

Northwest Atlantic Fisheries Organization



**Report of the NAFO Joint Commission–Scientific Council Working Group on Ecosystem
Approach Framework to Fisheries Management (WG-EAFFM) Meeting**

11–12 August 2022
Halifax, Nova Scotia

NAFO
Halifax, Nova Scotia, Canada
2022

Report of WG-EAFFM,
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1. Opening by the co-Chairs, Andrew Kenny (United Kingdom) and Elizabethann Mencher (USA)

The meeting was opened by the co-chairs, Andrew Kenny (United Kingdom) and Elizabethann Mencher (USA), at 09:00 hours (UTC/GMT -3 hours in Halifax, Nova Scotia) on Thursday, 11 August 2022.

The co-Chairs welcomed the scientists and fisheries managers, either participating in-person or virtually via WebEx, from Canada, European Union, Iceland, Japan, Norway, Russian Federation, Ukraine, United Kingdom, and the United States of America. The Chair of the Scientific Council (SC) was present. Observers from Ecology Action Centre, Food and Agriculture Organization of the United Nations (FAO), and Oceans North were also welcomed (Annex 1).

2. Appointment of Rapporteur

The NAFO Secretariat (Ricardo Federizon, Senior Fisheries Management Coordinator and Tom Blasdale, Scientific Council Coordinator) were appointed co-Rapporteurs of this meeting.

3. Adoption of Agenda

The provisional agenda as previously circulated was adopted with the following amendments (see Annex 2):

- Insertion of new agenda item 8 “*Review of NAFO CEM Chapter 2*”
- Renaming of agenda item 9.a “*Update on the FAO ABNJ Deep-Seas Fisheries Project*”
- Insertion of new agenda item 9.c “*Terms of Reference for the WG-EAFFM*”
- Insertion of new agenda item 9.d “*SC Workload*”

4. Review of the July 2021 Recommendations (COM-SC Doc. 21-08)

WG-EAFFM reviewed the recommendations and the status of their implementation. The summary pertaining to the major recommendations is presented in the table below.

Recommendations	Status
Secretariat to share NAFO’s work on SAI on bottom fishing with the UNGA VME review in 2022	See agenda item 9. b
Revision boundaries of seamount closures	The Commission adopted the proposed revision of the boundaries of Fogo, Corner Rise, and Newfoundland Seamounts closures (COM-SC Doc. 21-05). The revision of the boundaries is now reflected in the NAFO CEM.
Changes to Annex I.E.6 VME Indicator Species of the NAFO CEM	The Commission adopted the proposed changes. They are now reflected in the NAFO CEM.

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Independent experts review of the NAFO Roadmap Tier 1 and Tier 2	See agenda item 5.b.i
SC input to the review of the effectiveness of Chapter 2 of the NAFO CEM.	See agenda item 5.c.ii
STACTIC and Secretariat to work with NAFO fishery observers to the improvement of the VME species identification guide.	No progress due to Covid. The Secretariat, however, noted the ongoing work on the development of the Observer App for mobile phone in the reporting of fish and VME species by observers. It was also noted that the VME Species Identification Guide was updated to include bryozoans
Secretariat to inform CPs with inspection presence when vessels are operating in closed areas at speeds indicating fishing may be occurring,	No progress due to Covid. The Secretariat, however, noted that the secured MCS Website, one of the tools employed by STACTIC in monitoring compliance, features a fishing trip mapping that allows the detection in real time of fishing vessels steaming or operating in closed areas. The fishing trip mapping is accessible only to the NAFO inspectors.
Extension of the current closures for five years	The Commission adopted the proposal to extend the closures until 31 December 2026. The extension is now reflected in Article 17 of the NAFO CEM.
Commission considers the SC advice regarding additional area-based management measures to protect VMEs from SAI.	The Commission adopted the proposal to expand the boundaries of five (5) existing closed areas and to establish four (4) additional closures, on an interim period of two years (COM Doc. 21-16).
Commission supports the ABNJ Deep-Sea Fisheries Project	The Commission agreed to become a partner to the Project and commit only in-kind support in the amount of USD 3.03 million over the Project's 5-year term (2022-2027) (COM Doc. 21-21 Revised)
Commission supports the development of an MOU between the Sargasso Sea Commission Secretariat and NAFO Secretariat	The Commission adopted the recommendation (COM Doc. 21-21 Revised)

5. Presentation and discussion of Scientific Council responses to Commission requests for advice (COM Doc. 21-20 and SCS Doc. 22-01) relevant to WG-EAFFM

Andrew Kenny (co-Chair of this WG and co-Chair of the SC Working Group on Ecosystem Science and Assessment (WG-ESA), on behalf of the Scientific Council (SC) presented the SC response to the Commission requests relevant to this WG. The SC response, contained in SCS Doc. 22-18) was based on work undertaken by WG-ESA in November 2021 (SCS Doc. 21-21).

The presentation comprised five (5) parts, organized according to the Commission requests relevant to EAFFM (COM Doc. 21-20): a) Impact of scientific trawl surveys on VME in closed areas, b) Ecosystem Roadmap, c) VME analysis, including closures and Chapter 2 review, d) impacts of non-fishing activities in the NAFO Convention Area, and e) 3M and 3LNO Ecosystem Summary Sheets (ESS). The SC response to the Commission request presented below represents the headline advice formulated by the SC at its June 2022 meeting.

The WG took note of the advice. In its recommendations, the positive consideration of the scientific advice is reflected (see agenda item 10).

a. Commission Request # 3 – Evaluation of the impact of scientific trawl surveys on VME in closed areas and the effect of excluding surveys from these areas on stock assessments

Commission Request 3.- *The Commission requests that Scientific Council continue its evaluation of the impact of scientific trawl surveys on VME in closed areas and the effect of excluding surveys from these areas on stock assessments.*

Scientific Council responded:

Recent studies on the exclusion of surveys from closed areas indicate that survey indices for a number of species show measurable changes in estimates when sets from closed areas are omitted.

These studies also indicated that recurrence times in scientific surveys in the NRA may not result in significant adverse impacts in some cases. SC/WGESA will further review these studies at its 2022 November meeting before making a final recommendation.

Among the main conclusions of the analysis are the following:

- The revision of the closed areas that is carried out every 4 years makes it difficult to analyze the impact of the scientific surveys in the closed areas since these areas can change over time.
- Recurrence time for the surveys carried out in the NRA show that the benthic impact of the surveys activity is likely to have time to recover to the levels that existed prior to the benthic impact of the sampling activity at least for the closed areas delimited for sea pens (Closed areas 7, 8, 9, 10, 11, 12, and 14).
- For the closed areas based on large gorgonians and sponges (Closed Areas 1, 2, 3, 4, 5, 6 and 13) the conclusions are less clear due to the available information about the longevity of some of the coral and sponges species and the recurrence times of surveys.
- Reducing the trawling time in European surveys from 30 to 20 minutes in the sets made within the closed areas would considerably reduce the benthic impact extending the recurrence time to more than 1500 years.
- For most of the stocks indices, the estimation of biomass, abundance, age/length structure and bias over time is very similar with and without the data of the sets carried out in the closed areas.
- Only the EU survey indices for two stocks, Greenland halibut Subarea 2 and Division 3LMNO and roughhead grenadier Subarea 2 and 3, show a measurable change in estimates when information on sets made within closed areas is omitted. There are other species in which their total biomass indices do not change considerably, but bias occurs in the estimation of their biomass index and/or their age or length indices change appreciably when hauls from closed areas are removed from the calculations (e.g., redfish and witch flounder indices). The impact of these factors on the assessment would be case-dependent, and the assessment models would have to be run with and without the hauls in the closed areas to evaluate the differences in the results.

It was noted that analysis done so far was NRA only, and the reduction in tow duration only covers EU vessels as Canadian vessels already use 15 min tows. The measure for survey impacts is that the time between impacts should be >10 times the lifespan of the indicator spp. The life of sponges is estimated at 300 years so recovery time could be 3000 years. WG-ESA will carry out further analysis during their meeting in November 2022.

WG-EAFFM **expressed support** the advice of SC and awaits with interest the results of further analysis.

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b. Commission Request # 5 – Ecosystem Road Map

Commission Request #5: *The Commission requests that Scientific Council continue work on the sustainability of catches aspect of the Ecosystem Roadmap, including:*

- a. *In consultation with WG-EAFFM via co-Chairs, convene independent experts to do a scientific review of; a) the estimation of fisheries production potential and total catch indices, and b) the adequacy of this analysis for their proposed use within the NAFO roadmap (Tier 1), while considering how species interactions are expected to be addressed in the future (Tier 2) within the overall Roadmap structure. The outcomes of this review would need to be tabled in June at Scientific Council to be available in advance of the planned workshop in 2022.*

Scientific Council responded:

Scientific Council, in consultation with COM-SC WGEAFFM, convened a three person independent expert panel to address this request. Based on the results of the external review, and the follow-up discussions, **SC concludes** that the EPP/TCI work is scientifically sound, and more than adequate for supporting implementation of the Tier 1 of the Roadmap. Also in line with the review results, SC considers that while the recommendations on presentation of the material, and additional sensitivity analyses indicated by the reviewers should be carried out, completing these should not delay implementation of Tier 1.

SC Main conclusions

- *All reviewers agreed that the science presented in support of the total catch indices was sound and reasonable. Advice using the TCI approach would be sensible, reasonable, and even advisable in the NAFO EAFM Tier 1 context.*
- *The consensus recommendation (by the reviewers) is that the overall approach should proceed with suitable and minor validation points to be executed.*

SC next steps (short term)

- *Publication of the full suite of reviews (i.e. initial independent written comments, and follow-up consolidated review) as an SCS document.*
- *Production of a new SCR summarizing the EPP/TCI work and addressing the feedback and recommendations emerging from the independent expert review.*

Several WG-EAFFM members **reiterated their continued support** for the scientific work underpinning Tier 1 and 2 of the roadmap and their appreciation for the work of the reviewers.

- b. *Work to support the WG-EAFFM workshop in 2022, which will explore ecosystem objectives and further develop how the Roadmap may apply to management decision making.*

This request was discussed under agenda item 6: Outcomes of the WG-EAFFM Workshop (08–10 August 2022).

- c. *Continue its work to develop models that support implementation of Tier 2 of the EAFM Roadmap.*

Scientific Council responded:

In order to advance the development of models in support of Tier 2 assessments, SC made progress by a) defining the features required for Tier 2 models and identifying potential advice applications, b) making explicit the formal steps and operational requirements needed for Tier 2 model development, and c) examining ongoing modelling work that could support Tier 2 assessments.

Building upon this progress, the next steps towards a strategy for a broader implementation of Tier 2 would include a) developing a triage procedure for identifying priorities for model development, and b) developing mechanisms to promote the engagement of the broader research community in Tier 2 model development.

In terms of specific applications, the exploration of the existing multispecies Flemish Cap model for the implementation of Tier 2 for the Flemish Cap is an obvious operational next step.

Finally, it is critical to highlight that any progress on Tier 2 development and implementation is conditional on the support provided by CPs. Current capacity does not exist within WG-ESA and SC to engage fully on Tier 2 development.

SC Conclusions:

- *Tier 2 assessments represent a bridge between the large-scale strategic ecosystem advice and the tactical advice at the stock level.*
- *They provide the platform for testing targeted hypotheses about ecosystem/multispecies functioning and dynamics (including the assessment of trade-offs).*
- *The basic characteristics of Tier 2 models (without being overly prescriptive) are:*
 - 1) *being time-dynamic, and including fishing as a driver;*
 - 2) *incorporating only key interactions and drivers (e.g. Minimum-Realistic Models –MRM, Models of Intermediate Complexity for Ecosystem assessments –MICE); and*
 - 3) *Being amenable to statistical model fitting evaluation, and/or robust simulation testing (depending on the purpose of application).*

SC next steps:

- *Develop a triage process to help identify the cases where the need for Tier 2 modelling is more pressing.*
- *Stand out example is the Flemish Cap multispecies model.*

WG-EAFFM thanked SC for their continuing progress and discussed how the Roadmap as a whole could be useful to managers. WG-EAFFM noted concerns over the SC's current workload, and in that light the SC's capacity to address this type of analysis, especially when taking into consideration wider resource issues facing SC in general. These issues were addressed by recommendation #10.

FAO suggested that NAFO and FAO should consider holding a joint symposium focussing on the NAFO roadmap as part of the FAO ABNJ Deep-seas Fisheries project. This was further discussed under agenda item 9a: Update on the ABNJ Deep-seas Fisheries Project.

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c. Commission Request # 6 – VME analysis

Commission Request # 6: The Commission requests that Scientific Council, in relation to VME analyses:

- a. *Conduct a re-assessment of its previously recommended closures of 7a, 11a, 14a and 14b, incorporating catch and effort data for fisheries of shrimp from 2020 and 2021 into the fishing impact assessments. This work is to be completed by the 2023 Scientific Council meeting.*

Scientific Council responded:

The work to address this request is ongoing. Data preparations are underway, and analyses will be undertaken by SC in 2022 and 2023. Results are anticipated in 2023.

Given the ongoing and expected future demand of analyses like the one involved in this request, and to ensure SC can maintain effective quality control, transparency, ease of access and reproducibility of ecosystem-related assessment data sets and data products, **SC recommends:**

1. *Creating standardized data layers and products with supporting documentation (including metadata) for periodic reassessment purposes required to support the implementation of the NAFO Roadmap towards an Ecosystem Approach and to respond to requests from the Commission; and*
2. *Requesting the NAFO Secretariat to explore the feasibility of using GIS to manage, visualize and share those core data layers and derived products. This web-based application is intended for internal SC use only to preserve confidentiality and respect data ownership regulations from different Contracting Parties.*

Capacity currently exists for initial development of these standardized data layers but ongoing maintenance and support will require additional resources and capacity within the Secretariat.

WG-EAFFM generally supported the idea of creating standardized data layers and other products and having the Secretariat support those efforts. The working group suggested that the Secretariat explore what is being done in other RFMOs in relation to sharing of data including through GIS. It was further suggested that the Secretariat should consider additional resources that may be required to do this work, possibly including IT resources and additional staff and/ or further training for existing staff. These discussions are reflected in WG recommendations 1 and 2.

- b. *Review the effectiveness of NAFO CEM, Chapter 2 from a scientific and technical perspective and report back to the WG-EAFFM. WG-EAFFM would subsequently in 2022 consider whether any modifications to this Chapter should be recommended*

Scientific Council responded:

Scientific Council discussed the effectiveness of NAFO CEM, Chapter 2 from a scientific and technical Perspective.

The primary issue related to the content of Articles 21 and 22 concerning potential effect any change in the fishing footprint would have on the provisions in case of VME encounters, specifically a need to re-evaluate the encounter thresholds. Furthermore, under Article 23 (re-assessment of bottom fishing activities) the text does not fully reflect the current process to assess the risk of SAI.

SC conclusions:

- *With respect to Articles 21 and 22, the main issue discussed was potential changes to the fishing footprint and the consequences for the encounter thresholds – specifically the need to re-evaluate the threshold values.*
- *With respect to Article 23 (re-assessment of bottom fishing activities) the text does not fully reflect the current assessment framework (e.g. the roadmap) and the requirement to assess the risk of SAI*
- *Specific edits and suggested changes to Chapter 2 text are given in the WG-ESA report SCS 21-21.*

WG-EAFFM thanked SC for their work noting that, while the primary intention of the request was for SC to provide a broad review of the overall effectiveness of the measures from a scientific perspective, WG-ESA's specific editing suggestions were also welcome.

The SC's review complements a review of the chapter undertaken by STACTIC in 2021.

This review was discussed further under agenda item 9 and WG-EAFFM recommendations on suggested amendments to Articles 17, 23, and 24 are given in recommendation 12.

d. Commission Request # 12 – potential impact of activities other than fishing in the Convention Area.

The Commission requests Secretariat and the Scientific Council with other international organizations, such as the FAO and ICES to inform the Scientific Council's work related to the potential impact of activities other than fishing in the Convention Area. This would be conditional on CPs providing appropriate additional expertise to Scientific Council.

SC reiterates its prior advice that there are a number of activities occurring in the NRA (especially oil and gas) which appear to have significant spatial overlap with NAFO bottom fisheries, NAFO closures and VMEs, and have the potential to impact fisheries resources and the ecosystem. These activities have increased in recent years.

Information on “activities other than fishing” (e.g. trends, spatial location, overlapping with fisheries, VMEs and closed areas, and potential impacts) will continue to be included in the Ecosystem Summary Sheets.

Geographical location of oil and gas activities in the NRA is publicly available from several sources. Conversely, information on the assessment of potential impacts of such activities, as well as mitigation measures, is scarce or difficult to obtain.

SC also notes that current expertise, within SC WG-ESA in particular, and SC in general, is insufficient to allow SC to fully assess the long-term impacts of these activities on fisheries resources, VMEs and the wider marine ecosystem.

SC requests access to the data and analysis from monitoring programs of oil and gas activities from Contracting Parties.

SC also reiterates that CPs provide expertise in evaluation of marine environmental impacts of activities other than fishing (eg. oil and gas).

Canada highlighted that NAFO has no regulatory role for oil and gas activities, but noted it will continue to share information.

Oceans North recalled recently developed Canadian guidance on assessment and mitigation of potential impacts from oil and gas development in sensitive benthic area closures which may be of use to SC.

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WG-EAFFM further noted the need for more SC resources to address requests of this nature, should they continue to be requested by the Commission.

e. Commission Request # 13 – 3M and 3LNO Ecosystem Summary Sheets

Commission Request # 13: The Commission requests that Scientific Council proceed with developing the ecosystem summary sheets for 3M and 3LNO move toward undertaking a joint Workshop with ICES (International Council for the Exploration of the Sea) as part of a peer review of North Atlantic ecosystems.

Scientific Council responded:

SC noted that the request is a carryover from 2020.

SC has developed an action plan to move this work forward, but progress is effectively conditional on CPs providing the necessary support. This working plan includes:

Grand Bank (3LNO) EPU. The existing Ecosystem Summary Sheet (ESS) will be updated to the extent possible during the 2022 WGESA meeting, with a final review and formal approval by SC in June 2023.

Flemish Cap (3M) EPU. A draft ESS will be produced during the 2022 WGESA meeting, with an initial review and evaluation of progress by SC in June 2023. The extent of this progress will determine if a final ESS could be produced or if additional work is required.

Additional Data by CPs. ESSs may contain grey out items due to lack of data. In those cases where data may exist within CPs, **SC requests the Secretariat** to work with WG-ESA co-chairs to formalize the request of information to fill these gaps to extent possible.

Joint NAFO-ICES Workshop on Ecosystem Summaries. WGESA Co-chairs will re-establish contact with ICES about the possibility and potential scope for this workshop. Given current workload and capacity within SC, this workshop is not expected to take place until 2023 at the earliest. The renewed contact with ICES would be intended to keep the dialogue open on this matter, but without making concrete commitments.

SC considered that consolidating the creation and updating of ESSs would benefit from the creation of the Ecosystem-level Designated Expert (EDE) role, and created EDE positions for the Grand Bank (3LNO) and Flemish Cap (3M) EPU. However, no experts were designated in these positions, which remain vacant as all members of SC stated they could not take on further workload. Experts to serve in these positions would need to be identified/nominated by SC and/or Contracting Parties (CPs), and formally designated by SC. CP support in the form of new positions and/or additional capacity would be required for making the new EDE roles operational.

SC notes:

- *A near final (up-to-date) version of the 3LNO ESS was made available in June 2020 (SCS 20-14 Rev.) which is pending formal approval by SC.*
- *Successfully up-dating and completing ESS remains conditional on CPs providing the support required to carry out the work.*

WG-EAFFM thanked the SC for their work and supported these ongoing activities.

General WG-EAFFM discussion of the Scientific Council advice:

WG-EAFFM noted that the lack of resources available to SC was mentioned several times throughout the WG meeting. The Working Group discussed that both the amount of scientific requests and the breadth of those requests increases annually. It was acknowledged that while the SC is an independent body from the Commission and has the autonomy to prioritize its own workload, it would be beneficial if the Commission could consider a prioritization process for its new SC requests, while acknowledging such a process could be challenging.

This needs to be taken into consideration by the Commission in their discussions around prioritization. These issues were addressed by recommendation 10.

6. Update on the WG-EAFFM Workshop (2022), including the Open Dialogue Meeting (September 2021)

In opening this agenda item, the co-Chair (AK) recalled the SC response to 2021 Commission Request 5.b – *work to support the WG-EAFFM workshop in 2022, which will explore ecosystem objectives and further develop how the Roadmap may apply to management decision making*. The SC response, formulated in June 2022 to this request:

Scientific Council responded:

Building upon its advice in 2020 and the results from the independent scientific review of EPP-TCI, Scientific Council **recommends** that, *as an interim measure in the implementation of Tier 1 of the NAFO Roadmap, a TCI-based assessment of ecosystem overfishing be adopted by the Commission to inform their fishery management decisions.*

This recommended initial implementation of TCIs effectively constitutes a traffic light approach as follows:

Red light (total catches >2TCI; High risk of impacts due to ecosystem overfishing): *this is a catch scenario to be avoided and if reached, management measures should be taken to reduce total catches below 2TCI;*

Yellow light (1TCI < total catches < 2TCI; Intermediate risk of impacts due to ecosystem overfishing): *management measures should explicitly account for preventing the zone of high risk of ecosystem overfishing to be reached;*

Green light (total catches < 1TCI; Low risk of impacts due to ecosystem overfishing): *no additional management measures are required to reduce the risk of ecosystem overfishing.*

The Commission may also wish to consider a hard form of the TCI approach with operational decision rules.

There is a need to define appropriate ecosystem level objectives against which the different technical elements of the Roadmap can be applied.

In 08–09 August, the *NAFO WG-EAFFM Workshop for fisheries managers and scientists to draft ecosystem objectives* was conducted. The workshop focused on the implementation of Tier 1 of the Roadmap, specifically the application of TCI concept in the TAC decision process. The workshop was attended by forty-five (45) participants representing NAFO scientists and fishery managers, representatives from the fishing industry, international organization (FAO), and non-government organizations (Ecology Action Center and Oceans North). The participants of the workshop acted on their own personal capacity. Conclusions of the workshop are presented in Annex 3.

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WG-EAFFM noted their appreciation to the WG-EAFFM Co-Chairs, the SC Chair, and Mariano Koen-Alonso (Canada), as well as the Secretariat for all of their work in preparing for and facilitating the workshop. The workshop had been under development for several years, and postponed due to COVID, and the working group was pleased to see it move forward. Moreover, it was noted that the workshop model provided a useful format for having more in-depth and frank discussions than a typical WG meeting would normally allow.

Recommendations 3-9 (see agenda item 10) incorporate the SC advice and the conclusions of the workshop.

7. Update on proposed sub-group considering NAFO OECMs (Other Effective area-based Conservation Measures)

The plan to have an intersessional, small group exercise to explore the link between NAFO area-based management measures and the CBD's process was postponed due to the preparations of the WG-EAFFM workshop. Instead, Joe Appiott, Coordinator for Marine, Coastal and Island Biodiversity, Convention on Biological Diversity (CBD) was invited to give a talk (virtually) on the OECM criteria and the CBD process (COM-SC EAFFM-WP 22-12). WG-EAFFM noted that there is no selection or review of OECM submissions by competent management authorities, candidate OECMs are effectively accepted by the CBD as submitted.

WG-EAFFM will undertake intersessional work, taking into account the presentation from CBD and Andy Kenny, and will inform the next meeting of the working group on possible ways forward.

8. Review of the NAFO CEM, Chapter II

As required in Article 24 of the NAFO CEM, a review was conducted, taking in consideration input of SC (at its June 2022 meeting) and WG-ESA (SCS Doc. 21-21) as well as the previous input from STACTIC (see COM-SC 21-02). The review resulted to a recommendation of some revisions to the Articles of Chapter II, including the insertion of Significant Adverse Impact assessment in Article 23 and the timing of future reviews of Chapter II (See recommendation 12 in agenda item 10).

9. Other Matters

a. Update on the ABNJ Deep-Seas Fisheries Project

In 2021, the Commission agreed that NAFO becomes a partner to this project and commit in-kind support in the amount of USD 3.03 million over the Project's 5-year term (2022-2027).

Tony Thompson (FAO) provided an update on this project. A key element was the FAO suggestion to hold a joint symposium on ecosystem productivity models. As NAFO is undertaking ground-breaking work on ecosystem status in the NW Atlantic and linking ecosystem productivity with total fish production leading to more sustainable management under EAFM, and this work builds on existing stock assessment and has implications for the scientific advice, management, monitoring and compliance work of RFMO's, FAO believes this would be a suitable topic for a NAFO symposium in partnership with the Project and its global partners.

FAO requests that this WG consider this, and if appropriate, suggest forming an organising committee consisting of NAFO representatives from the science, management and compliance committees and FAO who would be able to assist in the planning of the symposium.

To this effect, the WG made a recommendation to further explore the possibility of such a symposium, as resources allow (See Recommendation 13 in agenda item 10).

b. Other International Relations

- **Biological Diversity Beyond Areas of National Jurisdiction (BBNJ) Process.** The WG noted the update on this process as contained in COM-SC EAFFM-WP 22-11 and presented by the Secretariat. The Secretariat

suggested that the main issues of these negotiations of particular interest for NAFO are area-based management tools (including the place of NAFO's VME closures, fish stock boundaries, etc. within any final international legally binding instrument (ILBI)), environmental impact assessments (including how this will relate to the work of NAFO's Scientific Council in fish stock and ecosystem assessment), and the governance structure of any ILBI and how it will interact with NAFO.

- **UN Bottom Fisheries VME workshop, August 2022.** In 2021, the Commission upon the recommendation of this WG directed the Secretariat to share its work on bottom fishing impacts along with any potential update of the SAI outcome with the UNGA VME review in 2022.

This workshop provided the opportunity for NAFO to share its work with the United Nations. Tom Blasdale, the Scientific Coordinator represented the NAFO Secretariat and reported on the work of NAFO regarding VMEs, including the management measures to protect VMEs and the SAI impact assessment of bottom fishing. He also served as a panellist (https://www.un.org/depts/los/bottom_fishing_workshop.htm).

The participants of this meeting who were also participants at UN workshop commended Mr. Blasdale on his productive participation and his effective presentation of NAFO's work on VMEs. The participants also commented that among the RFMOs at the workshop, NAFO leads in the implementation of the *FAO International Guidelines for the Management of Deep-Sea Fisheries in the High Seas*.

- **Sargasso Sea Commission** In 2021, the Commission upon the recommendation of the WG expressed its support for the development of an MOU between the Sargasso Sea Commission Secretariat and the NAFO Secretariat.

The Executive Secretary provided an update. The draft MOU is nearing the finalization stages as there are still some edits on the draft that needs to be agreed by the two Secretariats. The WG made a recommendation supporting the finalization of the MOU (see recommendation 14 in agenda item 10).

c. Terms of Reference for the WG-EAFFM

The co-Chairs indicated that the terms of reference of this working group as stipulated in FC Doc. 13/19 are due for review. The participants were requested to reflect on this as this item will be included in the agenda of the next meeting.

d. SC Workload

The SC Chair highlighted the issue of heavy workload among its members, which is not sustainable. Document SCS 22-05 *Scientific Council 5-year Plan 2022* was recalled to highlight the work, including among others, the work on PA, EAF, VME, SAI and MSE, and the resource gaps in completing the work. SC appealed to the WG to be cognizant of this predicament when formulating recommendations to the Commission.

10. Recommendations

In regard to the VME Assessments,

1. In regards to the VME and SAI assessments, WG-EAFFM recommends that the Commission direct the Secretariat to develop and electronically host the relevant data sets to support the SC's work and consider providing dedicated staff for data archiving, maintenance, and management, taking into consideration available resources and any confidentiality concerns.
2. Additionally, WG-EAFFM recommends that the Commission request the Secretariat to begin consideration of how these data sets or suitable derived data products might be made public in the future, while taking into consideration any confidentiality concerns about the data.

In regard to the Ecosystem Roadmap,

3. **WG-EAFFM recommends that the Commission adopt the use of TCI as a scientifically sound approach, as confirmed by the independent review, and that 2TCI can act as an ecosystem reference point to help inform managers.**
4. **Further, that the Commission request SC to include TCI information in its regular reporting on stock and ecosystem assessments.**
5. **WG-EAFFM recommends that the Commission request that WG-EAFFM explore effective methods to communicate TCI-related information to the Commission, in particular when 2TCI is, or is expected to be exceeded.**
6. **WG-EAFFM recommends that the Commission request SC and WG-EAFFM to explore possible underlying scientific causes and management considerations in the rare event when 2TCI is or is expected to be exceeded, similar to those when exceptional circumstances are triggered within MSE.**
7. **WG-EAFFM recommends that the Commission request SC to continue its efforts on the Roadmap, cognizant of capacity constraints and the need for prioritization.**
8. **WG-EAFFM further recommends that Commission direct WG-EAFFM to explore how NAFO might consider these management options, including the potential roles of WG-EAFFM and RBMS working groups.**
9. **WG-EAFFM recommends that the Commission request the SC and WG-EAFFM inform a Commission discussion on operational objectives for the protection of VMEs and biodiversity in the NRA.**

In regard to the Scientific Support for the Roadmap,

10. **WG-EAFFM reaffirms its recommendation to the Commission to seek scientific resources through CPs to support SC's activities, including those on the roadmap.**
11. **WG-EAFFM recommends that the Commission to better communicate the scientific work of the SC, to encourage greater interest in participation in SC activities.**

In regard to Chapter II, NAFO CEM,

12. **In relation to the review of Chapter 2, WG-EAFFM recommends that the Commission adopt the following edits to Articles 17, 23, and 24:**

Article 17 - Area Restrictions for Bottom Fishing Activities

Contracting Parties are encouraged to the extent possible to record all ~~coral and sponge~~ VME indicator species catch in their annual government and/or industry research programs and to consider non-destructive means for the long-term monitoring of VME ~~coral and sponges~~ in the closed areas.

Article 23:

(1) The Commission will request the Scientific Council to

(a) identify VMEs, on the basis of best available scientific information and with the cooperation of Contracting Parties;

(b) map sites where these VMEs are known to occur or likely to occur; and

(c) provide such data and information to the Executive Secretary for circulation to all Contracting Parties;

(d) an assessment of Significant Adverse Impacts (SAI) as defined by the FAO guidelines for deep-sea fisheries; and

(e) conduct a risk assessment based on the outcome of these assessments.

Article 24:

The provisions of this Chapter shall be periodically reviewed by the Commission at its Annual Meeting ~~no later than 2022~~ in the year following the reassessments set out in Article 23, paragraph 2(a).

In regard to the GEF ABNJ Deep Seas Fisheries Project,

13. WG-EAFFM recommends that the Commission request the Secretariat to work with the FAO to explore the idea of a joint NAFO-FAO symposium on ecosystem production models in relation to fisheries management, as part of the ABNJ deep sea fisheries project.

In regard to the Sargasso Sea Commission,

14. WG-EAFFM recommends that the Commission support the finalization of an MOU between the NAFO and Sargasso Sea Commission Secretariats.

11. Adoption of the report

The report was adopted via correspondence.

12. Adjournment

Andrew Kenny (United Kingdom) announced that he is stepping down as co-Chair of this WG after the meeting. WG-EAFFM members expressed profound appreciation and thanks for his leadership and long-standing service.

The meeting was adjourned at 15:30 (UTC/GMT -3 hours in Halifax, Nova Scotia) on 12 August 2022.

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Annex 2. Agenda

1. Opening by the co-Chairs, Andrew Kenny (United Kingdom) and Elizabethann Mencher (USA)
2. Appointment of Rapporteur
3. Adoption of Agenda
4. Review of the August 2021 Recommendations (COM-SC Doc. 21-08)
5. Presentation and discussion of Scientific Council responses to Commission requests for advice (COM Doc. 21-20 and SCS Doc. 22-01) relevant to WG-EAFFM
 - a. Commission Request # 3 – Evaluation of the impact of scientific trawl surveys on VME in closed areas and the effect of excluding surveys from these areas on stock assessments.
 - b. Commission Request # 5 – Ecosystem Road Map
 - i. Independent experts review of the NAFO Roadmap Tier 1 and Tier 2.
 - ii. Update on development of models that support implementation of Tier 2
 - c. Commission Request # 6 – VME analysis
 - i. Bottom closures 7a, 11a, 14a, 14b
 - ii. Scientific Council review of the effectiveness of NAFO CEM, Chapter 2
 - d. Commission Request # 12 – potential impact of activities other than fishing in the Convention Area.
 - e. Commission Request # 13 – 3M and 3LNO Ecosystem Summary Sheets
6. Outcomes of the WG-EAFFM Workshop (08–10 August 2022)
7. Update on proposed sub-group considering NAFO OECMs (Other Effective area-based Conservation Measures)
8. Review of the NAFO CEM, Chapter II (input of STACTIC)
9. Other Matters
 - a. Update on the ABNJ Deep-Seas Fisheries Project
 - b. Other International Relations (Update on the BBNJ, United Nations and Sargasso Sea Commission)
 - c. Terms of Reference for the WG-EAFFM
 - d. SC Workload
10. Recommendations
11. Adoption of the Report
12. Adjournment

**Annex 3. Conclusions of the NAFO Joint Commission-Scientific Council WG-EAFFM Workshop
of fisheries managers and scientists to draft ecosystem objectives, 08–10 August 2022**
(COM-SC EAFFM-WP 22-09)

The discussions during the workshop identified:

Ecosystem Objectives

1. The workshop discussed the ways NAFO has reflected ecosystem objectives in its decision-making processes, such as VME protection.
2. If NAFO would want to develop further ecosystem objectives, it could consider a process that is informed by scientific, policy, and socio-economic needs including climate change, multispecies/foodweb considerations, and ecosystem functions.
3. Developing ecosystem objectives which can be clearly linked to (and supported by) robust targets and indicators was highlighted as particularly important with respect to their effective implementation.
4. The 2TCI ecosystem reference point provides an opportunity for developing management objectives to maintain fishing pressure at levels generally consistent with ecosystem sustainability.

Implementation of Tier 1 of the Roadmap

1. There is an acceptance that the TCI concept and related scientific advice, as also confirmed by the independent external scientific review, is scientifically sound.
2. The 2TCI is an ecosystem reference point which historically has been associated with guild decline and an increased risk of reduced guild recovery, often due to fishing pressure (i.e., ecosystem overfishing – catches consistently exceeding fishable production given current ecosystem conditions).
3. The TCI-based assessment and the 2TCI ecosystem reference point are complementary to current practices and provides a check for evaluation of ecosystem sustainability.
4. Current single stock management practices (e.g., PA) have been generally effective in keeping catch levels below 2TCI, but there are a few examples where this has not been the case.
5. 2TCI is calculated over a pre-agreed reference period and revised periodically, or in response to concerns about changes in ecosystem productivity.
6. Practical applications of the 2TCI ecosystem reference point can be conceptualized as the triggering of an exceptional circumstances protocol, as in MSE. Regular monitoring and reporting is required, and action could be considered when the 2TCI ecosystem reference point is exceeded, or it is expected to be exceeded.
7. The exercises performed during the workshop showed the importance of flexibility in defining the management actions to avoid exceeding the 2TCI ecosystem reference point. Reasons for exceeding the 2TCI ecosystem reference point can be diverse (e.g., a pulse of large recruitment, changes in ecosystem productivity or ecosystem overfishing), and they need to be understood in each case while considering possible action.
8. At this time, a non-prescriptive approach to management actions in relation to exceeding the 2TCI ecosystem reference point is indicated to be more effective for management decisions than a prescriptive rule-based application of the 2TCI information. A more prescriptive MSE-type approach could eventually be considered in the future but would need to be developed and tested in the context of MSE-type exercises.

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9. Reporting on TCI levels should be incorporated into the standard COM request for scientific advice, and Information on the 2TCI ecosystem reference point should be communicated to the Commission, for example, via incorporation into stock and ecosystem summary sheets.
10. Science information and advice from single species assessments should be conveyed in relation to the corresponding 2TCI ecosystem reference point, in a format that combines across species within guilds, to help inform management decisions.
11. The discussion of the implementation of TCI-based advice highlighted the complexities of the trade-offs that are embedded in the TAC negotiations.