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Maritimes Region

Proceedings of the Regional Peer Review on the Application of the National Vulnerability Framework in the Maritimes Region

Meeting dates: November 22-24, 2021
Location: Virtual

Chairperson: Tana Worcester
Editor: Rabindra Singh

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Canada

Foreword

The purpose of these Proceedings is to document the activities and key discussions of the meeting. The Proceedings may include research recommendations, uncertainties, and the rationale for decisions made during the meeting. Proceedings may also document when data, analyses or interpretations were reviewed and rejected on scientific grounds, including the reason(s) for rejection. As such, interpretations and opinions presented in this report individually may be factually incorrect or misleading, but are included to record as faithfully as possible what was considered at the meeting. No statements are to be taken as reflecting the conclusions of the meeting unless they are clearly identified as such. Moreover, further review may result in a change of conclusions where additional information was identified as relevant to the topics being considered, but not available in the timeframe of the meeting. In the rare case when there are formal dissenting views, these are also archived as Annexes to the Proceedings.

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SUMMARY

The Department of Fisheries and Oceans Canada (DFO) is committed to ensuring sustainable aquatic ecosystems. A national framework for assessing vulnerability of aquatic ecosystems to ship-source oil spills was developed in 2017. A structured approach was used in the framework to identify ecological components most affected by a ship-source oil spill utilizing a suite of three criteria categories to assess vulnerability. The three categories were exposure, sensitivity, and recovery, each encompassing a number of criteria that were envisaged to be consistent and broad enough to be usable in multiple aquatic environments. In support of this, the framework has been adapted and applied in the Maritimes Region, to be used to identify the potential impacts of ship-source oil spills on aquatic ecosystems, as well as provide advice on the ability of ecosystems to recover from such impacts. The overall objectives of this Regional Advisory Process was to assess whether the proposed framework identifies scientifically defensible vulnerabilities in Maritimes Region aquatic ecosystems to ship-source oil spills. Participants in this meeting included, DFO Science, DFO Ecosystem Management, Environment and Climate Change Canada (ECCC), Natural Resources Canada (NRCan), the Canada-Nova Scotia Offshore Petroleum Board (CNSOPB), Province of Nova Scotia, Aboriginal communities / organizations, offshore petroleum industry, non-government organizations, the fishing industry, and academics (see Appendix B for list of participants). This virtual meeting was held on the afternoons of November 22nd, 23rd, and 24th, 2021, using Microsoft Teams (MS Teams).

INTRODUCTION

The Department of Fisheries and Oceans Canada (DFO) is committed to ensuring sustainable aquatic ecosystems. The development of a national framework in 2017 for assessing vulnerability of aquatic ecosystems to ship-source oil spills represented an important step toward meeting this commitment. In the Maritimes, the proposed regional application of the national framework may be used to identify the potential impacts of ship-source oil spills on aquatic ecosystems, as well as provide advice on the ability of ecosystems to recover from such impacts.

The national framework developed a structured approach to identify ecological components most affected by a ship-source oil spill utilizing a suite of criteria to assess vulnerability. This approach divides criteria into three categories: exposure, sensitivity, and recovery, each encompassing a number of criteria that were envisaged to be consistent and broad enough to be usable in multiple aquatic environments. In support of this, the framework has been adapted and applied in the Maritimes Region.

The overall objective of this Regional Advisory Process was to assess whether the proposed framework identifies scientifically defensible vulnerabilities in Maritimes Region aquatic ecosystems to ship-source oil spills. The specific objectives were to:

- Determine if the proposed species groupings for assessing vulnerability to ship-source oil spills are appropriate;
- Determine if the criteria used to identify species groupings most affected by ship-source oil spills are complete and appropriate;
- Provide recommendations on approaches and methods to address knowledge and data gaps in the application of the criteria (i.e., how to characterize uncertainty); and,
- Provide recommendations on potential uses of this framework for assessment of ecological vulnerability to environmental stressors, and specifically to ship-source oil spills.

The following working paper was used to provide the basis for discussion and advice: Maritimes Regional application of the national framework for assessing the vulnerability of biological components to ship-source oil spills in the marine environment by T. Lander, A. Hamer, V. Merritt, O. Jones, and C. Harvey.

See Appendix A for the Terms of Reference. Participants in this meeting included: DFO Science, DFO Ecosystem Management, Environment and Climate Change Canada (ECCC), Natural Resources Canada (NRCan), the Canada-Nova Scotia Offshore Petroleum Board (CNSOPB), Province of Nova Scotia, Aboriginal communities / organizations, offshore petroleum industry, non-government organizations, the fishing industry, and academics (see Appendix B for list of participants). This virtual meeting was held on the afternoons of November 22nd, 23rd, and 24th, 2021, using Microsoft Teams (MS Teams) (see Appendix C for the Agenda).

DAY 1: MONDAY, NOVEMBER 22, 2021

Rapporteurs: C. Harvey and O. Jones

The meeting started with the Chair, T. Worcester, welcoming everyone. After giving a brief overview of the National Framework and setting the stage for this meeting, the Chair then went over the Canadian Science Advisory Secretariat (CSAS) peer review process and the use of the Scientific Advice for Government Effectiveness (SAGE) Principles and Guidelines. Since the

meeting was using Microsoft Teams (MS Teams) as the platform, tips on the effective use of MS Teams were provided. After a roundtable of introductions from the participants, the Chair reviewed the Terms of Reference (Appendix A) and the Agenda (Appendix B) for the three-day meeting.

PARTS 1 AND 2: OIL SPILLS IN THE MARINE ENVIRONMENT; VULNERABILITY FRAMEWORK – CONTEXT, SCOPE, AND OVERVIEW

A background presentation on oil spills and the marine environment was presented by A. Hamer. This was followed by a presentation by T. Lander on the context, scope and overview of the vulnerability framework. After the presentations, clarification was sought on the spatial extent of oil spill risks and the species that are included in the risk assessment. The plan is to have all species evaluated for vulnerability across the entire Maritimes Region and to update the information, hopefully on an annual basis.

PART 3: MARITIMES APPLICATION – METHODOLOGY

In this presentation, T. Lander and A. Hamer described the methodology they used in applying the National Framework to the Maritimes Region. After the presentation, it was suggested that it would be useful in the main body of text to see how many species are in groups, and sub-groups. This would give a better feeling for how many species are in sub groups. This was something that the authors will likely include perhaps as a table or tables.

The current plan does not include Ecologically and Biologically Significant Areas (EBSAs) and Marine Protected Areas (MPAs) as a way to include a consolidated score for an area; however, this is something that could be easily be applied in the future to get at a biological sensitivity index. It was also suggested that the word “subtidal” should be defined since there are also canyons and slopes which have different habitats.

PART 4: VULNERABILITY CATEGORIES AND CRITERIA

T. Lander next presented on the Vulnerability Categories and Criteria. Discussion then followed on the meaning of the term “aggregated” as it applies to toothed cetaceans. The behaviour of these mammals suggests that they should be considered discrete. The national framework does not perform any scoring on sub-groups and this was something that the presenting team would consult experts for guidance to make sure that the species are in the right sub-group level. The team has consulted the International Union for Conservation of Nature (IUCN) list and then checked to see if any were relevant in the Maritimes Region.

On the issue of whether unconsolidated sediment could result in chronic effects after an oil spill, there are many factors that have to be considered and it would not be possible to anticipate long-term persistence in such sediments. If the oil persists in the environment, then this would be considered as an acute exposure. It was suggested that more text around unconsolidated sediments be included in the document, but it was pointed out that it is hard to define the impacts to specific taxonomic groups especially as it relates to mobility. The team was confident that breaking out unconsolidated and consolidated sediments was important for scoring, rather than undercutting some species, and that the rankings used capture the risk levels of mobile species, but they recognize that in some cases these may underscored.

More detailed taxonomic breakdown was suggested for invertebrates. It was also suggested that while some corals may be part of colonies, they could be considered discrete individuals. It was agreed that corals can form fields of colonies and this needs to be captured in the document. The national framework also does not provide guidance on what could be considered surface habitat but a definition of sea surface of 0 to 1 m was selected for use in this

assessment as it also captures the intertidal habitats and allowed for the greatest scoring differences. Other applications of the National Framework have used 0 to 10 m, or 0 to 5 m for the surface habitat. It is believed that the definitions used in the document captures the larval stages of some species when they occupy the sea surface. As an example, lobster gets scored twice because it uses the sea surface and the seabed based on their life stages.

The lack of information on some invertebrates may mean that they do not get a proper score but this can be adjusted as more information is obtained. The Mud Piddock increases the scoring for the sub-group because there is more information available on it. It was pointed that because some invertebrates have low scores, it does not mean they are not vulnerable. It is very difficult to assign a score to a species but this document is more of a guide and should be not considered as providing a comprehensive scoring system.

A list of references used in Newfoundland Region's marine spatial planning would be provided to the team to add to their list of useful references.

It was pointed out that whether a species would be affected by oil, or not, depends on mobility as well as variations in how oil types move/breakdown. This will also depend on how each species might react to an oil spill (might not move directly away from spill). Given such difficulty scoring, it was suggested that the document reflects the fact that these are relative scoring, and there should be an acknowledgement of the difficulty in scoring mobility for individual species.

The assessment does not consider socio-economic or cultural importance of species but rather tries to equalize the scoring of each species. It was suggested that biogenic (habitat forming) species should get higher scoring but are outside of the scope of framework; however, the species themselves are scored in the assessment.

DAY 2: TUESDAY, NOVEMBER 23, 2021

Rapporteurs: C. Harvey and O. Jones

The Chair reviewed the previous day's discussions and provided a summary of the main points discussed. Overall, there was not a lot of feedback on the framework but points raised centered on the criteria used and how they may have to be modified, particularly where there are modifications that might influence other regions. This review is looking for particularities that might have not been covered for the Maritimes Region and how stages of life histories affect scores. The application of criteria must also put species in the right bin (e.g., cetaceans may be discrete vs. dispersed). Conservation status was considered, as well as how each status is defined and whether there are factors that are not necessarily assessed in determining those statuses. For species that have interactions with sea-surface and/or sea-floor, it would be important to make sure that this is being captured in a way that makes sense intuitively.

A reviewer commented on the difference between the national and regional documents and specifically on operationalizing Figures 3 and 4 (in the national framework, DFO 2017). It was suggested that the way these figures are used in the document should be presented in greater detail so that readers can understand how additive scores versus screening out scores are achieved and what references were used in verifying the information. Groupings for invertebrates and fish larval stages may need to be treated differently in future iterations of the document. The point was also made that, at some time, the information from other groups like Canadian Wildlife Service should be brought into the framework. Discussion then followed on the inclusion of coral species and how newly identified species may be added to the species list in the future. While deeper species may not be in the list, they would fall into one of the sub-group scoring. Deeper offshore environments would also have less likelihood for exposure from a ship-source spill and are considered in the exposure category as seafloor interaction.

The ranked list of species impacted by an oil spill should get paired with distribution maps in the event of a ship-source spill so that only relevant species are really considered in the response.

PART 5: VULNERABILITY SCORING

The presentations continued with T. Lander and A. Hamer going over the vulnerability scoring. On chemical sensitivity, A. Hamer pointed out that while the data or information were not always available, it is an important driver in determining vulnerability and that future iterations of the rankings would have to describe how this lack of information results in a ranking.

PART 6 AND 7: RESULTS (MOST VULNERABLE SUB-GROUPS); CHALLENGES AND LIMITATIONS, DEALING WITH UNCERTAINITY, OPERATIONAL APPLICABILITY

After these presentations by T. Lander and A. Hamer, there was discussion on the how the National Framework was used in guiding the vulnerability scoring. It is hoped to eventually link the scores with some kind of database that includes spatial data. Scores can also change as more information becomes available. Taxonomy of a species determines its sub-group and how that species provides ecosystem services are important. Such services (such as habitat forming) will need to be considered in an oil spill response. It was suggested that maybe there is need to include in the table if the species listed are the most vulnerable in the groups, or the most commonly known. Discussion followed on the mechanical and chemical impacts of oil on how these pose some difficulties in ranking of an individual species such as marine plants or mammals.

DAY 3: WEDNESDAY, NOVEMBER 24, 2021

REVIEW OF DRAFT SCIENCE ADVISORY REPORT (SAR) AND WRAP UP

Rapporteurs: C. Harvey and O. Jones

After a quick review of the previous day's discussions by the Chair, there was further discussions on the previous day's presentations. It was agreed that there is need to more explicitly state the context and use of the Maritimes Framework. There is also a need to explain that there are other resources at risk that will be considered in the scope of the process. This would also be important to have in the SAR as well.

There is the potential that both subtidal and intertidal zones could be impacted by a spill. The responders need to make an operational decision on site because oil could impact a certain area and float in the first operational period, but then in the next it will be through the water column or intertidal zone. So, it is important to revise decisions based on the spill trajectory and this would meant that multiple species groups could be impacted. At the same time, this would result in more details being included in the framework which can be overwhelming. There is need to balance how much detail is provided with operability.

It was suggested that in addition to the tables in the document, there may also be the need to have a searchable database so that habitat sub-groups may be examined, as well as provide links to other useful regional products. A suggestion was made that the Working Paper should include operational aspects, such as examples of possible incidents where the framework my be used.

The plan is to get the scores reviewed by experts in the Maritimes Region. In Pacific, there was two rounds of reviews. The first was of the sub-groups, once those were vetted and scored, species experts were asked to review them and this resulted in score changes. The criteria

were there to help divide sub-groups and it may help to divide sub-groups in a more refined way so that the best score is assigned to the appropriate species. Participants asked for more details be included in the document on individual versus population level impacts from oil spills and how the types of oil can impact the ranking. Also, details on the 1P or 2P ranking would be good to provide in the document.

This framework is meant to be used once the specific details of the spill is known. It provides a guide on which species experts to bring in and which sub-groups need consideration. It was suggested that, if possible, the criteria used at the population and at the individual levels be explained or specified.

Participants started to look at the draft SAR and what the next steps may be for the Working Paper. There are not a lot of surveys that have been done on species that are not of socio-economic concern and this may bias against certain groups of species such as invertebrates. A suggestion was made to include a paragraph about not including the offshore area, since this is being called a Regional Framework. It was agreed that the SAR will be circulated with the suggested changes highlighted. For the rest of the meeting, participants made suggestions on wording and text for the summary bullets. It was agreed that the Working Paper should be accepted with the changes as suggested during the meeting. Changes to the SAR were made to the document as participants provided input.

REFERENCES CITED

DFO. 2017. A framework for assessing vulnerability of biological components to ship-source oil spills. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2017/032.

APPENDIX A: TERMS OF REFERENCE

Application of the National Vulnerability Framework in the Maritimes Region

Regional Peer Review – Maritimes Region

November 22-24, 2021
Virtual Meeting

Chairperson: Tana Worcester

Context

The Department of Fisheries and Oceans Canada (DFO) is committed to ensuring sustainable aquatic ecosystems. The development of a national framework for assessing vulnerability of aquatic ecosystems to ship-source oil spills in 2017 represented an important step toward meeting this commitment, and supported the organizational priority identified in the Report on Plans and Priorities by "Commencing the collection and analysis of science and marine ecosystems information and data as key supporting elements of the world class tanker system initiatives". In the Maritimes, the proposed regional application of the national framework may be used to identify the potential impacts of ship-source oil spills on aquatic ecosystems, as well as provide advice on the ability of ecosystems to recover from such impacts.

The National Framework developed a structured approach to identify ecological components most affected by a ship-source oil spill utilising a suite of criteria to assess vulnerability. This approach divides criteria into three categories: exposure, sensitivity, and recovery, each encompassing a number of criteria that were envisaged to be consistent and broad enough to be usable in multiple aquatic environments. In support of this, the framework has been adapted and applied in the Maritimes Region. If successful, the regional application of the framework will be useful in informing protection, prioritization, planning, and response operation efforts.

Objectives

The overarching objective of this Regional Advisory Process is to assess whether the proposed framework identifies scientifically defensible vulnerabilities in Maritimes Region aquatic ecosystems to ship-source oil spills.

Specific objectives of this Advisory Process are to:

- Determine if the proposed species groupings for assessing vulnerability to ship-source oil spills are appropriate;
- Determine if the criteria used to identify species groupings most affected by ship-source oil spills are complete and appropriate;
- Provide recommendations on approaches and methods to address knowledge and data gaps in the application of the criteria (i.e., how to characterize uncertainty); and,
- Provide recommendations on potential uses of this framework for assessment of ecological vulnerability to environmental stressors, and specifically to ship-source oil spills.

The following working paper will be reviewed to provide the basis for discussion and advice: Maritimes Regional application of the national framework for assessing the vulnerability of biological components to ship-source oil spills in the marine environment. Working Paper by T. Lander, Hamer A., Merritt, V., Jones, O., and Harvey, C.

Expected Publications

- Proceedings
- Research Document
- Science Advisory Report

Participation

- DFO Science
- DFO Aquatic Ecosystems
- Environment and Climate Change Canada
- Canadian Coast Guard
- Provincial Representatives
- Indigenous communities / organizations
- Non-Government Organizations
- Academics

References

DFO. 2017. A framework for assessing vulnerability of biological components to ship-source oil spills. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2017/032.

APPENDIX B: LIST OF PARTICIPANTS

Participants at the Maritimes Region Application of the National Vulnerability Framework Meeting, November 22-24, 2021. Y = present, a dash (-) indicates absence.

Name	Affiliation	Day 1	Day 2	Day 3
Bone, Bryden	DFO Maritimes / MPC	Y	Y	Y
Brady, Jeff	CCG NCR	Y	Y	-
Breeze, Heather	DFO Maritimes / MPC	Y	Y	Y
Beauchesne, David	Laval University	Y	-	Y
Clermont, Yves	DFO Quebec / Science	Y	Y	Y
Cooper, Andrew	DFO Maritimes / Science	Y	Y	Y
Desjardins, Christine	DFO Quebec / Science	Y	-	-
Feyrer, Laura	DFO Maritimes / Science	Y	Y	Y
Girouard, Nathalie	DFO NCR / Science	Y	Y	Y
Greig, Ryan	CCG NCR	Y	Y	Y
Hamer, Adrian	DFO Maritimes / Science	Y	Y	Y
Harvey, Cara	DFO Maritimes / Science	Y	Y	Y
Jeffery, Sharon	DFO Pacific / Science	Y	Y	Y
Jones, Owen	DFO Maritimes / Science	Y	Y	Y
Kelly, Noreen	DFO Maritimes / Science	Y	Y	Y
Lander, Terralynn	DFO Maritimes / Science	Y	Y	Y
Lawton, Peter	DFO Maritimes / Science	Y	Y	Y
MacDonald, Shawn M	Nova Scotia DFA	Y	-	-
Macisaac, Brittany	DFO Maritimes / Science	Y	Y	-
Matheson, Kyle	DFO NL / Science	Y	Y	Y
Merritt, Vicky	DFO Maritimes / Science	Y	Y	Y
Neves, Barbara	DFO NL / Science	Y	Y	Y
Paul, Stacey D	DFO Maritimes / Science	Y	Y	-
Robertson, Greg	ECCC	Y	Y	Y
Robinson, Brian	DFO Maritimes / Science	Y	Y	Y
Singh, Rabindra	DFO Maritimes / CSA	Y	Y	Y
St. Germain, Candice	DFO Pacific / Science	Y	-	-
Stortini, Christine	DFO Maritimes / MPC	Y	Y	Y
TeKamp, Mark C	Nova Scotia DNRR	Y	Y	Y
Wells, Nadine	DFO NL / Science	Y	Y	-
Worcester, Tana	DFO Maritimes / CSA	Y	Y	Y

APPENDIX C: AGENDA

Application of the National Vulnerability Framework in the Maritimes Region

22-24 November, 2021
Virtual Meeting (MS Teams)

Day 1: Monday, November 22, 2021

Time	Topic	Leads
1:00 – 1:10	Introduction	Chair, T. Worcester
1:10 – 1:25	Oil Spills in the Marine Environment	A. Hamer
1:25 – 1:45	Vulnerability Framework – Overview, Context and Scope	T. Lander, A. Hamer
1:45 – 2:30	Maritimes Application – Methodology Grouping Biological Components Determination of Regional Sub-Groups Vulnerability Categories and Criteria	T. Lander, A. Hamer
2:30 – 2:40	Health Break	
2:40 – 4:00	Methodology (Continued) Vulnerability Categories and Criteria	T. Lander, A. Hamer
	Reviewers comments and Discussion	Reviewers

Day 2: Tuesday, November 23, 2021

Time	Topic	Leads
1:00 – 1:10	Review of day 1, agenda for day 2	Chair, T. Worcester
1:10 – 2:10	Methodology (Continued) - Detailed Vulnerability Scoring	T. Lander, A. Hamer
2:10 – 2:20	Health Break	
2:20 – 3:00	Results (most vulnerable sub-groups) Challenges and Limitations Dealing with Uncertainty Operational applicability	T. Lander, A. Hamer
	Reviewers comments and Discussion	Reviewers
3:00 – 4:00	Review of draft SAR	Everyone

Day 3: Wednesday, November 24, 2021

Time	Topic	Leads
1:00 – 2:30	Continue Review of draft SAR and Wrap up	Everyone
2:30 – 2:40	Health Break	
2:40 – 4:00	Continue Review of draft SAR and Wrap up	Everyone