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Proceedings of the Regional Science Advisory Process on the Recovery Potential Assessment of Channel Darter (*Percina copelandi*), Lake Erie (DU1) and Lake Ontario (DU2) populations in Canada

Meeting date: July 9, 2019
Location: Burlington, ON

Chairperson: Sarah Bailey
Editor: Tessa Brinklow

Fisheries and Oceans Canada
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June 2020

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 9 July 2019 in Burlington, Ontario. The purpose of the meeting was to assess the recovery potential of Channel Darter (*Percina copelandi*), Lake Erie (DU1) and Lake Ontario (DU2) populations in Canada by providing updated information and associated uncertainties related to the 2010 RPA, advice that may be used for the development of a recovery strategy and action plan, and to support decision making with regards to the issuance of permits or agreements. Participants included DFO Science, Policy, Species at Risk Management and Fish and Fish Habitat Protection Program (Central and Arctic Region), the Ontario Ministry of Natural Resources and Forestry (OMNRF), Parks Canada (Trent Severn and Point Pelee), St. Clair Region Conservation Authority, and academic experts.

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) originally considered Channel Darter to be a single unit, and the species was designated as Threatened in April 1993. A reassessment by the committee in May 2002 confirmed the species' status as Threatened. In November 2016, Channel Darter was split into three separate units – the Lake Erie (DU1), Lake Ontario (DU2), and St. Lawrence (DU3) populations. The Lake Erie (DU1) and Lake Ontario (DU2) populations were designated as Endangered, while the St. Lawrence (DU3) population was down-listed to Special Concern (and was not covered in this RPA as such). Lake Erie (DU1) and Lake Ontario (DU2) Channel Darter populations are found only in Ontario with the majority of the remaining Lake Erie (DU1) populations found within nearshore lake and river habitats, and the Lake Ontario (DU2) populations limited to tributaries in the Bay of Quinte. Remaining populations have experienced dramatic reductions in range and abundance due to ongoing threats related to habitat modification and the invasive Round Goby (*Neogobius melanostomus*). Channel Darter DUs 1 & 2 are currently listed on Schedule 1 of the *Species at Risk Act* (SARA) as Endangered (August 2019), and is currently assessed as Special Concern under Ontario's Endangered Species Act (May 2017).

This proceedings report summarizes the relevant discussions from the peer-review meeting and presents recommended revisions to be made to the associated research documents. The Proceedings, Science Advisory Report and supporting Research Documents resulting from this science advisory meeting are published on the DFO Canadian Science Advisory Secretariat (CSAS) website.

INTRODUCTION

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) originally considered Channel Darter to be a single unit, and in April 1993, COSEWIC recommended that the species be designated as Threatened. This status was reassessed and confirmed in May 2002. In November 2016, Channel Darter was split into three separate units – the Lake Erie (DU1), Lake Ontario (DU2), and St. Lawrence (DU3) populations – and the DU1 and DU2 populations were designated as Endangered, while the DU3 population was down-listed to Special Concern (and was not covered in this RPA as such). The species was assessed because both populations (DU1 and DU2) are severely threatened by the invasive Round Goby, and because of threats related to major shoreline modifications. These modifications, particularly around the nearshore lake and river habitats of the Lake Erie (DU1) populations, alter flow regimes, and sediment and nutrient loading. Channel Darter is currently listed on Schedule 1 of the *Species at Risk Act* (SARA) as Endangered (August 2019), and is currently assessed as Special Concern under Ontario's Endangered Species Act (May 2017). A Recovery Potential Assessment (RPA) process has been developed by Fisheries and Oceans Canada (DFO) to provide information and scientific advice needed to fulfill SARA requirements including updating the 2010 RPA, and the development of recovery strategies and authorizations to carry out activities that would otherwise violate SARA (DFO 2007a).

The purpose of the meeting, as described in the Terms of Reference (Appendix 1), was to assess the recovery potential of Channel Darter. The RPA is a science-based peer-review process that assesses the current status of the species by addressing 17 steps in the RPA framework outlined in the Summary section of the Revised Protocol for Conducting Recovery Potential Assessments (DFO 2007a, b). The current state of knowledge about Channel Darter habitat requirements, threats to both habitat and the species itself, and scenarios for mitigation and alternatives to activities that negatively impact the species and its habitat, are included in the Science Advisory Report. A regional science peer-review meeting was held on 9 July 2019 in Burlington, Ontario to discuss the Channel Darter RPA. Meeting participants included DFO Science, Policy, Species at Risk Management and Fisheries Protection Program (Central and Arctic Region), the Ontario Ministry of Natural Resources and Forestry (OMNRF), Parks Canada (Trent Severn and Point Pelee), St. Clair Region Conservation Authority, and academic experts (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 recommended revisions to be made to the associated research documents.

DETAILED DISCUSSION

The meeting chair provided the participants with an introduction to the RPA by explaining the objective of the meeting and outlining the Terms of Reference. This included information on the DFO Science advisory and listing (COSEWIC and SARA) processes and designations. This also included the intent of the meeting and how the products of the meeting might be used. Draft research documents were developed by DFO and provided to participants in advance of the meeting. The draft research documents were the basis for discussion, and participants were encouraged to add to or change the material as needed to ensure that the best and most up-to-date information was included.

SPECIES DESCRIPTION

Presenter: Dave Andrews

This presentation included information on the description of Channel Darter, including morphological characteristics, colouration, feeding areas and diet. One participant questioned the species description of “no measurable morphological differences between DU1 and DU2”, stating that there are large size differences between the two populations and that it needs to be decided if the differences are a morphological characteristic or a life history trait. The participant suggested that there are data from papers written on collections from the Trent River that address these size differences. Another participant recommended that those suggested references should be reviewed and included.

The distribution of Channel Darter in Canada was summarized and illustrated using maps for each of the two DUs. A discussion on whether any missing data on collections added into documents was brought up. One participant suggested that there is a spreadsheet from a SARA progress report with data that may have been missed and could be added in. Another participant noted that there is loss of occurrence above Sonoco Dam, which has garnered interest with construction work in the lower Trent, and that the area is not monitored anymore. The participant suggested that it may be worth highlighting this on the map. It was also suggested that since the construction of the Dam in 2005/2006 and subsequent offsetting due to changes in water levels, there are still occurrences of the species both upstream and downstream, and as such, should be changed from a historical occurrence. Another participant responded that they were unsure if there were currently Channel Darters there anymore as they had never sampled there. The previous participant responded that there was a written report (that may or may not have excel data) regarding these occurrences that they would share, though flow and depth conditions for the area were outside the range for Channel Darter. A participant also commented that there are some date corrections needed regarding distribution that they would provide later, and that the Trent River work was done as a graduate student and not with the OMNRF.

OVERVIEW OF TRENT RIVER CHANNEL DARTER (DU2) RESEARCH AND MONITORING ACTIVITIES

Presenter: Scott Reid

This presentation summarized OMNRF research and monitoring activities of the Trent River Channel Darter (DU2). The spillway channel site failed to detect Channel Darter due to decreased flow that previously brought them into the channel. There was no change in Channel Darter abundance at the Sonoco Generating Station until this year.

A participant commented that in 2010, the size distribution appeared a bit broader and questioned if this was potentially because of the gear or time of year. The presenter explained that all sampling happened in August at multiple sites, and while there was some variation in flow across years, the water temperature does not vary (mid 20s°C). The pattern reflects the consequence of collecting more individuals and the great likelihood of collecting rarer, smaller individuals. Furthermore, there should not be any sampling bias as some of the differences in abundance can be related to changes in annual flow in the Trent River. In years with low flow, the water at the monitoring sites is largely shallow and stagnant, which is not preferred habitat for Channel Darter and so they disperse elsewhere. Alternatively, it is suspected that Channel Darter are attracted to the area in years of higher flow, and therefore, more individuals are collected.

A participant asked if transects are able to capture the variable depths of the entire area, or if any depths are missed (wadable vs non-wadable areas). The presenter explained that much of Trent River is non-wadable, including large stretches of habitat that are 2-4 m deep. From spring to early fall, Channel Darter are concentrated in areas that are wadable. However, in late

fall and winter when water temperatures decline, the distribution of Channel Darter into deeper areas is observed and catch numbers drop off. This is similar to what is reported of Channel Darter in the southern United States. In the summer of 2003-2004, minnow traps were used to try to collect Channel Darter at greater depths in Sonoco, however, no individuals were collected. During the summer months, larger systems, such as the Ottawa and Detroit Rivers, can also be trawled in areas with greater depths. On the other hand, it is believed that Round Goby utilize all depths, as supported by work done in Dr. Michael Fox's lab at Trent University, in which they angled for Round Goby in deeper waters and were able to catch individuals at depths of 1.5 – 3 m. This suggests that Round Goby habitat preference is much broader than described in the presented study.

Another participant asked if Channel Darter have an affinity towards shorelines. The presenter responded that they likely have an affinity for specific habitat more so than specifically shorelines. Sometimes the required habitat substrate of gravel and cobble is found along shorelines, other times it is found far from shorelines, as is the case at Sonoco. If a site had the right flow conditions, but not the required substrate, Channel Darters were not collected. Type of substrate was constant at each site, while flow conditions varied and subsequently had an influence on the aggregation of Channel Darters found.

A participant asked if any other fish assemblages are associated with Channel Darter. The presenter responded that River Redhorse (*Moxostoma carinatum*) likely are, as Channel Darter are often found in some of the key areas where there is a high abundance of River Redhorse and spawning River Redhorse. This may reflect availability of the right substrate and flow conditions present at those sites as both species require those similar conditions during at least one stage of their life history. However, other fishes, such as Longnose Dace (*Rhinichthys cataractae*), are sometimes not found in the same habitats as Channel Darter as they seem to be associated with faster waters.

In discussing flow management regimes and Channel Darter spawning, the presenter noted that water flow was highly variable this year with periods of high flow followed by periods of no precipitation. Bed topography of bedrock and boulders created a challenge as it directed water away from habitats and was not an efficient process. The presenter posed the question of whether improvement in habitat suitability would lead to the improvement of Channel Darter abundance, or whether it would result in an increased impact by Round Goby given their abundance in the system. This is currently an unknown and a question of management or recovery potential in the future.

CURRENT STATUS AND POPULATION ASSESSMENT

Presenter: Dave Andrews

The presentation section on current status summarized the current status of all Lake Erie (DU1) and Lake Ontario (DU2) populations of Channel Darter, including when individuals were first collected from a population, as well as the number of individuals most recently captured from that population. The presenter noted that Eastern Sand Darter (*Ammocrypta pellucida*) were also found in Rondeau Bay where 26 Channel Darter were found in one small area, though the Eastern Sand Darter were found further up in the bay. It was also noted that it would be helpful to have someone reaffirm the validity of the specimen from Port Burwell as it would have a significant impact from a restoration perspective. In regards to the Moira system, the presenter noted that one population may not have Channel Darter anymore. A participant noted that they looked for Channel Darter in Port Dover in the fall of 2017 via shoreline surveys, but were unsuccessful in collecting any individuals.

The presentation section on population assessment included tables showing the relative abundance and population trajectory for all Lake Erie (DU1) and Lake Ontario (DU2) populations of Channel Darter, as well as the certainty associated with the accuracy of abundance and trajectory values for each population. In explaining the methodology of the population assessment, the presenter noted that this method assesses the abundance of each population relative to the population that is in the best shape (i.e., a benchmark population that helps to interpret the abundance of other populations through comparison to it), which in this case was Trent River. The method of using a benchmark population to help make interpretations regarding abundance was used in past RPAs. A participant commented that if using a different methodology now than the 2010 RPA to assign abundance ranks, while continuing to assess the same populations and to use similar terminology, then clarification of such is needed, including something in the description of the assessment method that relates the two methods. The participant was concerned that without clarification, people may misinterpret population status changes when cross-referencing the two RPA documents since status changes can be due to a variety of factors, including population health changes, changes in information, and/or changes in methodology. Another participant added that clarification regarding why population status' change was also an important factor when considering recovery actions. A third participant noted that population status changes as a result of methodology changes could also be interpreted as an improvement if a better understanding of a population has been gained over the past 10 years. This participant also commented that the methodology used in the 2010 RPA was very vague. It was suggested that the text describing the methodology of the relative abundance index be added to the current document (perhaps as a footnote) to make the population assessment results explicit (similar to the RPA for Redside Dace).

In discussing the Population Status Table, a participant thought that the population trajectories for the Salmon River and Moira system should be changed from "Unknown" to "Stable" as there has not been a lot of development or new activity there and no Round Goby has been observed there to date. The participant also noted that the timeframe used for the assessment (a much broader period (COSEWIC assessment + 4-5 years of new data)) should be explicitly stated for added clarification when interpreting the data. It was further noted that a large survey of Channel Darter populations occurred in 2005-2006, but that there has not been such a survey since, apart from one small, targeted survey for a study at Point Pelee. Since then, there have been a lot of habitat changes as a result of various activities, erosion, and breaches in the Point Pelee area.

A participant noted that in cases where Channel Darter sampling year are unknown, the data was given a time range. However, it shouldn't be difficult to identify the dates of collection and include them. It was recommended that the localities be shared with Jason Barnucz, Nicholas Mandrak and Scott Reid, who could help determine the dates.

In discussing the population status table, it was noted that the population status for the Salmon River and Moira system would be changed from "Fair" to "Good" to reflect the above recommended changes in population trajectories.

HABITAT REQUIREMENTS; FUNCTIONS, FEATURES AND ATTRIBUTES TABLE

Presenter: Dave Andrews

The presentation included descriptions of Channel Darter, Lake Erie (DU1) and Lake Ontario (DU2) population habitat requirements for three life stages: spawn to hatch, young of year/juvenile (age one until sexual maturity), and adult. The habitat descriptions were broken

down into three categories: functions, features and attributes. This included the importance of riffle and shoal habitats, pools, and coarse-sand beaches.

A participant suggested that substrate types of cobble and gravel were correct for some river systems. The dominant substrate type in lake environments was coarse sand, and in other river systems, such as the Moira, Channel Darter were found using sand-bed pools/run areas downstream of wadable cobble gravel areas. He noted that the role and importance of clean, coarse sand as a substrate needs to be better identified.

Another participant questioned if the habitat functions, features, and attributes table should be the same as the habitat described in the 2010 RPA. They also wondered if there were any plans to expand research sites, such as spawning habitat at Moira and Salmon Rivers, or to take a broad consensus of habitat types used across different streams. Another participant responded that they do not have any plans for work related to spawning, but the Quebec group worked on characterizing spawning habitat and that research may be transferrable. They also addressed the question regarding whether the functions, features, and attributes tables should be the same by noting that in the recovery strategy, habitat for Quebec fish was in a separate table because their habitat was different. A third participant agreed the table should be kept. The first participant commented that stream flow was a limiting factor for spawning, however, other populations were presumably spawning in lacustrine habitats, and wondered if this was a life-history difference, though suggested that it may not be plastic (local adaptation).

The question of whether DU1 individuals use nearshore habitat (in St. Clair and Detroit) and connecting channels at a certain depth was asked by a participant. The response from another participant was that it depends on the definition of the term “nearshore”, and how important shoreline stabilization is as habitat for Channel Darter.

A discussion arose regarding water depths in the Trent River presented as ranging from 0.1 – 0.4 m during spawning season with one participant commenting that this statement gave an interpretation of things being very finite. Two other participants commented that there have been problems with consultants at sites where Channel Darter were present, but depth was outside of the listed range. They also noted that there are problems with constraints as a sudden diversion of water could change an area from unsuitable habitat into suitable. Since they deal with variability, the range helps to quantify and, in their opinions, was the best way to identify critical habitat in the Trent River due to its altered flow. Another participant commented that in the Great Lakes this year, depth variation was still dependent on water levels, which were controlled. It was agreed that the wording around this needs to describe relationships as opposed to absolutes and reflect that the highest suitability (or preferences) for the species is found within these given ranges, but that species presence is possible outside of this in some cases. A participant commented that the criteria provides a better target for offsetting as opposed to trying to re-create the species-specific definition of critical habitat.

In discussing the functions, features and attributes table, a participant questioned whether there was any substrate information associated with trawls that could be used to inform identification of critical habitat for DU1 riverine populations. They also noted that they were unsure if individuals were spawning. Another participant noted that in cases where life stage-specific information is unavailable that, by convention, the information is assumed to be the same as for adults. Therefore, the adult life stage substrate information for DU1 riverine populations should be used to inform substrate requirements for the spawn to hatch life stage. This led into a discussion about what the water depth for DU1 riverine populations (all life stages) should be stated as for identification of critical habitat. One participant suggested depths < 5 m as a more conservative range to 1.7 – 5.3 m. They also wondered if areas with available habitat, and the right substrate and flow conditions were areas that are indeed 1.7 – 5.3 m in depth, or if these

depths are a by-product of where trawling occurred, and gear type used. It was discussed that there is information available regarding how well depths outside these depth ranges have been sampled within the same water bodies where Channel Darter are found, and that with additional data, habitat electivity, preference, or frequency of depth could be determined to reflect the uncertainty in this range (documented absence or lack of sampling effort) and maximum depth. Additionally, it was recommended that it should be explicit that the range represents sampling depths that were limited by gear type used. It was also suggested that there may be sample records from offshore of shallow sites in Detroit River and/or built-up sandbars at shallower depths. It was concluded that it is currently unclear whether the depth range is a description of depths they were caught at or whether it is an actual preference or electivity for those depths.

Referring to the “Scientific Literature” column of the functions, features and attributes table, a participant asked whether the column related to both or one of the DUs. Another participant responded that the column was previous studies that they do not have data for, while the “Current Records” column, they do have data for. It was noted that some information from the “Scientific Literature” column could be moved over into the “Current Records” column.

Another participant wanted to make clear that since there are few collections available for DU1 and DU2 juveniles, juvenile habitat preference information from the DU3 population was used as a surrogate to populate the “Current Records” column of the juvenile life stage table. The conversation then turned to whether in cases where there is only information pertaining to adults of a DU, should that information be used in inference of juvenile preference, or should the information for that life stage from another DU be used. It was agreed that though past convention was to infer from other life stages within the same DU, a better, more precautionary approach would be to leave as unknowns as habitat selection and systems can be significantly different between both life stages and DUs. It was also decided that both DU1 riverine and lacustrine populations would be noted as unknown.

A participant commented that it is unknown where Channel Darter overwinter, and that these areas may not be protected, which is a key uncertainty. He recommended winter refugia be added as a habitat function for the adult life stage.

Another participant noted that the word “average” should be replaced by “mean” across the tables for consistency.

THREAT STATUS AND ASSESSMENT

Presenter: Dave Andrews

The presentation on threat status overviewed the likelihood and impact of threats, as well as the causal certainty associated with the threat impact. It was established that threat likelihood of occurrence (LO) would be categorized as “known” (K), “likely” (L), “unlikely” (UL), “remote” (R) or “unknown” (U); threat impact level (LI) would be categorized as “extreme” (E), “high” (H), “medium” (M), “low” (L), or “unknown” (UK). The causal certainty (CC) associated with threat level of impact would be categorized as “very high” (1), “high” (2), “medium” (3), “low” (4), or “very low” (5). Furthermore, it was established that population-level threat occurrence (PTO) would be categorized as “historical” (H), “current” (C), or “anticipatory” (A); population-level threat frequency (PTF) would be categorized as “single” (S), “recurrent” (R), or “continuous” (C); and population-level threat extent (PTE) would be categorized as “extensive” (E), “broad” (B), “narrow” (N), or “restricted” (R). The threat status was presented for each of the nine Channel Darter populations.

In discussing the threat of climate change, the uncertainty in trying to assess the potential effects of climate change for Channel Darter was highlighted. It was noted that the low

vulnerability ranking of Channel Darter to effects of climate change in Doka et al. (2006) should be taken into context as their model assessed wetland species, of which Channel Darter are not. The idea of climate change being a distinct threat was discussed, and it was agreed upon as a group that climate change should be removed from the threat assessment table as it is not a threat in and of itself and a majority of the rankings would need to be modified if it was. Instead, the group decided that climate change should be added into the document as text explaining how climate change is expected to affect other threats.

Discussions surrounding threat level assessment terms led one participant to note that dredging is an important threat due to removal of suitable substrate. They described the threat as habitat alteration. It was also noted that substrate removal fit with shoreline modification and that habitat alteration as a threat category was problematic as habitat alteration includes all other categories, such as nutrient loading and invasive species. Therefore, the consensus was to keep the threat terminology unchanged.

There was lengthy discussion regarding whether or not to change any values in the threat tables or to keep threat rankings from the 2010 RPA document. Consensus was made, and the group agreed to update the threat tables for only those threats that have had new information come to light since the 2010 RPA. This includes only the following threats: altered flow regimes, incidental harvest, and exotic species and diseases. It was also stated by one participant that this RPA's threat section should focus on the differences between DU1 and DU2 especially with respect to new information that has been published since 2010.

Discussion then focused around the threat of turbidity and sediment loading. A participant wondered what the impact of the stressor on Channel Darter was. A participant expressed low confidence in most of these. It was also questioned whether likelihood of occurrence (LO) should be based on actual conditions and that there should be data to rank where each site is in terms of that. Another participant responded that documented evidence of declines are from the United States and Ohio where heavy modification and increases in sediment loading are affecting riverine Channel Darter populations. The responding participant suggested this was not happening for DU1 and DU2 populations as a chronic stressor. It was then questioned how to classify threats that overlap threat classifications such as shoreline modifications, turbidity and sediment loading, and nutrient loading, however, it was concluded that while overlapping occurs, different impacts are experienced, and changing categories complicates classification. A participant suggested that sediment loading issues are not a threat to Ontario riverine populations as most systems are clear, and as such recommended threat impact (LI) to be low (L) across the board. Another participant noted that threat impact (LI) was medium (M) across the board in 2010, and likelihood of occurrence (LO) for the Moira System, and Salmon and Trent Rivers was unknown (U), though would be medium (M) if it were to occur. Another participant agreed that unless new research has been conducted since 2010, an unknown (U) likelihood of occurrence (LO) and a medium (M) impact (LI) for turbidity and sediment loading made the most sense for the Moira System, and Salmon and Trent Rivers.

Lake Erie (DU1) Populations

Threats to the Detroit River population of Channel Darter were discussed. A participant noted that bait harvest occurs in Detroit River and therefore the likelihood of occurrence for that threat in that system should be Known. In fact, participants agreed that this should be the case for all populations within DU1. Also, the causal certainty for exotic species and diseases was changed from low (4) to medium (3), based on comments from one participant. There was plenty of debate from participants on whether to keep threat rankings the same from the 2010 RPA. Consensus was reached and the group felt that the threat tables would be updated for only those threats that have had new information come to light since the 2010 RPA. This includes

altered flow regimes, incidental harvest, and exotic species and diseases. Participants decided to make the same changes to Lake Erie Central Basin (Rondeau Bay) and Lake Erie Eastern Basin (Port Burwell), as those made to Lake Erie Western Basin (Point Pelee).

Participants agreed that the LI for altered flow regimes should be changed from high (H) to low (L) for the St. Clair River and that likelihood of occurrence should remain as known (K). Lastly, causal certainty for exotic species and diseases was changed from low (4) to medium (3) for all populations in DU1.

Lake Ontario (DU2) Populations

Threats to the Moira System population were discussed and the participants concluded that altered flow regimes should be given a causal certainty of low (4) from medium (3). Lastly, the level of impact for exotic species and diseases was changed from low (L) to high (H), and the population-level threat occurrence was changed from current (C) to anticipatory (A).

Based on group discussion it was agreed that for Salmon River, the LI for exotic species and diseases should be changed from low (L) to high (H), and the PTO was changed from current (C) to anticipatory (A).

Participants agreed that all DU2 populations would have their threat ranking unchanged since the last RPA in 2010, except for altered flow regimes, exotic species and diseases, and incidental harvest. These three threat categories were the only categories in which new evidence has been published since 2010 with regards to a specific threat and its potential impact to Channel Darter in a particular system. Specifically, a participant stated that Scott Reid's work on Round Goby and altered flow in the Trent River would be considered new information for DU2 that wasn't available for the 2010 RPA.

REVIEW OF PROJECTS AND ACTIVITIES IN CHANNEL DARTER (DUs 1 & 2) HABITAT

Presenter: Dave Balint

The review of projects and activities summarized all works, projects, and activities that took place in Channel Darter habitat from 2014-2019. Participants discussed whether these activities were likely to increase, decrease, or remain the same in the future.

PATHWAYS OF EFFECT & NON-HABITAT RELATED THREATS

Presenter: Dave Andrews

This presentation addressed the Pathways of Effect (PoE), alternatives to activities that cause harm to Channel Darter, and methods of mitigating harmful effects.

In discussing mitigation measures and alternatives for invasive species, a participant noted that there is new legislation in the Fisheries Act that allows for the legal mitigation and control of high risk invasives.

During the discussion on mitigation measures and alternatives for incidental harvest and bait fishing, a participant commented that there needs to be more specific information in order to ban commercial and recreational fishing in areas where Channel Darter occur, and agreed with the alternatives presented for baitfish harvesting.

SOURCES OF UNCERTAINTY

Presenter: Dave Andrews

The presentation addressed sources of uncertainty related to life history, population abundance, distribution, and threats for both DU1 and DU2 populations. The idea of a long-term monitoring program for DU1 populations is suggested to address knowledge gaps in distribution and abundance of extant populations, and to identify spawning and overwintering sites. Other gaps in need of research included habitat requirements of life stages, feasibility of habitat rehabilitation and population repatriation, impacts of threats, and improved knowledge of prey availability, predation rates and fish community interactions.

One participant commented that, to date, not much is known about the DU-specific populations, but that the better ecological understanding of them we have, the better understanding we will have in regards to how they function and, in turn, how best to support the current DU structure. Another participant noted that Channel Darter contaminant studies are occurring this year. A participant questioned the need to address the feasibility of repatriating populations into watersheds that once supported DU1 and DU2 populations as they stated that the watersheds have not lost the populations to date.

REFERENCES CITED

DFO. 2007a. Revised Protocol for Conducting Recovery Potential Assessments. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2007/039.

DFO. 2007b. Documenting habitat use of species at risk and quantifying habitat quality. DFO. Can. Sci. Advis. Sec. Sci. Advis. Rep. 2007/038.

APPENDIX 1. TERMS OF REFERENCE

Recovery Potential Assessment – Channel Darter (*Percina copelandi*), Lake Erie (DU1) and Lake Ontario (DU2) populations

Regional Peer Review Meeting – Central and Arctic Region

July 9, 2019
Burlington, ON

Chairperson: Sarah Bailey

Context

After the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assesses an aquatic species as Threatened, Endangered or Extirpated, Fisheries and Oceans Canada (DFO) undertakes a number of actions required to support implementation of the *Species at Risk Act* (SARA). Many of these actions require scientific information on the current status of the wildlife species, threats to its survival and recovery, and the feasibility of recovery. Formulation of this scientific advice has typically been developed through a Recovery Potential Assessment (RPA) that is conducted shortly after the COSEWIC assessment. This timing allows for consideration of peer-reviewed scientific analyses into SARA processes including recovery planning.

In support of listing recommendations for Channel Darter by the Minister, DFO Science has been asked to undertake an RPA, based on the national RPA Guidance. The advice in the RPA may be used to inform both scientific and socio-economic aspects of the listing decision, development of a recovery strategy and action plan, and to support decision making with regards to the issuance of permits or agreements, and the formulation of exemptions and related conditions, as per sections 73, 74, 75, 77, 78 and 83(4) of SARA. The advice in the RPA may also be used to prepare for the reporting requirements of SARA s.55. The advice generated via this process will update and/or consolidate any existing advice regarding the Channel Darter.

Objectives

To provide current information, and associated uncertainties, to update the following elements for Lake Erie and Lake Ontario populations published in Bouvier and Mandrak (2010):

Biology, Abundance, Distribution and Life History Parameters

Element 2: Evaluate the recent species trajectory for abundance, distribution and number of populations.

Habitat and Residence Requirements

Element 4: Describe the habitat properties that Channel Darter needs for successful completion of all life-history stages. Describe the function(s), feature(s), and attribute(s) of the habitat, and quantify by how much the biological function(s) that specific habitat feature(s) provides varies with the state or amount of habitat, including carrying capacity limits, if any.

Threats and Limiting Factors to the Survival and Recovery of Channel Darter

Element 8: Assess and prioritize the threats to the survival and recovery of the Channel Darter.

Element 9: Identify the activities most likely to threaten (i.e., damage or destroy) the habitat properties identified in elements 4 and provide information on the extent and consequences of these activities.

Element 11: Discuss the potential ecological impacts of the threats identified in element 8 to the target species and other co-occurring species. List the possible benefits and disadvantages to the target species and other co-occurring species that may occur if the threats are abated. Identify existing monitoring efforts for the target species and other co-occurring species associated with each of the threats, and identify any knowledge gaps.

Scenarios for Mitigation of Threats and Alternatives to Activities

Element 16: Develop an inventory of feasible mitigation measures and reasonable alternatives to the activities that are threats to the species and its habitat (as identified in element 8).

Expected Publications

- CSAS Science Advisory Report
- CSAS Proceedings
- CSAS Research Document

Participants

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

References

Bouvier, L.D. and N.E. Mandrak. 2010. Information in support of a Recovery Potential Assessment of Channel Darter (*Percina copelandi)* in Ontario. DFO Can. Sci. Advis. Sec. Res. Doc. 2010/029. vi + 39 p.

APPENDIX 2. LIST OF PARTICIPANTS

Name	Organization/Affiliation
Dave Andrews	DFO – Science
Paul Aseltine	DFO – Policy
Sarah Bailey	DFO – Science (Chairperson)
Dave Balint	DFO – Species at Risk Management
Tara Bortoluzzi	Parks Canada – Point Pelee
Amy Boyko	DFO – Species at Risk Management
Tessa Brinklow	DFO – Science (Rapporteur)
Erin Carroll	St. Clair Region Conservation Authority
Tammie Dobbie	Parks Canada – Point Pelee
Andrew Drake	DFO – Science
Nicholas Mandrak	University of Toronto, Scarborough
Adrienne Mclean	DFO – Fisheries Protection Program
Valerie Minelga	Parks Canada – Trent Severn
Scott Reid	Ontario Ministry of Natural Resources and Forestry
Cass Stabler	Parks Canada – Trent Severn
Josh Stacey	DFO – Species at Risk Management

APPENDIX 3. MEETING AGENDA

Recovery Potential Assessment – Channel Darter (*Percina copelandi*), Lake Erie (DU1) and Lake Ontario (DU2) Populations

Regional Peer Review Meeting – Central and Arctic Region
Canada Centre for Inland Waters, 867 Lakeshore Rd., Burlington, ON
South Seminar Room (L225S)

9th July, 2019
Chairperson: Dr. Sarah Bailey

Time	Title	Presenter
9:00	Welcome and Introductions	S. Bailey
9:15	Purpose of Meeting	S. Bailey
9:30	Species Description/Distribution	D. Andrews
9:45	Overview of Trent River Channel Darter (DU2) Research and Monitoring Activities	S. Reid
10:30	Break	
10:45	Current Status and Population Assessment	D. Andrews
11:15	Habitat Requirements; Functions, Features and Attributes Table	D. Andrews
12:00	Lunch	
13:00	Threat Status	D. Andrews
14:15	Review of Projects and Activities in Channel Darter Habitat	D. Balint
14:30	Mitigation of Threats and Alternatives to Activities	D. Andrews
14:45	Break	
15:00	Sources of Uncertainty	D. Andrews
15:15	Review of Terms of Reference	S. Bailey
15:30	End of Meeting	