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Proceedings of the regional recovery potential assessment of Mountain Sucker (*Catostomus platyrhynchus*), Milk River populations (Designatable Unit 2)

10-11 January 2012
Lethbridge, AB

Chairperson Kathleen Martin

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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

In November 2010, the Milk River populations (Designatable Unit 2) of Mountain Sucker (*Catostomus platyrhynchus*) were designated as Threatened by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). Fisheries and Oceans Canada (DFO) Science was asked to undertake a Recovery Potential Assessment (RPA) to gather scientific information to support decision-making with regards to a *Species at Risk Act* (SARA) listing decision. A regional advisory meeting was held on 10-11 January 2012 in Lethbridge, Alberta. The purpose of the meeting was to provide science advice on the recovery potential of Mountain Sucker based on the 17-points outlined in the DFO RPA framework. Meeting participants included DFO Science and Habitat Management sectors of the Central and Arctic Region, and specialists from Alberta Sustainable Resource Development, Saskatchewan Ministry of Environment and Montana State University. Participants discussed the best available information and knowledge gaps for Mountain Sucker (DU2) on a range of topics related to species biology, abundance and distribution, habitat requirements, threats to survival or recovery, potential mitigation measures and allowable harm.

This Proceedings report summarizes the relevant discussions and presents the key conclusions reached at the meeting. Detailed information about Mountain Sucker which supports the assessment is published as Research Documents and the advice from the meeting is published as a Science Advisory Report on the DFO Canadian Science Advisory Secretariat Website.

Compte rendu de l'évaluation du potentiel de rétablissement du meunier des montagnes (*Catostomus platyrhynchus*), populations de la rivière Milk (unité désignable 2)

SOMMAIRE

En novembre 2010, le Comité sur la situation des espèces en péril au Canada (COSEPAC) a désigné les populations de la rivière Milk (unité désignable 2) de meunier des montagnes (*Catostomus platyrhynchus*) comme espèce menacée. On a demandé au secteur des Sciences de Pêches et Océans Canada (MPO) d'entreprendre une évaluation du potentiel de rétablissement (EPR) afin de recueillir des données scientifiques pour appuyer la prise de décisions concernant l'inscription de cette espèce en vertu de la LEP. Une réunion de consultation scientifique régionale s'est tenue les 10 et 11 janvier 2012 à Lethbridge, en Alberta. La réunion avait pour but de formuler un avis scientifique sur le potentiel de rétablissement du meunier des montagnes à partir du cadre d'évaluation du potentiel de rétablissement (EPR) du MPO. Parmi les participants à la réunion, on comptait les secteurs des Sciences et de la Gestion de l'habitat de la région du Centre et de l'Arctique ainsi que des spécialistes du ministère du Développement durable des ressources de l'Alberta, du ministère de l'Environnement de la Saskatchewan et de la Montana State University. Les participants ont discuté de la meilleure information disponible et des lacunes dans les connaissances concernant le meunier des montagnes (UD2) et de tout ce qui a trait à sa biologie, à son abondance et à son aire de répartition, à ses exigences en matière d'habitat, aux menaces pesant sur sa survie ou son rétablissement, aux mesures d'atténuation possibles et aux dommages admissibles.

Le présent compte rendu résume les discussions tenues et expose les révisions à apporter aux documents de recherche connexes. L'Avis scientifique et les documents de recherche à l'appui découlant de la présente réunion de consultation scientifique seront publiés sur le site Web du Secrétariat canadien de consultation scientifique du MPO.

INTRODUCTION

In November 2010, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) recognized three populations of Mountain Sucker (*Catostomus platyrhynchus*) and designated the Milk River populations (Designatable Unit 2) as Threatened. Their rationale for this designation was that these populations have a small area of occupancy and number of locations (8) that make them particularly susceptible to habitat loss and degradation from the altered flow regimes and drought that climate change is expected to exacerbate.

Fisheries and Oceans Canada (DFO) Science developed the Recovery Potential Assessment (RPA) framework to provide the information and scientific advice required for the Department to meet various requirements of the SARA including listing decisions, authorizations to carry out activities that would otherwise violate the SARA and development of recovery strategies. The information in the RPA may be used to inform both scientific and socio-economic elements of the listing decision, as well as development of a recovery strategy and action plan, and to support decision-making with regards to the issuance of permits, agreements and related conditions, as per section 73, 74, 75, 77 and 78 of SARA. The RPA for Mountain Sucker (Milk River Populations) was held 10-11 January 2012 in Lethbridge, Alberta.

The intent of this meeting is to assess the recovery potential of Mountain Sucker using the RPA framework outlined in the Revised Protocol for Conducting Recovery Potential Assessments along with the advice for documenting habitat use and quantifying habitat quality. The meeting followed the terms of reference (Appendix 1). Meeting participants (Appendix 2) included DFO Science and Habitat Management sectors of the Central and Arctic Region, and specialists from Alberta Sustainable Resource Development, Saskatchewan Ministry of Environment and Montana State University. DFO drafted two working papers, one modelling and one non-modelling, to serve as the basis for the RPA. They were distributed to participants in advance of the meeting. The meeting generally followed the agenda (Appendix 3).

This Proceedings report summarizes the relevant meeting discussions and presents the key conclusions reached. Science advice resulting from this meeting is published in the Canadian Science Advisory Secretariat Science Advisory Report (SAR) series. The technical details supporting the advice included in the two working papers presented at the meeting are published in the research document series. The complete list of references for material cited in this report can be found in the two research documents.

DISCUSSION

The Chair provided an overview of the processes by which the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) makes wildlife designations, the federal government lists species under the *Species at Risk Act* (SARA) and DFO conducts RPAs. An overview of the COSEWIC assessment of the Mountain Sucker and an explanation of the purpose for, and contents of, an RPA was provided.

Two working documents were reviewed during the RPA meeting: a modelling paper that provided information related to recovery targets and times to recovery, and a non-modelling paper that contained all other information relevant to the RPA. Participants began by discussing the non-modelling paper; no formal presentation was given.

Working paper: Information relevant to a recovery potential assessment of Mountain Sucker (*Catostomus platyrhynchus*), Milk River populations (DU2)

Authors: D.A. Boguski and D. Watkinson

Abstract[1]

In Canada, the Milk River populations of Mountain Sucker (*Catostomus platyrhynchus*) are distributed in southwestern Saskatchewan and west in the Milk and North Milk rivers in southern Alberta. They appear to be disjunct from their conspecifics elsewhere in Canada. In November 2010, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assessed these populations of Mountain Sucker as a separate designatable unit (DU2) and assigned them a designation of Threatened. While there is no evidence to suggest that the Milk River populations have declined in abundance since the species was first identified there, COSEWIC considers this small, bottom-dwelling freshwater fish to be at risk due to its small area of occupancy and number of locations (8). These conditions make Mountain Sucker particularly susceptible to habitat loss and degradation from altered flow regimes and drought that climate change is expected to exacerbate.

The Milk River populations of Mountain Sucker will be considered for legal listing under the *Species at Risk Act* (SARA). In advance of making a listing decision, Fisheries and Oceans Canada (DFO) has undertaken a Recovery Potential Assessment (RPA) that summarizes our current understanding of the distribution, abundance, and population trends of Mountain Sucker in DU2, along with recovery targets and times. The current state of knowledge about habitat requirements, threats to both sucker and its habitat, and measures to mitigate these impacts, is also reported. This information may be used to inform the development of recovery documents, and to support decision-making with regards to the issuance of permits, agreements and related conditions under the SARA.

Discussion

The document was reviewed, section by section, during the meeting and a number of editorial changes were made. Discussions related to each topic are described below.

SPECIES INFORMATION

Participants discussed the listing status of the Mountain Sucker (Milk River populations) under various federal and provincial species at risk legislation. The listing for the Saskatchewan *Wildlife Act* was changed from Threatened to “no status”.

TAXONOMY

Participants thought the section on taxonomy should remain in the RPA in spite of its length. There had been a small study which showed similarities between DUs 1 and 2 and differences between them and DU3. Meeting participants discussed the concern of hybridization. Some hybridization may be occurring between Mountain Suckers and Longnose and White suckers in reservoirs or areas where there are fluctuations in water levels and could be a function of habitat disturbance. Participants discussed yearly water stability in the different creeks. Participants agreed that additional information about hybridization should be added to the working paper given the potential for this threat in the Milk River.

Participants discussed barriers and the possibility of genetic exchange between Mountain Sucker between DUs 2 and 3. If Mountain Sucker are in lower St. Mary Lake in Montana which

[1] Updated following the meeting incorporating comments.

flows into the St. Mary River and then the Saskatchewan-Nelson drainage system (DU3), they could be entrained into the St. Mary canal and then into the Milk River system (DU2) (Figure 1). There are no barriers to fish movement between the North Milk and Milk rivers.

Participants also discussed the potential for movements within DU2. There is no possibility of Mountain Sucker travelling up the Frenchman River due to barriers on that river. However, there is a manmade canal from Battle Creek into Cypress Lake which is the source for the Frenchman River, so there is the potential for mixing there (Figure 1).

Within Saskatchewan there is a potential for fragmentation of Mountain Sucker habitat to occur as a result of drought and barriers at road crossings. It is not known whether the distribution of Mountain Sucker has changed from historic times to present given the limited sampling conducted for Mountain Sucker in the last decade and the non-targeted sampling conducted previously. Historically, Mountain Sucker could have moved from the Frenchman River to the Milk River but dams prevent that now.

Mountain Sucker occurs in eight waterbodies within DU2: North Milk River, Milk River, Battle Creek, Nine Mile Creek, Belanger Creek, Lonepine Creek Caton Creek and Conglomerate Creek. Participants discussed whether Mountain Sucker in these eight waterbodies should be treated as different populations or one population on the basis of connections and barriers between them. Participants decided to group the Milk and North Milk rivers together, as they could be one population, Battle and Nine Mile creeks together and Lonepine, Belanger, Caton and Conglomerate creeks together. Within the three groups there could be one or more populations with the potential for mixing, but there is not likely to be rescue effect between groups. The three “population” groups were named: the Milk River system (Milk and North Milk rivers), Battle Creek tributaries (Battle and Nine Mile creeks), and Frenchman River tributaries (Belanger, Lonepine, Caton and Conglomerate creeks).

SPECIES BIOLOGY AND ECOLOGY

The group discussed the life cycle and reproduction section of the non-modelling document and whether any information needed to be added. One participant suggested including information on spawning taken from the Belica and Nibbelink report. This information and any other pertinent information in the report will be added to the research document in this section. A maximum age of 6 years was used for the RPA modelling. McPhail reported the oldest Mountain Sucker for DU3 as a 9-year female, 22 cm in length.

Mountain Sucker specializes in consuming periphyton. None of the participants had anything to add to this section.

Information will be added about seasonal migration to this section from a Decker reference. One of the participants provided the following information to be included in the paper (from Belica and Nibbelink 2006). Some of the variation in abundance estimates of Mountain Sucker is probably related to movements.

Table 1 was added to the non-modelling document in this section. The group discussed whether it was relevant to include information on the other species that occurred in the three areas where Mountain Suckers are found. It was suggested that three tables could be included in this section. The group agreed to add the three tables and to have the tables include introduced species that occur in each area. There was a discussion around providing co-occurrence information for sucker species and whether a figure was needed in addition to a table. The group agreed that a table would be sufficient. Spelling of *Catostomus* was corrected in the research document. Tables will be completed and sent out to meeting participants for review.

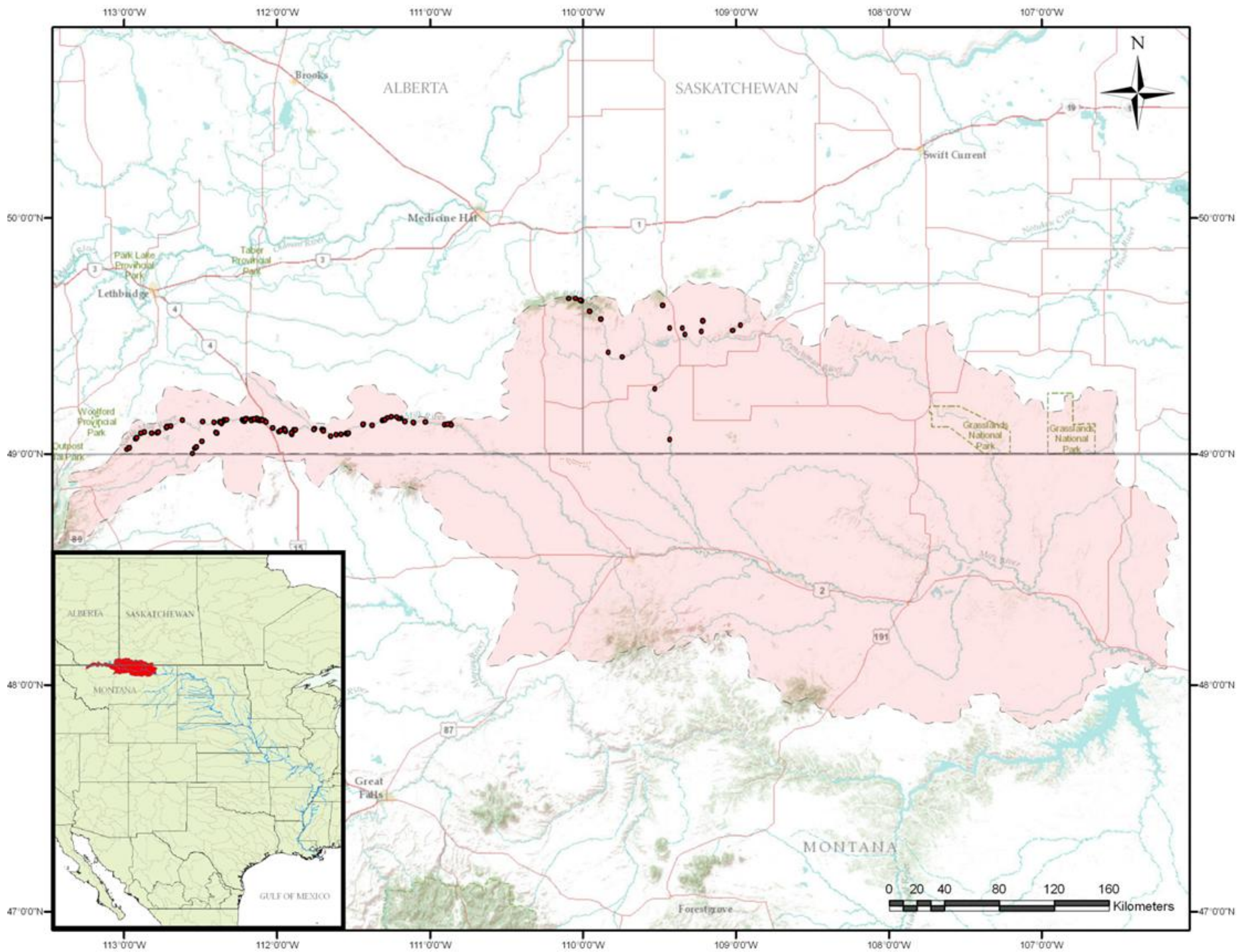

Figure 1. Species occurrence of Mountain Sucker, Milk River watershed populations in Alberta and Saskatchewan. Distribution records are from the ASRD Fish and Wildlife Management Information System as of October 2011, McCulloch et al. (1994), reports from Atton and Merkowsky (1983), and DFO (unpubl. data as of October 2011).

Participants discussed whether Mountain Sucker can adapt to drought and floods and whether they are capable of surviving as long as there is sufficient oxygen. The group agreed that if this species is still present then it must be able to adapt to drought and flooding. Mountain Sucker seems to prefer riffle environments when available so they may have higher oxygen requirements than other species. Fluctuation in oxygen levels therefore, could be a concern. A participant reported that diurnal oxygen fluctuations to sub-lethal levels can result in significant fish stress for White Sucker. The same effect could occur in Mountain Sucker. This section and the threats section of the research document will be updated to include the meeting discussions.

HISTORIC AND CURRENT DISTRIBUTION AND TRENDS

Maps were presented to show the range of Mountain Sucker including DUs 1 and 2 in Alberta and Saskatchewan. The Milk River system has been a highly altered system for more than a century. About 18.3 m^3/s of water is diverted from the St. Mary River via the St. Mary Canal into the North Milk River. The North Milk River flows north from Montana into Alberta. One hundred river kilometres downstream it joins the Milk River. The diversion flow is large enough that natural variation in the hydrology of the North Milk and Milk rivers is greatly reduced resulting in a fairly flat hydrographs for most of the year with stable flat flow ± 20 m^3/s from April to October. The canal system is typically shut down in September, and flows reduce to natural winter flow of approximately 1 m^3/s until spring snow melt or water is diverted again around April each year. The substrate is dominated by gravel and cobble and the channel has a moderate gradient above the Town of Milk River. The mainstem Milk River above the confluence does not receive augmented water from the St. Mary Canal so it may cease to flow every 3-4 years although residual pools remain and provide refugia for fishes. There are mostly shrubs with some Cottonwoods in this region with high gradient, boulder/cobble mix. The lower 130 km of the Milk River mainstem, upstream of the border with Montana, is fairly wide and slow with few riffles. It has a low gradient and sand/silt dominates the substrate. Mountain Sucker is not commonly found in the lower 100 km of the Canadian portion of the Milk River. Water temperature may be limiting in that reach. Mountain Sucker is not entirely absent from the Milk River in Montana; two were caught by Stash (2001) downstream of Fresno Reservoir near Havre.

There was discussion about the pre-1970s sampling and if they were targeting Mountain Suckers. It was determined that the sample area in the southeastern corner of Alberta (Cripple Creek) was misidentified on the map. Mountain Sucker also occur in streams on the prairies; they don’t remain just in higher elevation, high gradient habitat. Discussion about a reduction in Mountain Sucker range included some information for DU1. Before 1970 Mountain Sucker data for DU1 shows distribution further east into prairie habitat. In the 1990s sampling in the Old Man River and Saskatchewan River did not result in any Mountain Sucker when they had been found there previously. Since then the Mountain Sucker locations are mostly restricted to the foothills. It suggests that there have been changes to stream habitats in prairie-parkland areas. Habitat quality may be reduced as a result of such things as nutrient inputs (e.g., from feedlots).

Mountain Sucker in portions of DU2 outside the North Milk and Milk rivers were sampled during one week sampling surveys by DFO in 2003 and 2004. This sampling was conducted with a backpack electro-fisher. Mountain Sucker was collected in Battle Creek near Fort Walsh. Battle Creek flows from Alberta and was impacted by cattle. Mountain Sucker was collected at Nine Mile Creek (a tributary of Battle Creek) which had a fairly high gradient although the creek was impacted by cattle. Mountain Sucker was collected in the upper portions of Battle Creek but not in the lower portions of Battle Creek where it was present historically.

Caton Creek is a tributary on the north side of the Frenchman River. It is a small creek with loose cobble substrate, and probably experiences low flows at times. There were perched culverts acting as probable fish barriers upstream of the sampling site but the site had the highest catch per unit effort in Saskatchewan for collecting Mountain Sucker. A single Mountain Sucker was collected in a shallow riffle in Conglomerate Creek.

No Mountain Suckers were collected in Belanger, Davis or Fairwell creeks or Concrete Coulee (tributaries of the Frenchman River), or in the mainstem of the Frenchman River. In portions of Fairwell Creek and the Frenchman River there was no surface flow. Mountain Suckers also were not collected in Lodge Creek (southwest corner of Saskatchewan), Denniel Creek (near Val Marie, SK) or Johnson Creek (a tributary of the West Poplar River).

In the Saskatchewan River watershed in Saskatchewan no Mountain Suckers were collected in Gap, Box Elder, or Swift Current creeks. Swift Current Creek has records from the pre-1970s. Swift Current Creek was fast flowing but full of algae. A goldfish was caught there. The creek had good substrate but was likely highly eutrophic. A habitat change may have occurred since the pre-1970s when Mountain Sucker was last sampled.

In Saskatchewan, most of the species' distribution is located on the north side of the Frenchman River watershed where there is higher gradient and cooler water. All the creeks in Saskatchewan that contain Mountain Sucker are groundwater spring-fed systems. Seine netting and electrofishing were done in the Milk River. Maps were presented to the group along with photos of the river systems where sampling was conducted. Participants agreed that further sampling is needed to document the current distribution in the Frenchman River and Milk River drainages.

Data from several studies describing movements would be included in this section of the research document.

There was a discussion about anoxia and whether it was thought to be a problem in the winter. One participant said that creeks like the Battle may become anoxic during winter starting in January. All the sampling was done in flowing streams, so there is a good chance that they might stay open for the winter.

The Introduction and Species Biology and Ecology sections were brought up for discussion. Participants were satisfied with what was written in these sections. No changes were suggested.

HISTORIC AND CURRENT ABUNDANCE AND TRENDS

A participant asked for clarification on what was meant by "abundance" of Mountain Sucker in this section of the working paper. An example was given to help clarify: 74 seconds of sampling (backpack electro-fisher) yielded 15 Mountain Sucker over 20 m in Caton Creek. There is considerable annual variability as sampling a year earlier for 430+ seconds yielded only nine fish. In Montana, seining 300-m reaches of prairie streams caught from 1-348 (average 18) Mountain Sucker.

Relative abundance, population trajectory and status of Mountain Sucker in DU2 was ranked by the participants. For boreal fish with patchy distributions, data on a tertiary watershed basis (e.g., the Battle Creek system) were used and the average catch compared with other groups and then ranked on a scale of one to five. The three drainage systems (i.e., Milk and North Milk rivers, Battle Creek and Frenchman River) were ranked relative to the system with the highest abundance index which is the Milk River system. Participants used catch-effort data since those data are available. Sampling has focused on the Milk River system because it is much easier to sample there. The North Milk and Milk rivers are also larger systems than the Battle Creek and Frenchman River drainages on a scale of orders of magnitude.

Recent DFO sampling data produced an average of 0.41 fish/min. based on 3,679 s of shocking effort in the Frenchman River tributaries and 0.12 fish/min. based on 5,133 s of shocking effort in the Battle Creek system. Of the Frenchman River tributaries, Caton Creek had good catch rates while no Mountain Sucker was found in Belanger and Lonepine creeks. Table 3 in the research document was filled out on the basis of the three drainages (populations) with relative abundance indices of High, Medium and Low for the Milk River, Frenchman River and Battle Creek systems, respectively, on the basis of CPUE data. Participants noted that varying water levels can result in different levels of abundance among years.

The working paper indicates that there is no evidence of a decline in Mountain Sucker abundance in the Milk River system, though current sampling is not directly comparable to historic records. The group discussed different ways of figuring out population trajectory. They decided to compare the proportion of Mountain Sucker in the catch relative to a group of common species (e.g., White Sucker, Longnose Dace and Lake Chub) whose abundance was not expected to change over the period of comparison. Historic data reported by Willock (1969a, 1969b) and Smith 1966 could be compared with DFO's recent sampling information. The comparison analysis would be conducted following the meeting. Until the results are available, participants agreed that population trajectory should be rated as unknown for all three drainage systems, which resulted in a population status rating of fair for the Milk River system and poor for the other two. These ratings may change once relative abundance information is considered.

HABITAT REQUIREMENTS

Habitat requirements of the Mountain Sucker were discussed. There is a good description of the general habitat for Mountain Sucker in terms of velocity, oxygen, substrate and gradient requirements from the Milk River drainage but less information is available from the two Saskatchewan areas.

In general, these fish are found in cooler streams with steeper gradients at higher elevations which suggests they require more oxygenated and cooler waters. From a recovery planning perspective, a greater level of specificity is required than what is currently reported in the document. Recovery planners need to know if sufficient information is available to answer the following questions: (1) whether a particular habitat (e.g., spawning habitat) is critical to the species; (2) if so, what features or habitats are associated with specific life processes; and (3) where are they located.

The current sampling protocol for Mountain Sucker includes documentation of the capture site latitude/longitude coordinates, water depth, velocity and temperature. Participants thought the depth and temperature information that is included is inadequate. There is not enough information to determine where specific critical habitat is located. In the Milk River, fish were sampled by boat electrofishing. Once a fish was captured habitat information (depth and substrate) was collected for that location. So there is habitat use data but there are no habitat data for places where Mountain Sucker have not been caught. Sample sizes at various locations and the proportions of different life stages caught have not been analyzed. Participants agreed that habitat information should be collected for sampling sites where Mountain Suckers were not found.

Recent habitat information was compiled from sampling records. Data were collected in the Milk River for young-of-the-year (YOY), sub-adults and adults up to about age 6 (though there is no ageing information available). Sampling was conducted using boat electrofishing (95%) and seine netting included 746 sample sites (56 contained Mountain Sucker). Sand dominated more than 50% of the sites then, in decreasing order, silt (20%), gravel (15%), cobble (9%) and boulder (5%). Closer to the town of Milk River, the substrate contains considerably larger material (boulder, gravel) though sand is still present. Mountain Sucker seems to prefer gravel and cobble substrate. There was no apparent selection of depth. Mountain Sucker showed a clear preference for faster water velocities. YOY fish were typically found in the seine netting behind point bars and islands where there was virtually no flow. Velocity could be split up by age classes.

There was discussion of the need for habitat requirement information for juvenile and YOY rearing, overwintering, spawning, and feeding. Some information is available on habitat use (sample site flow velocity and substrate) by Mountain Sucker in the Milk and North Milk rivers but less so for the other two drainage systems. Available information on habitat use for Mountain Sucker elsewhere in their range could be included in the Research Document. There is very limited information on overwintering distribution of Mountain Sucker. In Alberta during most winters there are Chinook events resulting in areas of open water in the rivers. If this were not to occur there could be anoxic conditions and possible winter kills. Information on winter conditions in the two Saskatchewan drainages is needed. It was noted that habitat that looks to be “suitable” should be examined on a diurnal basis as it could be anoxic at times.

There is information on habitat needs for Mountain Sucker in the Black Hills in a paper by Dauwalter and Rahel et al. (2008). They look at stream permanence, stream slope, stream order and elevation which interacted in complex ways to influence the occurrence of Mountain Sucker. This species is more likely to be present in perennial streams and in larger, high gradient streams at high elevations than in smaller lower gradient streams at lower elevations.

There was discussion around areas of winter distribution. Very different winter ice cover on the rivers is expected with climate change. Information on winter conditions of the rivers, including oxygen levels, will be requested from fish experts in Saskatchewan to determine if there are barriers to movements and anoxic effects that might lead to winter kills.

Participants recommended that the Research Document include a table that shows length, life stage and habitat associated with each Mountain Sucker captured to date. To the extent possible, these data should be framed in terms of habitat features, functions and attributes.

RESIDENCE

Given the information currently available, participants agreed there is no evidence that Mountain Sucker has a residence.

RECOVERY TARGETS, RECOVERY TIMES AND MINIMUM AREA FOR POPULATION VIABILITY

Working paper: Recovery potential modelling of Mountain Sucker (*Catostomus platyrhynchus*), Milk River populations

Authors: Jennifer A.M. Young and Marten A. Koops

Presenter: Jennifer Young

Abstract

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) has assessed the Milk River populations of Mountain Sucker (*Catostomus platyrhynchus*) as Threatened in Canada (COSEWIC 2010). Here we present population modelling to assess allowable harm, determine population-based recovery targets, and conduct long-term projections of population recovery in support of a recovery potential assessment (RPA). Our analyses demonstrated that the dynamics of Mountain Sucker populations are very sensitive to perturbations that affect the survival of immature individuals (from hatch to age 2), and to the collective survival of adults

(ages 2-6). Harm to these portions of the life cycle should be minimized to avoid jeopardizing the survival and future recovery of Canada's Milk River populations. Based on an objective of demographic sustainability (i.e., a self-sustaining population over the long term), we propose a population abundance recovery target of 6,400 adult Mountain Sucker, requiring 3.0 – 16.6 ha of suitable habitat. Current estimates of mean vital rates suggest the population may be in decline, although parameter values are sufficiently uncertain that this may not be the case. Recovery strategies which incorporate improvements in the most sensitive vital rates of Mountain Sucker are most likely to improve the population growth rate; improvements of 20% in survival of all life stages significantly delayed extinction risks, and improvements of 84% and 28% respectively to juvenile and adult survival stimulated population growth.

Discussion

Population-based modelling, using means instead of tracking individual fish, is used in these analyses. The analysis uses an age-class based, post-breeding census model. As there are no aged fish from the Alberta sample, length frequency data are used. This is overlaid with size at age predicted from a von Bertalanffy growth curve, fit to Montana age data (Hauser 1969). The predicted size at age from Montana appears to match the Alberta length-frequency data. Mature individuals were 65 mm (male) or 78 mm (female). All were assumed to be mature at age 3 and some (~50%) at age 2. For size-dependent mortality it is assumed that larger fish have a lower mortality than smaller fish. Catch curve analysis was used to estimate m_0, from which survival at age is estimated. To incorporate uncertainty into the model, random rates using distributions, variances, and ranges from the table were drawn to make 5,000 different matrices and calculate the population growth for each. The geometric mean growth rate (lambda) was estimated as 0.78 indicating a decline, where a stable population would be 1, but the uncertainty ranges from severe decline to moderate gain (0.5-1.3) which means there is a real possibility the population is at equilibrium or growing. For a healthy population, some allowable harm may be possible but when the population is in decline, there is no scope for harm. The largest sample size came from the Milk River in 2006, so the results are mostly a snapshot of the circumstances there at that time. Recovery effort would be looked at. The tools we use to assess this are sensitivity or elasticity analysis. Elasticity is a measure of relative changes in population growth rate resulting from proportional changes in vital rates. The modelling results show that lambda (geometric mean growth rate) is less sensitive to improvements in fecundity than improvements in survival, especially for ages 0-1 and 1-2.

In this modelling the assumption is that mortality is consistent across the year and for both sexes. Longnose and White sucker female mortality increases following spawning. The author agreed that if this occurred in Mountain Sucker the results would change especially if there were drastic differences between the sexes. We have no information one way or another about this.

There was discussion around lambda. How much would we have to improve each parameter to get stability or growth? By increasing juvenile survival or some combination of juvenile and adult survival we would achieve stability or growth. It was suggested that the Maximum Scope, Plausible Scope and Plausible Growth portion of the table should be moved to a separate table to reduce confusion. In declining populations, fecundity is more important than in growing populations.

Recovery and habitat targets were discussed. How many individuals are needed for a recovered population? Demographic sustainability using Minimum Viable Population (MVP) is the smallest population size that will achieve persistence criteria. A probability of persistence (or extirpation) and timeframe for recovery is needed. To be consistent across species, 100 years is used though this is an arbitrary choice. The model uses an upper boundary (for probability of extinction) of 10% which is COSEWIC criteria for Threatened and a lower boundary of 99.9%.

Choosing the MVP criteria considers the maximum benefit (risk reduction) for effort (cost). The effect of catastrophes is also incorporated into the model as a rate of a single point event that reduces the population by 50%. The likelihood of a complete wipe-out in one year (100%) was considered as 0% with an exponential curve in between them. For small-bodied fish an increase in catastrophic probability had a greater risk of reducing their recovery potential than for large-bodied fish. Reed et al. (2003) reported a 15% probability of catastrophe per generation. Given that Mountain Sucker is a small fish, presumably, at higher risk of extinction, it is somewhat surprising they are found in such a variable environment. The results showed that assuming a 15% catastrophe with an extinction threshold of 50 the MVP (adults only, aged 2-6) is 6,400 (4,600-8,400). Below a population size of few thousand adults, Mountain Sucker is at risk of extinction.

Participants discussed these results. Information used in the modelling would be checked against that presented in the non-modelling working paper.

How much habitat is needed to support a recovered population? From the recovery target, it is possible to calculate the area per individual (API) based on a paper by Randall (in which he conducted meta-analysis of fish species in various environments and from that calculate the minimum area for population viability (MAPV). For an extinction threshold of 50 individuals, then a recovered population of Mountain Sucker need 29,903 m^2 or about 3 hectares of suitable habitat in which all their life processes can occur.

There was some discussion of the habitat results. If we had radio transmitters in the fish we would know how much habitat Mountain Sucker actually need. For boreal fish, tracking information is much more informative than Randall's API work. A participant thought that 5-10 fish per hectare is more typical. One participant thought that this translates into about 100 m of stream or 10,000 Mountain Sucker per hectare which is high. Several authors (Dauwalter et al., Isaac et al., and Moyle and Vondracek) have calculated densities and one participant thought they were more in the range of 400 to 1,000 Mountain Sucker per hectare. If there are available data, it can be incorporated and the MAPV recalculate.

One participant thought they should be removed and only the number of fish needed for a viable population should be included. There was concern that future decision-makers might think that only three hectares in total are needed. However others felt that the information should be included but should also include some context added around the results. It should also be clear in the discussion that this hectare requirement would mean that it is all suitable habitats. It was also pointed out that just because Mountain Sucker may have higher densities at certain times of the year, they likely need more space at one time or another during the year and/or lifetime.

Participant reiterated that Battle Creek system and Frenchman River tributaries need 6,400 adult Mountain Sucker to persist. That would mean that about 33 adults per kilometre in the Milk rivers are needed and these numbers are likely already there. The North Milk and Milk rivers are in much better shape than the two areas in Saskatchewan.

Participants agreed that population estimates, threat assessments and more information for life history parameters (age of maturity, fecundity and survival are the main drivers of the model) are needed. It was also noted that the estimated growth rate and associated extinction times will change with better parameters in the future whereas sensitivities and elasticities will not. Participants reviewed the conclusions about allowable harm and agreed that; when population trajectory is declining there is no scope for allowable harm, when population trajectory is unknown the scope for allowable harm can only be assessed once population data are collected, and scientific research to advance the knowledge of population data should be allowed.

The last statement was discussed: In the absence of population abundance and growth rate estimates, no harm should be allowed to the survival rate of Mountain Sucker. Participants asked for a clear explanation of what this would mean. Essentially it indicates that no harm that would reduce overall survival of the population would be allowed. This bullet will be removed as a general explanation of this is provided throughout the document. Other RPAs will be reviewed to check on the approach taken in them. It was agreed that it would be helpful to have some context that speaks to the assumptions and what it doesn't take into account (e.g., the species might be at the extent of its range and never met the recovery target) included in the RPA document. Something will be drafted and reviewed by the group for the RPA science advisory report. It was pointed out that the species will never likely reach the recovery targets recommended by the modelling in the two Saskatchewan areas. A participant thought it would be helpful to have context so recovery planners could decide whether it makes sense to strive for a recovery target of 6,500 in each of the Saskatchewan areas.

THREATS TO SURVIVAL AND RECOVERY

The Western Silvery Minnow (*Hybognathus argyritis*) and Rocky Mountain Sculpin (*Cottus sp.*), which are listed under SARA, and the Stonecat *(Noturus favus*), which is listed under Alberta's *Wildlife Act*, occur in the Milk River system. The Milk River recovery strategies for Western Silvery Minnow and the Rocky Mountain Sculpin describe the threats identified in the North Milk and Milk rivers. Participants suggested that this section should include the same threats identified in the recovery strategy. Table 5 was added to the research document to summarize the likelihood and impact of threats for each area. The group agreed to rate each threat individually for the three drainages. The ratings for threats in the Milk and North Milk rivers and their rationales were initially taken from the Western Silvery Minnow and Rocky Mountain Sculpin recovery potential assessment documents then revised as appropriate for Mountain Sucker.

Fragmentation was added to the table. The mainstem of the Frenchman River has four dams, all downstream of Cypress Lake, so it was rated as Likely and Medium impact. The Battle Creek proper doesn't have any dams although there is a diversion into Cypress Lake and multiple road crossings with culverts so it was also rated as Likely and Medium impact. Barriers (e.g., roads, culverts, bridges) are not as important for the Milk and North Milk rivers as in the two Saskatchewan areas. Earthen stock watering ponds occur at the tops of coulees in the two Saskatchewan areas adding localized impacts that perhaps add to the roads and culverts problems there. Stock watering ponds would not likely be a problem in the Cypress Hills interprovincial park in Saskatchewan. A participant pointed out that there are some earthen ponds in the Sweetgrass Hills along the Milk River too. Another suggestion was made to add information for each area under dam construction and operation.

The likelihood of groundwater wells in the Alberta and two Saskatchewan areas occurs (Known) but the impact is Low for all three areas. The impact of this threat in Alberta is Low due to the volume of the withdrawal relative to the size of the Milk River system. In Saskatchewan streams are groundwater fed thereby limiting the impact.

Surface water that is diverted out of the rivers is not screened and any entrained fish that are pumped out onto the fields are lost to the systems. Surface Water Extraction for Irrigation is Known and its impact near Battle Creek is High based on pivots visible in Google Earth. Fields west of the Frenchman River are square but very green so they are likely also irrigated. For that reason it was rated as Known and Medium to High. While discussing other impacts of irrigation a participant pointed out that Roberts and Rahel (2008) identified irrigation canals as sink habitat for trout and other fishes in a drainage in Wyoming. Canals are more common in Alberta than in Saskatchewan but participants still thought that Surface Water Extraction for Irrigation warranted a Low impact rating in Alberta.

In Saskatchewan, Surface Water Extraction for Non-irrigation (Temporary Diversion Licences (TDLs) for oil and gas) may occur in the Battle Creek system. Although there is evidence of well activity, it is not known how much water is used for wells. Relative to the amount of Surface Water Extraction for Irrigation, the impact of Surface Water Extraction for Non-irrigation is Low in the two Saskatchewan areas.

Participants discussed the threat of Dam Construction and Operation. There are four dams downstream of Cypress Lake along the Frenchman River. The dam located at East End is below all the known collection records for Mountain Sucker. The populations are located in tributaries of the Frenchman River between Cypress Lake and the East End dam. The dams may not impact the Frenchman River tributaries since there are no historic records of Mountain Sucker in the Frenchman River itself. However, there are many small earthen weirs in the watershed that may impact Mountain Sucker habitat. Around the Milk River, there are also numerous small earthen dams but these were considered less important than the large dam proposed near the Town of Milk River. Details are limited for Battle Creek but participants noted a connection between it and Cypress Lake.

Threat likelihood of Changes in Flow was considered Likely for both the Battle Creek system and Frenchman River tributaries. Threat impact levels for the two Saskatchewan areas were rated following the meeting. Both were rated Medium because of the presence of weirs and other control structures as well as the small size of these tributaries.

Changes in Geomorphology operate at a large scale. In the case of the Milk River system, this threat resulted from flow augmentation from the St. Mary diversion so the likelihood and impact of this threat was rated as Known and Low-Medium, respectively. In the Battle Creek and Frenchman River systems this threat is Unknown but if it does occur it would likely be Low because of the relatively low volume of water in these two systems relative to the Milk River system.

The threat identified as Changes in Habitat Quality and Availability refers to changes in substrate, velocity and other smaller-scale features in the environment. This threat is Likely for all three areas as a result of high volumes of water in the Milk River system and low volumes of water in the Battle Creek and Frenchman River systems. In the Milk River the larger volume of water may result in larger substrates that are less suitable for Mountain Sucker so the impact of this threat was rated Low to Medium. Threat impact levels for the two Saskatchewan areas were rated following the meeting. The impact level of this threat in the two Saskatchewan drainages was also rated Low to Medium because of the effects of periods of low flow and the resulting changes these have on habitat features.

Livestock Use of Flood Plain is a threat that occurs in the Saskatchewan region so it was rated as Known and High for both the Battle Creek and Frenchman River systems. The relative impact of this threat in the Milk River system is Low due to its larger size.

Mountain Sucker has a limited distribution so that threats related to the effects of Climate Change (e.g., changes in water temperature, introduced species) could affect this species, but the group agreed not to evaluate Climate Change as a separate threat.

Drought and Anoxia were both rated as Known in southern Alberta and Saskatchewan. Their threat impact levels on Mountain Sucker were rated as High.

Participants discussed introduced species in Saskatchewan. Fish species introductions were rated as Known for both regions. Brown Trout introductions could impact Mountain Sucker.

Rainbow Trout are a known fish predator and have been stocked in Saskatchewan. Brown and Brook trout were stocked in the Cypress Hills interprovincial park. Rainbow Trout and Brook Trout are known to be in Battle Creek and Frenchman River watersheds. One participant pointed out that when the effect of large Brown Trout was added to the best model of abiotic factors, it had a negative effect on the occurrence of Mountain Sucker. Negative effects of Brown Trout on the Mountain Sucker suggest that management of recreational trout fisheries needs to be balanced with Mountain Sucker conservation in the Black Hills. However, more spatially explicit information on Brown Trout abundance would allow managers to understand where the two species interact and where recreational fisheries need to be balanced with fish conservation. This information came from Dauwalter and Rahel (2008). Common Carp are downstream in the Frenchman River. Northern Pike are also likely to be in the Frenchman River. The impact of fish introduced into Fresno Reservoir (Yellow Perch and Walleye) is unknown. Fish introduction impacts were rated as Low-High.

An introduced species of crayfish (*Orconectes virilis*) was collected in Battle Creek and Frenchman River and its tributaries, including Conglomerate Creek. Therefore the likelihood of this threat is Known and its threat level impact is Low (Ian Phillips, Saskatchewan Watershed Authority, pers. comm.). The likelihood and impact of invasive plants (e.g., *Didymosphenia geminata*) in the Saskatchewan areas are unknown. In the Milk River, *Didymosphenia geminata* was the non-fish species of concern whereas in the Saskatchewan areas, it was the introduced crayfish species.

The group discussed whether or not nutrients should be handled separately from contaminants. It was decided to put nutrient loading under non-point source contamination and contaminants and toxic substances under point source contamination. Participants began by discussing non-point source contamination. Fertilization of fields can cause eutrophication which leads to reduced oxygen and winter kill in central Alberta. This doesn't occur in southern Alberta so much because most land around the Milk River is range land. Flow augmentation also eliminates anoxia. In the Frenchman River, where there are more agricultural row crops, this would be a more significant problem. The group then discussed point-source contamination. A participant asked where sewage from the Cypress Hills interprovincial park goes. It is not clear if it is a threat to the Battle Creek system but needs to be checked. In central Alberta, towns can dump their sewage into creeks by permit during spring freshet/flood which can cause fish kills. Both point and non-point source contamination were rated as Known and Low-High for the Battle Creek and Frenchman River drainages.

Scientific Sampling was rated as Known and Low all three areas.

Incidental Harvest was considered. It may be that Mountain Sucker is caught incidentally with personal bait. A bait ban wouldn't work well because it is unlikely that Conservation Officers can identify Mountain Sucker from other species thus enforcement would be problematical. Participants agreed that Scientific Sampling is probably a higher threat than Incidental Harvest.

Table 8 summarizes the spatial and temporal extent of the overall effect of threats on Mountain Sucker. A threat that is Widespread is a one that affects the majority of stocks (i.e., two or more) at a Medium or High level. Fragmentation will be added to the table and more information is needed (e.g., barriers). Experts in Saskatchewan will be asked about water extraction and its effects in order to evaluate this threat.

MITIGATIONS AND ALTERNATIVES

The Pathways of Effects (POE) material developed, initially in Ontario, is being used here where appropriate. The POE report was distributed to all participants in advance of the meeting. One participant felt that there should be statements included in the report evaluating whether the mitigations would work. There was some concern with the level of rigour in implementing the mitigations for a species at risk. Evaluating the implementation of mitigations however is not within the scope of this assessment. There are standard mitigations for some threats. However dams/ barriers or anoxia are specific threats for Mountain Sucker which may not be addressed by these. It was pointed out that the standard mitigations were not specifically developed for species at risk. There were developed to mitigate, limit or minimize threats. The generic mitigation measures may need to be modified to ensure the level of protection necessary for species of risk; a greater level of rigour may be needed. Participants agreed that this point should be made in the research document.

The only threats not included in the POE material are species introductions and scientific sampling.

The POE table listed turbidity and sediment loading as one of the threat categories. Participants discussed whether this should be identified as a threat for Mountain Sucker. Livestock use of the flood plain has been identified which does also lead to turbidity and sediment loading so where there are cattle this could be a problem (e.g., Nine Mile Creek). Impact could vary by time of year. For example, during winter, when there isn't much water and fish are already stressed, then these conditions could have more impact. There was discussion that turbidity and sediment loading may not be problem considering the Milk River is muddy yet has “high” numbers of Mountain Sucker. However this is likely up to a certain threshold. Presumably too much turbidity for too long could limit light penetration thereby negatively impacting periphyton production which is a food source for Mountain Sucker. These conditions may not be a problem in the Milk rivers but could be in the two Saskatchewan areas. There is an inherent turbidity gradient in the Milk River with the lowest sediment loading/turbidity above the forks and increasing towards the Alberta-Montana border. In general, Mountain Sucker occurs higher up in the Milk (lower turbidity) while Western Silvery Minnow occur farther downstream on the Milk (higher turbidity). This might suggest that Mountain Sucker may be more susceptible to turbidity and sediment loading than Western Silvery Minnow. Data on Mountain Sucker occurrence in relation to turbidity was plotted following the meeting (Figure 2) and is summarized in the research document.

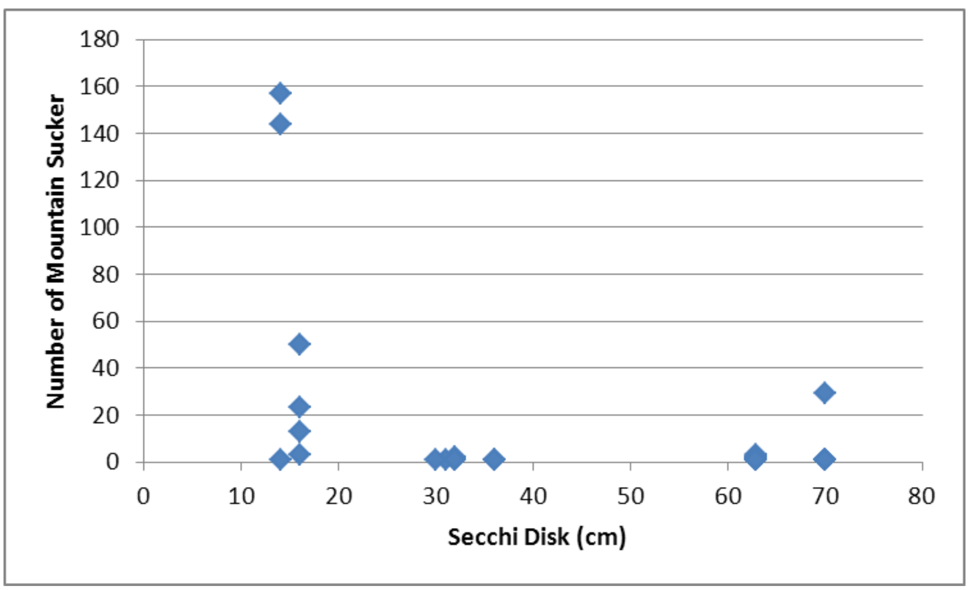

Figure 2 Relationship between turbidity and Mountain Sucker abundance in the Milk River (DFO, unpubl. data).

Species Introduction

Participants agreed that the report should note that there may be implications for Mountain Sucker in this DU of species introductions by U.S. jurisdictions within the range of this species. This would be added to the introductory paragraph under the Species Introduction subsection as well as to the Other Considerations section.

The group discussed introduced species. Northern Pike, Walleye, Yellow Perch, Lake Whitefish and Trout-Perch are all found in the Milk River system. This fairly heavy exotic fish load could impact other species like Mountain Sucker. Walleye and Northern Pike are a rarity in the Milk rivers although there is evidence that Northern Pike, a very adaptable species, is reproducing there. Pike were stocked in Shank Creek which flows into the Milk River in the 1930s although there is no proof that Northern Pike in the Milk River came from this stocking. They occur in the Missouri although they are not native there and could have come from the Fresno Reservoir (built in 1937 or 1938). They are also present in the Saskatchewan River system and in the St. Mary River (above the reservoir). Species introductions should also be added to the limiting factors section.

Stonecat is distributed within much of the Milk River system but is only found in the lower portions of the Frenchman River although it is considered native to the Milk and Frenchman basins in Montana. Stonecat may pose a predatory threat for Mountain Sucker. However, dams on the Frenchman River would prevent upstream movement of Stonecats to Saskatchewan Mountain Sucker locations. A discussion ensued about barrier removal or providing fish passage to eliminate fragmentation. It is important to provide a cautionary note to carefully and fully consider any moves to eliminate fragmentation.

Participants agreed that since there are concerns with genetic differences between stocks of Mountain Sucker the statement about using only native species should be qualified by saying “use only native species from the same genetic stock”.

Participants asked whether Russian Olive and Salt Cedar are becoming more of an issue in the Milk River system. They are considered noxious weeds in southern Alberta and could have impacts on the ecosystem but there were no plant ecologists in the room. These introduced species of riparian vegetation would be noted in Threats section as well as this section of the report.

Scientific sampling

The group agreed that this section was adequate and there was nothing to add.

OTHER LIMITING FACTORS FOR POPULATION SURVIVAL OR RECOVERY

Oxygen is important for Mountain Sucker but was not originally identified as a habitat requirement. Participants agreed that it should be added to the text in this section.

SOURCES OF UNCERTAINTY

The group agreed with the content of this section. Various points raised already during the meeting will be added here. Modelling data gaps will be added. There was discussion about whether lack of information was a threat. Sampling effort to obtain data on the location of the fish is lacking. Population-level information is lacking as is biology and life history information specific to DU2. There is a lack of historical data to compare with current material to know if there have been any changes over time. Although sampling has provided habitat data for the Milk River there are limited data for Saskatchewan which needs to be added to the working paper. Some participants felt that one of the main threats to this species is the lack of knowledge of where they occur, their life history, introduced species, etc. and one of the best ways to mitigate this is to conduct more research. However the lack of information itself is not a threat but decisions made without necessary information would be.

Participants decided the Sources of Uncertainty section of the working paper should highlight that good management decisions depend on good information and that information is lacking in some key areas. There is a need for more research to fully delineate the range of Mountain Sucker in Saskatchewan. There is also a lack of information in Saskatchewan regarding movements between and among populations relative to temperature, substrate and physical barriers (e.g., road crossings, dams).

OTHER CONSIDERATIONS

Information about the boundary waters treaty regarding water management and species introductions should be included. The group agreed to add a statement about species introductions within U.S jurisdiction that could be a source for the Canadian range of Mountain Sucker. In addition, some situations cannot be controlled by Canadian managers. For example 2001 was the third year of a drought which significantly impacted the Milk River. In August 2001, the siphon that carried the water from the St. Mary River to the Milk River sprung leaks. The Americans didn't particularly need the water downstream so they didn't fix the leaks which compounded the weather/drought conditions. Other information that will be added to this section is that two of the three population areas are in Saskatchewan. A statement will also be added about the other jurisdictions involved in this assessment (SK, AB, US and Canada) which will present other considerations when addressing the survival and recovery of the species.

ISSUES ADDRESSED IN THE RECOVERY POTENTIAL ASSESSMENT

The meeting participants reviewed the 27 terms of reference to be addressed in the recovery potential assessment (Appendix 4). All were addressed to the extent possible during the meeting. There may be more information available to evaluate abundance trajectories if the approach discussed at the meeting works. More information on habitat use, requirements and properties may be added to the non-modeling document when sampling data are re-evaluated. This may provide information on the spatial extent of the areas in Mountain Sucker DU2s range that are likely to have these habitat properties needed by Mountain Sucker. Following the meeting, further information will be gathered for the Saskatchewan areas. Maintaining the presence of Mountain Sucker in the three areas where this species is currently found will be included as a goal along with the population targets from modelling.

It is beyond the scope of the available information to allow Science to provide advice on risks associated with habitat "allocation" decisions, if any options would be available at the time when specific areas are designated as Critical Habitat. A general list of threats was developed during the meeting and information will be added later based on the meeting discussions. There is insufficient information to provide advice on the extent to which various threats can alter the quality and/or quantity of habitat that is available. There is not enough information to quantify the magnitude of each major potential source of mortality identified other than through the modelling included in the RPA. Discussion of the size of the Milk River and the number of individuals thought to be there is within the range of the recovery target. Similar information is not available for Saskatchewan. There is insufficient information to assess the magnitude by which current threats to habitats have reduced habitat quantity and quality. An inventory of mitigations and alternatives was developed. An inventory of activities to increase productivity or survivorship parameters however was not as there was insufficient information to allow this. The objective to estimate the reduction in mortality rate expected by each of the mitigation measures, alternatives and activities to increase productivity or survivorship was discussed.

Participants felt that we don't understand the necessary linkages. This should be addressed quantitatively but this information is not available. Translating these sorts of questions to cumulative habitat-based effects is difficult if not impossible. For species where direct mortality comes from fishing this may be easier to address. This is a serious issue for habitat-based threats. Something will be added to the document to ensure these discussions are included.

SUMMARY BULLETS FOR SCIENCE ADVISORY REPORT

Summary bullets were drafted by the meeting chair and reviewed by the participants. It was agreed that a statement should be added to the recovery target bullet to say the modelling results indicate that Mountain Sucker in the Milk River system are not in imminent danger of extirpation whereas the Saskatchewan populations are at risk. Another participant thought that text should be added to provide context for the modelling. The group agreed that a summary bullet about allowable harm should be added based on the meeting discussions.

APPENDIX 1: TERMS OF REFERENCE

Terms of Reference

Recovery Potential Assessment of Mountain Sucker

Central and Arctic Regional Advisory Meeting

Lethbridge, Alberta

8:30 a.m. to 4:30 p.m. (MDT) on 10 January 2012 and
8:30 a.m. to 12:00 p.m. on 11 January 2012

Chair: Kathleen Martin

Background

In November 2010, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) split Mountain Sucker (*Catostomus platyrhynchus*) into three populations and designated the Milk River populations as Threatened. The reason for this designation is because these populations have a small area of occupancy and number of locations (8) that make them particularly susceptible to habitat loss and degradation from altered flow regimes and drought that climate change is expected to exacerbate.

In advance of making a listing decision about whether to list Mountain Sucker on Schedule 1 as Threatened, Fisheries and Oceans Canada (DFO) Science has been asked to undertake a Recovery Potential Assessment (RPA). DFO Science developed the RPA framework to provide the information and scientific advice required for the Department to meet various requirements of the SARA. The information in the RPA may be used to inform both scientific and socio-economic elements of the listing decision, as well as development of a recovery strategy and action plan, and to support decision-making with regards to the issuance of permits, agreements and related conditions, as per sections 73, 74, 75, 77 and 78 of SARA.

This advisory meeting is being held to assess the recovery potential of Mountain Sucker. The resulting RPA Science Advisory Report (SAR) will summarize the historic and current understanding of the distribution, abundance and trend of this species, along with recovery targets and times to recovery while considering various management scenarios. The current state of knowledge about habitat requirements, threats to both habitat and Mountain Sucker, and measures to mitigate these impacts, will also be included in the SAR. At this stage in the SARA process for Mountain Sucker, the information in the RPA may be used to inform the listing decision, development of recovery documents and to support decision-making with regards to SARA agreements and permits.

Objectives

The intent of this meeting is to assess the recovery potential of Mountain Sucker using the RPA framework outlined in the Revised Protocol for Conducting Recovery Potential Assessments (see http://www.dfo-mpo.gc.ca/csas/Csas/status/2007/SAR-AS2007_039_e.pdf) along with the advice for documenting habitat use and quantifying habitat quality (see http://www.dfo-mpo.gc.ca/csas/Csas/status/2007/SAR-AS2007_038_E.pdf). The advice will be provided to the DFO Minister for her consideration in meeting various requirements of SARA including any listing decision for this species.

Products

The meeting will generate a proceedings report summarizing the deliberations of the participants. This will be published in the Canadian Science Advisory Secretariat (CSAS) Proceedings Series on the CSAS website. There will be CSAS Research Document(s) produced from the working paper(s) presented at the meeting. Advice from the meeting will be published in the form of a SAR.

Participation

Experts from DFO, provincial and U.S. academia will be invited to participate in this meeting.

APPENDIX 2: MEETING PARTICIPANTS

Name	Affiliation
Dave Boguski	Fisheries and Oceans Canada, Science
Robert Bramblett	Montana State University
Terry Clayton	Alberta Sustainable Resource Development
Holly Cleator	Fisheries and Oceans Canada, Science
Lia Kruger	Fisheries and Oceans Canada, Science
Kathleen Martin (Chair)	Fisheries and Oceans Canada, Science
Jennifer Merkowsky	Saskatchewan Ministry of Environment
Shane Petry	Fisheries and Oceans Canada, Species at Risk
Michael Sullivan	Alberta Sustainable Resource Development (ASRD)
Doug Watkinson	Fisheries and Oceans Canada, Science
Jennifer Young	Fisheries and Oceans Canada, Science

APPENDIX 3: MEETING AGENDA

Recovery Potential Assessment for Mountain Sucker

DFO office, 704 – 4th Avenue South, Lethbridge, AB

Chair: Kathleen Martin

10 January 2012

8:30 Welcome and introductions

8:40 Purpose of the meeting

8:50 Species biology and ecology

9:10 Historic and current distribution and trends

9:25 Historic and current abundance and trends

9:45 Residence

10:00 *Coffee break*

10:20 Information to support identification of critical habitat

11:00 Modelling presentation (Young) and discussion

11:45 *Lunch*

1:00 Recovery targets

1:45 Threats to survival and recovery

2:30 Limiting factors for population recovery

2:40 *Coffee break*

3:00 Mitigations and alternatives

3:45 Allowable harm

4:30 End of day

11 January 2012

8:30 Recap of first day

8:45 Data and knowledge gaps

8:55 Sources of uncertainty

9:05 Summary bullets for Science Advisory Report

10:05 *Coffee Break*

10:25 Maps/tables/figures and literature cited

10:50 Concluding remarks / next steps

12:00 Meeting adjourns

APPENDIX 4: ISSUES TO BE ADDRESSED IN THE RECOVERY POTENTIAL ASSESSMENT

Assess current/recent species status

1. Evaluate present Mountain Sucker DU2 status for abundance and range and number of populations.
2. Evaluate recent species trajectory for abundance (i.e., numbers and biomass focusing on matures) and range and number of populations.
3. Estimate, to the extent that information allows, the current or recent life-history parameters for Mountain Sucker DU2 (total mortality, natural mortality, fecundity, maturity, recruitment, etc.) or reasonable surrogates; and associated uncertainties for all parameters.
4. Estimate expected population and distribution targets for recovery, according to DFO guidelines (DFO 2005).
5. Project expected Mountain Sucker DU2 population trajectories over three generations (or other biologically reasonable time), and trajectories over time to the recovery target (if possible to achieve), given current Mountain Sucker DU2 population dynamics parameters and associated uncertainties using DFO guidelines on long-term projections (Shelton et al. 2007).
6. Evaluate residence requirements for the species, if any.

Assess the Habitat Use of Mountain Sucker DU2

7. Provide functional descriptions (as defined in DFO 2007b) of the properties of the aquatic habitat that *Mountain Sucker DU2* needs for successful completion of all life-history stages.
8. Provide information on the spatial extent of the areas in Mountain Sucker DU2s range that are likely to have these habitat properties.
9. Identify the activities most likely to threaten the habitat properties that give the sites their value, and provide information on the extent and consequences of these activities.
10. Quantify how the biological function(s) that specific habitat feature(s) provide to the species varies with the state or amount of the habitat, including carrying capacity limits, if any.
11. Quantify the presence and extent of spatial configuration constraints, if any, such as connectivity, barriers to access, etc.
12. Provide advice on how much habitat of various qualities / properties exists at present.
13. Provide advice on the degree to which supply of suitable habitat meets the demands of the species both at present, and when the species reaches biologically based recovery targets for abundance and range and number of populations.
14. Provide advice on feasibility of restoring habitat to higher values, if supply may not meet demand by the time recovery targets would be reached, in the context of all available options for achieving recovery targets for population size and range.
15. Provide advice on risks associated with habitat “allocation” decisions, if any options would be available at the time when specific areas are designated as Critical Habitat.

16. Provide advice on the extent to which various threats can alter the quality and/or quantity of habitat that is available.

Scope for Management to Facilitate Recovery of Mountain Sucker DU2

17. Assess the probability that the recovery targets can be achieved under current rates of *Mountain Sucker DU2* population dynamics parameters, and how that probability would vary with different mortality (especially lower) and productivity (especially higher) parameters.
18. Quantify to the extent possible the magnitude of each major potential source of mortality identified in the pre-COSEWIC assessment, the COSEWIC Status Report, information from DFO sectors, and other sources.
19. Quantify to the extent possible the likelihood that the current quantity and quality of habitat is sufficient to allow population increase, and would be sufficient to support a population that has reached its recovery targets.
20. Assess to the extent possible the magnitude by which current threats to habitats have reduced habitat quantity and quality.

Scenarios for Mitigation and Alternative to Activities

21. Using input from all DFO sectors and other sources as appropriate, develop an inventory of all feasible measures to minimize/mitigate the impacts of activities that are threats to the species and its habitat (Steps 18 and 20).
22. Using input from all DFO sectors and other sources as appropriate, develop an inventory of all reasonable alternatives to the activities that are threats to the species and its habitat (Steps 18 and 20).
23. Using input from all DFO sectors and other sources as appropriate, develop an inventory of activities that could increase the productivity or survivorship parameters (Steps 3 and 17).
24. Estimate, to the extent possible, the reduction in mortality rate expected by each of the mitigation measures in step 21 or alternatives in step 22 and the increase in productivity or survivorship associated with each measure in step 23.
25. Project expected population trajectory (and uncertainties) over three generations (or other biologically reasonable time), and to the time of reaching recovery targets when recovery is feasible; given mortality rates and productivities associated with specific scenarios identified for exploration (as above). Include scenarios which provide as high a probability of survivorship and recovery as possible for biologically realistic parameter values.
26. Recommend parameter values for population productivity and starting mortality rates, and where necessary, specialized features of population models that would be required to allow exploration of additional scenarios as part of the assessment of economic, social, and cultural impacts of listing the species.

Allowable Harm Assessment

27. Evaluate maximum human-induced mortality which the species can sustain and not jeopardize survival or recovery of the species.

References:

DFO. 2005. A framework for developing science advice on recovery targets for aquatic species in the context of the Species at Risk Act. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2005/054.

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.

Shelton, P.A., Best, B., Cass, A., Cyr, C., Duplisea, D., Gibson, J., Hammill, M., Khwaja, S., Koops, M., Martin, K., O'Boyle, B., Rice, J., Sinclair, A., Smedbol, K., Swain, D., Velez-Espino, L., and Wood, C. 2007. Assessing recovery potential: long-term projections and their implications for socio-economic analysis. DFO Can. Sci. Advis. Sec. Res. Doc. 2007/045.