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Proceedings of the National Peer Review for a Framework to Support Decisions on Authorizing Scientific Surveys with Bottom Contact Gears in Protected Areas with Defined Benthic Conservation Objectives

**January 16-18, 2018
Ottawa, Ontario**

**Chairpersons: Gérald Chaput and Lisa Settingington
Editor: Caroline Longtin**

Fisheries and Oceans Canada
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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

A National Science Advisory process was held January 16-18, 2018 in Ottawa (ON). The purpose of the meeting was to develop a framework to support decisions on authorizing scientific surveys with bottom contact gears in protected areas with defined benthic conservation objectives. The decision on whether or not bottom contact scientific surveys will be authorized in protected and sensitive benthic areas is the responsibility of DFO Oceans Management and DFO Fisheries and Resource Management. To assist in the decision-making process, DFO Science developed a national framework with an agreed set of assessment criteria that can be applied consistently across Canada.

The advisory process was informed by a working paper and subsequent presentations by Fisheries and Oceans Canada Science researchers and Oceans Management. A total of 32 participants from academia, industry, non-governmental organizations, and employees from DFO's six administrative regions participated in this advisory process.

These Proceedings summarise the discussions and the process for this peer review meeting. The advice from this meeting and the supporting research document have been posted on the DFO Canadian Science Advisory Secretariat website.

INTRODUCTION

Fisheries and Oceans Canada (DFO) Oceans Management requested a Canadian Science Advisory Secretariat (CSAS) National Peer Review meeting to provide advice on the conditions under which scientific research surveys with bottom contact gears may be authorized for sampling in protected areas with defined benthic conservation objectives. The decision on whether or not bottom contact scientific surveys will be authorized in these protected and sensitive benthic areas is the responsibility of DFO Oceans Management. To assist in the decision making process, DFO Science proposed to develop a national framework that can be used to assess the impacts of scientific surveys in protected areas and sensitive benthic areas relative to the broader ecosystem information value of the scientific surveys.

The Terms of Reference (TOR) for the science review (Appendix II) were developed in response to this request for advice from DFO Oceans Management. A working paper titled "Framework to support decisions on authorizing scientific surveys with bottom contact gears in protected areas with defined benthic conservation objectives" (distributed Jan. 9, 2018) and a case study titled "White hake, Atlantic cod and thorny skate in sea pen aggregation and conservation areas in the southern Gulf of St. Lawrence" (distributed Jan. 12, 2018) were distributed to participants and were the basis of the peer review and subsequent advisory report to meeting participants.

Shortly (Jan. 11, 2018) after distribution of the working paper, meeting participants were assigned sections of the working paper for a focused review. During the peer review meeting, at each point in the agenda, participants assigned the sections of the working paper under review were initially called upon for their comment; this was followed by comments and questions from all other participants. To assist in the working paper revisions, reviewers were requested to send their comments in writing to the co-chairs and to the lead author of the working paper.

MEETING PROCESS

The meeting was co-chaired by Gérald Chaput (DFO Science Gulf Region) and Lisa Setterington (DFO Science, Ottawa). The co-chairs alternated during portions of the meeting.

After the introduction of the chairs, it was reminded to participants that the Terms of Reference are relevant to both Oceans Management and Fisheries Management programs.

There was discussion as to how the framework would be used and whether it would be used by Science or Management. The framework is intended to be a tool that Science can use to assess the impacts of scientific surveys in specific protected areas. Science will then provide the information to Management to be used in the permitting decision stage.

Participants discussed whether existing monitoring programs for closed areas or Marine Protected Areas would be subject to evaluation using the new framework and it was agreed that the framework could be used although may not be sufficient on its own for those circumstances. It is also important to note that the framework is intended to apply to all scientific surveys, not only those proposed by DFO.

PRESENTATIONS OF THE WORKING PAPER AND DISCUSSIONS

The meeting began with an overview presentation by Paul MacNab (DFO Oceans Management, Maritimes Region) of the policies, conservation law, permitting authorities, and assessment frameworks associated with the Oceans Management program and the Fisheries Management program as they relate to protected areas and marine refuges. The presentation touched on the

elements in section 2 of the working paper. It was emphasized that scientific sampling is authorized by some act, and that authority to undertake sampling in closed areas may well require a framework to assist in the decision making process for authorization. Hence the purpose of this meeting to develop such a framework to support decision-making. It was suggested that the text in this section should be a summary of policies, acts, and regulations and to avoid providing details that could be in contradiction to official policy and regulatory documents.

TOR 1. DEVELOPMENT OF DESCRIPTORS OF THE FEATURES OF THE IMPORTANT BENTHIC COMPONENTS THAT ARE VULNERABLE TO THE BOTTOM CONTACTING GEARS AND RELEVANT CONTEXTUAL FACTORS (HABITAT TYPE, GEAR, ETC.)

This term of reference was addressed in section 3 of the working paper. A summary was presented by Hugues Benoit (Research scientist, Science Branch, Quebec Region).

Points of discussion

The conservation objective(s) of the closed area must relate to the important benthic components that are vulnerable to bottom contact gears in order to be assessed in the proposed framework. The framework is restricted to sessile, benthic organisms and biogenic habitats (e.g. corals, sponges, hydrothermal vents), and excludes bottom-dwelling mobile species (e.g. groundfish).

Sensitivity and recovery potential are important considerations when determining benthic component vulnerability. Sensitivity is greatest for fragile, sessile, erect and emergent organisms. Vulnerable benthic components may suffer mortality as a direct result of trawling or be injured by trawling which could lead to infection. Trawls may also spread pathogens between survey areas.

Recovery potential of benthic components can be estimated by considering characteristics of the benthic components as a proxy for recovery potential. Recovery potential can be affected by longevity of individuals or habitats (1s to 10s of years vs. 100s to 1000s of years); recruitment potential including larval dispersal distances and population connectivity; age of maturity; and, length of time required for substrate to become suitable for colonization after impact. For example, poor recovery can be linked to extreme longevity and/or poor recruitment potential. Participants agreed that recovery refers to the state of the benthic components prior to recent damage, such that the habitat is similar to neighbouring sites which were not impacted by the survey, and not the return to a pristine state.

Participants agreed that recovery should be assessed at the community level and it was suggested that the species with the longest lifespan could be used as a proxy for recovery of the benthic community. Participants also mentioned that cumulative impacts must be factored into recovery time if surveys occur more frequently than the rate at which recovery can occur.

TOR 2. CRITERIA TO ASSESS SCALE AND SCOPE OF IMPACT OF THE SCIENTIFIC ACTIVITY, INCLUDING THE IMPACTS ON ACHIEVING CONSERVATION GOALS AND MITIGATION OPTIONS

This term of reference was addressed in sections 4 and 5 of the working paper. A summary of those sections was presented by Hugues Benoit (Research scientist, Science Branch, Quebec Region). The surveys discussed include existing, ongoing and routinely occurring surveys that employ bottom-contacting gear, therefore, excluding surveys that do not significantly contact the

bottom as part of their normal operation (e.g., aerial, acoustic, dive and pelagic trawl surveys). There are 57 re-occurring bottom-contacting research surveys that take place in the coastal, shelf and slope waters off Canada.

Points of discussion

In order to determine the scale and scope of the impact on benthic components the proportion of the closed area that overlaps with the research survey must be calculated. The issue of impact scale must also be considered. Impact scale considers the geographic area impacted by the survey relative to the distribution of the species. For example, some survey areas may be small, but the species distribution may only be a few km², resulting in a large impact on that specific benthic habitat.

Cumulative impacts from multiple trawl surveys within the same geographic area and in the same year should be considered as a whole to determine which are permissible based on acceptable risk.

Participants raised the issue of un-surveyed areas and failed sets. Some areas are not trawled because survey gear has been destroyed during previous surveys or because the terrain is not conducive to trawling (e.g., steep slopes). Some areas are trawled multiple times in order to get one successful set; although, it was mentioned that some regions do not allow for more than one towing attempt in a MPA. In some trawls data is thrown out due to the collection of a large volume of corals and sponges that can't be hauled, resulting in failed sets. Participants suggested setting a cap on the amount of effort allowed to achieve a successful set. Participants also suggested mapping "blind zones" (i.e. areas with failed survey sets) to determine the proportion of a closed area that is not surveyed.

In order to minimize impact, participants suggested that the first sampling approach in new areas should be precautionary through non-destructive survey methods (e.g. drop camera).

TOR 3. CRITERIA TO ASSESS THE CONSEQUENCES OF EXCLUDING / MODIFYING SURVEY PROTOCOLS

This term of reference was addressed in section 4 and 7 (case study) of the working paper. A summary of those sections was presented by Hugues Benoit (Research scientist, Science Branch, Quebec Region).

Points of discussion

Participants suggested the following alternatives to trawl surveys in closed areas: change survey location, use observational methods, change gear type, and/or limit survey effort in closed areas.

Moving survey locations outside of closed areas will remove the risk of trawl damage on benthic components; however, there may be an impact on stock assessment data if surveys are excluded from closed areas. There may be few viable alternatives for alternate data collection locations for certain species whose ranges have a large geographic overlap with closed areas (e.g. white hake). There may also be instances where survey locations cannot be moved, such as survey domains for joint international surveys where survey size and location adjustments may not be allowed (e.g., Grand Banks).

Observational methods (e.g., drop and tow cameras, divers, ROVs, etc.) were suggested as alternatives to trawl surveys. Observational methods are good alternatives for shallow/coastal MPAs and are useful in data poor areas where caution should be exercised due to lack of knowledge. It was mentioned that observational methods can be a good alternative for sampling

benthic epifauna, but they are less useful for sampling sediment species and pelagic fish; therefore, visual methods may not be the best alternative for multispecies surveys. Spatial and temporal modelling can also be used to predict species abundance and distribution, including movement of species. Although there are options for alternate survey methods there are certain data that can only be reliably obtained from trawl surveys, such as age distribution and life history data.

Survey effort in closed areas could be reduced by limiting the number of hauls allowed within a closed area. Gear type and/or methods could also be altered within a closed area to reduce impact on benthic components, while keeping the standard gear type and/or methods in locations outside the closed area. However, a major consideration for modifying survey protocols and design involves the standardization or calibration of abundance indices when changing gear types or survey methods. Proper calibration is necessary for the continuation of data collection for time series.

Participants agreed that the purpose of the survey should be factored into the framework. For example, a DFO science survey to assess conservation objectives should be given special consideration.

Participants also raised the issue of increasing MPA/other measures coverage; therefore, it may not be possible to exclude scientific surveys from all closed areas without compromising stock assessment and ecosystem monitoring knowledge.

TOR 4. GUIDANCE ON APPLYING THE FRAMEWORK TO SPECIFIC CASES

The discussion referred to the case study document distributed prior to the meeting. A summary was presented by Hugues Benoit (Research scientist, Science Branch, Quebec Region).

Points of discussion

The framework developed is intended to provide information gathered by Science to managers to make decisions. The goal of the framework is for it to be used for information purposes only; it is not intended to be a decision making framework. In order to make the most informed decision possible the managers of all programs (e.g., Oceans Management, Fisheries Resource Management) that are potentially affected by the decision must consider all scientific surveys (DFO and external proponents) proposed in an area to consider the cumulative impacts of the surveys before making a management decision.

It was suggested that ongoing annual surveys would not need to be assessed yearly; however, scientists would have to either resubmit or amend their proposals when proposing changes to sampling locations. Further consideration is needed to determine how long an annual survey would be approved for and exactly which changes will require resubmission or amendments to the proposal.

For proposed surveys in new, unknown, and/or data poor areas there is a need to apply a precautionary approach to sampling. It was also suggested that proponents consider alternate gear ahead of proposing a destructive survey in any location and justify why the use of destructive survey methods are necessary.

DEVELOPMENT OF THE FRAMEWORK

The co-chair prepared a draft of the information that would be required of DFO Science in order for management to consider authorizing surveys in protected areas. The draft was presented in the afternoon of the second day. Based on discussions, revisions were made, sections were

added, and a second draft was developed for consideration by the participants during the third day.

During the morning of the third day of the meeting, the second draft of the framework of information was reviewed by all participants and modifications to the elements were made. In its draft form, the framework was agreed by participants as the essential information elements that would be required from Science by management for their decision-making process.

COMPLETION OF THE SCIENCE ADVISORY PROCESS

In the afternoon of the third day, the skeleton of the science advisory report, elements in bullet points for sections of the advisory report, and a summary in bullet points of the conclusions were reviewed and agreed by the meeting participants.

Prior to the close of the meeting, the co-chairs identified timelines for completing the peer review process. The process and schedule that resulted in the completion of the science advisory report are summarized below.

1. Jan. 30, 2018: draft advisory report sent from co-chair to core team from Science for completion.
2. Feb. 9, 2018: WEBEX call was convened with core team from science and co-chairs to complete the draft report prior to distributing to meeting participants.
3. Feb. 13, 2018: draft science advisory report circulated to meeting participants for their review, requested a return of comments and edits by Feb. 27, 2018.
4. Feb. 27, 2018: comments and edits were received from eight participants.
5. March 19, 2018: revisions to science advisory report were completed and approved by the co-chairs.
6. June 1, 2018: Science advisory report approved by DFO Science.
7. Aug. 22, 2018: Science advisory report (in both official languages) posted on the CSAS website.

Revisions to the working paper were completed, approved by the co-chairs, and the research document has been posted on the CSAS website.

Due to the late completion of this proceedings report, the content reflects the summary prepared by the rapporteurs (Caroline Longtin and Venitia Joseph), which was subsequently reviewed and edited much later by only the co-chairs.

APPENDICES

APPENDIX I. LIST OF MEETING PARTICIPANTS

Name	Affiliation
Lisa Settingington (co-chair)	DFO Science, National Capital Region
Gérald Chaput (co-chair)	DFO Science, Gulf Region
Jacinthe Amyot	DFO Oceans, Pacific Region
Sean Anderson	DFO Science, Pacific Region
Hugues Benoît	DFO Science, Quebec Region
Don Clark	DFO Science, Maritimes Region
Anya Dunham	DFO Science, Pacific Region
Nick Duprey	DFO Science, National Capital Region
Evan Edinger	Memorial University
Geneviève Faille	DFO Science, Quebec Region
Susanna Fuller	Ecology Action Centre
Diana Gonzalez Troncoso	Northwest Atlantic Fisheries Organization (NAFO), Spain
Beth Hiltz	DFO Resource Management, Central and Arctic Region
Venitia Joseph	DFO Science, Gulf Region
Ellen Kenchington	DFO Science, Maritimes Region
Mariano Koen-Alonso	DFO Science, Newfoundland Region
Caroline Longtin	DFO Science, National Capital Region
Paul Macnab	DFO Oceans, Maritimes Region
Andrew Majewski	DFO Science, Central and Arctic Region
Emilie-Pier Maldemay	DFO Oceans, National Capital Region
Amy Mar	DFO Resource Management, Pacific Region
Denise Méthé	DFO Science, Gulf Region
Andrea Morden	DFO Resource Management, Quebec Region
Liisa Peramaki	DFO Science, National Capital Region
Monik Richard	DFO Oceans, Gulf Region
Rick Rideout	DFO Science, Newfoundland Region
Jason Simms	DFO Resource Management, Newfoundland Region
Stephen Snow	DFO Oceans, Newfoundland Region
Doug Swain	DFO Science, Gulf Region
Kris Vascotto	Groundfish Enterprise Allocation Council (GEAC)
Wojciech Walkusz	DFO Science, Central and Arctic Region
Vonda Wareham	DFO Science, Newfoundland Region

APPENDIX II. TERMS OF REFERENCE

Framework to support decisions on authorizing scientific surveys with bottom contact gears in protected areas with defined benthic conservation objectives

National Peer Review

**January 16-18, 2018
Ottawa, Canada**

Chairperson: Lisa Setterington and Gérald Chaput

Context

The Government of Canada committed to and accomplished increasing the protected coastal and marine areas of Canada from 1% to 5% by 2017, and are on the way to achieving 10% by 2020, as part of the agreed Aichi Biodiversity Target 11. To achieve this goal, networks of marine protected areas and other effective area based conservation measures are being implemented. Many of these protected areas have valued benthic components with defined conservation objectives. Sensitive benthic area closures, such as coral and sponge conservation areas, are part of the other effective area based conservation measures being considered. The development of coral and sponge conservation areas is intended to facilitate the conservation and protection of cold water coral and sponge communities and their habitats.

A number of marine protected areas and existing and proposed sensitive benthic area closure boundaries overlap with historical fishing areas and scientific survey areas that provide information for the assessment of Canadian fish stocks by Fisheries and Oceans Canada (DFO). The fishing industry may be prohibited from using bottom contact fishing gears in marine protected areas that include benthic conservation objectives or other conservation closures for sensitive benthic areas. In many DFO regions, scientific surveys using bottom contact gears have been conducted for several decades in recently defined protected areas and data from these surveys are the foundation of the species specific and ecosystem assessments that have been used to identify the valued ecosystem components and the sensitive benthic areas currently being defined by the Government of Canada.

DFO Oceans Management has requested advice on the conditions under which scientific research surveys with bottom contact gears may be authorized for sampling in protected areas with defined benthic conservation objectives. If bottom contact scientific research surveys are to be allowed in these areas, an assessment of the impact of the activities on the defined conservation objectives and the importance of including / excluding the protected areas within the scientific survey protocols are required. The question is to what extent the current science research survey practices will have to be adapted to mitigate the damage caused by bottom contacting mobile trawls or other related science survey activities when sampling in protected areas with defined sensitive benthic features.

The impacts of scientific surveys on the sensitive benthic areas and the importance of the protected area to the integrity of the historical time series from the scientific survey will be case specific. The decision on whether or not bottom contact scientific surveys will be authorized in these protected and sensitive benthic areas is the responsibility of DFO Oceans Management. To assist in this decision making process, DFO Science proposes to develop a national framework with an agreed set of assessment criteria that can be applied consistently across Canada to assess existing and proposed scientific activities for their impact to the benthic components of protected areas and sensitive benthic areas and to assess the time series value of the scientific survey designs and protocols that include sampling in these protected areas.

Objectives

The objectives of the science peer review meeting are to develop a framework that can be used to assess the impacts of scientific surveys in protected areas and sensitive benthic areas relative to the broader ecosystem information value of the scientific surveys. The development of the framework would benefit from specific case study assessments to ensure workability and appropriateness of the framework. Specifically, the meeting will review:

- development of descriptors of the features of the important benthic components that are vulnerable to the bottom contact gears; these could include sensitivity to disturbance (structure), mobility, resilience, generation time, etc.;
- development of criteria to assess scale and scope of impact of the scientific activity (for example proportion of protected area potentially impacted, frequency of surveys, seasonality, type of gear used), including the impact on achieving conservation goals;
- development of criteria to assess the consequences of excluding / modifying survey protocols and design on the integrity of the time series information and reliability of harvest advice on ecosystem components under study. This also includes the consequences of excluding / modifying survey protocols on monitoring valued benthic and ecosystem components in the protected area; and
- guidance on applying the framework to specific cases.

Expected Publications

- Science Advisory Report
- Proceedings
- Research Documents

Participation

- Fisheries and Oceans Canada (DFO) (Ecosystems and Oceans Science, Ecosystems and Fisheries Management)
- Academia
- Invited experts

APPENDIX III. AGENDA

Time	Subject	Lead
Tuesday January 16, 2018		
9:00 – 9:30	Meeting room open	
9:30 – 10:00	Welcome, Introduction, Review ToR, Agenda	Chairs
10:00 – 10:50	Overview of policies, conservation law, permitting authorities and assessment frameworks	Paul Macnab
10:50 – 11:00	Break	
11:00 – 12:15	TOR 1: descriptors of the features of the important benthic components that are vulnerable to the bottom contact gears - discussion, questions	Hugues Benoît All
12:15 – 13:15	Lunch Break	
13:15 – 15:00	TOR 1 (follow-up if necessary) TOR 2: criteria to assess scale and scope of impact of the scientific activity including the impact on achieving conservation goals; - discussion, questions	All Hugues Benoît All
15:00 – 15:20	Break	
15:20 – 16:50	TOR 2 : discussion continued	All
16:50 – 17:00	First day summary, tasks for day 2	Chairs
Wednesday January 17, 2018		
Time	Subject	Lead
9:00 – 9:15	Summary of day 1, outstanding questions from day 1	Chairs
9:15 – 12:15	TOR 3: criteria to assess the consequences of excluding / modifying survey protocols - discussion, questions	Hugues Benoît All
12:15 – 13:15	Lunch Break	
13:15 – 15:00	Review draft framework	All
15:00 – 15:20	Break	
15:20 – 16:50	Continue review / development of draft framework - application of case study	All
16:50 – 17:00	Second day summary, tasks for day 3	Chairs
Thursday January 18, 2018		
Time	Subject	Lead
9:00 – 9:15	Summary of day 2, outstanding questions from day 1	Chairs
9:15 – 10:30	Continue review of draft framework - application of case study	All
10:30 – 10:45	Break	
10:45 – 12:15	Review, edit draft text of SAR	All
12:15 – 13:15	Lunch Break	
13:15 – 15:45	Review, edit draft text of SAR	All
15:45– 16:00	Meeting wrap-up, next steps	Chairs