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Northwest Atlantic Fisheries Organization

Report of the Fisheries Commission Working Group of Fishery Managers and Scientists on Vulnerable Marine Ecosystems (WGFMS-VME)

29 – 30 June 2011
Halifax, N.S., Canada

NAFO
Dartmouth, N.S., Canada
2011

Report of the FC Working Group of Fishery Managers and Scientists
on Vulnerable Marine Ecosystems (WGFMS-VME)
29 – 30 June 2011
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1. Opening of the Meeting

The Chair Bill Brodie (Canada) opened the meeting at 0935 hrs on Wednesday, 29 June 2011. He welcomed the participants from Canada, European Union (EU), Iceland, Japan, Norway, the Russian Federation, and the USA, as well as the Scientific Council (SC) Chair (Annex 1).

2. Appointment of Rapporteur

The Fisheries Commission Coordinator was appointed rapporteur.

3. Adoption of Agenda

The provisional agenda as previously circulated was adopted with insertion of three sub-items under Other Matters: a) NAFO's Implementation of the Ecosystem Approach, b) NERIEDA update, c) Procedural issues relating to the mandate of the working group, including utilization of SC advice (Annex 2).

4. Review of the scientific advice of the Scientific Council to the Fisheries Commission; evaluate associated risks

The Working Group (WG) received a summary of the Scientific Council report of the June 2011 meeting, from the SC Chair (Annex 3). The presentation of the SC Chair focused on responses to three VME-related questions from the Fisheries Commission (FC) to SC (items 13 – 15 of FC Doc 10/9 Rev.). There was relevant information on the coral and sponge protection zones (notably closed area #5), on encounter thresholds for sponge, and frequency and timing of fishing plans/assessments.

The WG drew the attention of FC to these responses. No evaluation of associated risks was conducted as it was decided that the WG would seek further clarification and instructions from the FC regarding this matter.

5. Review area closures, fisheries impact assessments and other measures outlined in the NAFO Conservation and Enforcement Measures (NCEM) with specific timelines

The WG agreed that the primary focus was those measures with specific timelines, and concentrated on those measures in its review. It was agreed that the effective closure period as well as the review date of seamount, coral, and sponge measures be harmonized. The WG recommended several extensions of closed area deadlines, and this is reflected in the updated text Chapter Ibis (see item 6).

Also, it was noted that the SC advice from June 2011 contained information on frequency and timing of fishing plans/assessments.

6. Update the text in Chapter Ibis of the NCEM as necessary

The review and update of Chapter Ibis generated some discussions, which focused mainly on removing outdated elements, clarifying the text, and reorganizing the articles.

Some changes were proposed in the text in order to bring clarity. In cases where there was no consensus, the text were square-bracketed with the intention of bringing these to the attention of the FC for clarification.

Annex 4 presents the proposed updated text of Chapter Ibis. The main features of the update are 1) moving Articles 15.5-15.10 (on seamounts closure) and Article 16 (on coral and sponge areas closure) and integrating them into Article 2bis, 2) harmonization of the closure and review dates of the protected areas and 3) consolidation of definitions related to VME (Article Ibis).

7. Recommendations to be forwarded to the Fisheries Commission

a) On mitigation strategies and measures to avoid significant adverse impacts on vulnerable marine ecosystems.

The WG recommends the extension of the existing coral and sponge closures until 2014 to synchronize with the seamount closure. This recommendation is reflected in the proposed update of Chapter Ibis of the NCEM.

b) Other recommendations

Update of Chapter Ibis of the NCEM

- The WG recommends to the FC the adoption of the proposed update of Chapter Ibis of the NCEM. The proposed update is contained in FCWG-VME WP 11/2 Rev.2, and is presented in Annex 4.

Issues arising from this meeting

- In relation to Article 1bis6 of the draft update concerning VME indicator species, the WG recommends to the FC to formulate a request to the Scientific Council to produce a detailed list of VME indicator species and possibly other VME elements.

- In relation to Article 2bis3 of the draft update, it is implied that exploratory fishery in the seamounts is allowed. The WG recommends that the FC clarify this measure and its application, with specific reference to Article 2bis, paragraph 2 (regarding 'fishable area'). The WG is of the view that there should be clear and consistent measures in the NCEM on exploratory fisheries vis-à-vis closed areas (seamounts, coral and sponge areas).

- In relation to Article 2bis8 of the draft update concerning the establishment of national coral and sponge monitoring programs, the WG recommends that FC clarify the intent of this measure.

- Concerning the role and task of the WG, the WG recommends to the FC to clarify whether this group should consider scientific advice before it is presented to the FC and make recommendations to the FC at the Annual Meeting.

8. Other Matters

a) NAFO's Implementation of the Ecosystem Approach

The Executive Secretary presented a summary of NAFO's decisions and actions in implementing the ecosystem approach. Measures on protection of sharks and turtles, as well as on bottom fisheries in the Regulatory Area (Chapter Ibis of NCEM) were outlined in line with the international instruments such as

the 1995 Fish Stock Agreement, 2006 UNGA Resolution 61/105, and the 2007 NAFO Amended Convention.

The WG was reminded that many of the measures currently in place in Chapter Ibis were the result of recommendations from this WG. The WG was also informed that the Secretariat, in consultation with the Contracting Parties, reports regularly to the United Nations Division for Ocean Affairs and the Law of the Sea (UNDOALOS). The latest report was transmitted in May 2011.

b) Update on NERIEDA Project

Enrique de Cardenas (EU) made an update-presentation on the research survey project NEREIDA (NAFO Potential Vulnerable Marine Ecosystems: Impact of Deep-sea Fisheries) coordinated by EU-Spain in collaboration with other Contracting Parties. This project was first announced at the 2008 NAFO Annual Meeting. It was noted that regular updates were already provided at previous WG meetings. Also at the 2010 Annual Meeting, a side-event was organized for a joint presentation by Canada and Spain on the research results of the on-going project.

All planned research cruises under the project have been undertaken. Activities since the last update focus on further processing of specimens and samples and data analyses.

Commitment of financial support on the project by EU and Canada are secured until 2014.

c) Procedural issues relating to the utilization of SC advice

The WG had some discussion around timing and function of the WG. Some members felt that the WG should examine in detail the most recent SC advice and responses on VME-related material, and provide recommendations to FC on this content. Other members of the WG felt that the SC advice should go directly to FC, who could then task the WG with specific items as required. The opinion of the Chair of SC was that the SC advice should be delivered to FC for action, rather that to various WGs or other Standing Committees of NAFO. Related to this issue, the WG also discussed options for best timing of any future WG meetings, but did not come to any conclusions. A clarification on the process and timing would be sought from FC.

9. Adoption of Report

This report was adopted through correspondence after the meeting**.**

10. Adjournment

The Chair thanked the participants and the Secretariat. The meeting was adjourned at 1605 hrs on Thursday, 30 June 2011.

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Annex 2. Agenda

1. Opening of the Meeting

2. Appointment of Rapporteur

3. Adoption of the Agenda

4. Review of the scientific advice of the Scientific Council to the Fisheries Commission; evaluate associated risks

5. Review area closures, fisheries impact assessments and other measures outlined in the NAFO Conservation and Enforcement Measure with specific timelines

6. Update the text in Chapter Ibis of the NCEM as necessary

7. Recommendations to be forwarded to the Fisheries Commission

    a. On mitigation strategies and measures to avoid significant adverse impacts on vulnerable marine ecosystems
    b. Other recommendations

8. Other Matters

    a. NAFO's implementation of the Ecosystem Approach
    b. NERIEDA update,
    c. Procedural issues relating to the utilization of SC advice

9. Adoption of Report

10. Adjournment

Annex 3. Fisheries Commission Requests and Scientific Council Responses

(FCWG-VME Working Paper 11/1)

For information purposes and to help facilitate discussions within the Working Group, the Secretariat has put together this working paper presenting the summary of the latest response from the Scientific Council to the FC Request for scientific advice on VMEs.

Contents:

FC Request for Advice		Scientific Advice	
FC Request	Request Item and FC Reference Document	SC Advice Formulation	SC Reference Document
Review any new scientific information on Coral and Sponge Protection Zone (Art. 16.3, 2011 NCEM)	Item 13, FC Doc 10/9 Rev.	Advice formulated at the June 2011Meeting	SCS Doc. 11/16, p. 34-35*
Application of simulation modelling in a GIS framework	Item 14, FC Doc 10/9 Rev.	Advice formulated at the June 2011Meeting	SCS Doc. 11/16, pp. 35-36*
Evaluating SAIs and Gear/Substrate impact assessments	Item 15, FC Doc 10/9 Rev.	Advice formulated at the June 2011Meeting	SCS Doc. 11/16, pp. 37-38*

*The SC June 2011 Meeting Report (SCS Doc 11/16) has been adopted by the Scientific Council. Pagination of the report may change due to formatting of the the report document for publication.

FC Request (item 13 of FC Doc. 10/9 Rev.)

Mindful of the NEREIDA mission, the international scientific effort led by Spain to survey the seafloor in the NAFO Regulatory Area,

Recognizing that the Coral and Sponge Protection Zones closed to bottom fishing activities for the protection of vulnerable marine ecosystems as defined in Chapter 1 Article 16 Paragraph 3 is in place until December 31, 2011,
Mindful of the call for review of the above measures based on advice from the Scientific Council,

Fisheries Commission requests that Scientific Council review any new scientific information on the areas defined in Chapter 1 Article 16 Paragraph 3 which may support or refute the designation of these areas as vulnerable marine ecosystems. In the event that new information is not available at the time of the Fisheries Commission meeting in September 2011, prepare an overview of the type of information that will be available and the timeline for completion.

SC Response (SCS Doc. 11/16, p. 34-35)

Sources of Information: SCS Doc. 08/10, 08/24, 09/06, 10/19, 10/24 and references therein.

Although a full review of all NEREIDA results is not yet available, SC have focused their efforts in the study and analysis of different streams of data from the Sackville Spur (Closed Area # 6). The goal was to provide, at minimum, a more comprehensive look of one of the close areas currently in place. These results can be considered as a first order approximation of what would be expected to find in other closed areas with similar characteristics. In addition to the focalized efforts on Sackville Spur, some data analyses for other areas like Flemish Cap south, Flemish Cap east (Closed Area # 4), and Flemish Cap northeast prong (Closed Area 5) were also pursued.

The battery of studies and analyses done for the Sackville Spur (Closed Area # 6) rendered some important results about the benthic communities in this area which support the designation of this area as a VME. It was found that both benthic organisms biomass as well as biodiversity are higher within the closed area, and that there were differences in the composition of the benthic community within and outside the closed area. Furthermore, the number of non-sponge benthic taxa is significantly and positively related to both depth and sponge density, supporting the notion that sponge grounds have an important structural role in defining these benthic systems.

In the Flemish Cap northeast prong (Closed Area # 5), the work done documented the existence of a gradient of benthic communities with depth, transitioning from coral dominated communities at ~2450m depth, to corals intermixed with sponges around 2000m, to sponge dominated grounds at 1500m, and to a diverse community of corals, sponges and other benthic taxa at ~1300m depth. This is probably the most interesting arrangement of corals and sponges communities documented so far in the NRA. It is worth noting that the lower boundary of the Closed Area # 5 does not reach sufficiently deep waters to protect the entire gradient of coral and sponges assemblages. Therefore it would be advisable to extend the lower boundary of this close area up to the 2500m contour.

Based upon the above findings, as well as prior studies, Scientific Council confirms that the original rationale and basis for identifying and establishing closed areas to protect significant concentrations of VME-defining corals and sponges was appropriate.

The processing of samples and analysis of the data collected during the NEREIDA project is still ongoing. A stream of results and studies are expected to become available over the next few years, but precise timelines for completion are dependent on the continuation of the funding and resources that had supported these research efforts until now. Many of these sources have already expired or are scheduled to finish in 2011. If current efforts aimed to secure additional funding are successful, a full analysis of NEREIDA data streams and collections is expected to be completed by 2014.

FC Request (item 14 of FC Doc. 10/9 Rev.)

Noting the response from the Scientific Council in June 2010 regarding simulation modeling in a GIS framework: "To apply this model to the NRA, an agreed upon set of gear descriptions and tow duration/lengths for each fishing fleet segment would need to be created. Further estimation of retention efficiencies of the different commercial gears and indirect effects of fishing will be needed to model effects of serious adverse impacts."

The Fisheries Commission requests that the Scientific Council: 1) acquire the requisite data and apply the model to the extent possible to the NRA, and 2) consider whether the SASI model used by the US New England Fisheries Council should be incorporated into the aforementioned GIS framework as a means of integrating significant adverse impacts into the approach.

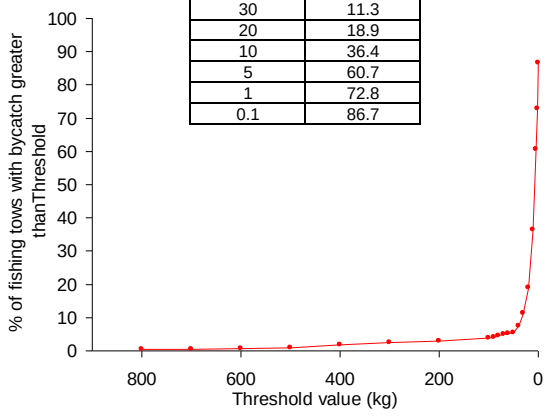
SC Response (SCS Doc. 11/16, p. 35-36)

Significant efforts were made to enhance and improve the GIS framework, and to apply it to the NRA, outside the closed areas, for the evaluation of VME-defining species bycatch threshold levels for encounter protocols. These efforts included a complete and open sharing of raw data among scientists of different contracting parties, a full engagement and collaboration with the staff at the NAFO Secretariat for the generation of VMS effort maps, as well as gathering information from actual commercial tows to capture their characteristics as realistically as possible within the GIS framework.

The key results from this analysis can be summarized in the following figure:

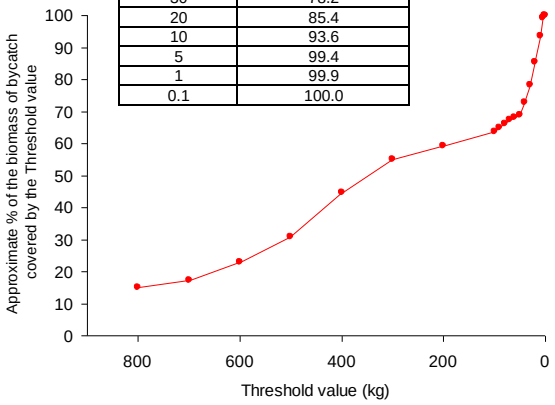
Impact of different threshold values on the fishery

Threshold value	% tows > Threshold
800	0.4
700	0.5
600	0.7
500	1
400	1.7
300	2.5
200	2.9
100	3.9
90	4.1
80	4.5
70	4.9
60	5.1
50	5.5
40	7.5
30	11.3
20	18.9
10	36.4
5	60.7
1	72.8
0.1	86.7



Impact of different threshold values on conservation

Threshold value	Approximate % of bycatch covered by the threshold level
800	15.1
700	17.3
600	22.9
500	30.8
400	44.6
300	55.0
200	59.4
100	63.8
90	64.9
80	66.1
70	67.5
60	68.2
50	69.0
40	72.9
30	78.2
20	85.4
10	93.6
5	99.4
1	99.9
0.1	100.0



At the present time, these results are relying on a simulation exercise intended to capture as much realism as possible. However, detailed and accurate reporting on bycatch of VME-defining species (sponges in this case) during commercial fishing operations is essential to validate the results from models like this, as well as to refine its accuracy and performance.

This GIS framework can generate outputs like the ones presented in the figures above, but it can also be used to provide estimations of biomass of sponge bycatch per effort, if selectivity values are available. The above analyses assume 100% catchability, but implementing other catchability values is possible.
The results obtained from the application of the GIS framework, indicate that the current encounter threshold for sponges bycatch is rarely met. If the intension of the threshold is to accomplish protection of sponges outside the closed areas this analysis therefore indicates that the threshold needs to be reduced. The above analysis can serve as a guide for this exercise. It is also considered very important to maximize efforts in the reporting of bycatch of corals and sponges, regardless of whether these bycatches hit or not the thresholds indicated in the encounter protocols.

Part 2: Consideration of the SASI model for its potential integration with the GIS framework, and its application to the NRA.

The Swept Area Seabed Impact model (SASI) addresses a different set of questions than the GIS framework, and hence, there is no particular benefit in merging both approaches into a single software application. SASI structure provides another tool to explore significant adverse impacts, but its current configuration/parameterization is not directly applicable to the NRA, however, the possibility of developing a SASI-like a tool for the NRA is expected to be explored further through the invitation extended to Brad Harris, a SASI expert from the University of Massachusetts, to join the Scientific Council Working Group of Ecosystem Approaches to Fisheries Management (WGEAFM).

FC Request (item 15 of FC Doc. 10/9 Rev.)

Recognizing the initiatives on vulnerable marine ecosystems (VME) through the work of the WGFMS, and with a view to completing and updating fishery impact assessments, the Scientific Council is requested to provide the Fisheries Commission at its next annual meeting in 2011: 1) guidance on the timing and frequency of fishing plans/assessments for the purpose of evaluating significant adverse impacts on VMEs; 2) a framework for developing gear/substrate impact assessments to facilitate reporting amongst the Contracting Parties

SC Response (SCS Doc. 11/16, p. 37-38)

Part 1: Guidance on timing and frequency of fishing plans/assessments

At the present time, no fishing plan/assessment has been submitted in the new format, so there is no actual procedural experience on which a more thorough guidance and feedback, not just on timing and frequency, but also on content can be provided. Nonetheless, some observations can be made that may be of utility.

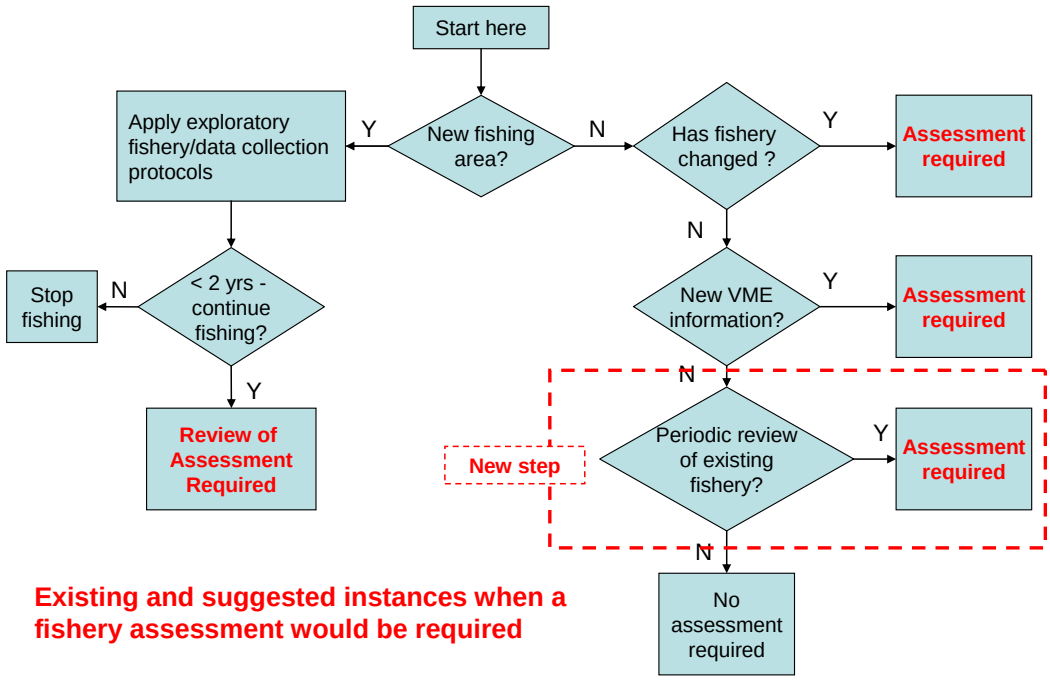
On regards to timing, the current NCEM provisions (Article 4bis) indicates that an assessment should be submitted no less that two weeks prior to the beginning of the June meeting of Scientific Council (SC), with the intent that this council submits its conclusions and recommendations to Fisheries Commission which, together with the advice received by its Working Group of Fisheries Scientists and Managers, it would be expected to make decisions and recommendations pertaining to the assessment in the following September meeting; this assumes the intent of the proponents is to start fishing on Jan 1 of the following year. However, this timeline does may not allow for sufficient time for SC to prepare an adequate review of the submitted assessment. SC rules of procedure states that the SC Agenda for the June meeting must be finalized two months prior to the meeting; it would be important to respect this timeline in order to provide, a least in principle, a minimal amount of time for SC to review the submitted assessment.

This timeline essentially implies that the submission of an assessment should take place approximately 8-9 months prior to the intended start of the fishery. However, the review of assessments by Scientific Council would most likely require input from STACFIS, which meets in June, but may also require input from the SC WGEAFM, which typically meets in December. Considering these circumstances, it would be advisable that fisheries assessments are submitted one year prior to the FC meeting at which a decision on the assessment is expected to be made; assessment submission should be tabled at the FC and SC meeting during the September Annual Meeting of the year prior to the one where the decision should be made. This would allow SC to have enough time to circulate the assessment among all necessary groups with sufficient time for their reviews to be available at the SC June meeting prior to the FC meeting that would make a decision about the assessment.

With respect to frequency, current procedures do not establish any specific frequency for fisheries assessments. For example, in new fishing grounds, an assessment is triggered by the request of pursuing exploratory fishing, and another one is required two years later if the contracting parties request to continue fishing after the exploratory fishing phase. On existing fishing grounds, assessments are triggered by a) significant changes in the fishery, or b) new scientific information on VMEs in a particular area becomes available. On these grounds, it is worth noting that there should be an established process for reporting and reviewing possible VME encounters, and that SC needs data from fisheries to address questions on whether VME have been detected during fishing, and/or to evaluate if significant changes in the fishery have occurred. Current procedures allow FC to requests updates on previously assessed fisheries, but there is no provision whatsoever that requires a periodic assessment of an existing fishery within the fishery footprint.

Given the lack of experience, it is difficult to gauge how demanding the review process of fisheries plans/assessments may be, or how this additional workload may affect the ability of SC to continue delivering the advice required within currently expected timelines. Until some assessments are actually submitted and reviewed, their true impact on regular SC activities will remain unknown.

Nonetheless, after examining the regulations that currently defines the frequency of assessments, Scientific Council suggests that a structure similar to the one depicted in the flowchart below, may help developing a more consistent approach to the submission and reviews of fisheries plans/assessments. This flow chart includes assessments required under current regulations, but it also incorporates new instances when an assessment would be required (e.g. periodic review of existing fisheries). The frequency of these periodic reviews would be better determined once some experience on assessments is gained, but it would be expected them to be on a multiyear cycle.



Part 2: Guidance on framework for gear/substrate impact assessment to facilitate reporting amongst Contracting Parties

Scientific Council considered the development of an impact assessment framework, but could not provide a comprehensive approach at this time. SC noted that such frameworks exist in other RFMOs, and that further review of these frameworks and investigations into the particular requirements in the NAFO areas is needed. SC also noted that it would be useful for the continuing work on this matter if the request could be somewhat elaborated to give clearer directions on the work needed. Depending on the scope of such a framework SC also notes that this would require a considerable workload on SC members and that additional data from fishing activities will likely be required (e.g. an enhanced data collection protocol, fishery data on corals sponges, etc).

Annex 4. Draft Update of Chapter Ibis – Bottom Fisheries in the NAFO Regulatory Area
(FCWG-VME Working Paper 11/2 Revision 3)

Article 1bis – Purpose and definitions

1. The purpose of this chapter is to ensure the implementation by NAFO of effective measures to prevent significant adverse impacts of bottom fishing activities on vulnerable marine ecosystems known to occur or likely to occur in the Regulatory Area based on the best available scientific information. For the purposes of this Chapter, NAFO will take into account the guidance provided by the FAO in the framework of the Code of Conduct for Responsible Fisheries and any other internationally agreed standards, as appropriate.

2. The term 'bottom fishing activities' means bottom fishing activities where the fishing gear is likely to contact the seafloor during the normal course of fishing operations.

3. The term "existing bottom fishing areas" means that portion of the Regulatory Area where bottom fishing has historically occurred and is defined by the coordinates shown in Table 1 and illustrated in Figure 3. ~~initially means areas where VMS data and/or other available geo-reference data indicating bottom fishing activities have been conducted at least in two years within a reference period of 1987 to 2007. This shall be revised regularly in accordance with Article 2bis.~~

4. The term "new bottom fishing areas" means all other areas within the Regulatory Area which are not defined as existing bottom fishing areas[, including waters deeper than 2000 metres].

5. The term "vulnerable marine ecosystems" means has the same meaning and characteristics as those contained in paragraphs 42 and 43 of the FAO International Guidelines for the Management of Deep-Sea Fisheries in the High Seas.

6. The term VME indicator species refers to species of coral identified as antipatharians, gorgonians, lophelia, and sea pen fields; cerianthid anemone fields; and sponges that constitute sponge grounds or aggregations, [and other VME elements].

7.~~6.~~ The term "significant adverse impacts" has the same meaning and characteristics as those described in paragraphs 17-20 of the FAO International Guidelines for the Management of Deep Sea Fisheries in the High Seas.

8. The term "exploratory fisheries" means all bottom fishing activities outside of the existing bottom fishing area (footprint), or if there are significant changes to the conduct or technology of existing bottom fishing activities within the footprint.

9. The term "encounter" means catch of a VME indicator species above threshold levels as set out in Article 6bis, paragraph 3, ~~with indicator species of coral identified as antipatharians, gorgonians, cerianthid anemone fields, lophelia, and sea pen fields or other VME elements~~. Any encounter with a VME indicator species or merely detecting ~~the~~ its presence ~~of an element itself~~ is not sufficient to identify a VME. That identification should be made on a case-by-case basis through assessment by relevant bodies.

Article 2bis Seamount, Coral, and Sponge Protection Zones

1. ~~5. As of January 1, 2007, and u~~ Until December 31, ~~2010~~ 2014, no vessel shall engage in ~~the following areas shall be closed to all~~ bottom fishing activities in the areas~~. The closed areas are~~ defined by connecting the following coordinates (in numerical order and back to coordinate 1).

Area	Coordinate 1	Coordinate 2	Coordinate 3	Coordinate 4
Fogo Seamounts 1	42°31'33"N 53°23'17"W	42°31'33"N 52°33'37"W	41°55'48"N 53°23'17"W	41°55'48"N 52°33'37"W
Fogo Seamounts 2	41°07'22"N 52°27'49"W	41°07'22"N 51°38'10"W	40°31'37"N 52°27'49"W	40°31'37"N 51°38'10"W
Orphan Knoll	50°00'30"N 45°00'30"W	51°00'30"N 45°00'30"W	51°00'30"N 47°00'30"W	50°00'30"N 47°00'30"W
Corner Seamounts	35°00'00"N 48°00'00"W	36°00'00"N 48°00'00"W	36°00'00"N 52°00'00"W	35°00'00"N 52°00'00"W
Newfoundland Seamounts	43°29'00"N 43°20'00"W	44°00'00"N 43°20'00"W	44°00'00"N 46°40'00"W	43°29'00"N 46°40'00"W
New England Seamounts	35°00'00"N 57°00'00"W	39°00'00"N 57°00'00"W	39°00'00"N 64°00'00"W	35°00'00"N 64°00'00"W

~~At the 2010 Annual Meeting, the Fisheries Commission agreed that the existing measures on seamounts be rolled over until December 31, 2014.~~

2. ~~6. At the 2007 Annual Meeting, t~~ The Fisheries Commission shall consider providing access to a small scale and restricted exploratory fishery, ~~effective January 1, 2008,~~ not to exceed 20% of the fishable area of each seamount. ~~These representative areas that may be fished on each seamount will be recommended by the Scientific Council based on existing survey and commercial data from these seamount areas. Scientific Council is requested to provide the Fisheries Commission, at the 2007 Annual Meeting, recommendations on: 1) areas that could be fished on each seamount and, 2) a protocol for the collection of the data required to assess these seamounts, with a view to future recommendations on management measures for these areas.~~

~~7. Contracting Parties shall provide the Executive Secretary, in advance of the June 2007 Scientific Council meeting, with all existing data from survey and commercial fisheries that have taken place in these seamount areas. The Executive Secretary will forward this information to the Scientific Council for its review in making the above noted recommendations to the Fisheries Commission.~~

3. ~~8.~~ A request to conduct exploratory bottom contact fishing, in the areas defined by paragraph 1 shall be in accordance with the Exploratory Protocol for New Fishing Areas (Annex XXV). ~~Vessels may only fish in the defined areas in accordance with the protocol established by the Scientific Council and adopted by the Fisheries Commission.~~ In addition to the protocol, vessels fishing in the areas defined in paragraph 1 ~~5~~, shall have a scientific observer onboard.

4. ~~9.~~ If vessels fishing in the areas defined in paragraph 1 ~~5~~ encounter ~~hard corals~~, a VME indicator species, as defined in paragraph 3 of Article 6bis of Chapter Ibis, interim encounter provisions as set out in paragraph 2 of Article 6bis of Chapter Ibis will apply. ~~notification of the location of the coral area is to be provided to the Executive Secretary which will implement an immediate temporary closure of that area to all Contracting Parties pending a Fisheries Commission decision at the next Annual Meeting.~~

~~10. The measures referred to in paragraphs 5-9 shall be reviewed in 2010 by the Fisheries Commission, based on the advice from the Scientific Council, and a decision shall be taken on future management measures which may include extending the application of these measures for an additional period or making the closure(s) permanent.~~

5. ~~1. As of January 1, 2008, and u~~ Until December 31, 2014, no vessel shall engage in bottom fishing activities in the following area in Division 3O ~~shall be closed to all bottom fishing activities. The closed area is~~ defined by connecting the following coordinates (as illustrated in Figure 1).

Point No.	Latitude	Longitude
1	42° 53' 00" N	51° 00' 00" W
2	42° 52' 04" N	51° 31' 44" W
3	43° 24' 13" N	51° 58' 12" W
4	43° 24' 20" N	51° 58' 18" W
5	43° 39' 38" N	52° 13' 10" W
6	43° 40' 59" N	52° 27' 52" W
7	43° 56' 19" N	52° 39' 48" W
8	44° 04' 53" N	52° 58' 12" W
9	44° 18' 38" N	53° 06' 00" W
10	44° 18' 36" N	53° 24' 07" W
11	44° 49' 59" N	54° 30' 00" W
12	44° 29' 55" N	54° 30' 00" W
13	43° 26' 59" N	52° 55' 59" W
14	42° 48' 00" N	51° 41' 06" W
15	42° 33' 02" N	51° 00' 00" W

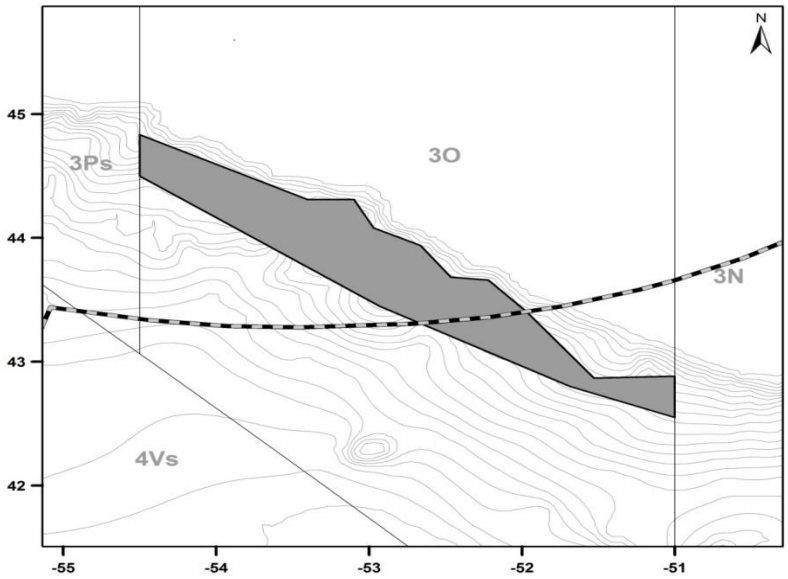


Figure 1. Polygon Delineating Area of 3O Coral Closure referred to in Article 2bis paragraph 5.

~~2. The measures referred to in Article 16 paragraph 1 shall be reviewed in 2012 by the Fisheries Commission, based on the advice from the Scientific Council, and a decision shall be taken on future management measures.~~

6. ~~3. As of January 1, 2010, and~~ Until December 31, ~~2011~~ 2014, no vessel shall engage in ~~The following areas shall be closed on an interim basis (until December 31, 2012) to all~~ bottom fishing activities ~~. The closed areas are~~ in the areas defined by connecting the following coordinates (as illustrated in Figure 2).

Area	Description	Point No.	Latitude	Longitude
1	Tail of the Bank	1.1	44º 02' 53.88" N	48º 49' 9.48" W
		1.2	44º 21' 31.32" N	48º 46' 48" W
		1.3	44º 21' 34.56" N	48º 50' 32.64" W
		1.4	44º 11' 48.12" N	48º 50' 32.64" W
		1.5	44º 02' 54.6" N	48º 52' 52.32" W
2	Flemish Pass/ Eastern Canyon	2.1	44º 50' 56.4" N	48º 43' 45.48" W
		2.2	46º 18' 54.72" N	46º 47' 51.72" W
		2.3	46º 25' 28.56" N	46º 47' 51.72" W
		2.4	46º 46' 32.16" N	46º 55' 14.52" W
		2.5	47º 03' 29.16" N	46º 40' 4.44" W
		2.6	47º 11' 47.04" N	46º 57' 38.16" W
		2.7	46º 40' 40.8" N	47º 03' 4.68" W
		2.8	46º 24' 24.12" N	46º 51' 23.04" W
		2.9	46º 07' 1.56" N	47º 30' 36.36" W
		2.10	45º 49' 6.24" N	47º 41' 17.88" W
		2.11	45º 19' 43.32" N	48º 29' 14.28" W
		2.12	44º 53' 47.4" N	48º 49' 32.52" W
3	Beothuk Knoll	3.1	45º 49' 10.2" N	46º 06' 2.52" W
		3.2	45º 59' 47.4" N	46º 06' 2.52" W
		3.3	45º 59' 47.4" N	46º 18' 8.28" W
		3.4	45º 49' 10.2" N	46º 18' 8.28" W
4	Eastern Flemish Cap	4.1	46º 48' 35.28" N	43º 20' 51.72" W
		4.2	47º 03' 58.68" N	43º 20' 51.72" W
		4.3	47º 03' 58.68" N	43º 34' 16.32" W
		4.4	46º 48' 35.28" N	43º 34' 16.32" W
5	Northeast Flemish Cap	5.1	47º 37' 42.24" N	43º 37' 29.64" W
		5.2	47º 58' 30.72" N	43º 44' 47.04" W

		5.3	48º 29' 52.44" N	44º 14' 42.72" W
		5.4	48º 27' 19.44" N	44º 21' 7.92" W
		5.5	47º 51' 14.4" N	43º 48' 35.64" W
		5.6	47º 35' 57.48" N	43º 43' 9.12" W
6	Sackville Spur	6.1	48º 18' 51.12" N	46º 37' 13.44" W
		6.2	48º 28' 51.24" N	46º 08' 33.72" W
		6.3	48º 49' 37.2" N	45º 27' 20.52" W
		6.4	48º 56' 30.12" N	45º 08' 59.99" W
		6.5	49º 00' 9.72" N	45º 12' 44.64" W
		6.6	48º 21' 12.24" N	46º 39' 11.16" W
7	Northern Flemish Cap	7.1	48º 20' 29.76" N	44º 54' 38.16" W
		7.2	48º 25' 2.28" N	44º 54' 38.16" W
		7.3	48º 25' 2.28" N	45º 17' 16.44" W
		7.4	48º 20' 29.76" N	45º 17' 16.44" W
8	Northern Flemish Cap	8.1	48º 35' 56.4" N	45º 05' 35.52" W
		8.2	48º 40' 9.84" N	45º 05' 35.52" W
		8.3	48º 40' 9.84" N	45º 11' 44.88" W
		8.4	48º 35' 56.4" N	45º 11' 44.88" W
9	Northern Flemish Cap	9.1	48º 34' 23.52" N	45º 26' 18.96" W
		9.2	48º 36' 55.08" N	45º 31' 15.96" W
		9.3	48º 30' 18.36" N	45º 39' 42.48" W
		9.4	48º 27' 30.6" N	45º 34' 40.44" W
10	Northwest Flemish Cap	10.1	47º 47' 17.16" N	46º 17' 27.96" W
		10.2	47º 58' 42.24" N	46º 06' 43.92" W
		10.3	48º 01' 6.6" N	46º 12' 3.96" W
		10.4	47º 49' 41.52" N	46º 22' 48" W
11	Northwest Flemish Cap	11.1	47º 25' 48" N	46º 21' 23.76" W
		11.2	47º 30' 1.44" N	46º 21' 23.76" W
		11.3	47º 30' 1.44" N	46º 27' 33.12" W
		11.4	47º 25' 48" N	46º 27' 33.12" W

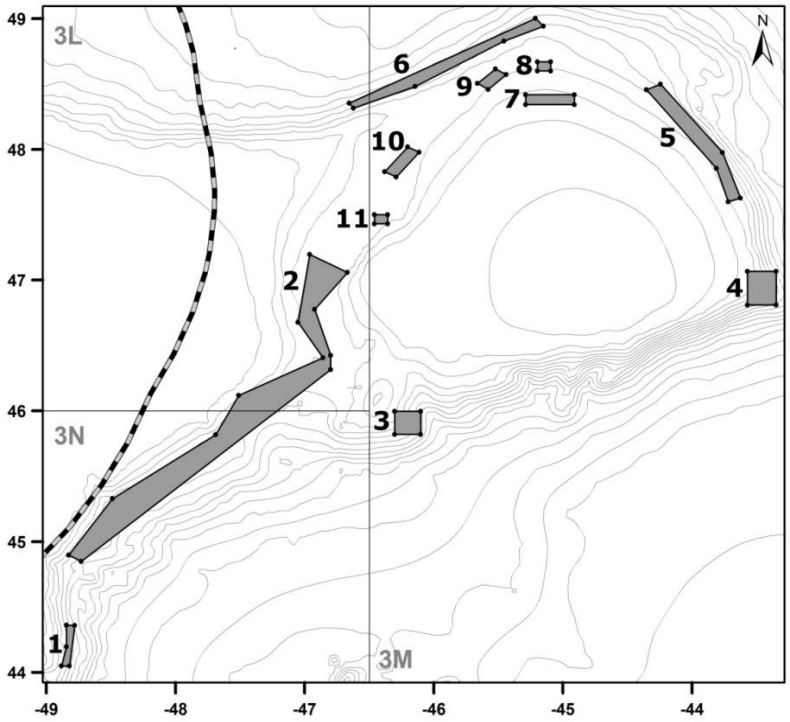


Figure 2. Polygons Delineating Areas of Higher Sponge and Coral Concentrations Referred to in Article 2bis paragraph 6.

7. ~~4.~~ The measures referred to in Article 2bis paragraph 6 shall be reviewed in 2014 by the Fisheries Commission, taking account of the advice from the Scientific Council and the Working Group of Fisheries Managers and Scientists, and a decision shall be taken on future management measures.

8. ~~5.~~ Contracting Parties shall establish/incorporate a coral and sponge monitoring program into government and/or industry research programs.

Article 3~~2~~bis - Map of existing bottom fishing areas (footprint)

The comprehensive map of existing bottom fishing areas ~~produced by the Executive Secretary~~ (as delineated by the coordinates shown in Table 1 and illustrated in Figure 3) ~~based on information submitted by Contracting Parties~~, shall be revised regularly to incorporate any new relevant information. Contracting Parties may, in the future, consider the possibility of refining the comprehensive map on the basis of haul by haul information, if available.

Table 1. Boundary points delineating the eastern side of the footprint in the NRA. The Canadian EEZ boundary delineates the western side of the footprint map (see Figure 3).

Point No.	Latitude	Longitude		Point No.	Latitude	Longitude
1	48°17'39"N	EEZ boundary[1]		26	46°26'32"N	46°58'53"W
2	48°16'51"N	47°25'37"W		27	46°27'40"N	47°12'01"W
3	48°19'15"N	46°53'48"W		28	46°04'15"N	47°09'10"W
4	48°29'21"N	46°21'17"W		29	46°04'53"N	47°31'01"W
5	48°32'43"N	46°08'04"W		30	45°48'17"N	47°37'16"W
6	48°48'10"N	45°37'59"W		31	45°33'14"N	47°52'41"W
7	48°59'54"N	45°17'46"W		32	45°27'14"N	48°10'15"W
8	49°02'20"N	44°53'17"W		33	45°16'17"N	48°26'50"W
9	48°56'46"N	44°33'18"W		34	44°54'01"N	48°43'58"W
10	48°33'53"N	44°10'25"W		35	44°33'10"N	48°50'25"W
11	48°08'29"N	43°57'28"W		36	44°09'57"N	48°48'49"W
12	47°42'00"N	43°36'44"W		37	43°50'44"N	48°52'49"W
13	47°12'44"N	43°28'36"W		38	43°34'34"N	48°50'12"W
14	46°57'14"N	43°26'15"W		39	43°23'13"N	49°03'57"W
15	46°46'02"N	43°45'27"W		40	43°03'48"N	48°55'23"W
16	46°38'10"N	44°03'37"W		41	42°54'42"N	49°14'26"W
17	46°27'43"N	44°20'38"W		42	42°48'18"N	49°32'51"W
18	46°24'41"N	44°36'01"W		43	42°39'49"N	49°58'46"W
19	46°19'28"N	45°16'34"W		44	42°37'54"N	50°28'04"W
20	46°08'16"N	45°33'27"W		45	42°40'57"N	50°53'36"W
21	46°07'13"N	45°57'44"W		46	42°51'48"N	51°10'09"W
22	46°15'06"N	46°14'21"W		47	42°45'59"N	51°31'58"W
23	45°54'33"N	46°24'03"W		48	42°51'06"N	51°41'50"W
24	45°59'36"N	46°45'33"W		49	43°03'56"N	51°48'21"W
25	46°09'58"N	46°58'53"W		50	43°22'12"N	EEZ boundary[2]

[1]approximately 47°47'45"W

[2]approximately 52°09'46"W

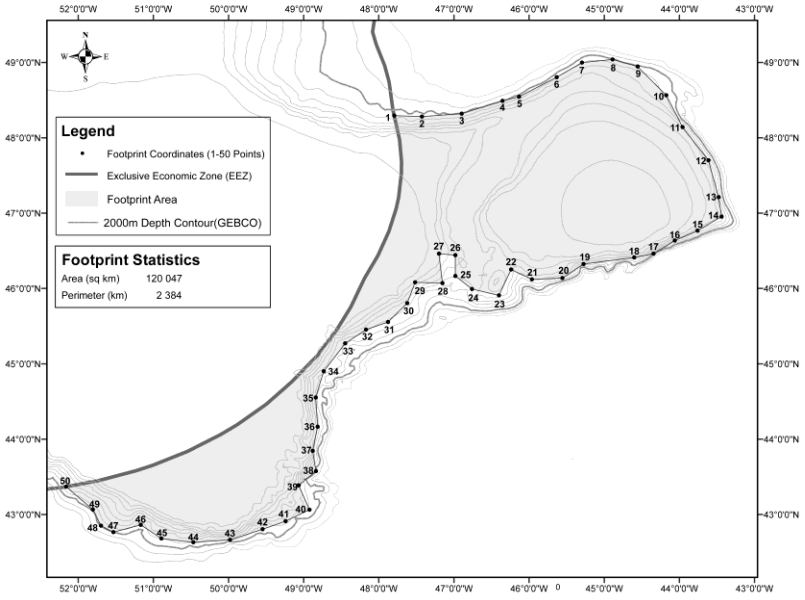


Figure 3. NAFO Regulatory Area footprint map (shaded).

Article 43bis - Bottom fishing activities in new fishing areas

1. ~~All bottom fishing activities in new fishing areas or with bottom gear not previously used in the area concerned, shall be considered as e~~ Exploratory fisheries ~~and~~ shall be conducted in accordance with the exploratory fisheries protocol set out in Parts I-IV of Annex XXV.

2.~~3.~~ Contracting Parties shall communicate a 'Notice of Intent to Undertake Exploratory Fishing' (Annex XXV, Parts I and IV)~~the exploratory fisheries protocol referred to in paragraph 1~~ to the Executive Secretary for forwarding to the Scientific Council for review and to all Contracting Parties for information, together with the ~~information or~~ preliminary impact assessment referred to in Article 5bis, paragraph 2 (i), below.

3.~~2.~~ The exploratory bottom fishing shall be subject to the assessment procedure set forth in Article 5bis, with the understanding that particular care will be taken in the evaluation of risks of the significant adverse impact on vulnerable marine ecosystems, in line with the precautionary approach.

4.~~5.~~ Prior to commencing new bottom fishing activities based upon the results of exploratory fisheries conducted in the prior two years, the Fisheries Commission shall review the assessments undertaken ~~in accordance with Article 5bis below~~ and the results of the fishing protocols implemented by the participating fleets~~, and shall:~~ and take decision in accordance with Article 5bis.~~:~~

~~i. establish conservation and management measures to prevent significant adverse impacts on vulnerable marine ecosystems from individual fishing activities and to ensure the long-term sustainability of deep-sea fish stocks, or~~

~~ii. not authorize these fishing activities to proceed.~~

5.~~6.~~ Contracting Parties shall ensure that vessels flying their flag conducting exploratory fisheries ~~are equipped with a satellite monitoring device and~~ have ~~an~~ a scientific observer on board.

6.~~4.~~ Contracting Parties shall provide promptly an 'Exploratory Fishing Trip Report' ~~report~~ of the results of such activities to the Executive Secretary for circulation to the Scientific Council and all Contracting Parties.

Article 54bis - Assessment of bottom fishing

1. The Scientific Council, with the co-operation of Contracting Parties, shall identify, on the basis of best available scientific information, vulnerable marine ecosystems in the Regulatory Area and map sites where these vulnerable marine ecosystem are known to occur or likely to occur and provide such data and information to the Executive Secretary for circulation to all Contracting Parties.

2. Assessment for proposed bottom fishing activities in the Regulatory Area shall follow the procedures below:

   i. If proposed bottom fishing activities is outside of the existing bottom fishing area (footprint) ~~identified by the Fisheries Commission~~, or if there are significant changes to the conduct or technology of existing bottom fisheries within the footprint, or new scientific information indicating a VME in a given area, the Contracting Party proposing to participate in bottom fishing shall submit to the Executive Secretary information and a preliminary assessment of the known and anticipated impacts of its bottom fishing activities on vulnerable marine ecosystems no less than two weeks in advance of the opening of the ~~annual meeting in~~ June meeting of the Scientific Council. Assessments should address the elements as set forth in Part V of Annex XXV. The Executive Secretary shall promptly forward these submissions to the Scientific Council and the Fisheries Commission.

   ii. The submission of such information shall be carried out in accordance with guidance developed by the Scientific Council, or, in the absence of such guidance, to the best of the Contracting Party's ability.

   iii. The Scientific Council shall undertake an assessment, according to procedures and standards it develops, and provide advice to the Fisheries Commission as to whether the proposed bottom fishing activity would have significant adverse impacts on vulnerable marine ecosystems and, if so, whether mitigation measures would prevent such impacts. The Scientific Council may use in its assessment additional information available to it, including information from other fisheries in the region or similar fisheries elsewhere.

3. The Working Group of Fishery Managers and Scientists on VMEs shall examine the advice of the Scientific Council and shall make recommendations to the Fisheries Commission in accordance with its mandate.

4. The Fisheries Commission shall, taking account of advice and recommendations provided by the Scientific Council and the ~~w~~Working Gg~~g~~roup of Fishery M~~m~~anagers and S~~s~~cientists, concerning bottom fishing activities, including data and information arising from reports pursuant to Article 6bis adopt conservation and management measures to prevent significant adverse impacts on vulnerable marine ecosystems. These ~~that~~ may include:

   i. ~~(a)~~ allowing, prohibiting or restricting bottom fishing activities;

   ii.~~(b)~~requiring specific mitigation measures for bottom fishing activities;

   iii.~~(c)~~allowing, prohibiting or restricting bottom fishing with certain gear types, or changes in gear design and/or deployment; and/or

   iv.~~(d)~~any other relevant requirements or restrictions to prevent significant adverse impacts to vulnerable marine ecosystems.

5. Fisheries Commission will periodically ask Scientific Council and the Working Group of Fishery Managers and Scientists on VMEs ~~working group of managers and scientists on vulnerable marine ecosystems~~ to provide advice to Fisheries Commission on the timing and requirement for assessment of a previously assessed bottom fishery.

Article 6~~5~~bis – Interim Encounter Provision

~~Definition of an Encounter – is an encounter, above threshold levels as set out in paragraph 3, with indicator species of coral identified as antipatharians, gorgonians, cerianthid anemone fields, lophelia, and sea pen fields or other VME elements. Any encounter with a VME indicator species or merely detecting the presence of an element itself is not sufficient to identify a VME. That identification should be made on a case-by-case basis through assessment by relevant bodies.~~

Contracting Parties shall require that vessels flying their flag and conducting bottom fishing activities within the Regulatory Area abide by the following rules, where, in the course of fishing operations, evidence of vulnerable marine ecosystems is encountered:

1. Existing fishing areas

   i. ~~a)~~ Vessels shall quantify catch of VME indicator species~~, i.e. coral and sponge~~.

   ii. ~~b)~~ if the quantity of VME ~~elements or~~ indicator species caught in a fishing operation (such as trawl tow or set of a gillnet or longline) is beyond the threshold defined in paragraph 3 below, the following shall apply:

   - The vessel master shall report the incident to the flag State Contracting Party, which without delay shall forward the information to the Executive Secretary, including the position that is provided by the vessel, either the end point of the tow or set or another position that is closest to the exact encounter location, the VME indicator species encountered, and the quantity (kg) of VME indicator species encountered. Contracting Parties may if they so wish require their vessels to also report the incident directly to the Executive Secretary. The Executive Secretary shall archive the information and report it to all Contracting Parties. The Contracting Parties shall immediately alert all fishing vessels flying their flag.

- The vessel master shall cease fishing and move away at least 2 nautical miles from the endpoint of the tow/set in the direction least likely to result in further encounters. The captain shall use his best judgment based on all available sources of information.

- The Executive Secretary shall make an annual report on single and multiple encounters in discrete areas within existing fishing areas to the Scientific Council. The Scientific Council shall evaluate and, on a case-by-case basis the information and provide advice to the Fisheries Commission on whether a VME exists. The advice shall be based on annually updated assessments of the accumulated information on encounters and the Scientific Council's advice on the need for action, using FAO guidelines as a basis. The Fisheries Commission shall consider the advice in accordance with Article 5bis, paragraph 4.

2. Unfished areas that are defined as 'New bottom fishing areas'

i. ~~a)~~ Vessels shall quantify catch of VME indicator species~~, i.e. coral and sponge~~. Observers deployed shall identify corals, sponges and other organisms to the lowest possible taxonomical level. The sampling protocol found in Annex XXV shall be used (templates).

ii ~~b)~~ If the quantity of VME ~~element or~~ indicator species caught in a fishing operation (such as trawl tow or set of a gillnet or longline) is beyond the threshold defined in paragraph 3 below, the following shall apply:

- The vessel master shall report the incident without delay to its flag state Contracting Party, which shall forward the information to the Executive Secretary, including the position that is provided by the vessel, either the end point of the tow or set or another position that is closest to the exact encounter location, the VME indicator species encountered, and the quantity (kg) of VME indicator species encountered. Contracting Parties may if they so wish require their vessels to also report the incident directly to the Executive Secretary. The Executive Secretary shall archive the information and without delay transmit it to all Contracting Parties. The Contracting Parties shall issue an immediate alert to all vessels flying their flag.

- The vessel shall cease fishing and move away at least 2 nautical miles from the endpoint of the tow/set in the direction least likely to result in further encounters. The captain shall use his best judgment based on all available sources of information.

- The Executive Secretary shall at the same time request Contracting Parties to implement a temporary closure of a two mile radius around the reporting position. The reporting position is that provided by the vessel, either the endpoint of the tow/set or another position that the evidence suggests is closest to the exact encounter location.

- The Executive Secretary shall make an annual report on single and multiple encounters in discrete areas within existing fishing areas to the Scientific Council This report should also include reports from the exploratory fishing activities conducted in the last year. The Scientific Council at its next meeting shall examine the temporary closure. If the Scientific Council advises that the area consists of a vulnerable marine ecosystem the Executive Secretary shall request Contracting Parties to maintain the temporary closure until such time that the Fisheries Commission has adopted conservation and management measures ~~acted upon the advice from the Scientific Council~~ in accordance with Article 5bis, paragraph 4 in Chapter Ibis. If the Scientific Council does not conclude that the proposed area is a VME, the Executive Secretary shall inform Contracting Parties which may re-open the area to their vessels.

~~- The vessel shall cease fishing and move away at least 2 nautical miles from the endpoint of the tow/set in the direction least likely to result in further encounters. The captain shall use his best judgment based on all available sources of information.~~

- The Executive Secretary shall make an annual report on archived reports from encounters in *new fishing areas* to the Scientific Council. This report shall also include reports from the exploratory fishing activities that were conducted in the last year. The Scientific Council shall evaluate the information and provide advice to the Fisheries Commission on the appropriateness of temporary closures and other measures. The advice should be based on annually updated assessments of the accumulated information on encounters as well as other scientific information. The Scientific Council's advice should reflect provisions outlined in the FAO guidelines. The Fisheries Commission shall consider the advice in accordance with Article 5bis, paragraph 4.

3. For both existing and new fishing areas, an encounter with primary VME indicator species is defined as a catch per set (e.g. trawl tow, longline set, or gillnet set) of more than 60 kg of live coral and/or 800 kg of live sponge. These thresholds are set on a provisional basis and may be adjusted as experience is gained in the application of this measure.

Article 7bis - Review

The provisions of this chapter shall be reviewed by the Fisheries Commission at its Annual Meeting in 2014 ~~2011. The Commission shall biannually thereafter examine the effectiveness of these provisions in protecting vulnerable marine ecosystems from significant adverse impacts.~~

[Annex I (to Chapter Ibis). Excerpts from the FAO International Guidelines for the Management of Deep-Sea Fisheries in the High Seas]

[Significant adverse impacts

17. Significant adverse impacts are those that compromise ecosystem integrity (i.e. ecosystem structure or function) in a manner that: (i) impairs the ability of affected populations to replace themselves; (ii) degrades the long-term natural productivity of habitats; or (iii) causes, on more than a temporary basis, significant loss of species richness, habitat or community types. Impacts should be evaluated individually, in combination and cumulatively.

18. When determining the scale and significance of an impact, the following six factors should be considered:

i. the intensity or severity of the impact at the specific site being affected;

ii. the spatial extent of the impact relative to the availability of the habitat type affected;

iii. the sensitivity/vulnerability of the ecosystem to the impact;

iv. the ability of an ecosystem to recover from harm, and the rate of such recovery;

v. the extent to which ecosystem functions may be altered by the impact; and

vi. the timing and duration of the impact relative to the period in which a species needs the habitat during one or more of its life- history stages.

19. allow the particular ecosystem to recover over an acceptable time frame. Such time frames should be decided on a case-by-case basis and should be in the order of 5-20 years, taking into account the specific features of the populations and ecosystems.

20. In determining whether an impact is temporary, both the duration and the frequency at which an impact is repeated should be considered. If the interval between the expected disturbance of a habitat is shorter than the recovery time, the impact should be considered more than temporary. In circumstances of limited information, States and RFMO/As should apply the precautionary approach in their determinations regarding the nature and duration of impacts.

Identifying vulnerable marine ecosystems and assessing significant adverse impacts

42. A marine ecosystem should be classified as vulnerable based on the characteristics that it possesses. The following list of characteristics should be used as criteria in the identification of VMEs.

i. Uniqueness or rarity – an area or ecosystem that is unique or that contains rare species whose loss could not be compensated for by similar areas or ecosystems. These include:

ii. Functional significance of the habitat – discrete areas or habitats that are necessary for the survival, function, spawning/reproduction or recovery of fish stocks, particular life-

history stages (e.g. nursery grounds or rearing areas), or of rare, threatened or endangered marine species.

iii. Fragility – an ecosystem that is highly susceptible to degradation by anthropogenic activities.

iv. Life-history traits of component species that make recovery difficult – ecosystems that are characterized by populations or assemblages of species with one or more of the following characteristics:

v. Structural complexity – an ecosystem that is characterized by complex physical structures created by significant concentrations of biotic and abiotic features. In these ecosystems, ecological processes are usually highly dependent on these structured systems. Further, such ecosystems often have high diversity, which is dependent on the structuring organisms.

Examples of potentially vulnerable species groups, communities and habitats, as well as features that potentially support them are contained in Annex 1A.

43. These criteria should be adapted and additional criteria should be developed as experience and knowledge accumulate, or to address particular local or regional needs.

Annex 1A (in reference to paragraph 42 of the FAO International Guidelines for the Management of Deep-Sea Fisheries in the High Seas). Examples of potentially vulnerable species groups, communities and habitats, as well as features that potentially support them

The following examples of species groups, communities, habitats and features often display characteristics consistent with possible VMEs. Merely detecting the presence of an element itself it not sufficient to identify a VME. That identification should be made on a case-by-case basis through application of relevant provisions of these Guidelines, particularly Sections 3.2 and 5.2,

Examples of species groups, communities and habitat forming species that are documented or considered sensitive and potentially vulnerable to DSFs in the high seas, and which may contribute to forming VMEs:

i. certain coldwater corals and hydroids, e.g. reef builders and coral forest including: stony corals (Scleractinia), alcyonaceans and gorgonians (Octocorallia), black corals (Antipatharia) and hydrocorals (Stylasteridae);

ii. some types of sponge dominated communities;

iii. communities composed of dense emergent fauna where large sessile protozoans (xenophyophores) and invertebrates (e.g. hydroids and bryozoans) form an important structural component of habitat; and

iv. seep and vent communities comprised of invertebrate and microbial species found nowhere else (i.e. endemic)

Examples of topographical, hydrophysical or geological features, including fragile geological structures, that potentially support the species groups or communities, referred to above:

i. submerged edges and slopes (e.g. corals and sponges);

ii. summits and flanks of seamounts, guyots, banks, knolls, and hills (e.g. corals, sponges, xenophyphores);

iii. canyons and trenches (e.g. burrowed clay outcrops, corals);

iv. hydrothermal vents (e.g. microbial communities and endemic invertebrates); and

v. cold seeps (e.g. mud volcanoes for microbes, hard substrates for sessile invertebrates).]