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Proceedings of the regional science peer review of the freshwater Ecologically and Biologically Significant Areas and Ecologically Significant Species criteria assessment

**November 19-20, 2013
Burlington, ON**

**Chairperson: Lynn Bouvier
Editors: Lynn Bouvier and Robert Randall**

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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 regional Science peer-review meeting was held on 19-20 November 2013 in Burlington, Ontario. The purpose of the meeting was to assess how effectively the criteria used to identify Ecologically and Biologically Significant Areas (EBSA) and Ecologically Significant Species (ESS) in marine ecosystems could be applied to freshwater. Bay of Quinte in Lake Ontario was used as a case study.

The Science Advisory Report will provide the information and scientific advice that may be used by Fisheries and Oceans Canada (DFO) to help identify and manage ecologically sensitive freshwater habitats and fish species. It will also list the current knowledge gaps and the future scientific research that is needed to support the identification of significant habitat and species in freshwater systems.

Meeting participants included experts from DFO and the Ontario Ministry of Natural Resources. This proceedings report summarizes the relevant discussions from the peer-review meeting and presents revisions to be made to the associated research documents. It will be published in the Canadian Science Advisory Secretariat (CSAS) Proceedings Series on the CSAS website. The working papers presented at the workshop will be published as CSAS Research Documents. The advice from the meeting will be published as a CSAS Science Advisory Report.

Compte rendu de l'examen par des pairs régional de l'évaluation des zones d'importance écologique et biologique et des critères relatifs aux espèces d'importance écologique en eau douce

SOMMAIRE

Une réunion régionale d'examen scientifique par les pairs s'est tenue les 19 et 20 novembre 2013 à Burlington, en Ontario. Elle avait pour objet d'évaluer s'il est possible d'appliquer efficacement aux écosystèmes d'eau douce les critères qui sont utilisés dans les écosystèmes marins pour déterminer les zones d'importance écologique et biologique (ZIEB) et les espèces d'importance écologique (EIE). La baie de Quinte, dans le lac Ontario, a servi de lieu pour l'étude de cas.

L'avis scientifique correspondant fournira les données et les avis scientifiques que Pêches et Océans Canada (MPO) pourra reprendre pour déterminer et gérer les habitats et les espèces de poissons d'eau douce sensibles. Il dressera aussi la liste des lacunes dans les connaissances actuelles et les futures recherches scientifiques nécessaires pour appuyer la détermination des habitats et espèces importants dans les systèmes d'eau douce.

On comptait parmi les participants des experts du MPO et du ministère des Richesses naturelles de l'Ontario. Le présent compte rendu résume les discussions pertinentes de la réunion d'examen par les pairs et présente les modifications qui seront apportées aux documents de recherche connexes. Il sera publié dans la série des comptes rendus du Secrétariat canadien de consultation scientifique (SCCS), sur son site Web. Les documents de travail présentés lors de l'atelier seront publiés en tant que documents de recherche du SCCS. L'avis découlant de la réunion sera publié en tant qu'avis scientifique du SCCS.

INTRODUCTION

In marine areas, ecologically sensitive habitats and fish species that require enhanced management are identified (DFO 2004, 2006) using specific criteria that address four conservation priorities:

1. Ecologically and Biologically Significant Areas (EBSA);
2. Ecologically Significant Species (ESS);
3. Depleted or rare species; and
4. Degraded areas.

It was determined that these criteria potentially could be used for identifying significant areas and species in freshwater ecosystems, as well (DFO 2011).

A science project was designed to demonstrate a transfer of knowledge between marine and freshwater ecosystems by extrapolating and assessing the Oceans criteria for identifying significant habitat and species. At a previous planning meeting in Burlington, the Bay of Quinte, Lake Ontario, was chosen as a case study by a science panel to evaluate the Oceans criteria. Criteria were evaluated by identifying key biota and important habitat in the Bay of Quinte using the Oceans EBSA and ESS criteria. Two writing teams were chosen: one to conduct the science review for significant areas and one to conduct the review for significant species.

A peer-review meeting was held at the Canadian Centre for Inland Waters, Burlington, Ontario, on 19-20 November 2013. The purpose of the meeting, as described in the Terms of Reference (Appendix 1), was to assess the application of the Oceans criteria to freshwater ecosystems.

Meeting participants included Fisheries and Oceans Canada (DFO) and the Ontario Ministry of Natural Resources (Appendix 2). The meeting followed the agenda outlined in Appendix 3.

This proceedings report summarizes the relevant discussions from the peer-review meeting and presents revisions to be made to the associated research documents. The Research Documents (Glass et al. 2014; Randall et al. 2014) provide information on the working papers presented at the meeting. The Science Advisory Report (SAR) examines how well the criteria can be interpreted in a freshwater context (Lake Ontario), any science-based examples relevant to the criteria, quantitative information available to measure the criteria, significant modifications or gaps in the criteria that relate to their use in freshwater, and any future science that is needed to support the identification of EBSA and/or ESS in freshwater (DFO 2014).

DISCUSSION

The chairperson presented the objectives of the meeting and an introduction to the Science advisory process. Two draft research documents had been developed by DFO and were provided to the participants in advance of the meeting. The draft reports were the basis for discussion; the participants were encouraged to add to or change the material as needed to ensure that the best, most accurate information was included.

EBSA Presentation

Presenter: Bob Randall

The presentation included background information on the Oceans EBSA identification process, the objectives of this freshwater study, methods of evaluating the EBSA, and a case study of the

Bay of Quinte with examples that fit each of the three primary criteria (uniqueness, aggregation and fitness consequences). The case study was followed by a list of the lessons learned and the knowledge gaps.

During the presentation a participant noted an error in the marine examples of fitness consequences. The Right Whale Conservation Area (Scotian Shelf) had been characterized as a shipping area, but in fact it is adjacent to a shipping area. No other corrections were made at this time.

Invited Review of the EBSA Criteria Assessment

Presenters: Don Cobb and Roland Cormier

After complimenting the authors on their work, the first presenter noted that consistency of terminology is important to convey the intentions of the study as clearly as possible. For example, the term 'protected area' should be clearly defined or deleted (i.e., protected area and EBSA are not necessarily synonyms).

They addressed the issue of scale, as well, stating that information on smaller areas would need to be preserved as studies expanded to larger water bodies. For example, if one area of the Bay of Quinte had been identified as a spawning shoal, then that data layer of the assessment would need to be retained rather than used only as a criterion for the larger EBSA listing.

The presenter suggested creating a ranking system to identify how pristine an area is, particularly in the Great Lakes, where most areas have been affected by development. They also suggested rethinking the criterion of genetic uniqueness in terms of areas that support genetically unique species, rather than in terms of the species themselves.

To give context to the case study of the Bay of Quinte, the coastal zones around Lake Ontario had also been evaluated. In all cases a depth of 0-20 m had been selected for review; the presenter suggested revisiting this decision and evaluating the lake as a whole. One of the authors of the report responded that this choice had been made because the analysis that had informed the study was conducted for the near shore, and the cut-off had been at 20 m. The presenter suggested adding that explanation to the paper.

The second presenter then offered their thoughts on the EBSA presentation, which were followed by a group discussion. (The two have been combined here for clarity.)

The presenter began by stating that many of these types of assessments do not define the term "significant." They pointed out that a definition had been given in a previous DFO report (DFO 2004).

They suggested highlighting that definition in the paper because it would distinguish EBSA from other listings and differentiate it as being based solely on ecological criteria. The EBSA presenter responded that the definition was supposed to be in the research document, and that if it was not, it would be added. Another participant confirmed that it had, in fact, been included.

Regarding boundaries of an ecosystem, the presenter suggested setting boundaries based on the presence of features that are characteristic of the ecosystem, then determining which areas within those boundaries are significant. The EBSA presenter responded that they would keep this suggestion, as well as the previous reviewer's comments about scale, in mind; however, they felt that first they needed to describe scale more effectively in the paper.

Another participant responded that, in a freshwater context, there might be more controversy over how one defines scales (e.g., watershed, basin) because freshwater systems are smaller with more physical boundaries. The second reviewer responded that a biogeographical

classification scheme might apply rather than a particular scale. A third participant argued that there is no right answer to this question because DFO manages at a variety of different scales simultaneously for different purposes.

An extended conversation around the topic of scale followed, with the participants weighing the merits and shortcomings of various approaches, including ecological and jurisdictional. The EBSA presenter asked if the bottom line was to start with ecological criteria. A participant responded that, while it was often the advisable approach, it was never possible to fully separate ecological and policy issues. They offered the example of the Pacific Ocean, which had been evaluated using the EBSA criteria. In the first application, 84% of the ocean had been ranked high on some criteria; because the resulting management recommendations would be too strict to accept, the evaluation had to be reexamined. The resolution was to ask what areas were exceptional on one criterion or seemed to be important on several criteria.

Following this example the participant emphasized that the data layers used in the evaluation process were essential for making a case to regulators. They also noted that one can take the approach of selecting a potential EBSA and then justifying the classification. This tactic, they said, is attractive when there are limited data available; however, it allows more room for error.

The topic of aggregation also arose. The second presenter referred to the table at the end of the guidance document, which broke aggregation into a variety of subcategories (e.g., spawning, feeding, refuge). If the paper was structured the same way, they suggested, it would be much easier to rate the significance of aggregation, and the document would provide detailed information for managers to return to in the future.

During the EBSA presentation the presenter had asked whether or not aggregation referred to a periodic occurrence. A participant responded to that question by stating that it was sufficient to have aggregation for a short period of time, but the definition was not restricted to this circumstance as aggregation could occur year-round.

Some editorial changes to the document were suggested. A participant recommended placing some sections of the document under different headings (e.g., moving nutrient aggregation from “Aggregation” to “Uniqueness”). Another suggested that it might be worth taking the time to rewrite the illustrative part of document, which referred to marine examples. It was not decided whether or not to include these revisions in the SAR.

The second presenter also recommended adding a reference to an exercise conducted by DFO in 2011 in which the application of EBSA criteria to freshwater was suggested (DFO 2011). A participant also proposed adding a map of the Bay of Quinte to the document. The EBSA presenter responded that one had been selected to add at a later date.

The participants then reviewed the terms of reference:

1. Are the criteria interpretable in a freshwater context?
 - The participants agreed that they were; however, one person noted that a few things did not apply to freshwater. Upwellings, for example, may have different connotations in a freshwater context.
2. Are there science-based examples relevant to the criteria?
 - The participants agreed that science-based examples existed and had been given in the EBSA presentation.
3. Is there quantitative information available to measure the criteria?

-
- The participants agreed that the EBSA presenter had provided this information in the case study of the Bay of Quinte.
4. Are there significant modifications or gaps in criteria that relate to their use in freshwater areas?
 - This question was addressed at the end of the EBSA presentation.
 5. If so, what future science is needed to support the identification of EBSA and/or ESS in freshwater?
 - This question was addressed in the group discussion.

ESS Presentation

Presenter: Bill Glass

The presentation included background information on the Oceans assessment process, the objectives of the study, evaluation methods, and a case study of species in the Bay of Quinte. A brief response to the terms of reference followed, at which time other considerations were also presented.

No comments were made on the presentation.

Invited Review of the ESS Criteria Assessment

Presenter: Tim Johnson

The presenter first addressed the “Methods” section of the research document. Because nearly 500 species had been identified in the Bay of Quinte and only 13 had been highlighted as ecologically significant, the presenter felt that more detail was required in explaining the selection process. The presentation had clarified that the species had been selected according to how well they met the assessment criteria; however, this rationale was not obvious in the text.

The presenter also stated that it was not clear whether those 13 species were examples of ESS, or whether they were the only ESS in the bay. (The same question was posed of the two sensitive species listed in the paper.) In addition, they suggested adding two species to the list: White Perch (*Morone americana*) and Alewife (*Alosa pseudoharengus*). Both species were abundant and played significant roles as predators and prey in the Bay of Quinte. Over the course of the group discussion, several participants supported this suggestion.

One of the ESS that had been listed was Yellow Perch (*Perca flavescens*); the presenter wondered why it had been included. It was ubiquitous throughout Ontario, and while it did support fisheries in the bay, if the population were lost there would be adequate prey and predator species to replace it.

The presenter also pointed out that there appeared to be a “blurring” of the Species at Risk and EBSA approaches. They suggested asking if there were unique aspects of the bay that, if lost, would lead to the loss of the ESS populations.

Referring to the section on harmful species, the presenter noted that the document discussed more general biology and history when literature on populations specific to the Bay of Quinte may have been more helpful.

The ESS presenter thanked the reviewer for their comments and said that they would do their best to incorporate them into the research document. A group discussion followed.

A participant suggested adding the definition of the term “significant” at the beginning of the paper and reiterated the need to clearly explain that the species were listed according to how well they met the assessment criteria. They also suggested adding two references: a SAR on eelgrass that declared it an ESS (DFO 2009) and a SAR that documented a threat assessment for eelgrass (DFO 2012).

Another participant stated that the opening of the paper required more context and suggested laying out the methodology in the introduction.

An extended conversation around the ESS followed, with participants making suggestions of species to add to the list and reconsider. Phytoplankton was a significant topic of discussion; however, the group did not come to a consensus as to how its many species should be addressed in the case study. A participant who co-authored the paper explained that there was no evidence that an individual species played a significant role in productivity, which was why no phytoplankton had been included in the list of ESS. They suggested that areas rich in phytoplankton might instead appear in the EBSA evaluation, as they would provide food to other species. Another participant noted that the criteria also made room for ecologically significant community properties, or abundance across several species as opposed to a single one. Some others recommended addressing this question in the section on methodology.

A participant referred to the species list at the back of the research document, pointing out that there were only a few species of microorganisms on it. The participant acknowledged that there was a knowledge gap in this area and recommended adding a comment that these are examples of a much wider list of microorganisms that are likely to be present in the bay. They also suggested adding a column to the list where the authors could indicate the abundance of a species; some of them were significant to the bay, whereas others had been sampled only a few times over several decades.

Terminology and references were also discussed. The document used the term “invasive species” to refer to both non-native species that caused harm and those that did not. The former definition is deliberately used by DFO, and so the participant suggested that the paper define its use of the term for clarity. They also recommended adding references to some sections (e.g., the section on Zebra Mussel, *Dreissena polymorpha*) and double-checking the comprehensive species list at the end of the document. The participant felt that the list was very long, and wondered if it needed revisions. They also noted that some species on the list caused problems in other water bodies (e.g., Water Chestnut *Eleocharis dulcis*) and that they might be considered for the list of harmful species in the bay. Lastly, the participant noted that there were some duplicates in the appendix that needed to be removed.

Several participants raised the question as to whether or not waterfowl should be listed among the species in the bay. A co-author of the paper explained that the paper had restricted its list to aquatic species; it was recommended that this information be included in the document.

Regarding methodology, a participant returned to a suggestion from the previous review: to start with the ESS criteria and determine how the species fit into it, rather than selecting species and then seeing how they fit within the criteria. It was agreed that this approach would be preferable in future studies.

The meeting chair paused the discussion to ask the authors of the paper whether they felt that the paper should provide a species list that was comprehensive of the species in the Bay of Quinte, or exemplary of the species in the bay. In agreement with comments made by other participants, one of the authors stated that the purpose of the paper should be to document the process by which they created the list of species; therefore, the list should be exemplary only. It was also emphasized that the paper should clearly state that fact.

The author also noted that either the research document or the SAR should discuss alternative approaches to the evaluation method and the merits of those alternatives compared to the authors' approach. They asked the group if they could think of any other approaches; a brief discussion followed, but no alternatives were agreed on.

The conversation returned to the question of communities versus individual species and how those two items should be addressed in the research document. Regarding phytoplankton and zooplankton, a participant said that measuring and managing populations would consume too many resources, and that the EBSA criteria would cover the presence of these communities in a given area. Two participants agreed with this feedback, and one suggested adding a paragraph or two to explain the significance of the communities within the Bay of Quinte. The species covered under the EBSA criteria would also be removed from the comprehensive list of species in the ESS document.

At this point another participant emphasized the importance of ensuring that, if communities were going to be part of the EBSA evaluations, that directive was clear to all parties involved in the assessment process. Otherwise, communities might not end up in either report. The group also discussed the problem that community dynamics were not addressed in any of the assessment criteria. One participant suggested listing this issue as a knowledge gap.

The meeting chair asked the group if they wanted to review the list of ESS to discuss any potential additions or subtractions. Some discussion arose around whether to include certain communities in the EBSA or the ESS assessment. A participant suggested outlining the area-based approach and the species-based approach in both papers, referring to their present conversation as an example of how the approaches were implemented and the benefits and challenges of each.

Ultimately, the group decided to leave the review of the list of ESS to the authors because creating a species list was not one of the objectives of the meeting. The participants would see the revisions to the paper at a later date.

Lastly, a participant noted that the use of the term "sensitivity" was somewhat unclear, and needed to be defined, particularly in relation to the term "rarity."

The group then reviewed the terms of reference for the ESS presentation and review:

1. Are the criteria interpretable in a freshwater context?
 - The participants agreed that they were.
2. Are there science-based examples relevant to the criteria?
 - The participants agreed that science-based examples existed and had been given in the ESS presentation.
3. Is there quantitative information available to measure the criteria?
 - The participants agreed that the ESS presenter had provided this information; however, they recommended adding references to the data sets used in the analysis.
 - A participant noted that some of the analysis relied on expert opinion, and that that fact should be captured in the paper, as well.
 - Another participant pointed out that communities of species at the lower trophic levels were difficult to address due to a lack of data.
4. Are there significant modifications or gaps in criteria that relate to their use in freshwater areas?

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- The participants agreed that the criteria did not address the issue of communities sufficiently. This topic was addressed in the group discussion.
5. If so, what future science is needed to support the identification of EBSA and/or ESS in freshwater?
- This topic was addressed in the ESS presentation. A participant added that Science is still trying to understand the processes that occur at the lower trophic levels.

Lastly, the meeting chair noted that the conclusion section of both papers spoke only about the Bay of Quinte. Since the objective of the assessment was to see if the criteria applied to freshwater systems in general, some wording would need to be added to address other water bodies.

Review of Summary Bullets

Presenter: Lynn Bouvier

The authors of the two research papers had provided summary bullets as a starting point for drafting the summary section of the SAR. The meeting chair invited the participants to review the bullets and suggest how to condense them without losing any of the report's key takeaways.

A participant suggested adding the word "planning" to the list of uses of the criteria because this was turning out to be one of their primary functions.

Next the group discussed the naming of the assessment criteria. In some cases the "B" in the EBSS (Ecologically and Biologically Significant Species) acronyms was dropped. A participant explained that EBSA criteria were used internationally; in some cases, other countries needed to include the "B" for their own management purposes. ESS criteria, on the other hand, were not used by an international body. In Canada, the "B" is often seen as redundant, so the group decided to leave it out of the acronym. The meeting chair noted that this decision should be applied to the edits to the ESS research paper because it used both "ESS" and "EBSS."

There was also conversation around "EBSA" versus the acronym "ESA" (ecologically significant areas) in the *Fisheries Act*. ESA did not have a specific definition; for this reason, a participant noted, managers were likely to look to the SAR for guidance. Therefore it was particularly important that the summary of the SAR state whether or not the EBSA criteria could be applied to freshwater systems. It was decided that the bullets would state that the criteria could be used to identify ESAs in Canada.

The group discussed how historical information about the *Oceans Act* and the *Fisheries Act* should be included in the document, if at all. They decided to summarize the information in a bullet point.

A bullet was added outlining the objectives of the studies. These were taken directly from the Terms of Reference.

The bullets explaining the EBSA and ESS criteria were condensed because the information that had been included was in the body of the papers, and also in other SARs. A participant suggested adding wording around which criteria could be kept "as is," which needed to be modified, and what criteria still needed to be created. All of these statements would be framed within the context of the Bay of Quinte case study, with a broader reference to freshwater as well.

The meeting chair suggested adding a bullet point that referenced the discussion on the applicability of the ESS criteria to non-fish species and explained which trophic groups were excluded from the tropho-specific criteria. At this point a participant stated that they had

returned to a previous SAR and seen that it had grouped certain species together (e.g., sponges) and then applied the criteria to that group.

The question of habitat in the context of the criteria also arose. The phrase “species that provide three-dimensional structure” was proving to be too narrow; therefore the participants agreed to change the phrase to “species that provide physical and chemical properties,” with the understanding that the wording would likely be altered during the editing process.

A participant disagreed with a bullet that stated that all the harmful species in the case study were non-native, but that this was “not a general trend.” The participants agreed that, while it shouldn’t be a general conclusion that non-native species are harmful, it is the trend that harmful species are non-native. Some debate around the harmfulness of invasive species and the place of this discussion in the SAR arose. Ultimately, the group concluded that, because invasive species weren’t a consideration in the context of marine analysis, the SAR should highlight the importance of examining them in a freshwater context.

A bullet was added outlining that the participants had discussed two approaches to the ESS assessment process, and that they chose to use expert opinion rather than data, which was lacking in some cases.

A participant noted that there was a knowledge gap around the appropriate scales of extrapolation. Management would want guidance on how far they could extrapolate site-specific studies while still performing sound practices. This point was added to the bullets, with the addition that the knowledge gap applied to both areas and species.

Later another conversation arose around the scale at which the EBSA and ESS criteria could be applied. It was decided that the phrase “landscape scale” would be used in order to give managers the flexibility to determine the appropriate scale for their individual studies.

The group also discussed the uses of general ecological knowledge versus site-specific data, and the feasibility of applying the ESBA and ESS criteria to systems about which little was known. Everyone agreed that the best approach was to add wording to the SAR that addressed the level of knowledge required to assess water bodies at different scales, and then add a bullet that summarized that discussion.

The participants had a similar conversation around the uses of spatial data versus population data. They could not decide on a methodology that would apply in all circumstances, and so a bullet was written to identify this question as a source of uncertainty.

A participant suggested adding two points that had come up frequently during the conversation: first was the need to define an ecosystem of interest upfront and then look for uniqueness within that context; the second was to address the fact that the group was assuming that there was management of basic sustainability levels everywhere, and that the ESBA and ESS criteria were to identify a need for enhanced management or a different level of risk tolerance.

The background information in the paper stated that amendments to the *Fisheries Act* created a need to identify ESAs. In the conclusion, the participants agreed to include the statement that the EBSA criteria were a scientifically defensible starting point from which to meet that need.

At this point the meeting chair closed the discussions and reviewed the group’s next steps. The research documents would be revised and sent out to the participants for review; they would have two weeks to provide feedback, at which point the authors would finish drafting the SAR. The SAR would be published within eight weeks, and the research document within four months. The chair then thanked everyone for their contributions and concluded the meeting.

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APPENDIX 1. TERMS OF REFERENCE

Freshwater Ecologically and Biologically Significant Areas (EBSA) / Ecologically Significant Species (ESS) Criteria Assessment

Regional Science Peer Review – Central and Arctic Region

November 19-20, 2013

Burlington, ON

Chairperson: Lynn Bouvier

Context

In marine areas, ecologically sensitive habitats and fish species that require enhanced management are identified under the Oceans Action Plan using specific criteria that address four conservation priorities:

1. Ecologically and Biologically Significant Areas (EBSA);
2. Ecologically Significant Species (ESS);
3. Depleted or rare species, and
4. Degraded areas.

These Ocean's criteria can potentially be used for identifying significant areas and species in freshwater ecosystems as well.

A science project was designed to demonstrate knowledge transfer between marine and freshwater ecosystems, by extrapolating and assessing the Oceans criteria for identifying significant habitat and species in marine ecosystems to freshwater ecosystems. At a previous meeting in Burlington, the Bay of Quinte, Lake Ontario, was chosen as a case study by a science panel to evaluate the Oceans criteria. Criteria were evaluated by identifying key biota and important habitat in the Bay of Quinte, by comparison with other areas in Lake Ontario, using the Oceans EBSA and ESS criteria. Two writing teams were chosen: one to conduct the science review for significant areas and one to conduct the review for significant species.

The identification and efficacy of ecologically significant areas and species in freshwaters as a tool for managers was included in the amendments to the Fisheries Act. This review of criteria was requested by DFO Science as a proactive task to initiate the evaluation of the existing criteria for potential use in freshwater ecosystems, using the Great Lakes as a pilot.

Objectives

The objective of the meeting is to conduct a Science peer review of the Oceans criteria for identifying:

1. Ecologically and Biologically Significant Areas, and
2. Ecologically Significant Species in freshwater ecosystems based on the two working papers.

The specific objectives for the meeting are to assess and provide advice on the following:

1. Are the criteria interpretable in a freshwater context?
2. Are there science-based examples relevant to the criteria?
3. Is there quantitative information available to measure the criteria?

-
4. Are there significant modifications or gaps in criteria that relate to their use in freshwater areas?
 5. If so, what future science is needed to support the identification of EBSA and/or ESS in freshwater?

Expected Publications

- Science Advisory Report
- Proceedings
- Research Documents (2)

Participation

- Fisheries and Oceans Canada (DFO) (Ecosystems and Oceans Science and Ecosystems and Fisheries Management sectors)
- Ontario Ministry of Natural Resources
- Academics (University of Waterloo)
- Other invited experts
- Participation is by invitation only.

APPENDIX 2. PARTICIPANTS

Freshwater Ecologically and Biologically Significant Areas and Ecologically Significant Species
Criteria Assessment

November 19-20, 2013

Canadian Centre for Inland Waters

| Last name | First name | Affiliation |
|------------------|-------------------|--|
| Bailey | Sarah | Fisheries and Oceans Canada, Science |
| Bouvier | Lynn | Fisheries and Oceans Canada, Science |
| Bowen | Kelly | Fisheries and Oceans Canada, Science |
| Bowlby | Jim | Ontario Ministry of Natural Resources |
| Brousseau | Christine | Fisheries and Oceans Canada, Science |
| Cobb | Donald | Fisheries and Oceans Canada, Science |
| Cormier | Roland | Fisheries and Oceans Canada, Ecosystems Management |
| Doka | Susan | Fisheries and Oceans Canada, Science |
| Glass | Bill | Fisheries and Oceans Canada, Science |
| Hoyle | Jim | Ontario Ministry of Natural Resources |
| Johnson | Tim | Ontario Ministry of Natural Resources |
| Koops | Marten | Fisheries and Oceans Canada, Science |
| Martin | Kathleen | Fisheries and Oceans Canada, Science |
| Michaud | Wendy | Note Taker |
| Mossman | Janet | Fisheries and Oceans Canada, Science |

APPENDIX 3. AGENDA

Freshwater Ecologically and Biologically Significant Areas (EBSA) and Ecologically Significant Species (ESS) Criteria Assessment

Regional Science Advisory Meeting

Burlington, ON

Chairperson: Lynn Bouvier

Tuesday, November 19, 2013

- | | |
|---------------|---|
| 9:00 - 9:30 | Objectives of Science Review, Process, and Introductions (Lynn Bouvier) |
| 9:30 - 10:00 | EBSA Presentation (Bob Randall) |
| 10:00 - 10:15 | Health break |
| 10:15 - 11:00 | Invited review of EBSA (Roland Cormier and Don Cobb) |
| 11:00 - 12:00 | General review of EBSA |
| 12:00 - 1:00 | Lunch (not provided) |
| 1:00 - 1:30 | ESS Presentation (Bill Glass) |
| 1:30 - 2:15 | Invited review of ESS (Tim Johnson) |
| 2:15 - 2:45 | General review of ESS |
| 2:45 - 3:15 | Health break |
| 3:15 - 3:45 | General review of ESS |
| 3:15 - 5:00 | Knowledge gaps and SAR summary bullets writing tasks (Bob Randall) |

Wednesday, November 20, 2013

- | | |
|---------------|--|
| 8:30 - 9:00 | Summary from previous day and tasks |
| 9:00 - 10:00 | Draft of SAR summary bullets |
| 10:00 - 10:15 | Health break |
| 10:15 - 12:00 | Draft of SAR summary bullets and conclusion of meeting |