose a significant risk to the conservation objectives of the MPA.

71. Canada also reported that it is working with NAFO Contracting Parties to identify and close bottom fishing in areas where fishing activities would cause significant adverse impacts on VMEs. As a result of a joint Canadian/United States proposal in 2022, NAFO expanded and refined the boundaries of its existing seamount area closures, added six new seamount closures, and extended the duration of all seamount closures for a further five-year period.

72. Norway reported that, in 2019, in light of new knowledge regarding VMEs in the Barents Sea, it undertook a review of its 2011 Regulation on bottom fishing activities in the Norwegian Economic Zone, the Fisheries Zone around Jan Mayen and the Fisheries Protection Zone around Svalbard. Now renamed the Regulation to protect vulnerable marine ecosystems, it was amended to close ten areas for bottom fishing activities, introduce new licensing requirements, and redefine the existing areas where bottom fishing activities require a special license.

73. Norway also noted that 44 per cent of all areas under Norwegian fisheries jurisdiction are subject to area-based management measures. This includes special protection for 18 cold-water reef areas in the form of a ban on bottom fishing gear.

74. The United States noted a number of actions to regulate and prohibit bottom fishing in the reporting period, including, *inter alia*, re-establishing a prohibition on bottom-contact fishing gear in the Northeast Canyons and Seamounts Marine National Monument, new protections in the Gulf of Maine relating to the impacts of most bottom-contact fishing gear, establishing new Habitat Areas of Particular Concern in the Gulf of Mexico, and creating new essential fish habitat conservation areas and deep-sea coral protection measures in the Pacific Fishery Management Council Region. As part of the latter measure, unfished deep habitats were closed to seafloor-contact gear to protect deep-sea corals.

(b) Implementing measures adopted by RFMOs

75. Bulgaria reported that it participates in the work of GFCM and complies with all its regulations and recommendations on protection of VMEs and sustainable fisheries. It also participates in the Working Groups on Fisheries Policy at the European Commission.

76. Japan noted that it implements CMMs adopted by RFMOs in whose regulation areas Japanese fishing vessels conduct deep-sea fishing through domestic legislation, including to implement monitoring, control, and surveillance measures and to deter illegal, unreported, and unregulated (IUU) fishing.

77. New Zealand reported that it continues to implement the bottom fishing requirements established in Conservation Measures (CMs) of the CCAMLR through permits issued under domestic legislation. Furthermore, it implements CMMs of SPRFMO through conditions on high seas fishing permits issued to New Zealand flagged

vessels that fish in the Convention Area and has also recently prosecuted breaches of such permits.

78. New Zealand also noted that, in 2019, it updated its bottom fishing catch level conditions on high seas fishing permits issued to New Zealand flagged vessels intending to fish in the SPRFMO Convention Area in implementation of SPRFMO's deep-water species measure. In 2020, SPRFMO adopted amendments proposed by New Zealand and Australia to improve the implementation of Member allocations of orange roughy.

79. Thailand reported that it enacted regulations and legislation to ensure compliance and enforcement of RFMO regulations applying to vessels in the high seas and to address and mitigate the impacts of fishing on VMEs. Pursuant to these regulatory measures, bottom trawling is now only allowed in certain areas and a fishing vessel must give notice when it enters or leaves a RFMO regulation area.

80. As a State Party to the SIOFA, Thailand reported that it complies with CMMs in the SIOFA regulatory area when its fishing vessels engage in bottom trawling, including the move-on rule. Furthermore, it annually reports on incidental bycatch and other species of concern in VMEs, as required by SIOFA.

81. The United States noted that, during the reporting period, it supported a review of SPRFMO's bottom fishing measure and the adoption of several proposals before the SPRFMO, including to amend bottom fishing CMMs to incorporate a spatial management approach and a new protocol for encounters with VMEs. It also led intersessional work, including the preparation of a draft proposal, for a further review of the bottom fishing measure in 2022, to be considered by the SPRFMO Commission in 2023.

(c) Establishing new RFMOs or taking measures where no RFMO exists

82. On 25 June 2021, the Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean (CAOFA) entered into force.³⁰ The Agreement prevents commercial fishing from taking place in the Central Arctic Ocean, for an initial period of 16 years, until States Parties have a greater scientific understanding of the area and ecosystem-based measures are in place to regulate commercial fisheries.³¹ Parties to the Agreement have committed to establishing, by June 2023, a program of joint scientific research and monitoring to gain a better understanding of the Arctic Ocean ecosystems and the potential for sustainable fisheries in this area.³²

83. New Zealand noted that its flagged vessels are not permitted to conduct bottom fishing on the high seas outside the CCAMLR and SPRFMO Convention Areas. Furthermore, all New Zealand flagged vessels fishing on the high seas require a high seas fishing permit issued in accordance with CMMs of RFMOs and other international obligations.

84. The United States reported that no vessels flying its flag are authorised to conduct bottom fishing outside of RFMO areas and it has only permitted one vessel to conduct bottom fishing in ABNJ, in NAFO waters. It noted that it supports efforts to establish RFMO/As, as appropriate, to regulate bottom fisheries in ABNJ where no such organizations or arrangements exist and calls upon States to cease authorizing fishing vessels flying their flag to conduct bottom fisheries in ABNJ where there is no RFMO/A

³⁰ The Parties to the CAO Fisheries Agreement are Canada, China, Denmark (in respect of the Faroe Islands and Greenland), the European Union, Iceland, Japan, the Republic of Korea, Norway, the Russian Federation, and the United States.

³¹ CAO Fisheries Agreement, Article 13(1).

³² CAO Fisheries Agreement, Article 4(2).

with the competence to regulate such fisheries or interim measures, until measures are taken in accordance with the FAO Guidelines and relevant General Assembly resolutions.

C. Actions taken by States and competent regional fisheries management organizations and arrangements in cooperating to undertake marine scientific research, collect and exchange scientific and technical data and information and develop or strengthen data-collection standards, procedures and protocols and research programmes

85. States and RFMO/As continued to undertake scientific research to improve their understanding of deep-sea ecosystems and impacts of bottom fisheries.³³ Canada reported on the conclusion by NPFC members of surveys on the Emperor Seamounts in 2021, and on the commitment of parties to CAOFA towards establishing a programme of joint scientific research and monitoring by June 2023, to improve their understanding of Arctic Ocean ecosystems. The United States reported on its collaboration with Canada, the European Union and the Republic of Korea on additional surveys in the Pacific and the Atlantic, noting that it had led modeling efforts to better understand VMEs. SEAFO reported on its research surveys supported by the EAF-Nansen Programme in a selection of seamounts, including one planned for 2022.

86. Efforts also continued on gathering and sharing scientific and technical data and information.³⁴ Thailand noted that it had reported data relating to fishing activities of incidental by-catch and other species of concern on VMEs to SIOFA annually. GFCM reported on its development and launch of a database of sensitive benthic habitats and species in 2020, and on an official call to gather data on the occurrence of VME indicators. NEAFC reported that the 2019 update to its memorandum of understanding with ICES underlined the need for scientific advice related to multispecies issues, ecosystem changes and climate change effects for the stocks relevant to NEAFC, among others. SIOFA reported that its adopted measures and most assessments were publicly accessible on its website, with further measures recommended by its Scientific Committee to improve the dissemination of restricted documents to a larger audience.

87. Japan reported that it had taken actions to share information of vessels without nationality. NAFO and SIOFA reported that they had on their websites lists of vessels authorized by flag States, and lists of vessels linked to illegal, unreported and unregulated fishing.

88. States and RFMO/As also reported on their efforts to develop and strengthen relevant standards, procedures and protocols, as well as exchange best practices.³⁵ Canada reported that it contributed to exchanging and developing best practices by hosting and participating in relevant regional workshops and expert workshops. NAFO reported that it had strengthened data collection procedures for VME indicator species by publishing field guides to deep water sponges, corals and other taxa, and that it had become a partner in the ABNJ Deep Sea Project in 2021. SEAFO reported that it had adopted guidelines for scientific research in the SEAFO Convention Area. SIOFA reported that it and CCAMLR had developed a joint tagging protocol and a protocol for data exchange on toothfish.

³³ Contributions of Canada, Japan, New Zealand, Norway, Spain, United States and NAFO.

³⁴ Contributions of Canada, New Zealand, Thailand, NAFO, NEAFC and SEAFO.

³⁵ Contributions of Canada, New Zealand, NAFO, NEAFC and SEAFO.

D. Recognition of the special circumstances and requirements of developing States

89. Due consideration should be given to the special circumstances and requirements of developing States and the specific challenges they may face in the implementation of the relevant provisions of General Assembly resolutions 66/68, 64/72 and 71/123.

90. NAFO continued to participate in and make in-kind contributions to FAO initiatives, including the Fisheries Resources Monitoring System (FIRMS),³⁶ the Aquatic Sciences and Fisheries Abstracts database,³⁷ the Coordinating Working Party on Fisheries Statistics of FAO³⁸ and the NEREIDA project.³⁹ As a partner to the ABNJ Deep Seas Project, NAFO shared its knowledge and experience with other RFMO/As. NAFO also continued to provide technical assistance and training to more recently established RFMO/As.

91. NEAFC took part in projects aimed at capacity-building in developing countries, primarily by sharing relevant knowledge and experience, including in support of capacity building and cross-sectoral engagement at the regional level. It noted a memorandum of understanding with GFCM in this regard. NEAFC also reported on its participation in the ABNJ Deep Seas project.

92. SEAFO reported that it recognizes the special requirements of developing States and their coastal communities, as reflected in article 21 of its Convention, and that it continued to offer developing countries special training with regard to port inspections and scientific observers. SIOFA reported that it contributed to the ABNJ Deep Seas Project and FIRMS.

93. New Zealand reported that it continued to explore ways to accommodate the special circumstances and challenges faced by developing States and had supported an exploratory potting proposal from the Cook Islands.

94. Japan reported that it continued to provide assistance for capacity building to developing countries, directly and through international and regional organizations, towards the conservation and sustainable use of fish stocks and the protection of VMEs.

IV. Activities of the Food and Agriculture Organization of the United Nations

95. During the period under review, the FAO has undertaken a number of activities to support States and RFMO/As in strengthening the regulation of bottom fisheries, including for the protection of VMEs.

96. FAO, through its Common Oceans programme (2014-2021) and the “Sustainable fisheries management and biodiversity conservation of deep-sea living marine resources and ecosystems in the ABNJ” (DS) project, supported by GEF, provided a forum for discussions and exchanges of ideas at independent expert multi-stakeholder meetings, including virtual meetings during the pandemic. An example is the VME workshop held in Japan with the North Pacific Fisheries Commission. The DS Project, working closely with RFMO/As, reviewed the application of the FAO ecosystem approach to fisheries within the ABNJ.⁴⁰ FAO, through the DS Project in 2020, undertook a study of

³⁹ See NAFO, “NEREIDA Scientific Research Project”, NAFO/GC Doc. 13/2, <https://archive.nafo.int/open/gc/2013/gcdoc13-2.pdf>.

⁴⁰ www.fao.org/documents/card/en/c/cb1509en.

Monitoring Control and Surveillance⁴¹ (MCS) and of the legal support⁴² necessary. The DSF Project is scheduled to start during 2022 and end in 2027.

97. The DS project also undertook an assessment of the status of deep-sea fish stocks. As the assessment of some of these deep-sea stocks remains problematic, especially for those that are associated with seamounts, the upcoming second phase of the DS Project will have a special focus on “data-limited” stocks to ensure that adequate data is collected and the assessment methods are developed to ensure sustainability.

98. FAO continues to support States and RFMO/As in the implementation of the 2008 Guidelines, which remain a key benchmark for measuring performance in the protection of VMEs from the impacts of bottom fishing. A review of the Guidelines, which was planned to be undertaken in 2020, is now planned to be undertaken in the second phase of the DSF Project, potentially in 2023.

99. As part of FAO’s efforts to protect VME, it has set up a VME database in partnership with relevant regional bodies, which serves as a central information sharing tool. FAO also continues to collaborate with States in identifying new or potential VMEs through data sharing and information received from scientific surveys and reports from commercial vessels.⁴³ An updated summary information on VME indicators, thresholds and encounter responses are available on its website.

V. Concluding remarks

100. Since the issuance of the previous report on measures taken by States and RFMO/As to address the impacts of bottom fishing on VMEs and the long-term sustainability of deep-sea fish stocks (A/75/157) in 2020, States and RFMO/As have continued to adopt and implement measures in accordance with the relevant provisions of General Assembly resolutions 64/72, 66/68 and 71/123. Many RFMO/As also provided information on how these measures would be periodically reviewed and, if necessary, updated to ensure their continued effectiveness.

101. There remain considerable knowledge gaps regarding the status of many deep-sea fish stocks and the potential for the recovery of VMEs from damage caused by bottom fishing activities, highlighting the importance of continuing to apply precautionary and ecosystems approaches. As scientific understanding of VMEs, and how they are impacted by fishing activities, as well as other stressors, over the short, medium and long term, continues to develop, it will be important to keep such measures under review. For example, improved understanding of how indicator species interact with other VME components could lead to changes in approach or expanded closures. Continued changes in ocean conditions and species distribution resulting from climate change, pollution and other stressors will also need to be taken into account. More information is also needed regarding the impacts that the COVID-19 pandemic may have had on VMEs, deep-sea fish stocks and their management, with a view to enhancing preparedness for future crises.

102. Although all RFMO/As with a mandate to manage bottom fisheries reported on the adoption and implementation of measures to address the impacts of bottom fishing, implementation appears to be progressing at different rates. Moreover, limited information was received regarding flag State implementation of resolutions 64/72,

⁴¹ Monitoring, control, and surveillance of deep-sea fisheries in areas beyond national jurisdiction (fao.org).

⁴² <http://www.fao.org/3/ca5628en/CA5628EN.pdf>.

⁴³ [Deep Sea Guidelines | Vulnerable Marine Ecosystems | Food and Agriculture Organization of the United Nations \(fao.org\)](#).

66/68 and 71/123, yet this remains a vital element of the overall framework for the protect of VMEs from significant adverse impacts.

103. The General Assembly review process provides an important opportunity for States to consider the extent to which the relevant provision of resolutions 64/72, 66/68 and 71/123 have been fully implemented, and the extent to which the overall guidance provided at the global level needs to be updated.