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Proceedings of the Review of Recovery Potential Assessment for the Umatilla Dace *(Rhinichtys umatilla)*

March 14, 2011
Nanaimo, BC

Sean MacConnachie, Chairperson

Compte rendu de l'examen de l'évaluation du potentiel de rétablissement du naseux d'Umatilla *(Rhinichtys umatilla)*

14 mars, 2011
Nanaimo, C-B

Sean MacConnachie, président

Fisheries and Oceans Canada / Pêches et Océans Canada
Pacific Biological Station / Station biologique du Pacifique
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Canada

Foreword

The purpose of these Proceedings is to document the activities and key discussions of the meeting. The Proceedings include research recommendations, uncertainties, and the rationale for decisions made by the meeting. Proceedings 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.

Avant-propos

Le présent compte rendu a pour but de documenter les principales activités et discussions qui ont eu lieu au cours de la réunion. Il contient des recommandations sur les recherches à effectuer, traite des incertitudes et expose les motifs ayant mené à la prise de décisions pendant la réunion. En outre, il fait état de données, d’analyses ou d’interprétations passées en revue et rejetées pour des raisons scientifiques, en donnant la raison du rejet. Bien que les interprétations et les opinions contenues dans le présent rapport puissent être inexactes ou propres à induire en erreur, elles sont quand même reproduites aussi fidèlement que possible afin de refléter les échanges tenus au cours de la réunion. Ainsi, aucune partie de ce rapport ne doit être considérée en tant que reflet des conclusions de la réunion, à moins d’indication précise en ce sens. De plus, un examen ultérieur de la question pourrait entraîner des changements aux conclusions, notamment si l’information supplémentaire pertinente, non disponible au moment de la réunion, est fournie par la suite. Finalement, dans les rares cas où des opinions divergentes sont exprimées officiellement, celles-ci sont également consignées dans les annexes du compte rendu.

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SUMMARY

These proceedings summarize the relevant discussions and key conclusions that resulted from a Fisheries and Oceans Canada (DFO), Canadian Science Advisory Secretariat (CSAS) Regional Advisory Process on March 14th, 2011 at the Pacific Biological Station in Nanaimo, B.C. One working paper focusing on the Recovery Potential Assessment (RPA) of Umatilla Dace (*Rhinichtys umatilla*) was presented for peer review.

In-person participation included DFO staff from Science branch, Oceans, Habitat and Enhancement branch, and Policy branch. Representatives from the province of BC and industry also participated

The conclusions and advice resulting from this review will be provided in the form of a Science Advisory Report providing advice to the species at risk program to inform listing decisions under the *Species at Risk Act* (SARA) and subsequent recovery planning activities.

The Science Advisory Report and supporting Research Document will be made publicly available on the CSAS Science Advisory Schedule at http://www.dfo-mpo.gc.ca/csas-sccs/index-eng.htm.

SOMMAIRE

Le présent compte rendu résume les discussions et l'essentiel des conclusions d'un processus de consultation régionale du Secrétariat canadien de consultation scientifique (SCCS) de Pêches et Océans Canada (MPO), qui s'est tenu le 14 mars 2011 à la Station biologique du Pacifique de Nanaimo (Colombie-Britannique). Un document de travail portant sur l'évaluation du potentiel de rétablissement du naseux d'Umatilla (*Rhinichtys umatilla*) a été présenté aux fins d'examen par les pairs.

Des employés de la Direction des sciences, de la Direction des océans, de l'habitat et de la mise en valeur et de la Direction des politiques du MPO participaient en personne à la réunion. Des représentants de la province de la Colombie-Britannique et de l'industrie étaient également présents.

Les conclusions et avis découlant de l'examen seront présentés sous forme d'avis scientifique destiné au programme des espèces en péril et visant à éclairer les décisions d'inscription sur la liste de la *Loi sur les espèces en péril* (LEP) et les activités de planification de rétablissement correspondantes.

L'avis scientifique et le document de recherche à l'appui seront rendus publics dans le calendrier des avis scientifiques du SCCS à l'adresse suivante : http://www.dfo-mpo.gc.ca/csas-sccs/index-fra.htm.

INTRODUCTION

A Fisheries and Oceans Canada (DFO) Canadian Science Advisory Secretariat (CSAS), Regional Advisory Process meeting was held on March 14th, 2011 at the Pacific Biological Station in Nanaimo to evaluate the Recovery Potential Assessment (RPA) of Umatilla Dace (UD) (*Rhinichtys umatilla*). A RPA is undertaken when the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) recommends an aquatic species as Threatened or Endangered. The purpose of the RPA is to provide information that will:

- Inform the decision to list or not to list a species on Schedule 1 of the Species at Risk Act (SARA)
- Support decisions on permitting allowable harm;
- Inform public consultations; and
- Assist the Recovery Team in developing a Recovery Strategy and/or Action Plan for the species if the listing recommendation is accepted.

Umatilla Dace was designated as a Species of Special Concern by COSEWIC in 1988. The species was re-assessed in November 2010 and was designated as Threatened due to a limited distribution in Canada encompassing habitats that have been extensively modified by widespread hydroelectric developments (change from riverine to reservoir habitats, altered flow regimes). It is possible that habitat will continue to be lost and degraded owing to hydroelectric operations, climate change, and increased water extraction. This species is also susceptible to aquatic invasive species that are widespread in the Columbia-Kootenay Rivers' portion of the species' range. Proposed additional hydroelectric and water storage development in the Similkameen River drainage is a potential major threat to habitat quality (COSEWIC 2010)

The Terms of Reference (TOR) for the science review (Appendix A) were developed in response to a request for advice from the species at risk program. Notifications of the science review and conditions for participation were sent to representatives with relevant expertise from First Nations, the hydro-electric and mining industry sectors, environmental non-governmental organizations, the provincial government and academia.

The following working paper was prepared and made available to meeting participants prior to the meeting (summaries provided in Appendix B):

Harvey, B., and Brown, T. 2011. Recovery Potential Assessment for the Umatilla Dace (*Rhinichthys Umatilla*). DFO Can. Sci. Advis. Sec. Res. Doc. 2011/107. vi + 40p.

The meeting Chair, Sean MacConnachie, welcomed participants, reviewed the role of CSAS in the provision of peer-reviewed advice, and gave a general overview of the CSAS process. The Chair discussed the role of participants, the purpose of the various publications (Science Advisory Report, Proceedings and Research Document), and the definition and process around achieving consensus decisions and advice. Everyone was invited to participate fully in the discussion and to contribute knowledge to the process, with the goal of delivering scientifically defensible conclusions and advice. It was confirmed with participants that all had received copies of the Terms of Reference, and working paper. The Chair also described the SARA recovery planning process

The Chair reviewed the Agenda (Appendix C) and the Terms of Reference for the meeting, highlighting the objectives and identifying the Rapporteur for the meeting (Martin Nantel) The Chair then reviewed the ground rules and process for exchange, reminding participants that the meeting was a science review and the meeting was to focus on the scientific information within the paper. The room was equipped with microphones to allow remote participation by web-

based attendees, and in-person attendees were reminded to address comments and questions so they could be heard by those online.

Participants were reminded that they were expected to contribute to the review process if they had information or questions relevant to the paper being discussed. In total, 19 people participated in the RAP (Appendix D).

The conclusions and advice resulting from this review will be provided in the form of Science Advisory Reports to the Species at Risk Program to inform program requirements. The Science Advisory Reports and supporting Research Document will be made publicly available on the CSAS Science Advisory Schedule at http://www.dfo-mpo.gc.ca/csas-sccs/index-eng.htm

REVIEW

**Paper was accepted subject to revisions*.*

GENERAL DISCUSSION

The authors presented the finding of their paper and noted the following:

- Umatilla Dace (UD) is a data poor species with heavy reliance upon a few surveys. Although there has been some new data recently collected by different agencies it is still considered data poor with key biological parameters missing like spawning timing, which was inferred in the paper from other species. Some authorities suggest it is doing well and recruiting, but baseline survey data has not been collected consistently, so it is difficult to come to a conclusion on population levels.
- Umatilla dace is suspected of having been the result of multi-hybridization events between speckled dace and leopard dace, but is treated as a distinct species.
- There is a tremendous dichotomy in data and knowledge – much more is known about the Columbia River dace than is known about the Similkameen River dace.
- Although there appears to be more than one population (Columbia-Kootenay and Similkameen), and they may have different abilities to adapt to different conditions, COSEWIC assigned one DU. It was noted that the species is at the northern end of its range, with approximately 5% of its global range in Canada.
- From the few studies conducted little information is available on distribution and abundance. Often only presences information is available. There has been some catch per unit effort studies in the Columbia, but it is not feasible to compare different locations or establish population trends due to a lack of data collection and highly variable survey methodologies.
- Habitat use: Most information presented was inferred from speckled dace. Sampling efforts to date have been focused on shallow-water habitat use (<1m).
- The authors described the rationale for designation by COSEWIC :
    - B1 and B2: limited extent or range of occupancy/index of occupancy (20,000 square km). Therefore UD doesn't meet range threshold in Canada.
    - Also have to meet two other criteria to meet TH or EN: i.e. a limited number of locations, 7, i.e. below 10.
    - Finally, Biii, i.e. anticipate a future loss in habitat or habitat quality. (i.e. Shanker's Bend dam proposal which may cause flooding to habitat, water withdrawals causing loss of riffle habitat, Columbia stranding and invasive species)

- The authors described the threats to the species.
    - Power generation and dams: COSEWIC considered ramping a major threat which results in stranding, makes habitat less usable, contributes to habitat loss, and habitat quality. Proposed mitigations; Consider slopes, different ramping rates which are being considered by BC Hydro. Impoundment was also identified as an issue, but made assumption they have few fish in reservoirs. Surveys finding more fish there could change this perception. Shanker's Bend: high dam scenario highly unlikely to occur because of the socio-economic aspect of flooding 25km of Similkameen River. Independent power projects, most of them are above dace habitat. Two possible: one in Similkameen for wood waste, water withdrawals for cooling. Also one potential power project on Cascades River, but not clear what downstream impacts of dam would be.
    - Invasive species: currently about 14 to 16 invasive species present in Upper Columbia, another at least 15 invasive species in lower Columbia with limited potential to end up in Upper Columbia. Not many ways to deal with this. Assumption of RPA: Impacts would be felt on riverine habitat.
        i. Northern Pike and Walleye now in Columbia and moving upstream but it is uncertain about their population levels. These are important recreational fishery species and increased fish pressure from the recreational community may actually reduce their population and subsequent threat.
    - Water extraction: Not identified as a major issue in main stem of Columbia which is tightly regulated, but is an issue in the tributaries. Also issue in Similkameen. Note that the total water yield has not declined, but there has been a shift in timing, locations, rates of melts, etc. Prolonged dry periods, resulting in low water in August and September coupled with peak snow melt can result in drought in August and Sept when needed by agriculture. Holders of water right could have some ways to store that water for redistribution at proper time.
    - Resource extraction: With the recent increase in the price of metals there has been increased interest in placer mining and Copper Mountain open pit mine is active. Also possibility of future coal extraction in Tulameen basin. Although new mining proposals still need to go through an environmental assessment the impact on UD is uncertain. The concerns centre on potential impacts to water quality rather than habitat quantity in the Smilkameen River.
    - Land use issues: Discussions focused generally on agriculture, water use and withdrawals, types of crop changing.
    - Timber harvesting and beetle kills: concerns but mixed ramification for system: dead standing trees will increase water to system because tress won't be transpiring. But if they were to be removed there may be a different response.
    - Over sampling: Collection guidelines / sampling criteria not in place for interior species.
- Allowable harm: A decline in abundance was not identified as the rationale for designation; rather it's the potential for future loss of habitat. The authors proposed some levels of allowable harm may be permissible as long as habitat impacts are minimized. To be precautionary, allowable harm should not increase beyond current levels. However, at a minimum, extensive surveys for presence/absence are required, especially in currently unsurveyed locations within the dace's range. This will verify the number of locations, help estimate population levels, and recommend appropriate levels of allowable harm.

Points of clarifications/ discussion:

- What water quality parameters were examined: The paper focuses on with sedimentation, N, Phosphates, but doesn't deal with pesticides and herbicides.
- A participant noted that a number of US researchers on Columbia have suggested flushing response by US rather than increased effort.
- A participant noted that there are two kinds of reservoirs on Columbia: high vs. low fluctuations. Historically, lakes in system fluctuated a lot. Probably not a lot of riparian habitat then because of fluctuation. Still lots of uncertainty of UD presence in reservoirs.
- A participant noted that invasive algae in Columbia probably causing significant changes in habitat since it shown up a decade or so ago. The authors were not convinced it is invasive, but it may be natural and expanding.
- A participant inquired about where the directive to not consider climate change comes from? The authors responded that they included regional differences, but must address human induced threats as defined in the TOR. Climate change is bigger. RPA more meant to dealt with the symptoms of climate change, as opposed to climate change itself.
- Historic threats vs. modern threats: RPA has tendency to confuse the two. Broader threats that are difficult to deal with, which now exacerbates other threats. RPA should take this into consideration.
- Invasive fish species were viewed as a serious threat to UD. There was significant discussion on the threat level that invasive species may have on UD. A lot of the invasive species listed as common are not necessarily a significant threat to dace. Should they then be considered a threat? Eg. Walleye are there to stay, but most of the other species are not abundant in the riverine habitat. They have moved north from the US, but have not approaching levels where they are a UD population threat. A recommendation was made to ensure that the RPA should clearly support the assessment of it being common. Use numbers as much as possible, or be careful in how we qualitatively describe.
- A participant noted that the main issue with UD is methods for sampling dace. Numerous techniques have been tried but results are not consistent. Recommends that surveys are needed to capture abundance/trends, spawning/rearing habitats. Sampling needs to consider deeper waters and diurnal sampling. Need to know/develop the methods for this.
- Questions arose around how much primary data is the description of the range based on and how valid is it. Lots of implications for this, so need to ensure it's accurate. Evidence they're above Slocan dam? How about Pend d'Oreille? (one instance of ID noted in RPA).
- A participant indicated that BC Hydro is indexing dace in the Columbia River annually and indicated that these reports were available.
- A participant pointed out that UD is one of the more common and relatively abundant species they're collecting in Oregon. Did authors consider US papers? The authors responded that they had searched US literature and spent considerable time on this endeavour, but had not found many papers specific to Umatilla dace, but not sure any new papers would change the RPA assessment.
- One participant felt that there was bias in report against mining and questioned the validity of the cited sources (newspaper, CBC, etc.). He offered to provide scientific data to authors. Doesn't think slag is an issue in terms of habitat; authors mentioned the river appears to be much cleaner, but can't say slag is not an issue. RPA should also consider water quality for Pend d'Oreille.

- Discussions about how water extraction is a threat to UD because UD likes higher velocity water. If you reduce water below 20% of mean annual discharge, you expose riffles; again, this is habitat issue. The authors agreed to bring in clarifications to RPA: need higher low-season water elevations for domestic release at the right time. Need to also look at water licences, hopefully the new water act will deal with lots of these issues (water use, monitoring, etc.). Water storage upstream above UD habitat has some potential to relieve some water habitat issues. ENGOs have been promoting small stream upslope water storage for specific uses for a while.
- More clarity on water retention in upper Similkameen is needed.

REVIEWS

Ray Lauzier:

- The first reviewer recommended that future work could look at an ecosystem based planning given the overlap between Umatilla Dace and white sturgeon. This reviewer recommended that the authors use the Pathways of effects model to further qualify the proposed threats as described by Coker et al. (2010).
- Useful to broaden our thinking to ecosystem thinking rather than single species recovery at the northern end of its range.
- Emphasized need to make recommendations based on Coker et al. Pathway of Effects, and then start filling the gaps through CSAS or other avenues.
- Recommended papers be accepted with major revisions.

Authors' responses:

- The authors emphasized that it's not the lack of numbers of fish which are causing problems for assessed threat level, but lack of quality habitat and threats to it.
- Given the lack of quantitative data, difficult to advise on recovery targets. Therefore the authors focused on how to mitigate or eliminate major threats. Given lack of data, acceptable recovery target would be to move from threatened to special concern. One option is verify their existence in more locations (or remove any one of the three conditions of the threatened status). Wouldn't help the species, but would change its designation. This will be better captured in the paper.
- Authors may consider moving all recommendations, which are now interspersed throughout paper, in a "recommendations" section at the end of the paper.
- One author felt many of the specifics should be dealt with in a recovery strategy, but could perhaps be included in the paper so readers would know to pay attention to it at recovery planning stages. Warned against including too much historic information.
- Concerns were expressed about COSEWIC criteria that have a bias to list species at the northern end of their range given first two criteria have greater propensity to be met for these species. Further concern was raised about the discussion about moving species back from threatened to special concern in a bureaucratic kind of way without real attempts at doing anything for the species.
- COSEWIC chooses to work on species they suspect to be at risk. Reasonable for DFO to reassess after reviewing additional info, and decide to make a recommendation not to list.
- BC Hydro have used Pathway of Effect quite regularly when they have lack of data. Generate hypotheses, then used structured decision-making to rank hypotheses based on

votes for each hypotheses. The authors responded that the Pathway of Effect Approach has some value, but not sure how to apply it at the RPA level, given the limited abundance of data.

Gary Birch:

- Drafted comments, then operational and quality assurance staff reviewed.
- Sent section of reports to folks who are currently doing work in the field
- Sent some of statements to consultant who reviewed
- Provided three papers: 1) mostly technical paper 2) Golder paper on distribution information (historically more UD along border than upper areas, three sets of reasonable data came out: '93-94 seasonal habitat use, duplicated in late '90s and 2001, and more recently by AMEC (life history study, not abundance). Other study looking at ramping effect (late '90s early 2000) but biased for UD. General conclusion Golder: none of the data sets are a good record of abundance. Best sets are 93-94 and 90s early 2000. Interestingly, if you look at catch rates with stranding data, see fluctuation in abundance. Can only conclude it's still there, that it has been there over the last 18 years, that there's been recruitment over that period. Useful even if not strong data.
- Report reasonably fair attempt at reviewing the limited data.
- Review of BC Hydro letter previously sent to authors (not included in proceedings):
- 1) northern range, tend to be responding to anthropogenic changes, more so than other species elsewhere, influences changes in populations, which in turn makes potential threats difficult to identify and quantity. Bias of COSEWIC criteria. Multiple hybridization events.
- 2) difficulty with use other species of daces as surrogates
- 3) Many techniques tried, most of them failed. Only effective technique has been backpack electrofishing. Difficulties capturing different age classes.
- Also problems identifying UD. Also difficulty looking at depths. >1m. UD could potentially spawn at lower depths, and could be protected. Shouldn't jump to conclusions, need to look at all potential habitat.
- The reviewer asked questions about listing/do not list under SAR and expressed frustration that listing should not be the only way we can do work on a species. Lack of such a process within SARA is a real frustration.

Authors' responses:

- Any references/examples of multiple-hybridization successes that could evolve different local adaptation to challenges?
- If tried different sampling methods to try something, how do you declare that it's not working? Catching no fish, does that mean there are no fish or that the method is not working. References were made to artificial hybridization studies with guppies, subtle differences which may not replicate in nature. Gary will send reference to Brian. Gary stated some of these techniques do not work because they've been tried alongside other techniques that do work.

General Discussion

- Discussion around ensuring resource extraction section will be revised according to latest information (citable). To be provided to the authors as soon as possible.

- Should have recommendations and conclusions before the Science Advice Report is due. Final paper will be completed by mid-June.
- Discussion around “recoverability” of the species. Consensus wasn’t reached but the authors agreed to rework the paper so that it states that recovery will be achieved when the species is back down to Special Concern.
- A participant suggested that it would be useful to develop a series of scenarios as to how the future could unfold: 1- more science to look at range, occupancy, etc. maybe we’ll realize range is bigger than thresholds, so things may not be as bad as we thought, and therefore downgrade to Special Concern. Similarly, this could reveal that COSEWIC was right and that the species is still TH, and maybe we now need to split up the DU in different populations, and take actions that is specific to each DU. Or without different DUs, we still might find there isn’t much we can do about that, but we can do things to maintain status quo. One of the scenarios should also consider 2 DUs, given that different populations have different threats. One author suggested that it could be left as one DU, and deal with them as two different management units. See matrix below. By undertaking actions/scenarios, may end up with “X” in matrix, then potential to move down to Special Concern. The delineation of DUs is ultimately COSEWICs responsibility.
- Approach it hierarchically: think broad scenarios first, then within each think about what can be done to reduce threats. Based on these alternatives, we can then articulate what recovery can mean, i.e. what are the possibilities, what can be achieved within each scenarios, how likely are we to reduce threats (and potentially to downgrade assessment status).
- Question about what constitutes different locations: Locations are based on threats. Two different locations would have to be independent to each other with regards to the same threat. Followed by further discussions on threats and locations.
- Concerned was expressed with second criteria for listing (anticipated future loss of habitat or habitat quality). Report goes on about hydro-electric facilities, but implications (explicitly stated) that new generation is reducing habitat, but in fact more habitat is being created, so wouldn’t meet the criteria. New habitat created may still be a threat that may need more mitigation. However population is still recruiting, after 50 years of stranding! So we can’t say that UD can’t use habitat even in the presence of stranding.
- Would be helpful to connect threats to dace, that will help recovery section though use of scenarios.
- If specific research needs to happen, then should include that in Allowable Harm section. May need to take Allowable Harm from something else to allocate to research. Or increase it.
- Questions was raised that the RPA mentions potential critical habitat would be described as riverine with characteristics as per RPA. Do we know which portion of the range has these characteristics? No.
- Concerns were expressed about recommendations for critical habitat given the paucity of data to identify geographic area the same way we did with sturgeon. Concerned about potential changes to existing operations.
- A recommendation was made to incorporate latest definition of residence from Terms and Concepts Workshop publication

Reason for Designation: B1ab(iii) AND B2ab(iii)

Criterion (threshold for *Threatened*):	EO: Extent of Occurrence (<20,000 km^2)			AO: Area of Occupancy (2000 km^2)			a: Number of Locations (<10)			biii: Area or quality of habitat (projected to decline)		
Population Unit:	All Combined	Similkameen	Columbia	All Combined	Similkameen	Columbia	All Combined	Similkameen	Columbia	All Combined	Similkameen	Columbia
Possible Actions/Scenarios - indicate how values of AO, EO, a and biii might change (give probability)												
1 split DU into 2 (or more) populations (collect DNA to confirm)	12,425	?	?	608 grid (27.3 stream)	?	?	6	1	5	decline	decline	decline
2 surveys of distribution and DNA to assess population structure	increase ?	increase?	increase ?	increase ?	increase?	increase ?	increase ?	increase?	increase ?	-	-	-
3 investigate threats (e.g., review human impacts and model viability (PVA)	-	-	-	-	-	-	-	-	-	no decline?	no decline?	no decline?
4 initiate measures to reduce threats or prevent them from getting worse	-	-	-	-	-	-	-	-	-	no decline?	no decline?	no decline?
5 transplants to increase the number of locations	increase ?	increase?	increase ?	increase ?	increase?	increase ?	increase ?	increase?	increase ?	increase ?	increase?	increase ?
6 other ?												

RECOMMENDATIONS

- Accept paper with revisions
- Be less subjective on describing invasive species levels (remove the term “common”)
- Include language of impacts from climate change on UD
- Explore research options to develop appropriate deep water survey methods and seasonal survey times.
- Add information on status of US populations of UD
- Describe possible inter-species interactions. E.g UD and WS
- Clarify water retention recommendation on Similkameen
- Reformat paper to have recommendations at the end of the document.

Possible mgmt scenarios

1) Invest in further monitoring to refine number of locations and area of occupancy to provide information for future COSEWIC assessment
2) Develop management approach/listing for different populations/units e.g. Columbia vs. Similkameen
3) Maintain status quo
4) Study threats
5) Measures to reduce threats/prevent them from getting worse
6) Transplants to increase # of locations
7) Explore genetic analysis of differences btwn two populations

Allowable Harm:

Spell out specific research needs in defining allowable harm. Current recommendation is for current levels of harm to continue. Need to increase this amount to allow for research. Allowable harm should be linked to impacts to quality and quantity of habitat.

Allowable harm is subject to future understanding of population levels.

ACKNOWLEDGEMENTS

Thank you to the authors for the hard work and the participants for a constructive review. Thank you to Martin Nantel for rappoteuring. Thank you to Janeane MacGillivray for administrating the webinar and arranging the logistics of the meeting.

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Coker, G. A., D.L. Ming, and N.E. Mandrak. 2010. Mitigation Guide for the Protection of Fishes and Fish Habitat to Accompany the Species at Risk Recovery Potential Assessments Conducted by Fisheries and Oceans Canada (DFO) in Central and Arctic Region. Version 1.0. Can. Manuscr. Rep. Fish. Aquat. Sci. vi + 40 p.

COSEWIC. 2010. COSEWIC assessment and status report on the Umatilla Dace *Rhinichthys umatilla* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xii + 37 pp.

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APPENDIX A: TERMS OF REFERENCE

Terms of Reference

Recovery Potential Assessment –
Umatilla Dace *(Rhinichthys umatilla)*
in British Columbia

Pacific Regional Advisory Process

March 14, 2011
Nanaimo, B.C.
Chairperson: Sean MacConnachie

Context

When the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) designates aquatic species as threatened or endangered, Fisheries and Oceans Canada (DFO), as the responsible jurisdiction under the Species at Risk Act (SARA), is required to undertake a number of actions. Many of these actions require scientific information on the current status of the species, population or designable unit (DU), threats to its survival and recovery, and the feasibility of its 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 the consideration of peer-reviewed scientific analyses into SARA processes including recovery planning.

Umatilla Dace was designated by COSEWIC as Threatened in April 2010. DFO Science has been asked to undertake an RPA, based on the National Frameworks (DFO 2007a and b) developed for this purpose. The information and advice in the RPA may be used to inform both scientific and socio-economic elements that are considered by the Minister of Fisheries and Oceans Canada in recommending whether a species is listed as threatened or Endangered under the Species at Risk Act, 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.

Objective

Taking into consideration available information, and accounting for uncertainties, provide information and advice respecting the potential for Umatilla Dace recovery. The following working paper will be reviewed in support of this objective.

Harvey, B. and T. Brown 2011. Recovery Potential Assessment of the Umatilla Dace (Rhinichthys umatilla) in British Columbia. CSAP (Centre for Science Advice Pacific) Working Paper 2011/P64.

The provision of recovery potential information and advice is guided by the DFO National Framework (DFO 2007a and b) developed for this purpose. The frameworks outline the following specific elements for the provision of RPA information and advice, and will be used to guide this review.

A. Population status, trends and trajectories

1. Evaluate present Umatilla Dace 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 Umatilla Dace (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 Umatilla Dace population trajectories over three generations (or other biologically reasonable time), and trajectories over time to the recovery target (if possible to achieve), given current population dynamics parameters and associated uncertainties using DFO guidelines on long-term projections (Shelton *et al.* 2007).

B. Species Residence

6. Evaluate residence requirements for the species, if any.

C. Habitat Use of Umatilla Dace

7. Provide functional descriptions (as defined in DFO 2007b) of the properties of the aquatic habitat that Umatilla Dace needs for successful completion of all life-history stages.
8. Provide information on the spatial extent of the areas in Umatilla Dace 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.

D. Assess the Scope for Recovery of Umatilla Dace

17. Assess the probability that the recovery targets can be achieved under current rates of Umatilla Dace 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.

E. Scenarios for Threats Mitigation and and/or Recovery

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.

F. Allowable Harm

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

Expected Publications

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

Participation

DFO Science, Oceans, Habitat and Species at Risk, Policy and Economics, Aboriginal Communities, Province of BC, External Reviewers, Industry, Non-governmental organizations and Other Stakeholders will be invited to participate in this meeting.

References Cited

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APPENDIX B: REVIEWS

Review of the draft working paper of the Recovery Potential Assessment for the Umatilla Dace (*Rhinichthys umatilla*) by Brian Harvey and Tom Brown

This paper provides good review of all the existing available information on Umatilla dace distribution and abundance as well as developmental pressures on where Umatilla dace have been observed. I will provide my comments and suggestions by answering the questions I ask of reviewers of CSAP working papers.

Is the purpose of the working paper clearly stated?

The purpose of the paper is implied in the first section of Current/Recent Species Status with a definition and purpose of a Recovery Potential Assessment (RPA). An introductory section explaining the objective of RPA's and how they are used should be separate from the Current/Recent Species Status section. This section also includes acknowledgements, which should also be separate, as it does not relate to the Current/Recent Species Status.

Are the data and methods adequate to support the conclusions?

Unfortunately there is very little data on the habitat and life history characteristics on the Umatilla dace, through no fault of the authors. In the second section under Probability that Recovery Targets Can be Achieved, the authors state "We believe Umatilla dace can recover". I don't believe there is sufficient information to set recovery targets, and there is insufficient data to provide an assessment as to the status of the species in relation to its natural population abundance and distribution. There is insufficient information to provide advice on allowable harm, and that should be clearly stated in the working paper, given the situation in Otter Creek where extirpation is partially attributed to scientific sampling. What advice is provided on allowable harm is based on previous data that may not reflect the current conditions or status. In the third section there is only one recommendation on reasonable alternatives to the activities that are threats to the species and its habitat and there are no recommendations on reasonable and feasible activities that could increase the productivity or survivorship parameters. While species-specific information is not available to make species-specific recommendations, general recommendations could be made on habitat protection measures using the pathways of effects outlined by Coker *et al* (2010) based on the limited observations of type of habitat used by this species, and the types of habitat pressures in the areas where this species has been previously observed.

Are the data and methods explained in sufficient detail to properly evaluate the conclusions?

The is insufficient data to provide a current assessment of Umatilla dace, again through no fault of the authors, as there have not been any surveys for the species in 20 years or about 5 generations. However, greater detail is needed on the ongoing studies that are being undertaken by BC Hydro in some of the systems, to give some confidence in the quality and quantity of the data being collected to provide advice in protective and mitigative measures to ensure recovery to yet to be determined targets.

Are the recommendations provided in a form useful to a resource manager?

There are very few specific recommendations due to a lack of species-specific data. However, as I noted above, in the absence of species-specific information, general recommendations could be made on habitat protection measures using the pathways of effects outlined by Coker

et al (2010) based on the limited observations of type of habitat used by this species, and the types of habitat pressures in the areas where this species has been previously observed.

Does the advice reflect the uncertainty in the data, analysis or process?

There is very little advice based on very little current data. The purpose of the RPA is to provide advice to the Minister on allowable harm, listing decisions, as well as technical advice used to develop recovery plans. Due to the explicit purpose of the RPA, the best possible advice based on the best available information is required. In data-poor situations, such as with Umatilla dace, general advice and recommendations with clearly stated caveats are more useful than no advice and recommendations, with the understanding this advice will be updated when there is sufficient species-specific information.

Can you suggest additional areas of research that are needed to improve our assessment abilities?

Obviously targeted abundance and habitat surveys are required for Umatilla dace and related co-occurring species. The majority of studies on impounded rivers appear to be undertaken by BC Hydro. However, surveys are also required on the Kettle River, the Similkameen River, especially in the vicinity of Keremeos, and possibly the Tulameen River. Comparative sampling would provide a more complete and accurate assessment of distribution and abundance. Comparators could be night/dusk vs. daylight sampling, electrofishing vs. minnow trapping, large rivers (Columbia) vs. medium/small rivers (Similkameen, Kettle) as well as seasonal sampling. Biological sampling is needed to provide basic information on age, growth, fecundity, and survivorship to be used to delineate life history characteristics and assess limiting factors and vulnerabilities of Umatilla dace and their habitats. Habitat use and preferences of co-occurring species collected during the targeted surveys would provide information on potential competitive pressures.

I have provided a marked copy of the draft working paper with suggested revisions and comments, and I won't outline those points in the written review. I noted a few points in the marked paper which appear to be conflicting.

I noticed there is no information on the past potential impacts of linear development (rail and road), and bridge crossings on the Similkameen River. Also, I believe agricultural practices in the Similkameen Valley have changed considerably over the past several years, as I remember ginseng farms some years ago (that were reputed to extensively use pesticides) appear to have been replaced by vineyards. This may have been a past habitat pressure on Umatilla dace. In the 1950's, dykes were built in the vicinity of Keremeos, eventhough they were well set back form the river to allow meandering of the main river channel, the actual construction in the riparian zone may have had an impact on locally observed Umatilla dace and access to side channel habitat. (DFO *et al* 2005)

As I outlined earlier in this review, further development of general recommendations and advice is required based on what is known on the habitat requirements of riverine freshwater fish. There are specific examples of pathways of effects models outlined in Coker *et al* (2010) that could be used as a basis for general advice and recommendations.

I feel this paper would benefit from the addition of a perspectives or background section, rather than strictly following the required outline of an RPA. This section could outline that Umatilla dace appears to be at the northern edge of its range, and co-occurs in the region with other closely related dace species. In virtually ever river where Umatilla dace is presently found, its

habitat has undergone developmental pressures from hydro development, agriculture, water extraction, linear developments (rail and highway) and industrial development. Given the degree and likely effects of these habitat pressures, is it reasonable to expect recovery to its unknown abundance levels and distribution, or should recovery targets be developed with at precautionary levels and distribution patterns to ensure continued survival at the edge of its historic range? This paper would benefit from providing some recommendations or options in this regard.

I recommend this paper be accepted with revisions.

Respectfully submitted

Ray Lauzier
Pacific Biological Station, Marine Environments and Aquaculture Division

References:

Coker, G. A., D.L. Ming, and N.E. Mandrak. 2010. Mitigation Guide for the Protection of Fishes and Fish Habitat to Accompany the Species at Risk Recovery Potential Assessments Conducted by Fisheries and Oceans Canada (DFO) in Central and Arctic Region. Version 1.0. Can. Manuscr. Rep. Fish. Aquat. Sci. vi + 40 p.

DFO, Okanagan Nation Alliance and BC Ministry of Water Land and Air Protection. 2005. The State of Fish and Fish Habitat in the Okanagan and Similkameen Basins. Report commissioned by the Canadian Okanagan Basin Technical Working Group (COBTWG). 110 pp.

Umatilla Dace - RPA review by Gary Birch – BC Hydro
Substantive comments

- P4: It might be worthwhile noting why COSEWIC recommended the species be listed as threatened; the criteria used were limited range, <10 locations, and declining abundance or a threat to the current abundance; should not the RPA document show the data support these criteria?
- P5: if inferences are the primary source of information, we believe this necessitates strong consideration of s-e consequences
- P5: When Ud coexists with Ld or Sd, are the different populations then likely to vary in life history and ecosystem niche occupied? Also if populations result from multiple occurrences of hybridization would that argue for slightly different adaptive responses? added to the fringe-range concern, the inference is that surrogates may be less useful to establish Umatilla dace conclusions across all populations.
- P6: Which sex has the longest pelvic fins? Need to state how this allows for sex differentiation to understand if reasonable for sex differentiation (or is there overlap?)
- P6: I understand that RLL did not find any nests and this sentence incorrectly suggests they did

- P6: current BCH study ToR is considering late spring to mid-summer because we believe the data for spawn timing are thin and there is a need to look across the spring and summer
- P6: I am told ageing has often relied on length frequency and not on accurate confirmable ageing structures. This should be noted before conclusions are based on age structure
- P6: so, males mature at 2 years and females at 3 years, but in the Columbia, catches are thought to consist primarily of 1 and 2 year olds; this suggests larger older fish including mature fish occupy unsampled habitats and perhaps spawning also occurs in unsampled habitat (deeper water?); also see comments re-unknown spawning habitat pg 17
- P7: Sd coexist with Ud in Kettle, see previous comment re-variation of ecosystem use when co-specifics present; does not impact Columbia population however. Do speckled dace and Leopard dace coexist? If so, then perhaps Sd occupy similar niche as Ud when in parallel situation with Ld, which would support using this surrogate
- P7: I would change to 'predation' to include interspecific interactions – cannibalism is too specific
- P7: back calculating correlates to spawning occurring in late July which is later than suggested elsewhere; seems that spawn timing is very uncertain
- P7: suggests that site may more closely approach habitat requirements, where did McPhail find this fish?
- P8: could this infer each population may have different adaptive behaviours depending on circumstances at time of hybridization, and some may be more able to maintain themselves than others?
- P8: In the Columbia, redside shiners were a dominant forage fish and likely prey species for piscivores before the arrival of walleye. Once walleye depleted the shiners, it would be logical that less abundant species such as dace would become more sought after as prey.
- P9: this section includes comments on Population Trajectory but would be nice if that were separate section on trajectories as suggested in the policy guide
- P11: This is new in the latest draft. While I agree, I have two points. First, a survey of the Pd'O needs to looks upstream into the Salmo and into the US. If the Ud found by Peden was real, it is somewhat likely to have come from upstream stream habitat. Second, estimate of abundance will require verification that cpue metrics reflect abundance which we likely cannot say wrt current measures
- P13: I am wondering about your inclusion of these three groups as one population; while its likely they hybridized as one population, they are currently separated and the Kootenay and Slocan group upstream of Brilliant dam are impacted by impoundment rather than hydrograph operations as you've suggested for the Columbia group. Different threats could argue for treatment as different groups.
- P13 This is true but it infers that the species abundance has declined in the Kootenay which is not true. BCH have a draft summary (which we will provide as soon as it is finalized) which supports declines in numbers caught between 1993 and 2001 but subsequent sampling shows an increase in catch; longnose dace show similar variations in catch. The data suggest fluctuating catch levels have occurred over time, and that the cause of declines in both species dring this time period was a common one.

RLL suggested the most likely cause of 1990s reduction was invasive walleye (RLL 1995); walleye numbers have somewhat stabilized since that time.

- P13: It appears that catches may have declined over the 1990s and have increased again in 2000s, this suggests a cause other than hydro operations; recommend looking at correlation with invasive species abundance
- P14: in light of multiple hybridization origins and different associated species as competitors (other dace) it seems likely the different groups would have behaviorally adapted differently to their habitat
- P14: I thought you'd suggested impoundment eliminates riverine habitat, which is a significant threat to Ud?
- P14:I can understand using surrogate dace species to infer life history parameters, but is there evidence that a sucker species would share life history characteristics with dace? It would seem they use different spawning locations, different ecosystem niches, etc. and so an assumed comparability should be backed with references. If GM's comment (37) below is factual, such references should be available
- P14:This statement is true, however it should be considered in light of the preliminary nature of the work. I checked with RLL staff, and they said "this is based on inference from the sample data: i.e., they caught juveniles in the shallows so interpret this to mean this was important habitat for the species and by extension, since flow reductions impacts were greatest at the time in shallow water areas, life stages that use these areas would be at higher risk of stranding. This does not, however, account for any possible avoidance or escape behaviour that reduces the susceptibility to stranding by this species". It also would not take into consideration any subsequent changes in hydrographic operations which have occurred.
- P15: and above? when I think of where Ud are found usually riffles are upstream?
- P15: RLL and Golder have caught juveniles in this type of habitat but not fry; I suspect this comes from Peden's work and if so should be appropriately referenced.
- P15: GM comment – a) a bit too verbose for a scientific statement

  b) The metaphor is actually wrong: the impressionist movement was characterized by the *accurate* depiction of light and movement – the exact opposite of the intent of the statement
- P16: I suspect some of these habitats are not important to Ud and rather more important to other fish species such as trout, whitefish, suckers, sturgeon, etc. If true then you should not infer here as important to Ud.
- P16: I checked this comment with RLL staff who pointed out that this work predates SARA and so the term "critical habitat" should NOT be used in the SARA context. "The term "critical habitat" was not used in the DFO (SARA) context; it just meant it was important for a particular species or life stage. Umatilla dace have been caught at some of the areas mentioned (e.g. both banks upstream from the oxbow to the Highway 3A bridge) but not in other areas mentioned like the large eddy at the confluence or in the oxbow channel. " While you have correctly pointed out that these "important" habitats are NOT specific to dace, reader would conclude they are. I would suggest you should remove those habitats mentioned which are not used by dace. You should also NOT infer dace spawn in these areas as RLL did not locate spawning habitat.
- P16: Because of Guy Martel's (GM) comments on the language in this paragraph, I checked with RLL staff who commented that they would not use terms like "refinements of habitat use" (they asked what does that mean?) or "Other subtleties". The paragraph

seems to be an interpretation of a variety of work but makes interpretations not addressed strictly by the data.

- P18: this is rather key to us, and I would like to see a reference. I take it the observations come partially from lab studies but since I believe consultants have not observed spawning in the Columbia, how would we know for certain?
- P18: Juveniles (less than 1 year of age but older than 6 months?)
- P18: Reference please; if juveniles are one year olds as opposed to YOY why not call them such. Juveniles to me mean fish that are not newly hatched but are younger than a year, but that would conflict with the next section. Perhaps you need to define your terms somewhere.
- P18: This conflicts with an early reference that fry and juveniles are found over silt and sand; can they have preference for both? I also checked with RLL staff and while they agree with the statement for juveniles, they stated they did not find fry. Again it may be there are different interpretations of your terms
- P19: therefore cannot meet conditions of RPA policy? no population trajectories, no time to recovery target, no recovery target themselves, you cannot structure a recovery plan when you don't have the data to indicate the degree to which the species is in trouble?
- P19: If abundance trends are the goal, then in fact sampling shoudl focus on areas of know concentrations; wider sampling would then be required to determine the patchiness of the distribution. However, neither appraoch is adequate to dela with the question of the depth of residence (and sesaonal and diel movements), location and timing of spawning, etc.
- P19: I think you mean that there is no evidence that they are territorial as you refer to guarding. This should be clearer
- P19:Residence" is ambiguous. In this case you appear to mention habitat requirements
- P23: if this is the reason, then the threats should address this and instead they are a combination of habitat loss and habitat alienation or contamination. Habitat loss is primarily related to Shanker's Bend and if that is the concern then don't suggest listing the species elsewhere will alleviate loss.
- P23: there are actually two possible threats i) loss of habitat usually resulting from impoundment (as opposed to flooding which generally happens downstream), and ii) reduction of habitat carrying capacity resulting from nonadaptive parameters resulting form things like flow changes (flooding, stranding, habitat exposure etc.), and water quality changes (T, TGP, turbidity reduction). You say that they have a wide temperature tolerance, and prefer clear water, so unless there is TGP present, water quality is not an issue. Therefore it comes down to flooding or exposure of habitat. We have not demonstrated eggs are exposed, and stranding while it occurs does not seem sufficient to affect catch, so what is expected of hydro companies? What do we have to do to eliminate the threat, and what science is this requirement based on?
- P23: since this section includes flow and water quality issues, it is redundant with the next section. as such it may be best to either discuss impoundment effects here and operational effects in the flows section, or have two subsections under Hydro development, and have a separate section on non-hydro water quality threats
- P23: Edits to table 1.

- P30: I did say this, and this is the result of Hamblin's work, but I was referring to climate change effects in the last 10-20 years, not dam effects. Hamblin's work coccured in the late 90s and I am unsure whether the effects he refered to where the result of dams, climate change or both. I have therefore removed my pers. comm.
- P30: actually if you limit yourself to what is technically feasible it is unlilkely you will meet the requirements for a RPA; you need to find spawning habitat, juvenile and older adult habitat, define seasonal and diel changes, find a suitable abundance index or even better find a means of establishing a mark-recapture database etc. It is fairly clear that electrofishing is the only effective means of sampling but as stated earlier it is only effective in shallow waters and shallow waters evidently do not represent the full range of habitat occupied. Demonstration of recovery is therefore not feasible until you have found the methods required to research the fish.
- P32: I assume you are referring to the proposed Murphy Creek IPP in 2003? probably should mention the location and briefly described what is proposed as you do below for the Cascades project.
- P35: I would suggest that simply stating that any reservoir could serve as habitat is simplifying the issue; one possible reason for variable success may be how much the reservoir fluctuates annually and the subsequent effect on shallow water habitat conditions. Ud do not appear to have been found historically in the larger lakes in the Kootenays which fluctuated a lot each year (as much as 10s of meters), and they are not found in fluctuating reservoirs today. However they do seem to be found in reservoirs without much fluctuations and in association with suitable stream habitat. All conjecture on my part, but a thought.
- P39: MdH - This is quite an old reference. Water extractions have increased substantially since then. One changes has been Trail now takes water from the river rather than a local lake where they previous collected water. You may want to contact the CWR for better information on extraction volumes
- P48: this does not make sense? I suspect you are referring to fragmentation effects of loss of access from the downstream component of the population in the US
- P52: GM - Similkameen and Kettle may be checked. No Okanagan sites, though

  GB – Kettle was not used in the study in the end, only Similkameen
- P53: Seems curious this is the only alternative considered; if you list in the lower Columbia, what alternatives would you expect? Need to know to understand socio-economic consequences; what about treatment of invasive species which are more likely a significant impact

RPA Assessment for Umatilla Dace March 15, 2011

Jordan Rosenfeld, BC Ministry of Environment

This document does a fairly good job of summarizing the available information on distribution, status, threats, and recovery potential for Umatilla Dace. Most of the interpretations of what little information is available are reasonably balanced, although in some instances there is a tendency to speculate based on limited information. Below I identify some moderate concerns followed by more detailed editorial comments.

Major points

1) Vagueness around discussion of Recovery Targets.

Section 1.8 Pg. 11 states “We believe Umatilla dace can recover.” It is not clear what this means since the next line states that recovery targets cannot be established. This makes no sense logically. Recovery targets should be, at a minimum, to maintain current distribution and abundance. Abundance targets cannot be quantitatively established with current data, but a specific target to maintain current abundance and distribution is a reasonable semi-quantitative minimum recovery target that should be achievable (as implied in the “We believe Umatilla dace can recover.” statement), since there is no compelling evidence of a current decline, and clearly a need to prevent a future one. These should be explicitly stated as baseline recovery targets, or at least set up as assumed baseline recovery targets for the purpose of discussion; greater recover targets involving re-establishment of part of the historic range may also be achievable (i.e. re-establish the Otter Creek popn).

2) Future status issues with respect to threat

There seems to be a lack of appreciation that species with small or isolated (narrowly distributed) populations will always be at risk (i.e. never be de-listable) simply because they will always be vulnerable to extinction from stochastic catastrophes. This is independent of population size. For example, it there are 5 independent populations, each of which is quite large (say 20,000 dace, each in 5km of river) they would likely remain at risk because , for example, a chemical spill in one of the rivers could conceivably eliminate an entire population (contingent on the degree of isolation and potential for natural recolonization).

3) Potential for recolonization and low flow effects

The extinction of fish from Otter Creek (and whether they have or have not recolonized) may provide some very useful information on both the sensitivity of these fish to extinction, the effects of population size and isolation on persistence, and the potential for recovery. Similarly, if other Similkameen tribs are subject to very low flows, their presence or persistence in these tribs may also provide potentially useful information on how distribution/persistence is related to low flows.

4) Pg 12, section 1.9.1 Quote: “Does the continued persistence of the species mean it is not especially sensitive to habitat changes of the kind caused by hydro development?”

This suggests that the authours are confounding persistence and sensitivity (i.e. significant changes in population density that do not lead to extinction). Persistence of populations below dams means that the taxa has not gone extinct under this perturbation. This does not mean that the species is not sensitive to habitat change. If a free-flowing river is converted to a reservoir, and populations of lotic fish drop dramatically in the flooded reach, then clearly they ARE sensitive to this habitat alteration. Whether or not they can persist (either in remaining free-flowing reaches or in reservoirs at lower densities) is a separate issue.

Along a similar line, reported collection of Umatilla dace at low levels in some reservoirs does not mean that they are “adapting to major changes in habitat” (pg. 16). Adaptation is an evolutionary or behavioural shift of some kind. Presence in reservoirs at (presumably) lower densities represents persistence in a presumably less preferred habitat (that could even be a sink), rather than adaptation. This highlights the need to be more precise in choice of words, and the need to emphasize data gaps and uncertainty. There is value in exploring the implications of uncertainty, but it is important to limit unfounded speculation.

5) Potential for future delisting based on improved distribution/abundance data

This is an important conservation/resource management issue. Objectively, if a species is indeed actually more abundant and/or widely distributed than previously thought, this is good news from a conservation perspective since it means that it is objectively less likely to be at risk of decline or extinction. However, risk is a continuum. If new information means that a species is marginally no longer at risk using COSEWIC criteria, but considerable threats remain to existing populations that could result in local decline or extinction of populations then it may

again cross the COSEWIC extinction threshold in the future, which is an outcome that resource management agencies need to try to prevent. The point being that management actions may still potentially be required to PREVENT dace from becoming at risk in the future, even if they are downgraded to Special Concern (unless new data is very clear that they are far from being anywhere near a COSEWIC listing criteria).

Minor comments:

1) Pg. 3, 3 lines from bottom – Dace are likely to be eaten by any piscivore (e.g. trout), not just pikeminnow

2) 1.2.1 The problem is a lack of quality data from standardized surveys.

3) Page 6 top. Electroshocking will underestimate abundance regardless of depth – capture efficiency for benthic fish is typically low, ~20-40% (I just pulled those numbers out of a hat. Efficiency is typically ~40% for water column fishes like salmonids).

3) 1.2.2 after "distribution and abundance" insert "collected in a reigorous and quantative fashion"

4) 1.2.2.1 First paragraph. Insert "reported by Rosenfeld (1996)". I did NOT do this study, I just wrote up the report with data that was given to me, and I had nothing to do with the data collection even as a contract monitor. For all I know it's complete garbage.

5) Pg 7 second paragraph, second sentence. Sentence is unclear. I think the point being made is that threats are more likely to impact populations through loss of habitat rather than by mortality within intact habitat. In either case populations could still be limited by available habitat. Try to clarify wording and intent.

6) 1.3 – bottom of page 7. Discussion confounds two factors that put species at risk. The first is small popn size. This will increase vulnerability to extinction from stochastic events just because the popn is closer to and extinction boundary (zero popn). The second is productivity (resilience) – a species that is highly productive and has very high juv recruitment and survival can bounce back quickly from popn reductions. But not if the population is reduced to zero by a stochastic event because the popn is already very small.

7) 1.4 end of 4th paragraph – forget about differences between shallow and deep habitat – just defining habitat use/associations in general (including the shallow/deep contrast) is a huge data gap.

8) Page 9 3rd paragraph – Inferences based on presence and use of slow water habitat in reservoirs tends to be quite speculative. Clearly the presence and abundance of dace in reservoirs is an important data gap that needs to be filled, since it has implications for population size, distribution, and persistence. However, it is not clear how abundant fish are in reservoirs, and whether these are source or sink populations, i.e. it is possible that these fish contribute minimally to the long-term persistence of the species. However, either possibility remains speculative at this stage.

9) Page 10, top paragraph. There is a "Now I say it, now I don't" issue here. First line says juvs are less bottom oriented. Last line says they have a preference for rock interstices. Clarify/reconcile this apparent inconsistency.

10) 1.4.4 Clarify meaning of "midwater". Does this mean middle of the vertical water column or centre of the channel?

11) section 1.8 Third paragraph. Is it reasonable to assume that substrate quality will continue to improve? This depends on sediment loads and sediment transport rates. Is this the opinion of a qualified geomorphologist, based on sampled substrate trends over time in the reach in question, or off-the-cuff speculation? It makes intuitive sense, but comes across as highly speculative in the absence of any hard evidence or professional opinion.

12) section 1.9.1.1 last line pg 16 – after “mortality as young fish” insert “and if juvenile recruitment is limiting the adult population,”

13) Pg. 17, second paragraph, second line. Insert “potentially” before “reducing some of the negative consequences”. This is completely speculative, and should be qualified.

24) 1.9.1.2 “The province has not applied for intervener status.” Gee, that makes me proud.

25) 1.9.4 Resource extraction. Makes me wonder what role (if any) resource extraction/placer mining/mining runoff/sedimentation etc. may have played in present low levels of dace abundance in the Similkameen (assuming they are actually anomalously low).

26) 1.12.2 Second paragraph – Black bullhead not in list of invasive species section earlier. These guys can be nasty predators, although perhaps not in faster water habitat.

APPENDIX C: AGENDA

Agenda

Recovery Potential Assessment for the
Umatilla Dace *(Rhynicthys umatilla)*
in British Columbia
Pacific Regional Science Advisory Process
March 14, 2011
Nanaimo, British Columbia
Chairperson: Sean MacConnachie

Working Paper to be reviewed:

Harvey, B. and T. Brown 2011. Recovery Potential Assessment of the Umatilla Dace (*Rhinichthys umatilla*) in British Columbia. CSAP (Centre for Science Advice Pacific) Working Paper 2011/P64. 9:00	Introductions	Sean MacConnachie
9:10	Review Agenda & Housekeeping	Sean MacConnachie
9:20	CSAS Overview & Procedures	Sean MacConnachie
9:30	Review of Terms of Reference as pertains to research document	Sean MacConnachie & RAP Participants
9: 40	Presentation of Working Paper	Brian Harvey
10:30		***Break***
10:50	Questions of Clarification	RAP Participants
11:15	Presentation of Reviews & Authors' Responses	Reviewers & Author(s)
12:00		***Lunch Break***
1:00	Discussion and Building Agreement on Conclusions, Recommendations, Advice and Future Work	RAP Participants
3:00		***Adjournment***

APPENDIX D: PARTICIPANTS

First name	Last name	Affiliation
Louise	Porto	AMEC Nelson
Gary	Birch	BC Hydro
Jon	Bisset	Canadian Columbia River Inter-tribal Fisheries Commission
Llewellyn	Matthews	Columbia Power Corporation
Tola	Coopper	DFO
Robyn	Kenyon	DFO
Raymond	Lauzier	DFO
Sean	MacConnachie	DFO
Martin	Nantel	DFO
Jake	Schweigert	DFO
Jas	Sidhu	DFO
Heather	Stalberg	DFO
Chris	Wood	DFO
Tom	Brown	DFO
Karen	Calla	DFO
Sheila	Street	Fortis BC
Brad	Wright	Fortis BC
Brian	Harvey	Fugu Fisheries Ltd.
Bill	Duncan	Teck Metals