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Sciences des écosystèmes  
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## **Canadian Science Advisory Secretariat (CSAS)**

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**National Capital Region**

### **Proceedings of the National Advisory Meeting on Science advice on the use of Timing Windows as a mitigation measure**

**February 14–17, 2022  
Virtual Meeting**

**Chairpersons: Mike Bradford and Karin Ponader**

**Editors: Alex Tuen, Karin Ponader, Jon Midwood, Sean Naman, Douglas Braun, Tyler  
Tunney, and Kelly Code**

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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**

These Proceedings summarize the relevant discussions and key conclusions that resulted from the Fisheries and Oceans Canada (DFO) Canadian Science Advisory Secretariat (CSAS) National Advisory Review Meeting on the use of timing windows as a mitigation measure to prevent or reduce the likelihood that potentially harmful impacts of works, undertakings, and activities (WUAs) will occur on fish and fish habitat.

This meeting was originally planned to be held virtually February 14–17, 2022, though the meeting was successfully completed February 14–16 without needing to convene February 17.

The science advice will assist DFO's Fish and Fish Habitat Protection Program (FFHPP) in the development of a science-based framework that could be used to guide the creation, modification, use, and assessment of timing windows.

The conclusions and advice resulting from this meeting are provided in the form of a Science Advisory Report which is available on the CSAS website. The supporting Research Document reviewed and discussed at the meeting is also available on the CSAS website.

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## INTRODUCTION

A Canadian Science Advisory Secretariat (CSAS) National Peer Review Meeting was held virtually February 14–16, 2022 to review the use of timing windows as a mitigation measure. Timing windows define periods in the annual cycle when works, undertakings, or activities (WUAs) can occur with low risk of harm to fish and fish habitat. The process was successfully completed in three days and therefore it was not required to re-convene on February 17, 2022 (as originally planned). The agenda was adjusted accordingly during the meeting to accommodate for this schedule change.

Participants included Fisheries and Oceans (DFO) staff from various sectors as well as external experts, who introduced themselves at the start of the meeting (Appendix 3). The Chairs provided an overview of the CSAS policies, reviewed the Terms of Reference and the meeting Objectives (Appendix 1) that served as the foundation for this CSAS process, and reviewed the Agenda (Appendix 2).

The meeting Objectives were outlined as follows:

1. Review and synthesize examples of the use of timing windows to mitigate impacts to fish and fish habitat. This review will assist in the development of new timing windows, or the refinement of existing ones, and their application. The review may include, but is not limited to:
  - a. Scientific studies that provide the ecological rationale for the use of timing windows, effectiveness studies, and frameworks or decision tools that contributed to the development of timing windows.
  - b. Considerations and rationale used by other agencies (i.e., other governments and organizations) that may have contributed to the development, application, and evaluation of timing windows.
2. Develop a standardized nationally-applicable set of criteria and/or scientific principles that should be considered in the development of a risk-based framework to guide the creation of effective timing windows, modification/refinement of existing timing windows, and their use.
3. Provide advice on the design of studies to evaluate the effectiveness of timing windows. This may include research, monitoring, or modelling approaches.

DFO Fish and Fish Habitat Protection Program (FFHPP) provided context for their Request for Science Advice and for this CSAS process. FFHPP has a regulatory review process in place to assist proponents to remain compliant with relevant provisions under the *Fisheries Act* and the *Species at Risk Act*. Works, undertakings, and activities (WUAs) in or near water are reviewed to determine the risk that they may have harmful impacts on fish and fish habitat. Linkages are made between the WUAs, the pressure by which WUAs affect the ecosystem, and the resulting endpoints for fish and fish habitat (Pathways of Effects or POEs). Mitigation and/or avoidance measures may then be proposed to reduce the pressure, or break links between pressure and endpoints, and to manage the impacts. FFHPP is seeking science advice on the effectiveness of timing windows as a measure to mitigate pressures resulting from WUAs in freshwater, estuarine, and coastal environments.

Timing windows are one of several standard mitigation measures that may be incorporated in a Letter of Advice or *Fisheries Act* Authorization, or included in Standards and Codes of Practice. In most cases, establishing timing windows is a collaborative effort with provinces or territories. The purpose of this exercise is to be better positioned to work with them in establishing additional windows where gaps exist, modifying windows when necessary, and updating them

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based on evolving environmental conditions. This is part of the overall effort to ensure that tools to assist federal decision-making are developed based on the best available science.

The advice generated by this process will assist FFHPP in the development of a science-based framework that could be used to guide the creation, modification, use, and assessment of timing windows. That framework will assist FFHPP to:

1. Rationalize use of timing windows within FFHPP regulatory tools.
2. Develop an approach for consistent scientifically defensible risk-based application of timing windows within FFHPP regulatory tools.
3. Monitor and improve application of timing windows over time.
4. Regularly update/amend timing windows to account for changes to the environment (such as climate change) or species status in collaboration with other jurisdictions as applicable.
5. Fill gaps and ensure a full nation-wide contingent of timing windows.

A Working Paper was prepared and distributed to all participants prior to the meeting and formed the basis of meeting discussions. Two participants (Doug Watkinson and Colin Lake) were asked in advance of the meeting to provide formal reviews of the Working Paper and to provide their reviews at the meeting to facilitate the peer-review process. The authors of the Working Paper presented an overview of the outcomes of the Working Paper respective to each meeting Objective which was then followed by questions and comments from the formal reviewers as well as the other meeting participants. After review and discussion and having reached scientific consensus, a Science Advisory Report was drafted and the Research Document was revised to address comments from the meeting. These documents are available on the CSAS website. The general discussions that were held respective to each Objective are summarized below.

## **OBJECTIVE #1: REVIEW OF LITERATURE, AND AGENCY APPROACHES TO TIMING WINDOWS**

### **PRESENTATION**

Presenter: Tyler Tunney, Working Paper author

This presentation covered an introduction to the Working Paper and a summary of the results from the literature review that formed the basis of chapter 4 and 5. The presentation focused on the following components:

- The definition of the term “timing window”; the definition of “effectiveness of a mitigation”; and definition of “effectiveness of a timing window”.
- A summary of the literature review on the use of timing windows, including the methodology used and an overview of the results including literature trends, rationale, evaluation/effectiveness, and frameworks.
- A review of the current Canadian timing windows.

### **REVIEWER COMMENTS**

Reviewer: Doug Watkinson

- The main takeaway was that while the issues on the complex questions related to impacts are difficult to quantify, they were well summarized in the Working Paper. The discussion

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centered around flow and water level management, which is not commonly considered by the provinces in the establishment of timing windows. During the literature review, the authors did not find any information on the use of timing windows for flow or water level management and therefore it was not specifically addressed in the Working Paper. The meeting Chair recommended that the Science Advisory Report could include a comment on how the principles outlined under Objective #2 apply to flow also and that the considerations might be of value for flow management as well as construction management.

- Figure 6 in the Working Paper was important to revisit to capture findings according to the available scientific publications.

Reviewer: Colin Lake

- Overall the Working Paper was comprehensive and well written. It was noted that the paucity of research on timing windows available in the literature further illustrates the need for this CSAS review. The observation that the majority of literature reviewed related to timing windows were focused on dredging was not a surprise to either the reviewer or the meeting participants as this is a common WUA. The Working Paper reflects that there is a lack of information and many variables to consider. Provinces provide their perspectives and challenges, which do not make it easy to arrive at generalizations for establishing timing windows.
- “Timing window” and “restricted activity period” are clearly distinguished which is helpful because they are often used interchangeably.
- Approaches are diverse, therefore the similarities and differences should be investigated to arrive at the best practices and lessons learned.

## **DISCUSSION AND SUMMARY OF KEY POINTS**

- The discussion centered around the large variability in timing windows among provinces with limited scientific documentation for their development, limited availability of information about the marine environment, and a lack of monitoring studies related to the effectiveness of timing windows. FFHPP’s monitoring of timing windows is generally focused on compliance monitoring. Discussion on monitoring was reserved for later in the agenda under Objective #3.
- Participants noted that information on marine timing windows in some provinces (e.g., Quebec and British Columbia) is limited but available, and that a reference to any existing marine timing windows should be included in the Working Paper if possible.
- The Working Paper clearly outlines that the information that could be gathered from the literature search was not highly detailed but was summarized to the extent possible. The material was not easily accessible, making it difficult to determine a clear intent and rationale for the establishment of specific timing windows and the data that underlie their development.
- It was stated that the definition of the terminology used in this process is important. Meeting participants felt that it was positive that it was clarified at the beginning of the Working Paper that “timing window” describes a period when work can occur versus “restricted activity period” or “exclusion windows” being the opposite.

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## **OBJECTIVE #2: CONSIDERATIONS FOR THE DEVELOPMENT OF A STANDARDIZED NATIONALLY APPLICABLE SET OF CRITERIA FOR THE CREATION OF EFFECTIVE TIMING WINDOWS, MODIFICATION OF EXISTING TIMING WINDOWS, AND THEIR USE**

### **PRESENTATION**

Presenter: Sean Naman, Working Paper author

This presentation covered:

- Considerations to develop, apply, and modify timing windows.
- The introduction of a conceptual model based on how timing windows should be informed by an integrated estimate of risk through a WUA. These include timing and vulnerability of fish life processes, environmental and habitat conditions, and temporal characteristics of WUA pressures.

### **REVIEWER COMMENTS**

Reviewer: Doug Watkinson

Regarding the development of a standardized nationally applicable set of criteria and/or scientific principles that should be considered in the development of a risk-based framework, the reviewer suggested that:

- A consideration of risk should be based on the species life history related to spawning, specifically semelparous versus iteroparous, and longevity.
- There are higher risks to species with limited opportunities to reproduce successfully. The impact from reduced spawning success may be more severe for semelparous species. As well, short lived iteroparous species may be more impacted than long lived.

When considering risk, there needs to be a discussion on impacts in lotic versus lentic habitat:

- Habitat in a lotic environment could be at higher risk as the effects of a WUA impact are transported downstream.
- A WUA may remain as a concentrated impact in a lentic environment, thus may be devastating to the habitat in a work area over a smaller footprint.

Finally, while it is clear how timing windows can be used, having a link with residual pressures should be noted in the Working Paper, as residual pressures may flag a need for other mitigation measures.

Generally the reviewer expressed that the considerations under Objective #2 are the strongest part of the Working Paper with all nuances captured. The use of the examples as well as the flow diagram that outline decision-making were highlighted as particularly useful.

### **DISCUSSION AND SUMMARY OF KEY POINTS**

- It was noted that other than dredging, there is not much information on the types of WUA pressures that are best addressed by timing windows.
- A key area that needs better information in the Working Paper is the linkage from WUA to habitat. The literature review shows a focus on sediments and contaminants. The CSAS Research Document [Review of Pathways of Effects \(PoE\) diagrams in support of FFHPP risk assessment](#) (Brownscombe and Smokorowki 2021) extensively reviews in-water WUAs



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and land-based impacts as they relate to timing, which may help the Habitat-WUA connection as opposed to the more species-based concept.

- Due to the large variability, participants expressed the challenge of how to make the advice site-specific and how to produce a tool that protects fish and fish habitat. There are compromises between broad versus narrower timing windows. At spatial scales, there are variations in localized and spatial effects.
- A participant noted that a precautionary approach should be used when implementing timing windows. Cumulative effects must be determined and considered when restricting the activities of work into shorter periods of time. If cumulative, it is important to know how each life stage is affected by the WUAs, and how the cumulative effects of WUAs affect the life stages. The fish community must be understood. More activities being undertaken simultaneously translates into more cumulative risk and more diverse risk. It was suggested that this should be addressed in the Working Paper and a statement should be included in the Science Advisory Report. It was noted that the conceptual framework presented could be extended to consider the cumulative risk of multiple WUAs, assuming those risks were additive.
- The conceptual model (Figure 8) as envisioned by the Working Paper authors was endorsed by the meeting participants and consensus was reached on how it should be used. The Science Advisory Report must ensure this conceptual model is explained succinctly.

### **OBJECTIVE #3: EFFECTIVENESS OF TIMING WINDOWS**

#### **PRESENTATION**

Presenter: Douglas Braun, Working Paper author

This presentation covered:

- The key features of the tiered approach which include:
  - A level of monitoring that aligns with the information needs and uncertainty; and
  - An approach which is standardized but flexible.
- An overview of the suggested tiered approach to evaluate effectiveness of timing windows:
  - Tier 1: Probability of exposure: Determine if there is overlap between the timing window and a life process, habitat process, or WUA. In other words, this answers the question: “Are the fish there?”
  - Tier 2: Consequence of exposure on habitat or life process. Determine if exposure to a WUA pressure during the timing window has a negative effect on a life process or habitat process. This digs deeper into impacts to define relative risks for the bottom panel of Figure 8 of the Working Paper.
  - Tier 3: Consequence of exposure to the population. Determine if exposure of a life process or habitat process to a WUA pressure during the timing window has population-level effects. This is beyond the requirements of the regulatory program but could be a research activity to provide more information about WUAs in general and interaction between WUAs and timing windows that may help inform science and regulatory management.
- An example for the application of the tiered approach to effectiveness would be to record observations of sockeye salmon spawners in a river during a timing window for some WUA. Spawning is a vulnerable life stage and is predictable and consistent year-to-year.

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- Triggers for effectiveness studies listed included:
    - New timing window.
    - New information (observations of fish presence or habitat process during timing window).
    - Extending existing timing windows (in other words, “Are these extensions reasonable?”).
  - A summary of the conceptual model for the evaluation of the effectiveness of timing windows was provided as follows:
    - Tiers increase in the amount of inference.
    - Lower tiers may trigger the next more intensive tier. Tiers can also be applied independently.
    - Feedback loops.
    - Endpoint criteria should be based on weight of evidence. There will not be a single study to show timing windows are effective.

## **REVIEWER COMMENTS**

Reviewer: Colin Lake

- It was noted that timing windows are not the only mitigation measure and may not be used or considered in certain circumstances, leading to the question of “when is a timing window considered the right tool?”.
- For example, habitat that has been previously dredged may rarely be utilized by fishes and thus mitigation of impacts using timing windows may not be applicable. Instead, concurrent monitoring for fishes in the area to be dredged may be more suitable to ensure fish are not present during the works.

Reviewer: Doug Watkinson

Regarding the provision of advice on the design of studies to evaluate the effectiveness of timing windows, which may include research, monitoring, or modelling approaches, the reviewer suggested that:

- A WUA can result in nonlethal, often cumulative impacts that are strongly influenced by both the physical environment as well as the aquatic community at the same time. It is difficult to quantify impacts.
- Another option that was suggested was to use the Joe Model. The reviewer understands it is being further developed to address these types of threat/risk based questions. Quantifying potential impacts will be key in decision-making.
- A combination of field and lab studies should be considered. An example of a type of study provided by the reviewer was a movement study paired with bioenergetics in the laboratory.

## **DISCUSSION AND SUMMARY OF KEY POINTS**

- There was general endorsement and support for the tiered approach model suggested by the meeting participants.
- An FFHPP participant found it useful that the three tiers feed into an adaptive management cycle.

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- It was suggested that the Working Paper should put more emphasis on the rationale used for different tiers as well as provide more examples for especially Tier 2, including telemetry or Joe Model with a link to the CSAS process.
  - Users of the advice would like to see guidance for climate change considerations and hoped that Objective #2 would have triggered discussions or other resources about when to update existing timing windows. The authors identified uncertainties in the Working Paper, which included climate change and other key considerations mentioned throughout the Working Paper.

### **KEY UNCERTAINTIES AND PARTICIPANTS' LAST THOUGHTS**

- The authors extracted from the Working Paper a list of uncertainties and presented them. These included:
  - Cumulative effects and scaling the conceptual model to multiple WUAs.
  - Specific responses of life processes and habitat processes to WUA pressures.
  - Climate change.
  - Scaling the conceptual model from single species to communities.
  - Basic uncertainty and knowledge gaps.
- Climate change was identified as a driver across Canada on every factor and received particular attention during the discussions. The authors acknowledged this, but expressed concern that addressing it in more detail would add excessive length to the Working Paper. The authors proposed to briefly address climate change in the Other Considerations or Conclusions of the Working Paper.
- A suggestion was made to revise the language in Tier 3 to include the unit of interest (population level, subpopulation level, or local population level), rather than population level. The authors agreed that this would allow Tier 3 to be flexible for how the clients want to use the tiered approach.
- The authors clarified that Tier 1, the probability of exposure, is also implicit in Tier 2. This is an important point needing clarification. The starting tier depends on how much information is present. It was suggested that the authors should clarify the rationale for Tier 1 and Tier 2, and delineate them as necessary.

### **EXPECTED PUBLICATIONS AND THEIR NEXT STEPS**

#### **WORKING PAPER (RESEARCH DOCUMENT)**

Throughout this meeting, participants expressed that the figures included in the Working Paper were well-designed and easy to understand. The Working Paper authors received comments from the formal reviewers as well as the participants with suggestions for changes in the figures as summarized below.

Figure 7 is a plot showing the variability of timing windows within and between Canadian provinces and territories.

- Participants noted confusion around the lines shown for the months of January, February, and March in the graph, for which the authors acknowledged to make adjustments.

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- There was preference to indicate in the figure header that the figure is only focusing on freshwater timing windows and excludes marine timing windows, which the authors agreed to include.

Figure 8 is a conceptual model that visually portrays the key components to be considered in the assessment of risk related to the development, modification, and application of timing windows. These components are: timing of life process, vulnerability of life process, environment (for example, flow), WUA pressure, and risk of WUA over the four seasons, with the summer period highlighted as the exclusion window.

- Additional examples of more complicated situations such as high temperature and low flow period should be added to the Working Paper. In circumstances where the bottom line (risk to fish and fish habitat) is a flat line and there is no ideal timing window, a focus on other mitigation measures should be suggested.
- It was suggested to modify the WUA Pressure panel to better differentiate the three bands.
- The authors acknowledged that the generalized curves presented in some figures (e.g., Figure 10, Figure 13) do not fully capture how a system will respond to a pressure (or removal of that pressure). For example, the rate and magnitude of recovery of aquatic vegetation following a pressure (as outlined in Figure 13) is dependent on the season and temperature with slower recovery outside of the main growing season.
- It was suggested to mention in the Working Paper that observed declines in pressure could be the result of restoration measures after the impact and that operational/implementation requirements and biological requirements are both important to consider.
- This figure demonstrates that if the timing window does not align with the lowest level of risk, it probably will not be effective.
- It was suggested to avoid using the word “risk” as it is fluid and there is much contention in an FFHPP context. Participants agreed to replace “Risk of WUA” with “Risk to Fish and Fish Habitat”.

Figure 10 shows components of persistence of pressure as a result of a WUA over Time.

- The red dotted line represents a situation where a WUA results in a permanent impact on the ability of habitat to support fish. In this scenario, where a residual pressure cannot be mitigated, using a timing window will not be effective or would not be utilized, because a timing window is meant to address temporary impacts.
- It was suggested to include a vertical “on/off” line to signify when a risk is gone after an activity is completed.
- It was clarified by the authors that the ends of the brackets for persistence and residual pressure are meant to vertically align and will be corrected in the Working Paper. The persistence bracket is meant to be the total of WUA duration plus residual pressure.
- While stated in the Working Paper, it was noted that the curves in the figure should be distinguished as either specific curves or net pressures, and stated generally in the figure caption.
- Concerning the terminology “residual pressure”, another word should be used because “residual” has a specific meaning in a habitat context, meaning “leftovers after all mitigation measures are applied”. Participants agreed to replace “residual pressure” with “continuing pressure”.

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Figure 14 depicted a concept of timing window efficiency with periods of no construction, buffers on either side, and timing windows.

- Meeting participants observed that this figure is the reverse of the conceptual model presented in Figure 8. Suggestions were offered to redraw Figure 14 to be consistent with Figure 8. It was noted that the color pallet of this figure (red, orange, green) should be changed for accessibility purposes according to CSAS policy.
- There was a suggestion to provide a quantitative percent risk. However, it was determined that since this figure is conceptual, the risk needs to be a qualitative expression but could be shown as a gradient for the purpose of the diagram, including a buffer.

In Figure 15, life process or habitat may differ inter-annually as well as among individuals in a population, similar to the first panel of Figure 14, but highlights any uncertainty in the no-construction period and buffers.

- It was clarified that this figure shows that when uncertainty is present, risk tolerance must be maintained.
- It was suggested that this figure could also be inverted and be made consistent with Figure 8 and Figure 14.
- One participant raised that the precautionary principle is important to consider in this figure as narrowing the window may impinge on the fish. The meeting Chair noted that while this is a useful consideration, it is a risk management decision, which is not within the scope of the provision of peer-reviewed science advice in a CSAS process.
- It was suggested that examples should be added to show that multiple WUAs and concentrating their timing could have a strong impact on the risk. When different WUAs are overlaid, there might be a synergistic and additive risk.
- The authors noted that they had performed a simple calculation to determine the efficiency of different amounts of overlapping between the timing windows and the no construction periods to determine how much overlap provides an acceptable balance between human productivity and risk to the fish. However, the authors decided it was outside the scope of the Working Paper, but could be considered as future work.

At the end of the meeting, the Working Paper review comments were presented one final time as an opportunity for participants to ensure their comments and discussion points were captured accurately. Participants expressed support that the Chairs will incorporate and approve the revisions without needing further involvement from reviewers and participants. Participants accepted the Working Paper to be published as a Research Document including the changes that were discussed during the meeting.

## **SCIENCE ADVISORY REPORT**

Participants collaborated in real time on the draft Summary Bullets for the Science Advisory Report, based on key pieces of advice related to each of the Objectives of the Terms of Reference.

Participants expressed consensus on all Bullets.

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## APPENDIX 1: TERMS OF REFERENCE

### Science advice on the use of Timing Windows as a mitigation measure

#### National Advisory Meeting – National Capital Region

February 14–17, 2022

Virtual Meeting

Chairpersons: Mike Bradford and Karin Ponader

#### Context

Fisheries and Oceans Canada's (DFO) Fish and Fish Habitat Protection Program (FFHPP) has a regulatory regime in place to avoid, mitigate and offset the potentially harmful impacts of works, undertakings, or activities (WUAs) on fish and fish habitat. To manage these potentially harmful impacts, avoidance and/or mitigation measures such as timing windows are used to prevent or reduce the likelihood that a harmful impact will occur.

Timing windows are also called environmental windows or work windows, and are sometimes defined by their complement, e.g., restricted activity periods. They define lower-risk periods of the year during which the pressure imposed by a WUA may have a lesser effect on fish and fish habitat. Timing windows are a mitigation measure used by biologists and project proponents to reduce pressures that may have effects on fish, or may impair the habitat's capacity to support one or more life processes of those fish. They are almost always used in combination with other mitigation or avoidance measures included in Letters of Advice or *Fisheries Act* Authorizations or other program instruments.

Timing windows currently in use are often developed by, or in collaboration with, provinces and territories, and vary by jurisdiction, species, or watercourse. The [Projects Near Water website](#) provides a list of tabs by territory and province, with links to the respective provincial and territorial websites where instructions on how to identify specific timing windows can be found. Their description varies as they are developed by each jurisdiction based on their own approaches or templates. For example, in some cases, periods of the year when activity is to be restricted are identified (five provinces and two territories) while others define specific periods of when a WUA can take place (five provinces and one territory).

FFHPP is seeking science advice on the effectiveness of timing windows as a measure to mitigate pressures resulting from WUAs in freshwater, estuarine, and coastal environments. Advice generated by this process will assist FFHPP in the development of a science-based framework that could be used to guide the creation, modification, use, and assessment of timing windows. That framework may assist FFHPP to (a) rationalize the use of timing windows within FFHPP regulatory tools, (b) develop an approach for consistent and scientifically-defensible risk-based application of timing windows for FFHPP-regulated activities, (c) monitor and improve application of timing windows over time, (d) regularly update/amend timing windows to account for changes to the environment (e.g. climate change) or species status in collaboration with other jurisdictions as applicable, and (e) fill gaps and ensure a full nation-wide complement of timing windows.

It is expected that this process will also have synergies with other current Canadian Science Advisory Secretariat (CSAS) processes focused on habitat science advice, namely revisiting Pathways of Effects (PoE) diagrams in support of FFHPP risk assessment, estimating impacts and offsets for death of fish, and assessing cumulative effects in support of policy development and regulatory decision making. Information may also be used for application of provisions of the *Species at Risk Act* for cases where listed species may be exposed to the WUA. Science advice on the use of temporal avoidance to mitigate impacts of noise in the marine environment

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is found in other CSAS processes<sup>1</sup> and will not be part of this process, although some of the principles may be applicable.

### **Objectives**

Participants will review Working Paper(s) and other information to address the following objectives:

1. Review and synthesize examples of the use of timing windows to mitigate impacts to fish and fish habitat. This review will assist in the development of new timing windows, or the refinement of existing ones, and their application. The review may include, but is not limited to:
  - a. Scientific studies that provide the ecological rationale for the use of timing windows, effectiveness studies, and frameworks or decision tools that contributed to the development of timing windows.
  - b. Considerations and rationale used by other agencies (i.e., other governments and organizations) that may have contributed to the development, application, and evaluation of timing windows.
2. Develop a standardized nationally-applicable set of criteria and/or scientific principles that should be considered in the development of a risk-based framework to guide the creation of effective timing windows, modification/refinement of existing timing windows, and their use.
3. Provide advice on the design of studies to evaluate the effectiveness of timing windows. This may include research, monitoring, or modelling approaches.

### **Expected Publications**

- Science Advisory Report
- Proceedings
- Research Document

### **Expected Participation**

- Fisheries and Oceans Canada (Ecosystems and Oceans Science, Ecosystems Management, Biodiversity Management)
- Provinces and Territories
- Academia
- Other invited experts

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<sup>1</sup> DFO. 2020. [Review of the Statement of Canadian Practice with respect to the Mitigation of Seismic Sound in the Marine Environment](#). DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2020/005.

**APPENDIX 2: AGENDA**

**Fisheries and Oceans Canada  
Canadian Science Advisory Secretariat (CSAS)**

**Science advice on the use of timing windows as a mitigation measure**

**AGENDA**

<b>DAY 1</b>		
<b>Time (EST)</b>	<b>Monday, February 14, 2022</b>	<b>Lead</b>
11:00-13:00	Welcome and Housekeeping notes	Chairs
	Participant introductions	Group
	Introduction to CSAS advisory process	Karin Ponader
	Overview of the FFHPP program need for science advice on the use of timing windows as a mitigation measure	Kelly Code (FFHPP)
	Review Terms of Reference including the overview of goals and objectives of meeting	Mike Bradford
	<b>Presentation on Objective #1:</b> Review of literature, and agency approaches to timing windows	Working Paper Authors (Tyler Tunney, Doug Braun, Jon Midwood, Sean Naman, Jordan Roszell)
	<b>Comments from reviewers:</b> Literature and agency review	Reviewers (Doug Watkinson, Colin Lake)
13:00-14:00	Break	
14:00-16:00	<b>General Discussion:</b> Literature and agency review	Group
	<b>Summary of key points:</b> Literature and agency review	Chairs

<b>DAY 2</b>		
<b>Time</b>	<b>Tuesday, February 15, 2022</b>	<b>Lead</b>
11:00-13:00	<b>Recap</b> of Day 1 and summary bullets from Day 1	Chairs
	<b>Presentation on Objective #2:</b> Considerations for the development of a standardized nationally applicable set of criteria for the creation of effective timing windows, modification of existing timing windows, and their use	Working Paper Authors
	<b>Comments from reviewers:</b> Considerations	Reviewers
13:00-14:00	Break	



<b>DAY 2</b>		
<b>Time</b>	<b>Tuesday, February 15, 2022</b>	<b>Lead</b>
14:00-16:00	<b>General Discussion:</b> Considerations	Group
	<b>Summary of key points:</b> Considerations	Chairs

<b>DAY 3</b>		
<b>Time</b>	<b>Wednesday, February 16, 2022</b>	<b>Lead</b>
11:00-13:00	<b>Recap</b> of Day 2, SAR bullets	Chairs
	<b>Presentation on Objective #3:</b> Effectiveness of timing windows	Working Paper Authors
	<b>Comments from reviewers:</b> Effectiveness of timing windows	Reviewers
13:00-14:00	Break	
14:00-16:00	<b>General Discussion:</b> Effectiveness of timing windows	Group
	<b>Summary of key points:</b> Effectiveness of timing windows	Chairs

<b>DAY 4</b>		
<b>Time</b>	<b>Thursday, February 17, 2022</b>	<b>Lead</b>
11:00-13:00	<b>Review of SAR bullets and conclusions</b>	Chairs
	<b>Status of Working Paper:</b> List of revisions	Chairs
13:00-14:00	Break	
14:00-16:00	<b>Next steps:</b> Production of documents, review, publication	Chairs

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### APPENDIX 3: LIST OF PARTICIPANTS

<b>Name</b>	<b>Affiliation</b>
Barrell, Jeffrey	Fisheries and Oceans Canada
Bradford, Mike	Fisheries and Oceans Canada
Braun, Douglas	Fisheries and Oceans Canada
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Harwood, Andrew	Ecofish Research
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Kiriluk, Rick	Fisheries and Oceans Canada
Kristmanson, James	Fisheries and Oceans Canada
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Sabean, Christine	Fisheries and Oceans Canada
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Tuen, Alex	Fisheries and Oceans Canada)
Tunney, Tyler	Fisheries and Oceans Canada
Watkinson, Doug	Fisheries and Oceans Canada