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Proceedings of the regional peer review of the Evaluation of habitat restoration activities for species at risk fishes within the Crown Marsh (Long Point Bay)

4 May 2016
Burlington, ON and via Teleconference/WebEx

Chairperson: Lynn Bouvier
Editor: Lia Kruger

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Canada

Foreword

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

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SUMMARY

A regional science peer-review meeting was held on 4 May 2016 in Burlington, Ontario. The purpose of the meeting was to peer review the evaluation of the habitat restoration for species at risk fishes within the Crown Marsh (Long Point Bay).

The Long Point wetland complexes have been inundated with invasive plant species (e.g., European Common Reed – *Phragmites australis*), resulting in large expanses of monoculture wetland habitat that no longer support aquatic and terrestrial biota historically present. In response, efforts are underway to mechanically remove monocultures, and restore open water habitat. There are four wetland species at risk fishes present (Pugnose Shiner, *Notropis anogenus*; Lake Chubsucker, *Erimyzon sucetta*; Grass Pickerel, *Esox americanus vermiculatus*; and Warmouth, *Lepomis gulosus*) within the Crown Marsh of Long Point Bay. The area is also identified as Critical Habitat for Pugnose Shiner, Lake Chubsucker and Eastern Sand Darter (*Ammocrypta pellucida*). It is unknown whether newly created wetland cells within the marsh will support local fish species recovery; or function as "population sinks" or "ecological traps". To determine the use of newly created open-water habitats by wetland fishes and the quality of the newly restored habitats, Fisheries and Oceans Canada (DFO) and Ontario Ministry of Natural Resources and Forestry (OMNRF) initiated a three-year effectiveness monitoring program at the Crown Marsh, Long Point Bay in 2012. Fish use and habitat quality of wetland sites were assessed by sampling newly (created in 2012) and recently created (6-7 years old) wetland habitats, and nearby reference sites for three successive field seasons (2012, 2013 and 2014).

Participants included DFO Science and Species at Risk programs, Ontario Ministry of Natural Resources and Forestry, and University of Toronto.

This proceedings report summarizes the relevant discussions from the meeting and presents recommended revisions to be made to the associated research document. The working paper presented at the meeting will be published as a Canadian Science Advisory Secretariat (CSAS) Research Document. The advice from the meeting will be published as a CSAS Science Advisory Report.

Compte rendu de l'examen régional par les pairs de l'Évaluation des activités de restauration de l'habitat des espèces de poisson en péril dans le marais Crown (baie Long Point)

SOMMAIRE

Une réunion régionale d'examen scientifique par des pairs a eu lieu le 4 mai 2016 à Burlington, en Ontario. Le but de la réunion était de procéder à un examen par les pairs de l'évaluation de la restauration de l'habitat des espèces de poissons en péril dans le marais Crown (baie Long Point).

Les complexes de milieux humides de Long Point ont été inondés d'espèces de plantes envahissantes (p. ex. le roseau commun – *Phragmites australis*), ce qui a entraîné la formation de grandes étendues d'un habitat humide dominé par une monoculture qui ne peut plus subvenir aux besoins de biotes aquatiques et terrestres qui le peuplent depuis longtemps. En réponse, on consacre des efforts afin de retirer mécaniquement les monocultures et de restaurer un habitat en eau libre. On compte quatre espèces de poisson en péril – le méné camus (*Notropis anogenus*), le sucet de lac (*Erimyzon sucetta*), le brochet vermiculé (*Esox americanus vermiculatus*) et le crapet sac-à-lait (*Lepomis gulosus*) – dans les zones humides du marais Crown de la baie Long Point. La zone est également désignée comme étant un habitat essentiel pour le méné camus, le sucet de lac et le dard de sable (*Ammocrypta pellucida*). On ne sait pas si les cellules de zones humides nouvellement créées à l'intérieur du marais appuieront le rétablissement des espèces de poisson locales, ou encore fonctionneront en tant que « bassins de population » ou « pièges écologiques ». Afin de déterminer l'utilisation des habitats en eau libre nouvellement créés par les poissons des zones humides et la qualité des habitats nouvellement restaurés, Pêches et Océans Canada (MPO) et le ministère des Richesses naturelles et des Forêts de l'Ontario (MRNFO) ont lancé en 2012 un programme de surveillance de l'efficacité d'une durée de trois ans dans le marais Crown de la baie Long Point. Les responsables du projet ont évalué l'utilisation par les poissons et la qualité de l'habitat des zones humides en prélevant des échantillons dans les habitats en milieu humide nouvellement créés (en 2012) ou créés depuis quelques années (il y a 6 à 7 ans), ainsi que dans des sites de référence, pendant trois saisons sur le terrain consécutives (2012, 2013 et 2014).

Les participants regroupaient des employés du Secteur des sciences et du Programme sur les espèces en péril du MPO, du ministère des Richesses naturelles et des Forêts de l'Ontario et de l'Université de Toronto.

Le présent compte rendu résume les discussions pertinentes tenues lors de la réunion et décrit les modifications recommandées à apporter au document de recherche connexe. Le document de travail présenté lors de la réunion sera publié en tant que document de recherche du Secrétariat canadien de consultation scientifique (SCCS). L'avis découlant de la réunion sera publié en tant qu'avis scientifique du SCCS.

INTRODUCTION

DFO Species at Risk Program has requested advice from DFO Science and Ontario Ministry of Natural Resources and Forestry to provide a better understanding of how the newly created habitat supports species at risk fishes and whether there is an overall benefit to these species over time. As a result, a peer review meeting was held on May 4, 2016 in Burlington, Ontario. Meeting participants (Appendix 1) included DFO (Science, and Species at Risk), Ontario Ministry of Natural Resources and Forestry, and University of Toronto. DFO drafted one working paper and distributed it to participants in advance of the meeting.

The intent of this meeting, as described in the Terms of Reference (Appendix 2), was to provide a better understanding of how the created habitat supports species at risk fishes and whether there is an overall benefit to these species over time.

Specifically, science advice was required to:

1. Compare and characterize fish assemblages and habitat conditions in created wetland habitats and reference sites.
2. Assess the value of the created habitats (sources, sinks) and provide approaches that could be used to maximize this value to species at risk fishes.
3. Review the existing Long Point Bay Best Management Practices document that is currently in use for channels to determine if there are additional measures that should be included in this document and identify associated knowledge gaps.

The meeting generally followed the agenda (Appendix 3). The meeting Chair provided a brief overview of DFO's CSAS Science Advisory Process and the guiding principles for the meeting.

This Proceedings report summarizes the relevant meeting discussions and presents the key conclusions reached during the meeting. Science advice resulting from this meeting is published on the DFO CSAS website in the Science Advisory Report series. The technical details supporting the advice are published in the Research Document series. The complete list of references for material cited in this report can be found in the Research Documents (Rook et al. 2016).

WORKING PAPER PRESENTATION

Presenter: Natalie Rook

Abstract

The purpose of this research document was to determine if the restoration of Long Point Crown Marsh, Lake Erie was beneficial towards fishes and supported local fish recovery as there are five fish species at risk (SAR) found in this region. Crown Marsh has been invaded by the invasive grass *Phragmites australis*. There is a desire to restore the habitat and provide more open water habitat. Dredging has occurred to remove the invasive plant and to create ponds that are connected to Long Point Bay. To evaluate the effect of these restoration activities on fishes, Fisheries and Oceans Canada (DFO) and the Ontario Ministry of Natural Resources and Forestry (OMNRF) sampled six ponds between 2012-2014. Four created ponds and two reference ponds with minimal human disturbance were sampled using enclosure seining methods. In addition to sampling the fishes, habitat data were collected, and water depth and temperature were recorded over time using level loggers. Spotted Gar (*Lepisosteus oculatus*), a species at risk, was never caught during the three years sampling took place. The most recently created ponds, Ankney and Kozac, supported four species at risk, including Grass Pickerel

(*Esox americanus vermiculatus)*, Lake Chubsucker (*Erimyzon sucetta)*, Pugnose Shiner (*Notropis anogenus)*, and Warmouth (*Lepomis gulosus)* at various times throughout sampling. The created ponds, Thompson and West Feed, supported Grass Pickerel, Lake Chubsucker, and Pugnose Shiner but not Warmouth. Overall the fish communities were different among ponds and also over time. Habitat also varied as the created ponds, Ankney and Kozac, exhibited less submerged vegetation and more open water compared to the reference ponds. They were also shallower compared to reference ponds and West Feed Pond. None of the ponds were large enough to support the minimum viable population of Lake Chubsucker. Also, many of the ponds occasionally experienced very low water levels, high water temperatures in the summer, and low dissolved oxygen, all of which are indicative of an ecological trap habitat. Further research should be completed on the channels connecting the ponds to Long Point Bay. This includes sampling the channels and tagging fishes to track their movement through channels to determine if fishes are able to migrate out of the ponds. Also, a better understanding of the overwintering conditions should be established. When constructing ponds, approaches that should be considered include ensuring pond depth is sufficient, creating large channels to support fish movement, and dredging when fishes are not spawning.

Discussion

A participant asked if Ponds 4 and 6 were newly created. The presenter indicated that they were and will be added to the site map in the research document.

A participant asked how the connections between Long Point Bay and each pond, and specifically Kozac, were verified. Another participant responded that all ponds were connected to Long Point Bay. Kozac connects to the bay through a ‘secondary artery’ and was accessed via boat.

A participant noted that neither Spotted Gar nor Eastern Sand Darter were captured in Crown Marsh although it was identified as having Critical Habitat for Eastern Sand Darter and this should be noted in the document. Another participant commented that the mapping identifies Crown Marsh as Critical Habitat based on the bathymetry rather than substrate information. Based on functional attributes the area is not Critical Habitat. A participant noted that most areas have sand and therefore should be considered Critical Habitat but the presenter responded that there is only sand in areas that have been dredged (otherwise, they are wetland habitat with organic material). A participant asked if they were lighting up as Critical Habitat due to previous records. A participant responded that the records are from the middle of Long Point Bay and they are 2 or 3 km from Crown Marsh. Another participant noted that they are capturing everything in the area when mapping Crown Marsh. Another participant added that a lot of the perimeter of the inner bay where it’s wetland, it will lack the functional attributes that were discussed for Eastern Sand Darter. The functional attributes for Eastern Sand Darter, if still existed would be in the middle of the bay (sand and open and exposed to wind and current). A participant thought it would be helpful to say that the functional attributes of Eastern Sand Darter Critical Habitat are not meet within the Crown Marsh area. This information was to be added to the research document.

There was a discussion around capturing information in the document regarding the Eastern Sand Darter not being found in Crown Marsh. A participant suggested including “while mapping includes Crown Marsh as Critical Habitat, based on known requirements it is not Critical Habitat for Eastern Sand Darter”. Another participant suggested also including something about Spotted Gar which is the opposite situation. They suggested including information such as, Crown Marsh exhibits habitat attributes that align with those related to Spotted Gar Critical Habitat, but Spotted Gar has not been found within the Crown Marsh area. The group agreed and these statements will be added to the document.

A participant asked about the emergent macrophyte vegetation and whether it was different in species composition for reference ponds versus created ponds. Another meeting participant responded that generally there are more macrophytes in reference ponds (mostly *Chara*, bladderwort and *Elodea*). An OMNRF participant commented that the OMNRF does not intend to do any maintenance work to clean out macrophytes from the ponds.

There was a discussion around the number of species at risk found in the natural and created ponds. A participant asked if they noticed any increase in species at risk over time. Another participant directed meetings participants to Table A3 and A4 in the research document for a list of SAR found in created and natural ponds. The number of species at risk fishes fluctuated from year to year without trend. A participant referred to Table A2 to indicate results were highly variable particularly in 2013 and it was challenging to sample because of dense vegetation. It is important to focus on seeing that different year classes of species at risk fishes exist in the ponds.

A participant said that the area around Pond 6 was developed over a period of three years and subsequently asked if it was currently connected or isolated. A meeting participant responded that the two newest sites are connected and the most southerly portion of Pond 6 was connected to the existing central Pond 6, which has been connected to the main channel for many years. A participant said that they have a map that shows them as separate. An OMNRF participant clarified that they were connected last year.

A participant noted that there was data collected from five repeat surveys conducted at each site, which would allow for detection probabilities and they are wondering if any analysis was done. The participant questioned whether the data was considered in terms of detectability of fish species at risk. They added that this type of analysis may be possible since data from repeated sampling events was available, and if it was found that the reference ponds had higher detection probability, it would indicate that are home to a greater number of species at risk fishes. The participant also indicated that submergent macrophyte density would have to be considered because this would negatively affect seining efficiency. They wondered if the questions about species at risk abundance might be answered if the detection probability was examined. Another participant responded that detected probability has not been examined yet, but there is a post-doctoral student that will be attempting to address these questions. Another participant noted that fish species at risk abundance might have been underestimated at sites where macrophytes were very dense as this might affect the deployment of the bag seine. Similarly, sampling at sites with decreased macrophyte cover may also decrease fish abundance as there is less cover provided to the fish and there is an increased chance of the fish being scared from the site.

A participant suggested a closer examination of the field notes to determine vegetation type and cover in each pond. Recently disturbed areas had higher turbidity. They suggested comparing the turbidity in the inner bay to the turbidity at Crown Marsh. They also suggested adding more macrophyte and turbidity information to the discussion section in the working paper. The group agreed.

A participant commented that the West Feed Pond was dredged in late 2012, and they questioned whether this activity influenced the fluctuations presented from 2012 to 2014 (the type of macrophytes found post-dredging). Another participant responded that vegetation was lost along the south edge of pond but ¾ of the pond vegetation remained undisturbed and they did not notice changes in macrophytes between the three years.

REVIEW OF THE EXISITING LONG POINT BAY BEST MANAGEMENT PRACTICES (BMP)

Presenter: Dave Balint

Summary

Background

- Historical occurrence of numerous dredging and aquatic vegetation removals throughout Long Point Bay
- Recent designation of Critical Habitat for 3 species (Eastern Sand Darter, Lake Chubsucker and Pugnose Shiner) in 2010 and 2012
- Destruction of Critical Habitat and harm to species at risk fish may require permits under the *Species at Risk Act* or activities may not be permitted to proceed
- BMP's developed to avoid or mitigate incidental harm to species at risk and protect habitat and to decrease administrative burden with existing infrastructure
- Existing structures: boat wells, slips, marinas, navigation channels
- Navigation channels connect to pond creation sites in Crown Marsh
- Are the BMP's effective in mitigating incidental harm and protecting habitat?

Standard mitigation

Sediment controls, no side casting, minimize disturbance to banks, contain/stabilize dredged materials, machinery clean, washed, refueled away from water, etc.

Additional mitigation: to be discussed

- Middle of channel dredged with vegetation along shoreline left undisturbed
- In small channels (1–7 m wide) dredging should not exceed 60 % of channel width
- In main navigation or collector channels (>7 m wide), dredging should not exceed 50% of the channel width to a maximum of 6 m. Dredging occurs in middle of channel with vegetation left intact along the sides.
- Timing: dredging completed as late in the year as possible to allow YOY fish to grow, to improve their ability to move away from work sites. In water works should be conducted between August 1st and March 15th to protect spawning and larval fish. Works should be completed before November 1 to avoid harm to turtles and amphibians.

Discussion

A participant asked if the BMPs are effective in mitigating incidental harm and protecting habitat for species at risk fishes and was looking for input from species experts.

A participant asked why channel width rather than depth was used as the criteria to determine the allowable area to be dredged when Critical Habitat delineation is generally more dependent on depth. The presenter responded that there are more fluctuations with depth. Another participant added that BMPs using width have been developed for navigation (boat size) and vegetation. Many channels are lined with vegetation that they want to conserve.

The group discussed timing windows. A participant said they used August 1 for in-water works as this would give young-of-the- year (YOY) Lake Chubsucker time to grow. They generally

double in size during this time frame. If swimming out of the way is the best form of mitigation, then allowing them time to grow larger increases their likelihood of survival. A participant noted that the general information provided in the BMP is acceptable but it is unknown what species of fish are occupying the channels. They noted the importance of sampling the channels to determine fish usage of these areas. Another participant commented that it would also be beneficial to complete research to support the current proposed timing windows to mitigate impacts from activities like dredging.

An OMNRF participant indicated that the current timing window does present a challenge for DFO and OMNRF staff in relation to permitting. The OMNRF fish timing window was July 1, but the recommendation from the BMP is August 1. The OMNRF staff indicated that they are currently working with a July 15 timing window. It was indicated that the inconsistencies in DFO and OMNRF timing windows present a challenge. OMNRF are encouraging everyone to use the Aug 1 window. A participant wondered what the reasoning was behind the July 15 timing window. OMNRF responded that it was a corporate OMNRF decision.

There was a discussion about the back end of the timing window. A participant noted that August 1 is good for early spawning species, but wondered for late spawning species if this would provide sufficient time for growth of larval or YOY fishes. A participant responded that to protect spawning, August 1 would be a good end date for in-water works but they were not sure if this is a good date to allow larval fishes to escape. A participant wondered how big of a concern this is for YOY fishes. A participant indicated that there is literature available indicating hundreds of dead small fish and invertebrates after backhoe activity. Another participant asked whether there was a difference for small channels as compared to agricultural drains. A participant responded that there would be no difference because the fish have nowhere to go in smaller channels. A participant noted that the logic in the document makes sense and therefore a precautionary end date of August 1 is good.

A participant wondered if information from the Pugnose Shiner turbidity study was relevant to this discussion. Another participant commented that this study did not look at whether fishes avoided turbidity. They thought that turbidity does increase predation in the short term because the fish are unable to school. The size of fish affects their ability to move away, but even in a large pond they might not be able to escape if they are too small.

A participant noted that a vegetative bank is left on either side of the channel when it is being dredged. These vegetative banks act as a refuge for fishes during dredging. It was also noted that the proponent can be asked to leave remnant habitat when dredging, which would benefit fishes such as Pugnose Shiner that have limited capacity to migrate. A participant asked if it was possible to maintain water access along sides while working in channel. A participant said that it is possible for the majority of locations.

A participant asked if the BMP document was sent out and how would revisions be dealt with. Another participant responded that the BMP is sent out when a proponent applies for a permit. There is no formal process for making revisions, and that this can be done ad hoc. It was noted that the current BMP applies exclusively to existing infrastructure and does not apply to Turkey Point.

A participant inquired on the efficiency of the sediment controls, and the length of time it takes for the particles to resettle. A meeting participant responded that it takes 2–3 days for the sediment to settle. Since the Crown Marsh region is dominated by sand it will settle faster but there is variation within Long Point.

A participant commented that the wording ‘In small channels (i.e. 1-7 metres wide), dredging should not exceed 60% of the channel width” from the BMP should be changed to

"minimal as possible not exceeding 60% of channel width". Although it is currently unknown, this would become relevant once it is determined if fish are using the whole channel or only the channel banks.

During the discussion, the group identified the following knowledge gaps:

- Where and when species at risk fishes are spawning. Are they spawning in the channels?
- Abundance and distribution of species at risk fishes in canals assuming that these areas are providing source populations for Crown Marsh.
- Fine scale distribution of species at risk in the channels. Are they using the entire channel width or only using the channel banks? (loosing 60% vs nothing).
- Distribution of Eastern Pondmussel in inner Long Point Bay.

DRAFT SCIENCE ADVISORY REPORT SUMMARY BULLETS

The group discussed the Science Advisory Report summary bullets and made the following suggestions:

In the second sentence of the second bullet, replace 'may' with 'a concern was identified'.

A participant said that there was also a concern related to the destruction of Critical Habitat. Another participant suggested adding a reference to Eastern Sand Darter and it's delineated Critical Habitat (not functional).

Another meeting participant suggested replacing 'effects' with 'difference' in one of the bullets. They also suggested using the term 'population density' or 'relative abundance'.

A participant asked if they can refer to the population density because they have the numbers; and add them to research document. Another participant thought that if they were going to add them then they should look at the population density now and come to a consensus together. The group agreed to only include community composition and not abundance or density data.

A participant asked if one of the channels did not have water at one point. Another participant responded that the data logger showed it went to zero, but that does not mean that there was not any water. A participant suggested adding a statement explaining this. A participant asked if there was a data logger in the center. There was, but they would have to go back and look at the logger.

One participant commented that there needs to be consistency with 'minimum' or 'average' in the research document.

A participant commented that we should only be providing generic guidance as the guidance is based on a single study. There was a discussion on whether or not prescriptive guidance could be provided based on a single study. It was decided that although the guidance would be generalized it is based on scientific research.

A participant inquired on the depth of the reference ponds, and if it was shallower than the recommended 1.5 water depth. Another participant suggested removing the 1.5 m minimum depth requirement, and replacing it with advice on the need for variation of water depth throughout the pond. This would allow for pockets of deeper water, and would provide a refuge for fishes during low water levels. A participant inquired on the level of dissolved oxygen in the shallowest pond. The presenter responded that since the depths were recorded continuously (from the level loggers) and dissolved oxygen was only recorded at the time of sampling, that conclusions should not be drawn from these values. Another participant noted that lake level will also have an effect on dissolved oxygen levels.

A meeting participant thought that the group should focus more on connecting channels and deep pockets to provide a refuge, rather than being prescriptive on the pond as a whole. Another participant agreed and added that by going from dry land to some depth of water at the inner bay (continuous slope), they will need to maintain access to connecting channel to come in or out. A participant said that they could maintain the gradient with an emphasis with the deepest portion of the pond near the access channel. The meeting chair agreed that this would be changed in the research document.

A participant asked if the depths associated with Ankney or Kozac were typical of created ponds. A participant from OMNRF said that overall they are shallower but they are looking for variability in ponds to create diversity. The ponds can be self-maintaining if built the correctly (i.e., with proper gradients).

A participant suggested rewording the summary bullet to include the recommendation of maintaining a 'permanent connection' between the ponds and connecting channels rather than just a 'connection'. The group agreed. Another participant asked if there has ever been a time where there was not a connection. A participant responded that there is generally always a connection, but another participant disagreed, indicating that during one of their site visits there was a sediment load in place blocking one of the channels that connects Ankney Pond.

A participant thought that there needed to be a more refined description of seasonal pattern (larval, YOY fish habitat) and they also commented that doing this will help refine timing window recommendations. This will be added as a bullet.

Another participant suggested adding 'composition and distribution' of fishes in channels with emphasis on fish species at risk to the second last bullet.

A participant suggested adding information from the BMP related to ensuring that vegetative edges are left on either side of the channel when dredging occurs creating a continuous patch of vegetation. The use of these vegetative edges by fishes should be listed as a current knowledge gap.

A participant suggested that it should be explicit that the current study only focuses on the Long Point Crown Marsh area, and that the results of this research should not be applied to the various other projects occurring within the Long Point Inner Bay. Another participant disagreed with this statement, indicating that the recommendation of the current study could be applied to other similar wetland areas. The group agreed that a bullet should be added to the science advisory eport indicating that the recommendations could be applied to other projects within the inner bay.

OMNRF would like to review the revised research document. The meeting chair indicated that she would send the revised research document and proceedings to all participants for their review.

The meeting was adjourned.

REFERENCES CITED

Rook, N.A., Mandrak, N.E., Reid, S.M., and Barnucz, J. 2016. Evaluation of the effects of habitat restoration on fish species at risk within Crown Marsh, Long Point Bay, Lake Erie, Ontario. DFO Can. Sci. Advis. Sec. Res. Doc. 2016/059. v + 34 p.

APPENDIX 1. PARTICIPANTS

Name	Affiliation
Ted Barney	OMNRF
Eric Clelend	OMNRF
Alan Dextrase	OMNRF
Rich Drouin	OMNRF
Tim Haxton	OMNRF
Kathryn Markham	OMNRF
Cam McCauley	OMNRF
Claire Paller	OMNRF
Yingming Zhao	OMNRF
Dave Balint	Fisheries and Oceans Canada, Species at Risk
Jason Barnucz	Fisheries and Oceans Canada, Science
Lynn Bouvier	Fisheries and Oceans Canada, Science
Dominique Lebrun	Note taker
Nick Mandrak	University of Toronto
Debbie Ming	Fisheries and Oceans Canada, Species at Risk
Scott Reid	OMNRF
Natalie Rook	Fisheries and Oceans Canada, Science

APPENDIX 2. TERMS OF REFERENCE

Evaluation of habitat restoration activities for Species at Risk fishes within the Crown Marsh (Long Point Bay)

Regional Science Peer Review – Central and Arctic Region

May 4, 2016
Burlington, Ontario and WebEx/Teleconference

Chairperson: Lynn Bouvier

Context

The Long Point wetland complexes have been inundated with invasive plant species (e.g., European Common Reed – *Phragmites australis*), resulting in large expanses of monoculture wetland habitat that no longer support aquatic and terrestrial biota historically present. In response, efforts are underway to mechanically remove monocultures, and restore open water habitat. There are four wetland species at risk (SAR) fishes present (Pugnose Shiner, *Notropis anogenus*; Lake Chubsucker, *Erimyzon sucetta*; Grass Pickerel, *Esox americanus vermiculatus*; and Warmouth, *Lepomis gulosus* within the Crown Marsh of Long Point Bay. The area is also identified as Critical Habitat for Pugnose Shiner, Lake Chubsucker and Eastern Sand Darter (*Ammocrypta pellucida*). It is unknown whether newly created wetland cells within the marsh will support local fish species recovery; or function as "population sinks" or "ecological traps". To determine the use of newly created open-water habitats by wetland fishes and the quality of the newly restored habitats, Fisheries and Oceans Canada (DFO) and Ontario Ministry of Natural Resources and Forestry (OMNRF) initiated a three-year effectiveness monitoring program at the Crown Marsh, Long Point Bay in 2012. Fish use and habitat quality of wetland sites were assessed by sampling newly (created in 2012) and recently created (6-7 years old) wetland habitats, and nearby reference sites for three successive field seasons (2012, 2013 and 2014).

Various waterfowl groups have been engaged in open water habitat creation (predominantly for improving waterfowl habitat) within coastal marshes for some time and continue to propose work with the potential to impact SAR fishes and their habitat. DFO Species at Risk Program has requested advice from DFO Science and OMNRF to provide a better understanding of how the newly created habitat supports SAR fishes and whether there is an overall benefit to these species over time. This information will also be used to inform approaches (e.g., design criteria, Best Management Practices documents) that may be used to improve habitat created to better serve the needs of SAR fishes here and possibly in other locations.

Objectives

The objectives of the meeting are to:

1. Compare and characterize fish assemblages and habitat conditions in created wetland habitats and reference sites.
2. Assess the value of the created habitats (sources, sinks) and provide approaches that could be used to maximize this value to species at risk fishes.
3. Review the existing Long Point Bay Best Management Practices document that is currently in use for channels to determine if there are additional measures that should be included in this document and identify associated knowledge gaps.

Expected Publications

- Science Advisory Report

- Proceedings
- Research Document

Expected Participation

- Fisheries and Oceans Canada (Science Sector and Species at Risk Program)
- Ontario Ministry of Natural Resources and Forestry
- Academics
- Conservation Authorities
- Other invited experts

APPENDIX 3. AGENDA

Evaluation of habitat restoration activities for species at risk fishes within the Crown Marsh (Long Point Bay)

Regional Science Advisory Meeting

Burlington, ON

Chairperson: Lynn Bouvier

Wednesday, 4 May 2016

1:00 - 1:15	Introductions, Objectives of Science Review, and Process – Lynn Bouvier (DFO)
1:15 - 2:00	Presentation on Crown Marsh Project – Natalie Rook (DFO)
2:00 - 3:00	Discussion
3:00 - 3:15	Health Break
3:15 - 3:30	Presentation on Long Point Bay Best Management Practices – Dave Balint (DFO)
3:30 - 3:45	Discussion
3:45 - 5:00	Draft of science advisory report summary bullets and conclusion of meeting – Lynn Bouvier (DFO)