Fisheries and Oceans Canada | Pêches et Océans Canada
Ecosystems and Oceans Science | Sciences des écosystèmes et des océans

Canadian Science Advisory Secretariat (CSAS)

Proceedings Series 2021/051

National Capital Region

Proceedings of the National Advisory Meeting on the Evaluation of Existing Risk Assessment Methods for Granting Ballast Water Management Exemptions

Meeting dates: February 23–25, 2021
Location: Virtual Meeting

Chairperson: Thomas Pratt
Editors: Sarah Bailey, Dawson Ogilvie, Stephanie Sardelis, and Alex Tuen

Fisheries and Oceans Canada
200 Kent Street
Ottawa, ON K1A 0E6

November 2021

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.

Published by:

Fisheries and Oceans Canada
Canadian Science Advisory Secretariat
200 Kent Street
Ottawa ON K1A 0E6

http://www.dfo-mpo.gc.ca/csas-sccs/
csas-sccs@dfo-mpo.gc.ca

ISSN 1701-1280
ISBN 978-0-660-40911-5 Cat. No. Fs70-4/2021-051E-PDF

Correct citation for this publication:

DFO. 2021. Proceedings of the National Advisory Meeting on the Evaluation of Existing Risk Assessment Methods for Granting Ballast Water Management Exemptions; February 23–25, 2021. DFO Can. Sci. Advis. Sec. Proceed. Ser. 2021/051.

Aussi disponible en français :

MPO. 2021. Compte rendu de la réunion consultative nationale sur l'Évaluation des méthodes existantes d'évaluation des risques pour l'octroi de dérogations en matière de gestion des eaux de ballast; du 23 au 25 février 2021. Secr. can. de consult. sci. du MPO. Compte rendu 2021/051.

TABLE OF CONTENTS

SUMMARY IV

INTRODUCTION 1

EVALUATION OF EXISTING RISK ASSESSMENT METHODS FOR GRANTING BALLAST WATER MANAGEMENT EXEMPTIONS 1

- CONTEXT ON STANDARDS AND PROCEDURES FOR GRANTING EXEMPTIONS 1
- THE JOINT HARMONIZED PROCEDURE METHOD 1
- RESULTS AND RECOMMENDATIONS FOR THE JOINT HARMONIZED PROCEDURE 2
- THE SAME RISK AREA APPROACH 3
- RESULTS AND RECOMMENDATIONS FOR THE SAME RISK AREA APPROACH 3
- GENERAL DISCUSSION AND OTHER CONSIDERATIONS 4

APPENDIX 1: TERMS OF REFERENCE 5

APPENDIX 2: AGENDA 7

APPENDIX 3: LIST OF PARTICIPANTS 8

SUMMARY

These Proceedings summarize discussions, recommendations, and conclusions from the Canadian Science Advisory Secretariat National Advisory Meeting held February 23–25, 2021. Canada is a signatory to the International Convention for the Control and Management of Ships' Ballast Water and Sediments, where Regulation A-4 of the Convention allows Canada to exempt ships from requirements to manage ballast water for up to five years, based on certain conditions. These include a scientifically robust risk assessment that can distinguish between unacceptable high-risk scenarios and acceptable low-risk scenarios with respect to Canada's environment, human health, property and resources. A working paper was produced to review two existing risk assessment methods (Joint Harmonized Procedure and Same Risk Area) that assess the environmental requirements of ballast water management exemptions. The purpose of this virtual meeting was to peer review the working paper and provide recommendations on suitable risk assessment methods to assess exemptions from ballast water management in waters under Canadian jurisdiction.

The meeting participants concluded that both the Joint Harmonized Procedure and Same Risk Area are suitable risk assessments, but that each method should be conducted following the recommended modifications and minimum requirements to address identified weaknesses.

INTRODUCTION

During February 23–25, 2021, a virtual National Advisory Meeting was held to peer review the *Evaluation of Existing Risk Assessment Methods for Granting Ballast Water Management Exemptions*. This National Advisory Meeting provided science advice on the recommended risk assessment methods for assessing ballast water management exemption applications in waters under Canadian jurisdiction (see Terms of Reference in Appendix 1 for details).

The National Advisory Meeting commenced with the Chairperson providing an overview of the Canadian Science Advisory Secretariat (CSAS) peer review process and agenda of the meeting. Transport Canada (client) provided context on the request for science advice, such that Transport Canada requires an acceptable method to evaluate the environmental requirements of ballast water management exemptions. The Chairperson presented the Terms of Reference (Appendix 1), wherein the objective of the meeting was to evaluate two existing risk assessment methods (Joint Harmonized Procedure and Same Risk Area) to determine the recommended methods to be used to assess exemption applications. Meeting participants included experts from Fisheries and Oceans Canada (DFO), Transport Canada, academia, and stakeholders from industry (Appendix 3).

The Science Advisory Report and supporting Research Document will be posted on the Fisheries and Oceans Canada (DFO) Science Advisory Schedule as they become available.

EVALUATION OF EXISTING RISK ASSESSMENT METHODS FOR GRANTING BALLAST WATER MANAGEMENT EXEMPTIONS

CONTEXT ON STANDARDS AND PROCEDURES FOR GRANTING EXEMPTIONS

Context was provided for the study, including the International Maritime Organization's (IMO) standards and procedures for granting ballast water management exemptions. The Joint Harmonized Procedure and Same Risk Area risk assessment methods were introduced. The objective of the study was reviewed, which was to evaluate the risk assessments by conducting a literature review and applying these methods to Canadian case studies.

One participant commented on the importance of providing clear definitions of terminology used in the risk assessments (e.g., survival, establishment, species of concern, risk) to ensure that the assessments are conducted in a consistent manner. The authors agreed to use clear, consistent terminology throughout the working paper.

THE JOINT HARMONIZED PROCEDURE METHOD

The steps of the Joint Harmonized Procedure risk assessment method were presented, including conducting port surveys to create port species lists, selecting species of concern (hereafter known as target species) for risk assessment, and using a decision tree to evaluate the risk of transferring ballast water from the source to recipient port. The methods used in the Joint Harmonized Procedure case study were summarized, which evaluated the risk associated with transferring ballast water from Boston, USA, to Saint John, Canada.

A participant suggested to specify the preferred method(s) of identifying organisms sampled during port surveys (e.g., morphological or molecular techniques). Since there are both strengths and weaknesses to each taxonomic method, the group agreed that either method can be used to identify organisms, provided that organisms are accurately identified to the species level. Furthermore, applicants will need to provide a quality assurance plan for data collection

and analysis to ensure that the data are of sufficient quality to evaluate the risk associated with ballast water transfers.

The target species selected for risk assessment can greatly influence the outcome of the assessment. Therefore, participants agreed that the target species criteria must be clear and concise, including the required severity of negative impact for a species to be selected as a target species. Additionally, a participant recommended to utilize detailed species-specific risk assessments conducted by DFO to select target species (when possible), due to the considerable effort required to evaluate the impact of nonindigenous species with high certainty. This concern is addressed in the Science Advisory Report.

There were discussions on whether nonindigenous species with unknown impact should be selected as target species as a precautionary measure. Since the impact of many nonindigenous aquatic species (e.g., marine invertebrates) are poorly studied, selecting these species would almost certainly guarantee a high-risk outcome in the decision tree. Therefore, the authors suggested using an evidence-based approach to evaluate the impact of species by selecting those that cause noticeable, measurable impact.

RESULTS AND RECOMMENDATIONS FOR THE JOINT HARMONIZED PROCEDURE

The results of the Boston-Saint John case study were summarized. Additionally, the advantages, limitations, and uncertainties of the Joint Harmonized Procedure were described, and draft recommendations for a Canadian version of this risk assessment method were proposed.

A participant proposed to include a preliminary assessment of target species to the Joint Harmonized Procedure using existing data obtained from literature or databases. Utilizing existing data can help to inform the applicant on whether an exemption is unlikely to be granted due to the presence of target species at the source port, before detailed port surveys are conducted. The group agreed to include a pre-screening literature-based assessment as the first step of the adapted Joint Harmonized Procedure.

The target species criteria used in the Joint Harmonized Procedure were developed to create a regional target species list to simplify and standardize the selection of target species across exemption applications. There were discussions on whether a pre-selected target species list should be created for each Canadian region. Since Canada may receive exemption applications for inter-regional shipping routes, the group concluded to adapt the target species criteria to be used on a port-by-port basis. Additionally, target species would be selected by the applicant using the adapted target species criteria.

The high or low risk determination in the Joint Harmonized Procedure’s decision tree is based on the salinity difference between ports and target species that are at the source port, but not at the recipient port. There was concern that the decision tree does not account for establishment of euryhaline species and other environmental conditions that may influence the establishment of species at the recipient port. The group agreed to modify the decision tree by including a question that assesses the survival of target species in the recipient port based on their physiological tolerances to salinity and temperature.

The participants were also concerned that the full range of environmental conditions (temperature and salinity) at ports may not be captured by recording the conditions during two sampling visits. Therefore, the group decided that the environmental data used in Canadian risk assessments should at minimum include monthly temperature and salinity data from surface

and bottom depths. Additionally, a participant recommended that the environmental data could be obtained from world ocean databases, if available.

THE SAME RISK AREA APPROACH

The Same Risk Area approach, which is the delineation of highly connected areas where target species are likely to disperse unassisted and establish throughout the area, regardless of their dispersal by ballast water, was introduced. The dispersal of individuals is determined using a biophysical model that simulates the transport of pelagic organisms via water circulation. This assessment can be conducted on either individual target species (species-specific approach) or a range of traits applicable to a variety of species (trait-based approach). The methods of the Same Risk Area case study assessing the natural connectivity between ports within the Gulf of the St. Lawrence were summarized.

There were comments regarding the depth preference (0 – 100 meter) of larvae used in the model, as the larvae of most species remain in the mixed upper layer (10 – 20 meter depth). The authors stated that the depth preference was chosen to include a broad range of species, since some larvae remain at depths below the mixed upper layer. Participants commented on the effect that mortality of larvae would have on port connectivity, if included in the model. The authors responded that although mortality can be included in the model, mortality was not considered to examine the maximum potential natural dispersal rate of larvae. Participants discussed whether the mortality of larvae should be included in the Same Risk Area guidelines.

Participants requested that the port connectivity metrics used in the model be clarified with supporting rationale. The authors clarified that the connectivity metrics indeed measured the exchange of larvae between ports and the metrics were expressed as percentages because the number of larvae released was known.

There were comments on the feasibility of setting a threshold between high and low connected ports to help inform the exemption decision-making process. The group determined it would not be feasible to define a specific threshold for port connectivity during the CSAS meeting due to time constraints. However, it was agreed to include a general statement describing high connectivity between ports in the Science Advisory Report and working paper, providing guidance on the interpretation of port connectivity results.

It was noted that the Same Risk Area assessment was applied to the Boston-Saint John case study, but this port pair was excluded from the working paper since no larvae reached Saint John. The participants requested to include the results of this case study in the working paper to provide a direct comparison to the outcome of the Joint Harmonized Procedure. The authors agreed to include these results in the working paper.

RESULTS AND RECOMMENDATIONS FOR THE SAME RISK AREA APPROACH

The results of the Same Risk Area case study were summarized. The advantages, limitations, and uncertainties of the Same Risk Area approach were presented, and draft recommendations for a Canadian Same Risk Area approach were described.

A participant requested that the results of the Same Risk Area case study include assessment of connectivity between ports within the network, rather than the connectivity across the entire network. This would help guide the interpretation of connectivity between neighbouring ports, building towards the overall connectivity across the network. The authors agreed to provide a more detailed explanation of the port connectivity results in the working paper.

GENERAL DISCUSSION AND OTHER CONSIDERATIONS

There were discussions on the recommended risk assessment methods to be used to assess exemption applications in Canada. The group concluded that both the Joint Harmonized Procedure and Same Risk Area approach are suitable risk assessment methods, but that each should be conducted following the recommended modifications and minimum requirements to address identified weaknesses. Participants also commented on the situations when each method is likely to be used, which are described in the Science Advisory Report.

The group determined that the Same Risk Area assessment could be conducted following a high-risk outcome from the Joint Harmonized Procedure's decision tree, assessing whether the target species are likely to naturally disperse to the recipient port. The results of the Same Risk Area assessment can overrule the high-risk outcome of the decision tree if the ports are highly connected for the assessed target species.

One participant suggested that applicants could submit a notice of intent during the early stages of the exemption application process to consult regional experts and review the methods to be used in the risk assessment. The participants concluded that a notice of intent should be submitted before conducting port surveys or port connectivity modelling. Additionally, the authors recommended that an independent peer review should be undertaken on completed exemption applications though the CSAS process to evaluate the data and methods used in the risk assessment.

A participant commented that most exemption requests are expected to be relatively short distance domestic or international transits, but ship owners may also want to apply for one-time exemption requests. The authors suggested that for one-time requests, ships could use alternative approaches to manage their ballast water, such as discharge to shore or brine treatment.

There were discussions on whether the risk assessments should include ships' ballast water operations (e.g., volume and frequency of ballast water transfers, days in transit) that influence the probability of establishment. Although the IMO recommends including information on ships' ballast water operations in exemption applications, there is currently insufficient data to quantify the likelihood of establishment based on propagule pressure. Therefore, these factors were not considered as part of the recommended risk assessment methods.

Concerns were raised about withdrawing an exemption if a nonindigenous species spreads to the donor port during the exemption period, as the species could potentially be transported to the recipient port by ballast water. The authors suggested that the exemption should be reassessed using either recommended risk assessment method to determine whether the exemption should be withdrawn. A participant noted that a sudden withdrawal of an exemption may unfairly affect the ship owner because they would not be allowed to conduct ballast operations until an onboard ballast water management system is installed. The authors stated that the risk-reward associated with applying for an exemption should be clearly described in the Science Advisory Report, and that relatively few exemptions are expected to be granted.

APPENDIX 1: TERMS OF REFERENCE

Evaluation of Existing Risk Assessment Methods for Granting Ballast Water Management Exemptions

National Advisory Meeting — National Capital Region

February 23–25, 2021

Virtual Meeting

Chairperson: Thomas Pratt

Context

Transport Canada regulates the ballast water of ships to mitigate the risks of introducing and spreading harmful aquatic species in Canada's waters. Transport Canada's ballast water policy and regulatory program is supported by DFO science advice. In 2010, Canada acceded to the International Convention for the Control and Management of Ships' Ballast Water and Sediments (the Convention) and, in June 2019, Canada's proposed ballast water regulations to implement the Convention in Canada were pre-published in the Canada Gazette 1.

Regulation A-4 of the Convention allows Canada to exempt ships from requirements to manage ballast water for up to five years, based on certain conditions. These include a risk assessment based on the International Maritime Organization's G7 Guidelines for Risk Assessment, which calls for a scientifically robust assessment that can distinguish between unacceptable high-risk scenarios and acceptable low-risk scenarios with respect to Canada's environment, human health, property and resources. Additionally, exemptions must not impair or damage the environment, human health, property or resources of adjacent or other states.

Canada's proposed regulations include this exemption provision. Because unmanaged ballast water discharges have been found to pose a high risk in all areas of Canada, Transport Canada does not anticipate that Canada would grant large numbers of exemptions. However, Transport Canada intends to accept applications from vessel owners for exemptions that meet the requirements of the Convention. These applications would be considered on a case-by-case basis. Transport Canada intends to develop guidelines for applicants, and envisions that applications would be reviewed in conjunction with Fisheries and Oceans Canada.

At this time, Transport Canada is seeking science advice to support its development of a Canadian regime for accepting and assessing exemption applications that protects Canada's environment and is fair to industry. Specifically, DFO is asked to provide science advice related to methodologies that may be used to evaluate the risk of granting ballast water exemptions in waters under Canadian jurisdiction.

Objectives

The objective of this science advisory process is to:

Conduct an evaluation of two ballast water risk assessment methods previously considered by the International Maritime Organization by conducting a literature review and applying the selected methods to case studies in Canada to:

a. Identify advantages, limitations and uncertainties of each risk assessment method;

b. Identify circumstances under which the risk assessment may not adequately assess the risk of ballast water; and,

c. Identify recommended method(s) of risk assessment to be used in ballast water management exemption applications within Transport Canada's regime for accepting and assessing exemption applications.

Expected Publications

- Research Document
- Science Advisory Report
- Proceedings Document

Expected Participation

- Fisheries and Oceans Canada
- Transport Canada
- Industry
- Academia
- International

APPENDIX 2: AGENDA

National Science Advice on the Evaluation of Existing Risk Assessment Methods for Granting Ballast Water Management Exemptions

Virtual Peer Review Meeting

February 23–25, 2021

Chair: Thomas Pratt

February 23, 2021		
11:00 – 11:15	Welcome, roll call, CSAS overview, and meeting process	Chair
11:15 – 11:30	Request for advice and context	Colin Henein
11:30 – 11:45	Terms of Reference	Chair
11:45 – 12:00	Introduction: International Maritime Organization's Ballast Water Management Convention and existing risk assessment methods	Sarah Bailey
12:00 – 12:15	Break	-
12:15 – 14:00	Joint Harmonized Procedure: Methods (Q&A); results and case studies (Q&A); assessment and recommendations (Q&A)	Dawson Ogilvie

February 24, 2021		
11:00 – 11:05	Brief welcome and roll call	Chair
11:05 – 12:55	Same Risk Area Approach: Methods (Q&A); results and case studies (Q&A); assessment and recommendations (Q&A)	Dawson Ogilvie
12:55 – 13:10	Break	-
13:10 – 13:40	General discussion period	Chair
13:40 – 14:00	Present draft Science Advisory Report	Chair

February 25, 2021		
11:00 – 11:05	Brief Welcome and roll call	Chair
11:05 – 13:00	Draft Science Advisory Report discussion: Advantages, limitations, knowledge gaps, and uncertainties; conclusions and recommendations; and summary bullets	Chair
13:00 – 13:15	Break	-
13:15 – 13:45	Exemption checklist	Dawson Ogilvie
13:45 – 14:00	Outstanding items and closing remarks	Chair

APPENDIX 3: LIST OF PARTICIPANTS

Name	Organization/Affiliation
Alex Tuen	DFO Science, National Capital Region
Chris Mckindsey	DFO Science, Québec Region
Claudio DiBacco	DFO Science, Maritimes Region
Colin Henein	Transport Canada
Cynthia McKenzie	DFO Science, Newfoundland and Labrador Region
Daniel Côté	Groupe Desgagnés
Daniel Michaud	Transport Canada
Dawson Ogilvie	DFO Science, Ontario and Prairie Region
Joël Chassé	DFO Science, Gulf Region
Kim Howland	DFO Science, Ontario and Prairie Region
Mario Tamburri	University of Maryland Center for Environmental Science
Nathalie Simard	DFO Science, Québec Region
Okko Outinen	Finnish Environment Institute SYKE
Paul Mudroch	Transport Canada
Rémi Daigle	DFO Science, Maritimes Region
Sarah Bailey	DFO Science, Ontario and Prairie Region
Stephanie Sardelis	DFO Science, National Capital Region
Thomas Pratt	DFO Science, Ontario and Prairie Region
Thomas Therriault	DFO Science, Pacific Region