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Northwest Atlantic Fisheries Organization

Report of the Ad Hoc Working Group of Fishery Managers and Scientists on Vulnerable Marine Ecosystems (WGFMS)
8 – 12 September 2008
Montreal, Canada

NAFO
Dartmouth, N.S., Canada
2008

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1. Opening

The Executive Secretary opened the meeting at 9:30 a.m. on Monday, September 8, 2008 and welcomed delegates to Montreal (Annex 1).

2. Election of Chair and Vice-Chair

Bill Brodie (Canada) was elected by the delegates as Chair of the working group and he subsequently chaired the meeting. No vice-chair was elected at this time.

3. Appointment of Rapporteur

Ricardo Federizon (NAFO Secretariat) was appointed as the rapporteur.

4. Adoption of Agenda

The agenda previously circulated was adopted (Annex 2) with minor modification. Under item 8, "Other Matters" became "Recommendations and Observations". As the Chair pointed out, the Scientific Council (SC) had addressed the Vulnerable Marine Ecosystem (VME) Data Collection Protocol of the Fisheries Commission (FC) request for advice and referred the matter to this FC Working Group. It was agreed to include this topic for discussion under agenda item 7.

5. Risk Evaluation and Recommendations on Mitigation Strategies and Measures to Avoid Significant Adverse Impacts on Vulnerable Marine Ecosystems, drawing on Relevant International Information

Deliberation on this item began with the presentation by the SC Chair on the SC response to the FC request for scientific advice on the protection of vulnerable marine ecosystems (VMEs) made in September 2007 and in May 2008 (items 10 of FC Doc 07/21 and FC Doc 08/2). The SC Chair referred to the SC June Meeting report (pp. 30-42 of the SCS Doc 08/19) as well as the SC Working Group on Ecosystem Approach to Fisheries Management (WGEAFM) which met in May 2008 (SCS Doc 08/10). Details of the SC response are contained in these documents.

Drawing on the criteria given by FAO International Guidelines for the Management of Deep-Sea Fisheries in the High Seas (hereafter referred to as FAO guidelines) on the identification of VMEs, as well as the best scientific data available (e.g. observer data, research surveys), the SC identified eight areas within the NAFO Regulatory Area (NRA) as potential candidates for VMEs. The SC Chair noted that the VME boundaries identified so far are preliminary, based on broad-scale distribution information, and that high resolution habitat mapping would be required to identify VMEs boundaries with greater certainty. The SC Chair also clarified that the Scientific Council did not recommend closures for the candidate VMEs but that it left open what type of mitigation measures might be appropriate for VMEs within each of these areas.

The Working Group recommends that focus be placed first on adding precision to the current body of scientific information and mapping related to corals and seamounts and secondly, on

information and mapping related to the sponges. The group recognized the need for capacity building and education of the fishing industry with respect to the identification of vulnerable species, especially corals. In this context, delegates were informed that a coral identification guide was in the process of being finalized (probably within the next 4 months).

Canada presented an update on the FAO guidelines that were finalized in substance in August 2008.

Canada introduced a discussion paper on risk assessment and mitigation measures to avoid significant adverse impacts on VMEs (FCWGWP 08/6 Revision 2). This paper adopts ideas from the FAO guidelines and describes a three-tiered assessment process as an initial approach based on existing information on fish species and habitat-forming species. The outcome of such a process functionally assigns impacts to one of three categories of low, moderate and high likelihood of impact, leading to the development of appropriate mitigation measures.

In the deliberation of this paper, it was realized that there is a lack of clarity as to the mandate of this working group in the development of risk assessment process and mitigation measures. Some delegates indicated that they did not have the authority to support adoption on behalf of their Contracting Parties.

It was **decided** that the FCWGWP 08/6 Revision 2 be forwarded to the Fisheries Commission with a note that further clarification is sought (Annex 3).

Another paper was introduced by Canada on preliminary risk evaluation on the candidate VMEs identified by the SC in its June 2008 Meeting (FCWGWP 08/7 Revision 1, Annex 4). This conceptual paper spurred some debate as to whether actual evaluation can actually be done considering the time constraints and the available scientific information on some of the candidate VMEs. Canada clarified that the purpose of this paper is to facilitate the prioritization of the VMEs for further assessment. As discussed above, the priority VMEs are those that involve corals and seamounts. It is recognized that starting the process of the risk evaluation is a fulfillment of the United Nations General Assembly (UNGA) Resolution and that this is a continuing work. Thus, any protocol and measures developed this year are considered preliminary and subject to refinement as more experience and scientific knowledge are gained.

6. Operational Procedures in 2008 in relation to Encounters of Vulnerable Marine Ecosystems

Initial discussions noted the need for improvement of ecosystem-related scientific data collections and the high costs that are associated with this. It was pointed out that the recent multi-disciplinary EU survey of the Hatton Bank was described as exemplary for an ecosystem-related research endeavour (see SCS Doc 08/19). It was also recognized that more experts on marine ecosystems should be included in the scientific delegations and that some Contracting Parties were in process of doing so. The EU suggested that the NAFO observer program be modified with a more scientific focus that would allow collection of data that are relevant to ecosystems. Russia presented information that its NAFO observers undergo training in collecting and processing biological data.

Regarding VME encounter protocols, Denmark (in respect of the Faroe Islands and Greenland) proposed to consider the current NAFO by-catch provision involving “move-away” as a starting point. It was also suggested to examine existing VME encounter protocols such as the one developed by the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR). The USA explained that in a study published by International Union for Conservation of Nature (IUCN), encounter protocols specified various thresholds for coral catches in a haul, and this has been applied by one country in the Pacific. The USA also stressed

that moving away upon encounter with a vulnerable ecosystem would be a mandatory requirement following both the current NAFO regulations (new Chapter I bis of Conservation and Enforcement Measures) as well as the FAO guidelines.

Norway pointed out that three different types of fishing areas could be defined, each of which would require a different protocol: (1) existing fishing areas, (2) new fishing areas, and (3) closed areas. Protocols were developed for existing and new fishing areas (FCWGWP 08/4 Revision 3), noting that requirements for new fishing areas are more stringent.

It is recognized that in the development of an encounter protocol, a "threshhold" has to be established, e.g. a certain quantity of indicator species caught, and an "encounter" has to be defined.

With the consideration of the comments and concerns mentioned above, USA presented a draft proposal concerning VME encounters as a possible replacement of Article 5 of Chapter I-bis (FCWGWP 08/13). Further discussion is required to establish quantitative thresholds, and to refine the definition of encounter.

It was **agreed** that the (FCWGWP 08/4 Revision 3, Annex 5) be forwarded to the Fisheries Commission as a recommendation for adoption.

7. Review and Finalization of Exploratory Fishery Protocol for New Fishing Areas and the Development of Templates for Elements of the Protocol

The Working Group reviewed the Exploratory Fishery Protocol and developed templates for Harvesting Plan, Catch Monitoring Plan and Data Collection Plan as contained in FCWGWP 08/10-12 Revision 3 (Annex 6). This protocol is **forwarded** to the Fisheries Commission with the recommendation for adoption. It is noted that the templates address the VME Data Collection Protocol mentioned in item 4.

8. Recommendations and Observations

Recommendations by Ad Hoc Working Group of Fishery Managers and Scientists on Vulnerable Marine Ecosystems

1. The WG notes the extensive work of the Scientific Council at its 2008 meetings but also notes that additional precision related to the mapping of candidate VME is required in order to develop specific recommendations on vulnerable marine ecosystems. The WG recommends that focus be placed first on adding precision to the current body of scientific information and mapping related to corals and Seamounts and, secondly, on information and mapping related to sponges. In this regard, the WG recommends Fisheries Commission seek the following information from Scientific Council with a view to completing fishery impact assessments at the earliest possible date:

    - Provide, as soon as possible in 2008, delineations, if any, of significant concentrations of corals in the Regulatory Area by species for the identification of VMEs. This should include the size and catch characteristics of corals obtained respectively from commercial fishing vessels and fisheries research vessels and the assessment of significant adverse impacts, with a particular focus on those species which involve interactions with commercial fisheries. The data should include absence/presence of corals as well as density.

- Provide, by June 30, 2009, delineations, if any, of significant concentrations of sponges in the Regulatory Area by species, including the size and catch characteristics of sponges obtained respectively from commercial fishing vessels and fisheries research vessels, with a particular focus on those species which involve interactions with commercial fisheries. The data should include absence/presence of sponges as well as density.

- With respect to corals and sponges noted above in canyons, provide detailed information as soon as practicable or at least a report on progress by June 30, 2009, with a particular focus on those species which involve interactions with commercial fisheries.

2. Given the earlier Fisheries Commission decision to protect Seamounts and drawing attention to the Scientific Council report that identifies the existence of additional Seamounts (i.e. Fogo Seamounts), the WG recommends the extension of the current Seamount measures to these new Seamounts and the amendment of Article 14 of the NAFO Conservation and Enforcement Measures accordingly.

3. Given the terms of reference for the Ad Hoc Working Group and the role of Scientific Council related to Vulnerable Marine Ecosystems, the WG recommends that Fisheries Commission provide guidance related to an approach to risk assessment/mitigation measures to avoid significant adverse impacts on VME. And, in particular, the WG draws attention to a Canadian proposal that outlines a possible risk assessment process (FCWGWP 08/06 (Revision 2) that is available for further discussion. The WG also recommends that, depending on the outcome of Fisheries Commission deliberation on this subject, a coordinated schedule or work program should be developed to guide the work of Scientific Council and the Ad Hoc Working Group of Fishery Managers and Scientists on Vulnerable Marine Ecosystems.

4. To provide for coordinated, planned, and precautionary fisheries in new fishing areas conducted beyond the existing NAFO footprint, the WG recommends the adoption of the Exploratory Fishery Protocol and templates in FCWGWP 08/10-12 – Revision 3.

5. The WG concluded that, in general, the probability of significant adverse impact on vulnerable marine ecosystems is higher in new fishing areas rather than in existing fishing areas. Given this, the WG has produced an interim Encounter Provisions for Deep Sea Vulnerable Marine Ecosystems (FCWGWP 08/4 Revision 3) that outlines an encounter protocol for new fishing areas and existing fishing area for the consideration of Fisheries Commission. Additional discussion is required on several issues including the threshold weights for encounters, inclusion of sponges for 2009, and additional clarity on process.

Observations by Ad Hoc Working Group of Fishery Managers and Scientists on Vulnerable Marine Ecosystems

1. Based on information presented, the Working Group observes that high concentrations of corals were found by survey trawls in a few localized areas in the Regulatory Area within 4 of candidate VME areas identified by Scientific Council. And, based on a preliminary information presented related to catch of coral by commercial vessels in areas currently fished, the Working Group observes that there appears to be little interaction between species of corals and fishing activity in the Regulatory Area. This may reflect decades of sustained fishing.

2. With respect to the South East Shoal relative to capelin spawning during June/July, marine mammal feeding grounds and bivalve populations, the Working Group observes that there is not a high risk of significant adverse impact on the capelin spawning grounds. It was noted that there is no directed capelin fishery, seasonal and low fishing levels generally exist from the yellowtail and skate fisheries, the Canadian fishery for yellowtail has a closure during the summer season, and there is minimal interaction with cetacean populations. In addition, the habitat comprises a sandy, gravel bottom, with limited or no presence of coral or sponge concentrations, and limited bottom perturbation associated with the capelin spawning period.

3. Participants in the Working Group re-affirmed their strong commitment to implement the internationally agreed standards to protect VME from significant adverse impact, as identified under UNGA 61/105 and FAO guidelines. The WG understands that this will be an ongoing process and that the work in 2008 represents what can be done with the information and resources available. This work will continue beyond 2008 as information and experience expands.

9. Adoption of report

The report was adopted by the Working Group immediately before adjournment.

10. Adjournment

The Chair thanked the participants from all Contracting Parties for their hard work over the course of the meeting, the SC Chair for his presentation and contributions, and the NAFO Secretariat for their usual excellent support at the meeting, including the work done by the Rapporteur. EU thanked the Chair for his work in chairing the session.

The meeting was adjourned at 11:00 a.m. on September 12, 2008.

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Annex 2. Agenda

1. Opening of the Meeting
2. Election of Chair and Vice-Chair
3. Appointment of Rapporteur
4. Adoption of Agenda
5. In examining the advice of Scientific Council to Fisheries Commission, evaluate risk and make recommendations on mitigation strategies and measures to avoid significant adverse impacts on vulnerable marine ecosystems, drawing on relevant international information[1]
6. Develop operational procedures in 2008 in relation to encounters of vulnerable marine ecosystems to prevent significant adverse impacts
7. Review and finalize attached Exploratory Fishery Protocol for new fishing areas including the development of templates for elements of the protocol for adoption by the Fisheries Commission in 2008
8. Recommendations and Observations
9. Adoption of Report
10. Adjournment

[1] Including but not limited to the pending FAO International Guidelines for the Management of Deep-Sea Fisheries in the High Seas

Annex 3. Risk Assessment/Mitigation Measures to avoid Significant Adverse Impacts on VME
(FCWGWP 08/6 – Revision 2)

General

UN Resolutions and FAO work outline requirements/processes for fishery assessments to determine the impact/risk that these fisheries may pose to vulnerable marine ecosystems.
Although all fisheries must be assessed, not all assessments have to be of the same intensity and detail. It may be possible to consider different levels of sophistication for assessment processes. A preliminary assessment of all available information conducted by NAFO can be used to help identify higher priority fisheries that may require further assessment, and lower priority fisheries that are less likely to require quantitative risk assessments.

The outcome of risk assessment processes functionally assigns impacts to one of three categories:
- Low - Likelihood of impact low, or impact likely to be ecologically non-serious.
- Moderate - Likelihood of serious impact not necessarily low, but mitigation measures available to manage the risks to keep them acceptable.
- High - Likelihood of serious impact not low and requirement for higher level mitigation.

Such a system would ensure compliance with all pertinent resolutions, explicitly showing due diligence in keeping the impacts of fishing sustainable and managing workload appropriately. This system, if adopted, should be applied consistently in all fisheries.

Once a fishery has been assessed, the assessment may be revisited periodically, but not annually. It should be revisited when there are major changes in the fishery, such that its impacts might have changed or major changes to an ecosystem such that vulnerability to fishing has developed.

Ecological Benchmarks for Evaluating Impacts

The decision to allow fishing to occur is based implicitly on the understanding that Contracting Parties are not expected to maintain the ecosystem in a pristine condition. Rather, Contracting Parties are expected to ensure that impacts are sustainable.
- Sustainability with regard to productivity of systems is associated with ability to recover from perturbations on biologically appropriate time schedules (life histories).
- Sustainability with regard to biological diversity is associated with keeping the risk of local extirpation of any species/population very low.
- Sustainability with regard to ecosystem resilience is associated with not reducing the connectivity among species in the ecosystem.
- Sustainability with regard to habitat is expressed through Productivity, Diversity and Resilience. Habitat is not being managed to maintain any particular configuration of rocks and benthos – it is managed to ensure it remains productive for native species, and so all the species can find adequate amounts of necessary habitat requirements.

Primary impacts of fishing on target and by-catch species will be assessed through assessing sustainability of *direct mortality* on the species. Indirect effects of fishing (effects mediated through altering abundance of a species' food supply or predation pressure) would only be assessed if a species was known to be vital prey species or a "controlling" predator.

Primary impacts of fishing on marine habitats will the assessed through evaluating the impacts of fishing on the *function* of the habitat, and not just its physical parameters. Documenting that an alteration of a habitat feature(s) is likely to occur is not synonymous with serious adverse impacts. Alterations must have noteworthy ecological consequences to represent serious adverse impacts.

Notwithstanding the point that the management objective for fisheries impacts is *not to* maintain pristine conditions, Fisheries Commission can choose to set aside parts of marine ecosystems for that purpose.

Implementation Issues Relative to Benchmarks

If an area is identified as unique, under VME criteria, the management challenge is to ensure that authorized fisheries will pose a low risk of altering the features that make it unique or that the alteration will not persist for more than very short periods of time.

If an area identified under any other VME criteria, then acceptable impacts relate to time to recovery from a fishery impact. For populations, recovery requires that there be a source to repopulate the area where the mortality occurred. If a source is available, recovery will be rapid and secure.

For habitat features that are the VME rationale for an area, re-colonization is only an option for those parts of habitat that are biological and mature in ~3-20 years (i.e. not coral). For biotic structural habitat features and very long lived biotic features, rapid and secure recovery does not apply.

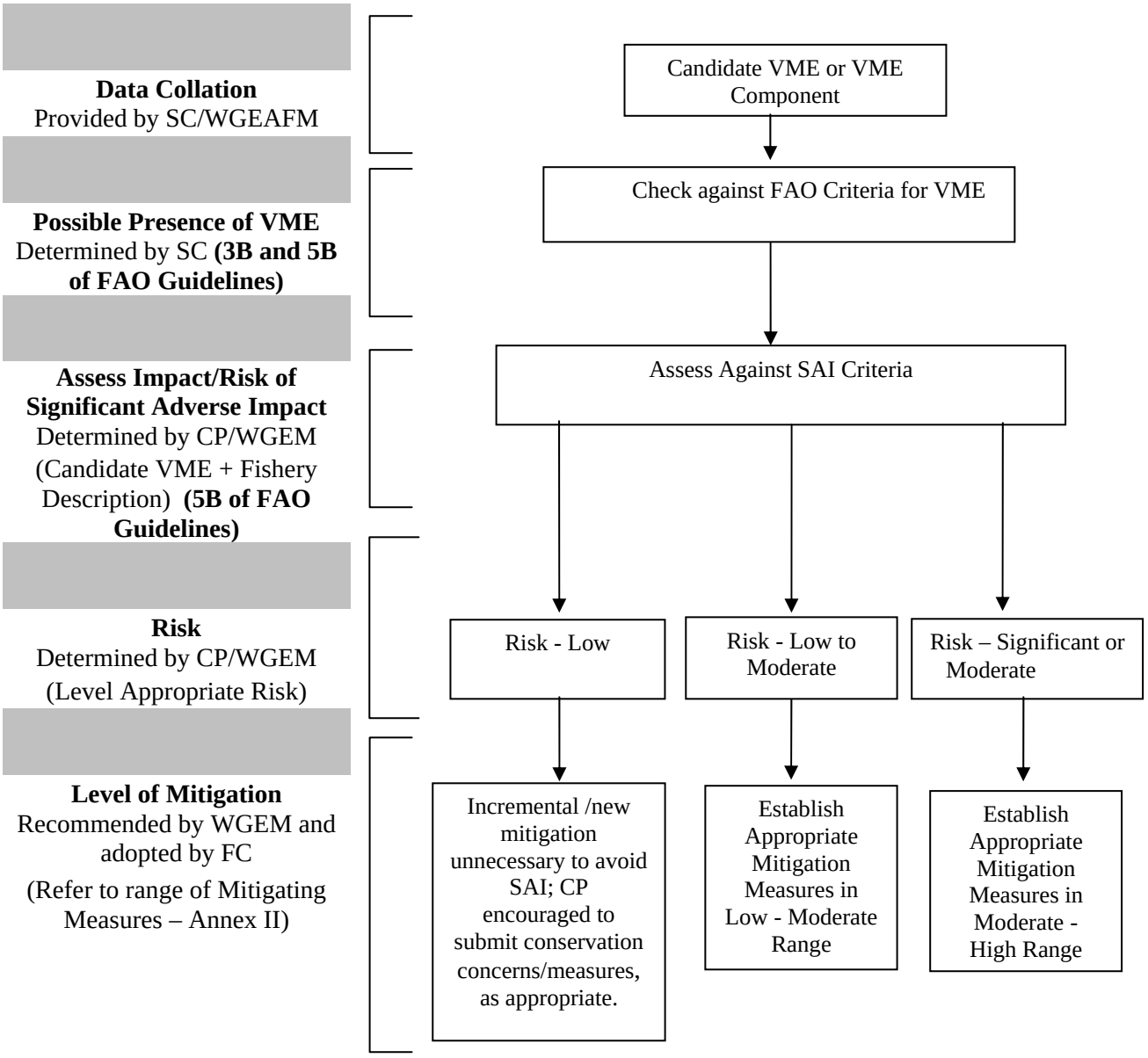
If the structural habitat feature is large/spread widely *and* has several species closely associated with the feature for some or all parts of their life histories, then it may be appropriate to conclude the habitat has functional significance to those species and substantial efforts should be made to mitigate alterations. Risk aversion increases as the association with a particular life history increases particularly if there is evidence that the habitat feature is saturated with the species and alteration of the habitat could decrease productivity of dependent species.

The history of fishing in an area can be relevant to the risk assessment. If an area has a history of fishing for decades, and over that period fishing recurred "often" relative to recovery times of the longer-lived species, then a preliminary risk assessment on available data may conclude that the community being impacted has adapted to regular fishing disturbance.

Concluding that an area meets one or more VME criteria does *not* equate to a conclusion that the area should close to fishing operations. It merely means that the area needs to be managed with risk aversion relative to the features that made it a VME. The best tools for delivering such risk aversion will vary widely with ecological features, the type of fishing, and the history of an area.

Ultimately, as noted in FAO guidelines, assessments can only occur on a case by case basis. The immediate focus of the WGEM should be on VME areas/component areas of highest risk.

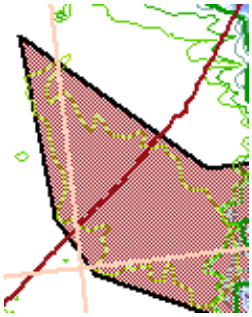
Sustainable Use Risk Assessment Template for Commercial Fisheries in the NAFO Regulatory Area (Illustrative only)



Sample Application

Candidate VME:

Southeast Shoal (VME 6) without adjacent shelf slope/canyons



Data Collation:

Completed by SC/WGEAFM – 2008

Presence/Description of VME: (Rationale)

Unique spawning grounds for capelin, marine mammal feeding grounds, bivalve populations. Vulnerable fish species: spawning capelin.

Risk of Significant Adverse Impact: (Description of Fishery/Impacts)

Fish - Capelin Spawning Area - June/July

- No directed capelin fishery
- Seasonal and low fishing levels generally from yellowtail and skate fisheries.
- Canadian yellowtail seasonal closure for 6 weeks during summer season

Marine Mammal Feeding Grounds

- Minimal interaction with cetacean populations

Bivalve population (mussels/softshell clam)

- Minimal interaction unless reef-forming; no evidence of reef formation

Habitat - Sandy, gravel bottom

- Limited or no presence of coral or sponge concentrations
- Limited bottom perturbation associated with capelin spawning period

Conclusion (SAI on VME):

Low Risk

Level of Mitigation:

Existing mitigation appropriate, no additional measures required

Annex 3.1 - FAO Guidelines

Determination of Candidate VME

3.B Vulnerable Marine Ecosystems

14. Vulnerability is related to the likelihood that a population, community, or habitat will experience substantial alteration from short-term or chronic disturbance, and the likelihood that it would recover and in what time frame. These are, in turn, related to the characteristics of the ecosystems themselves, especially biological and structural aspects. VME features may be physically or functionally fragile. The most vulnerable ecosystems are those that are both easily disturbed and very slow to recover, or may never recover.
15. The vulnerabilities of populations, communities and habitats must be assessed relative to specific threats. Some features, particularly ones that are physically fragile or inherently rare, may be vulnerable to most forms of disturbance, but the vulnerability of some populations, communities and habitats, may vary greatly depending on the type of fishing gear used or the kind of disturbance experienced.
16. The **risks** to a marine ecosystem are determined by its vulnerability, the probability of a threat occurring and the mitigation means applied to the threat.

5.B Identifying Vulnerable Marine Ecosystems

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. These include:
- habitats that contain endemic species;
- habitats of rare, threatened or endangered species that occur only in discrete areas; or
- nurseries or discrete feeding, breeding, or spawning areas.

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:
- slow growth rates;
- late age of maturity;
- low or unpredictable recruitment; or
- long-lived.

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 1.

Annex 1 - 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 is 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.A and 5.B.

Examples of species groups, communities and habitat forming species that are documented or considered sensitive and potentially vulnerable to deep-sea fisheries in the high-seas, and which many contribute to forming VMEs:

i. certain coldwater corals 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, hydro-physical 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).

Assessing Significant Adverse Impact

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.
44. States and RFMO/As, and as appropriate FAO, should assemble and analyse relevant information on areas under the competence of such RFMO/As or where vessels under the jurisdiction of such States are engaged in DSFs or where new or expanded DSFs are contemplated, as a necessary step toward the identification of VMEs.
45. Where site-specific information is lacking, other information that is relevant to inferring the likely presence of vulnerable populations, communities and habitats should be used.
46. In designating an ecosystem as vulnerable, the decision should evaluate habitats and ecosystems against the criteria presented in paragraph 42, individually or in combination, using the best available scientific and technical information. Characteristics should be weighted according to their relative contribution to an ecosystem’s vulnerability.

3.C 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 life-history stages.

19. Temporary impacts are those that are limited in duration and that 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.

Assessment

47. Flag States and RFMO/As should conduct assessments to establish if deep-sea fishing activities are likely to produce significant adverse impacts in a given area. Such an impact assessment should address, *inter alia*:

i. type(s) of fishing conducted or contemplated, including vessels and gear-types, fishing areas, target and potential by-catch species, fishing effort levels and duration of fishing (harvesting plan);
ii. best available scientific and technical information on the current state of fishery resources and baseline information on the ecosystems, habitats and communities in the fishing area, against which future changes are to be compared;
iii. identification, description and mapping of VME known or likely to occur in the fishing area;
iv. data and methods used to identify, describe and assess the impacts of the activity, the identification of gaps in knowledge, and an evaluation of uncertainties in the information presented in the assessment;
v. identification, description and evaluation of the occurrence, scale and duration of likely impacts, including cumulative impacts of activities covered by the assessment on VME and low-productivity fishery resources in the fishing area;
vi. risk assessment of likely impacts by the fishing operations to determine which impacts are likely to be significant adverse impacts, particularly impacts on VME and low productivity fishery resources; and
vii. the proposed mitigation and management measures to be used to prevent significant adverse impacts on VME and ensure long-term conservation and sustainable utilization of low-productivity fishery resources, and the measures to be used to monitor effects of the fishing operations.

48. Risk assessments referred to in paragraph 47 (vi) above should take into account, as appropriate, differing conditions prevailing in areas where DSF are well established and in areas where DSF have not taken place or only occur occasionally.

Annex 3.2 – Illustrative List of Mitigating Measures

Measure	Vulnerable Species	Vulnerable Habitat
Low		
Enhance understanding of biology and life history of species	X	X
Promote the conservation and recovery of populations	X	X
Harmonize international/national regulation related to conservation	X	X
Monitoring and Reporting Requirements	X	X
Move away/catch avoidance based on %/weight/other factor	X	X
Moderate		
Releasing/returning live animal to ocean	X	
Move away/catch avoidance based on %/weight/other factor	X	X
Effort controls to limit total fishing days, particularly in new areas	X	X
Catch controls to limit total catch	X	X
Temporal Closure based on presence of animals	X	
Gear modification – use of measures to restrict ghost fisheries	X	X
High		
Gear modification – change gear type or modify mesh/hook size	X	X
Gear modification – reduction in bottom contact		X
Gear modification – by-catch reduction devices (grates)	X	
Temporal Closure based on presence of animals	X	
Spatial Closure based on presence of animals	X	X

Annex 4. Conceptual Overview of Preliminary Risk Evaluation Based on SC Report (June 2008) on Candidate VME (FCWGWP 08/7, Revision 1)

Preamble

There is a need to address information gaps and to prioritize work of the Ad Hoc Working Group of Fishery Managers and Scientists on Vulnerable Marine Ecosystems (WG on VME).

Fish species that may be present in candidate VME but their presence does not necessarily indicate a VME. Fish species are also present in other areas, and it is appropriate that any required management measures are evaluated for and applicable to the entire NRA.

International scientific work to categorize sensitive sponge species/fields is not complete, and there may be a resilience of many species to perturbation by fishing gear.

Categorization and data for sensitive corals is available, though analysis of this data is not yet complete. In the short term, the priority focus of the working group will therefore be on concentrations of sensitive corals located within the candidate VME as defined and refined by the Scientific Council.

Preliminary risk assessments of significant adverse impact (SAI) on sponges and corals will be re-evaluated based on information requested of the Science Council. An important objective of this work is to define specific boundaries of concentrations that clearly represent VME.

Additional information on sponges is expected to be available in 2009. The additional information on corals should be available in the Fall of 2008, enabling the working group to re-evaluate risk of SAI and to consider recommending potential mitigation measures for the 2009 fishery. The risk evaluation on corals and sponges will consider their continuing presence in the candidate VME notwithstanding many years of fishing activity in these areas.

1. Flemish Cap East

SC Rationale: Large Gorgonians and high density of sponges 500-1500m

Preliminary Risk Evaluation of SAI: [TBD – see Canadian paper on Risk Assessment]

Recommended Action: (1) SC to provide additional information and greater definition on and location of concentrations of large gorgonians and sensitive and vulnerable sponge species, individual species resilience to perturbation, recovery expectations, definition and location of sponge fields, etc. (2) WG on VME to re-evaluate risk and consider requirement for further mitigation measures based on information from the SC on large gorgonian corals in 2008 and on sponges in 2009.

2. Northern Flemish Cap

SC Rationale: Area of high density of pennatulaceans, alcyonaceans and antipatharians and to a lesser extent, solitary scleractinians and small gorgonians 500-1000m

Preliminary Risk Evaluation of SAI: [TBD – see Canadian paper on Risk Assessment]

Recommended Action: (1) SC to provide additional information and greater definition on and localized concentrations of each of these species, individual species resilience to perturbation, and recovery expectations. (2) WG on VME to re-evaluate risk and consider requirement for further mitigation measures based on information received from SC in future.

3. Sackville Spur

SC Rationale: High density of sponges 1000-1500m

Preliminary Risk Evaluation of SAI: [TBD – see Canadian paper on Risk Assessment]

Recommended Interim Action: (1) SC to provide additional information and greater definition on and location of concentrations of sensitive and vulnerable species, individual species resilience to perturbation, recovery expectations, definition and location of sponge fields, etc. (2) WG on VME to re-evaluate risk and consider requirement for further mitigation measures based on information received from SC in future.

4. Southern Flemish Pass to Eastern Canyons

SC Rationale: Large gorgonians and large survey catches of sponges 500-1500m

Preliminary Risk Evaluation of SAI: [TBD – see Canadian paper on Risk Assessment]

Recommended Action: (1) SC to provide additional information and greater definition on and location of concentrations of sensitive and vulnerable species, individual species resilience to perturbation, recovery expectations, definition and location of sponge fields, etc. (2) WG on VME to re-evaluate risk and consider requirement for further mitigation measures based on information received from SC on large gorgonians in 2008 and on sponges in 2009.

5. Beothuk Knoll

SC Rationale: Abundant gorgonian corals; large survey catches of sponges 500-3000m

Preliminary Risk Evaluation of SAI: [TBD – see Canadian paper on Risk Assessment]

Recommended Action: (1) SC to provide additional information and greater definition on and location of concentrations of sensitive and vulnerable species, individual species resilience to perturbation, recovery expectations, definition and location of sponge fields, etc. (2) WG on VME to re-evaluate risk and consider requirement for further mitigation measures based on information received from SC on gorgonian corals in 2008 and on sponges in 2009.

6a. South East Shoal

SC Rationale: Unique capelin spawning grounds, marine mammal feeding grounds, long-lived and relict bivalve populations.

Preliminary Risk Evaluation of SAI: low risk due to low fishing activity during capelin spawning season

Recommended Action: (1) continuation of existing moratorium on directed capelin fishing (2) consideration of capping all fishing effort on defined capelin spawning grounds during June-July capelin spawning period.

6b. South East Shoal - Adjacent Shelf Edge/Canyons

SC Rationale: Records of corals in canyons.

Preliminary Risk Evaluation of SAI: [TBD – see Canadian paper on Risk Assessment]

Recommended Action: (1) for individual canyons, the SC to provide additional information and greater definition on and localized concentrations of sensitive and vulnerable species, individual species

resilience to perturbation, recovery expectations, definition and location of sponge fields, etc. (2) WG on VME to re-evaluate risk and consider requirement for further mitigation measures based on information received from SC in future.

7. Division 3O Coral Closure Area

SC Rationale: Existing coral closures, based on coral concentrations, high by-catch of pennatulaceans and solitary scleractinian corals 200-1500m

Preliminary Risk Evaluation of SAI: - low to moderate based on existence of large closed area and apparent resilience to fishing gear or existing voluntary contact avoidance measures in the open area.

Recommended Action: (1) Existing closure to be reviewed by FC in 2010 based on advice from the SC, and consideration of future management measures.

8. Seamounts and other Knolls

SC Rationale: Mega-habitats ……all above 2000m

Preliminary Risk Evaluation of SAI: moderate to high

Recommended Action: (1) extension of NAFO existing closure/exploratory fishing protocols to the following areas: x, y, z.

Annex 5. Norwegian proposal for operational procedures in existing and new fishing areas

(FCWGWP 08/4, Revision 3)

Explanatory Memorandum

In May 2008 the Fisheries Commission of NAFO decided to initiate mapping of 'existing fishing areas' with the ambition to provide comprehensive maps by the end of the year. Once that mapping exercise has been completed, the NRA can be divided into three sub-areas:

1) Existing fishing areas
2) Unfished areas that are potential 'New fishing areas'.
3) Closed areas (e.g. coral closure, closed seamounts)

Since fishing activities are prohibited for 3), the proposed measures to deal with encounters with VME's concerns 1) and 2).

In line with the FAO guidelines and the UNGA resolution, appropriate and practical regulations and fishing procedures have to be implemented for each of these areas. The protocols for each type of area should reflect the level of knowledge of each type of area and the associated risk of significant adverse impacts on VMEs. It must be assumed that the uncertainty and therefore risk increases from 1) to 2).

A protocol for exploration in 'new fishing areas' was established by the Commission in May 2008 and would be reviewed by the WG (article 5 of chapter I bis). This proposed protocol does not include procedures for what actions should be taken when encountering VMEs.
In addition to 100% observer coverage and detailed reporting, a move away requirement when encountering VME indicators above an agreed threshold quantity has to be included. In addition, the WG proposes that the Contracting Parties are required to implement temporary closures following encounters of VME indicators exceeding the agreed threshold.

The WG considers that the threshold definition as an interim measure pending further evaluation by the Scientific Council. It is proposed however, that this interim definition is to be applied in 2009.

Proposal

Against this background, it is proposed that Article 5 in Chapter 1 bis is replaced by the following:

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**
    a) Vessels shall quantify catch of primary indicators of VMEs, i.e. coral [and sponge].
    b) if the quantity of VME indicators 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, which without delay shall forward the information to the Executive Secretary. 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 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 judgement based on all available sources of information.

- The Executive Secretary shall make an annual report on encounters in existing fishing areas to the Scientific Council. The scientific Council shall evaluate the information and provide advice to the Fisheries Commission on whether a VME exists [and if so possible mitigation measures]. 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 4, paragraph 5.

2) **Unfished areas that are defined as 'New fishing areas'**

a) Vessels shall quantify catch of primary indicators of VMEs, 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 x shall be used (templates).

b) If the quantity of VME indicators 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, which shall forward the information to the Executive Secretary. 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 Executive Secretary shall at the same time request Contracting Parties to implement a temporary closure of a square representing 4X4 nautical miles 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 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 and [recommends] a closure of the proposed area, the Executive Secretary shall request Contracting Parties to maintain the temporary closure until such time that the Fisheries Commission has acted upon the advice from the Scientific Council in accordance with Article 4, paragraph 5 in chapter 1 bis. 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 judgement 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 4, paragraph 5.

3) For both existing and new fishing areas, an encounter of VME indicators is defined as a ***catch per set (e.g. trawl tow, longline set, or gillnet set) of more than [50] kg of coral [and/or 200kg of sponge].***

Annex 6. Exploratory Protocol for New Fishing Areas and Proposed Templates for the Exploratory Protocol for New Fishing Areas where fishing gear is likely to contact the seafloor (FCWGWP 08/10-12, Revision 3)

Exploratory Protocol for New Fishing Areas

The Exploratory Fishery Protocol for New Fishing Areas shall include:

- A harvesting plan which outlines target species, dates and areas. Area and effort restrictions should be considered to ensure fisheries occur on a gradual basis in a limited geographical area.
- A mitigation plan including measures to prevent significant adverse impact to vulnerable marine ecosystems that may be encountered during the fishery.
- A catch monitoring plan that includes recording/reporting of all species caught, 100% satellite tracking and 100% observer coverage. The recording/reporting of catch should be sufficiently detailed to conduct an assessment of activity, if required.
- A data collection plan to facilitate the identification of vulnerable marine ecosystems/species in area fished.

Exploratory fisheries shall not commence until this information has been provided to the Executive Secretary and forwarded to all Contracting Parties and the Scientific Council for information.

Proposed templates for the exploratory protocol for new fishing areas where fishing gear is likely to contact the seafloor

I. CONTRACTING PARTY SUBMITS NOTICE OF INTENT TO UNDERTAKE EXPLORATORY FISHING TO THE NAFO SECRETARIAT

HARVESTING PLAN	MITIGATION PLAN	CATCH MONITORING PLAN	DATA COLLECTION PLAN
• TARGET SPECIES	MEASURES TO PREVENT SIGNIFICANT ADVERSE IMPACTS TO VMEs	IDENTIFY AND RECORD ALL SPECIES BROUGHT ONBOARD TO THE LOWEST POSSIBLE TAXONOMIC LEVEL	DATA WILL BE COLLECTED AND REPORTED IN A STANDARDIZED FORMAT
• FISHING DATES		100% SATELLITE COVERAGE	
• DESCRIPTION OF AREA TO BE FISHED		100% OBSERVER COVERAGE	
• ANTICIPATED EFFORT			
• BOTTOM FISHING GEAR-TYPE(S) USED			

II. CONTRACTING PARTY SUBMITS TRIP REPORT TO THE NAFO SECRETARIAT

PROPOSED DRAFT TEMPLATE FOR THE EXPLORATORY FISHERY PROTOCOL FOR NEW FISHING AREAS WHERE FISHING GEAR IS LIKELY TO CONTACT THE SEAFLOOR

ADVANCED NOTICE OF INTENT TO UNDERTAKE EXPLORATORY FISHING[1]

NAME OF VESSEL:

FLAG STATE OF VESSEL:

ANTICIPATED **LOCATION(S)** OF EXPLORATORY FISHING ACTIVITIES (INCLUDE LAT/LONG):

ANTICIPATED **DATES** OF EXPLORATORY FISHING ACTIVITIES:

HAS ANY **PREVIOUS FISHING** BEEN UNDERTAKEN IN ADJACENT AREAS (IF SO, IDENTIFY INFORMATION SOURCE):

DEPTHS EXPECTED TO BE ENCOUNTERED DURING EXPLORATORY FISHING ACTIVITIES:

DO **HABITAT MAPS** OF THE AREA EXIST (IF SO, PLEASE IDENTIFY SOURCE(S)):

ARE **TAXONOMIC KEYS** IDENTIFYING POTENTIALLY VULNERABLE SPECIES AVAILABLE (IF SO, IDENTIFY SOURCES(S)):

KNOWN **VULNERABLE MARINE ECOSYSTEMS (VMEs)**[2] IN THE LOCATION(S) TO BE FISHED:

MITIGATION MEASURES TO PREVENT SIGNIFICANT ADVERSE IMPACT TO VMEs, IF ENCOUNTERED:

DO **BATHYMETRIC MAPS** OF THE EXPLORATORY AREA EXIST (IF SO, PLEASE IDENTIFY SOURCE(S)):

DOES ANY **FISHERIES SCIENTIFIC INFORMATION** IN THE EXPLORATORY AREA EXIST (IF SO, IDENTIFY SOURCE(S)):

TARGET SPECIES BEING SOUGHT:

WHAT **GEAR TYPE(S)** ARE BEING PROPOSED TO BE USED (PLEASE IDENTIFY) IN WHAT AREAS (INCLUDE LAT/LONG):

[1] EXPLORATORY FISHING IS DEFINED AS ALL BOTTOM FISHING ACTIVITIES IN NEW AREAS OR WITH BOTTOM GEAR NOT PREVIOUSLY USED IN THE AREA CONCERNED AND NOT IDENTIFIED IN ARTICLE 2 OF NEW CHAPTER I BIS (SEE NAFO/FC DOC. 08/3)
[2] REFER TO FAO INTERNATIONAL GUIDELINES FOR THE MANAGEMENT OF DEEP-SEA FISHERIES IN THE HIGH SEAS

PROPOSED DRAFT TEMPLATE FOR THE EXPLORATORY FISHERY PROTOCOL FOR NEW FISHING AREAS WHERE THE FISHING GEAR IS LIKELY TO CONTACT THE SEAFLOOR

CONTRACTING PARTY EXPLORATORY FISHING[1] TRIP REPORT SUBMITTED TO THE NAFO SCIENTIFIC COUNCIL

NAME OF VESSEL:

FLAG STATE OF VESSEL:

LOCATION(S) OF AREAS FISHED (INCLUDE LAT/LONG):

DATES OF FISHING ACTIVITIES:

DEPTHS ENCOUNTERED DURING FISHING (LIST FOR EACH HAUL INCLUDING LAT/LONG):

TOTAL HOURS/AREA FISHED (LIST FOR EACH HAUL INCLUDING LAT/LONG):

GEAR TYPE(S) USED (PLEASE IDENTIFY) IN WHAT AREAS (INCLUDE LAT/LONG):

VULNERABLE MARINE ECOSYSTEMS (VMEs)[2] ENCOUNTERED (LIST FOR EACH HAUL INCLUDE LAT/LONG):

MITIGATION MEASURES TAKEN TO PREVENT SIGNIFICANT ADVERSE IMPACT TO VMEs IF ENCOUNTERED:

LIST OF ALL ORGANISMS (RETAINED, BYCATCH) BROUGHT ONBOARD (IDENTIFIED TO THE LOWEST TAXONOMIC UNIT):

LIST OF POTENTIAL VULNERABLE INDICATOR SPECIES[3] BROUGHT ONBOARD BY LOCATION (INCLUDE LAT/LONG):

LIST OF ORGANISMS RETAINED FOR **BIOLOGICAL SAMPLING** (E.G., LENGTH-WEIGHT, SEX, AGE), IF ANY:

[1] EXPLORATORY FISHING IS DEFINED AS ALL BOTTOM FISHING ACTIVITIES IN NEW AREAS OR WITH BOTTOM GEAR NOT PREVIOUSLY USED IN THE AREA CONCERNED AND NOT IDENTIFIED IN ARTICLE 2 OF NEW CHAPTER I BIS (SEE NAFO/FC DOC. 08/3)

[2] REFER TO FAO INTERNATIONAL GUIDELINES FOR THE MANAGEMENT OF DEEP-SEA FISHERIES IN THE HIGH SEAS

[3] REFER TO ANNEX 1 FAO INTERNATIONAL GUIDELINES FOR THE MANAGEMENT OF DEEP-SEA FISHERIES IN THE HIGH SEAS

NOTE: DATA REPORTING SHOULD FOLLOW A STANDARDIZED SPECIFICATION, FOR EXAMPLE, AS ADOPTED BY SCIENTIFIC OBSERVER PROGRAMS.