Fisheries and Oceans Canada | Pêches et Océans Canada
Science | Sciences

C S A S | *S C C S*

Canadian Science Advisory Secretariat | **Secrétariat canadien de consultation scientifique**

Proceedings Series 2006/026 | **Série des comptes rendus 2006/026**

Allowable Harm Analysis Workshops for Freshwater Species at Risk in Central and Arctic Region

Ateliers d'évaluation des dommages acceptables pour les espèces en péril d'eau douce dans la Région du Centre et de l'Arctique

October 18-19, 2005
February 8-9, 2006
February 13-14, 2006
Burlington ON

les 18 et 19 octobre 2005
les 8 et 9 février 2006
les 13 et 14 février 2006
Burlington ON

B. Cudmore, N.E. Mandrak (chairperson), T.J. Morris and A. Edwards

B. Cudmore, N.E. Mandrak (président de réunion), T.J. Morris et A. Edwards

Fisheries and Oceans Canada / Pêches et Océans Canada
Great Lakes Laboratory for Fisheries and Aquatic Sciences /
le Laboratoire des Grands Lacs pour les pêches et les sciences aquatiques
867 Lakeshore Rd.
Burlington Ontario L7R 4A6

November 2006 | **novembre 2006**

Canada

Allowable Harm Analysis Workshops for Freshwater Species at Risk in Central and Arctic Region

October 18-19, 2005
February 8-9, 2006
February 13-14, 2006
Burlington ON

B. Cudmore, N.E. Mandrak (chairperson), T.J. Morris and A. Edwards

Ateliers d'évaluation des dommages acceptables pour les espèces en péril d'eau douce dans la Région du Centre et de l'Arctique

les 18 et 19 octobre 2005
les 8 et 9 février 2006
les 13 et 14 février 2006
Burlington ON

B. Cudmore, N.E. Mandrak (président de réunion), T.J. Morris et A. Edwards

Fisheries and Oceans Canada / Pêches et Océans Canada
Great Lakes Laboratory for Fisheries and Aquatic Sciences /
le Laboratoire des Grands Lacs pour les pêches et les sciences aquatiques
867 Lakeshore Rd.
Burlington Ontario L7R 4A6

November 2006

novembre 2006

ISSN 1701-1272 (Printed / Imprimé)

Published and available free from:
Une publication gratuite de :

Fisheries and Oceans Canada / Pêches et Océans Canada
Canadian Science Advisory Secretariat / Secrétariat canadien de consultation scientifique
200, rue Kent Street
Ottawa, Ontario
K1A 0E6

http://www.dfo-mpo.gc.ca/csas/

CSAS@DFO-MPO.GC.CA

Printed on recycled paper.
Imprimé sur papier recyclé.

Correct citation for this publication:
On doit citer cette publication comme suit :

DFO, 2006. Allowable Harm Analysis Workshops for Freshwater Species at Risk in Central and Arctic Region; October 18-19, 2005, February 8-9, 2006 and February 13-14, 2006. DFO Can. Sci. Advis. Sec. Proceed. Ser. 2006/026.

MPO, 2006. Ateliers d'évaluation des dommages acceptables pour les espèces en péril d'eau douce dans la Région du Centre et de l'Arctique; les 18 et 19 octobre 2005, les 8 et 9 février 2006 et les 13 et 14 février 2006. Secr. can. de consult. sci. du MPO, Compte rendu 2006/026.

SUMMARY

The *Species at Risk Act* (SARA) is intended to protect species at risk of extinction/extirpation in Canada, and to promote their recovery. SARA includes prohibitions on killing, harming, harassing, capturing or taking individuals of species listed as Threatened or Endangered on Schedule 1. However, persons may be issued a permit under Section 73 of SARA that exempts them from prosecution for violating prohibitions on the listed species, as long as the mortality is incidental to the pursuit of some other activity for which the permit was issued.

An allowable harm analysis will provide guidance on the level of harm that the species can withstand without jeopardizing the recovery of that species. The revised framework for conducting an allowable harm analysis (AHA) is presented in Canadian Science Advisory Secretariat (CSAS) Stock Status Report 2004/048. However, this framework was developed primarily for incidental harm related to by-catch in commercial fisheries. For the freshwater species at risk (SAR) in Central and Arctic (C+A) Region, most incidental harm is likely to take place as a result of habitat alteration and destruction. Therefore, it is necessary to develop an AHA method that can incorporate other sources of human-induced harm, and to use that methodology to conduct AHA for the SAR in C+A currently listed by SARA, and likely to be listed by SARA as Threatened or Endangered.

Three workshops were held at the Canada Centre for Inland Waters, Burlington, Ontario: 1. October 18-19, 2005 (freshwater fishes and mussels), 2. February 8-9, 2006 (freshwater fishes), 3. February 13-14, 2006 (freshwater mussels). These workshops were held to review and modify, if necessary, the proposed AHA method and the background material (i.e. the potential sources of human-induced harm for each species) required to conduct an AHA for each species.

At the first workshop, there was much discussion about when the AHA should be conducted for a species, and it was decided that a timeline needed to be developed. The AHA methodology was agreed upon and two more workshops were held in February 2006 to review the AHA for selected C+A freshwater SAR (freshwater fishes and mussels). Implementation documents, to be developed by DFO clients (e.g. Fish Habitat Management, recovery teams, permit issuers) will form part of the tools for fish habitat biologists, recovery team members and others to make decisions concerning allowable harm and C+A freshwater species at risk.

SOMMAIRE

La *Loi sur les espèces en péril* (LEP) a pour but de protéger les espèces en voie de disparition au Canada et de promouvoir leur rétablissement. La LEP stipule qu'il est interdit de tuer des individus des espèces inscrites à l'annexe 1 en tant que menacées ou en voie de disparition, de leur nuire, de les harceler, de les capturer ou de les prendre. Cependant, une personne peut se voir octroyer un permis en vertu de l'article 73 de la LEP qui l'exempte d'une poursuite pour violation des interdictions des espèces désignées, en autant que la mortalité fortuite découle de la poursuite d'activités autres pour lesquelles le permis a été émis.

Une évaluation des dommages acceptables donnera des conseils sur le niveau des dommages auquel les espèces peuvent résister sans compromettre leur rétablissement. Le cadre révisé pour la réalisation d'une évaluation des dommages acceptables fait partie du rapport sur l'état des stocks 2004/048 du Secrétariat canadien de consultation scientifique (SCCS). Cependant, ce cadre a été élaboré à l'origine pour les dommages fortuits liés aux prises accessoires des pêches commerciales. En ce qui concerne les espèces en péril dans la région du Centre et de l'Arctique, les dommages fortuits vont vraisemblablement se produire suite à la détérioration et la destruction de l'habitat. Il est donc nécessaire d'élaborer une méthode d'évaluation des dommages acceptables qui peuvent comprendre d'autres sources de dommages anthropiques, et d'utiliser cette méthodologie pour réaliser l'évaluation des dommages acceptables pour les espèces en péril dans la région du Centre et de l'Arctique présentement désignées par la LEP, et celles qui sont des espèces désignées comme étant menacées ou en voie de disparition par la LEP.

Trois ateliers ont eu lieu au Centre canadien des eaux intérieures de Burlington en Ontario : 1. Les 18 et 19 octobre 2005 (poissons et moules d'eau douce), 2. Les 8 et 9 février 2006 (poissons d'eau douce), 3. Les 13 et 14 février 2006 (moules d'eau douce). Ces ateliers ont eu lieu pour examiner et modifier, si nécessaire, la méthode d'évaluation des dommages acceptables proposée et les renseignements généraux (c.-à-d., les sources potentielles de dommages anthropiques pour chaque espèce) requis pour réaliser une évaluation des dommages acceptables pour chaque espèce.

Lors du premier atelier, il y avait beaucoup de discussion à propos du moment au cours duquel l'évaluation des dommages acceptables devait être réalisée pour une espèce, et on a décidé qu'un calendrier devait être mis au point. On a convenu d'une méthodologie de l'évaluation des dommages acceptables et deux autres ateliers ont eu lieu en février 2006 pour examiner l'évaluation des dommages acceptables pour les espèces en péril d'eau douce sélectionnées dans la région du Centre et de l'Arctique (poissons et moules d'eau douce). La mise en œuvre de ces documents, qui seront élaborés par les clients du MPO (par ex., la gestion de l'habitat du poisson, les équipes de rétablissement, les émetteurs de permis) formeront une partie des outils pour les biologistes de l'habitat du poisson, les membres de l'équipe de rétablissement et les autres personnes qui prennent des décisions à l'égard des dommages acceptables et des espèces en péril d'eau douce de la région du Centre et de l'Arctique.

INTRODUCTION

The *Species at Risk Act* (SARA) is intended to protect species at risk of extinction/extirpation in Canada, and to promote their recovery. SARA includes prohibitions on killing, harming, harassing, capturing or taking individuals of species listed as Threatened or Endangered on Schedule 1. SARA also prohibits the sale or trade of individuals of such species (or their parts), damage or destruction of their residences, or destruction of their critical habitat. A Recovery Plan (Recovery Strategy + Recovery Action Plan) must be developed for each species listed on Schedule 1 within specified timelines. Once the Recovery Plan is adopted, some activities that kill, harm, harass or capture individuals of species may be allowed if those activities are specified in the Recovery Plan (Section 83(4) of SARA). During the time between legal listing and adoption of the Recovery Plan, or if not identified in a Recovery Strategy, persons may be issued a permit under Section 73 of SARA. This permit exempts them from prosecution for violating prohibitions on the listed species, as long as the mortality is incidental to the pursuit of some other activity for which the permit was issued. The Minister of Fisheries and Oceans can only issue permits under Section 73 of SARA if the Minister is satisfied that specific preconditions have been met. These are:

• 73(3)(a) all reasonable alternatives to the activity that would reduce the impact on the species have been considered and the best solution has been adopted;

• 73(3)(b) all feasible measures will be taken to minimize the impact of the activity on the species…; and,

• 73(3)(c) the activity will not jeopardize the survival or recovery of the species.

The revised framework for conducting an allowable harm analysis (AHA) is presented in Canadian Science Advisory Secretariat (CSAS) Stock Status Report #2004/048. However, this framework was developed primarily for incidental harm related to by-catch in commercial fisheries. For the freshwater SAR in C+A Region, most incidental harm is likely to take place as a result of habitat alteration and destruction. Therefore, funding was obtained from the DFO Species at Risk Program to develop an AHA method that can incorporate other sources of human-induced harm, and to use that methodology to conduct AHA for the SAR in C+A currently listed, and likely to be listed, by SARA as Threatened or Endangered.

To ensure a sound scientific basis for the AHA method, a workshop was held at the Canada Centre for Inland Waters, Burlington, Ontario on October 18-19, 2005. The purpose of this workshop was to review and modify, if necessary, the proposed AHA method and the background material (i.e. the potential sources of human-induced harm for each species) required to conduct an AHA for each species. The proposed methodology for determining allowable harm was reviewed as a single group of all workshop participants; and review of the background information was done in two break-out groups: a fish group and a mussel group.

Participants included the workshop steering committee, invited internal and external species experts (fish and mussel biology), and representatives from DFO Fish Habitat Management (FHM) and the province of Ontario (Appendix A). Representatives from the other provinces in C+A elected to participate by commenting on the workshop documents. Information and materials provided at the workshop included background information on the species to be covered, appendices containing threats to species cited, and a proposed methodology for determining allowable harm for freshwater species at risk in C+A.

Two workshops were held separately in February 2006, one for freshwater fishes (February 8-9), and the second for freshwater mussels (February 13-14). The purpose of these workshops was to critically review the AHA for each freshwater SAR. A further review of the proposed methodology for determining allowable harm for freshwater fish SAR was also conducted, while discussions of threats by population for each species occurred at both the freshwater fish and mussel workshops. Participants at both workshops included the workshop steering committee, invited internal and external species experts, and representatives from DFO FHM and the province of Ontario (Appendix A).

The workshops are summarized in this report in three parts: 1) the first workshop in October for both freshwater fishes and mussels; 2) the February freshwater fishes workshop; and, 3) the February freshwater mussel workshop.

PART 1: AHA WORKSHOP #1 – OCTOBER 18-19, 2005

DISCUSSION OF KEY ISSUES

Background Information

- AHA & Recovery Strategies: General discussion about allowable harm and the need to conduct the analysis for activities not included as permitted activities in a SARA-approved recovery strategy. The need to address multiple threats, cumulative impacts and indirect effects was discussed. Allowable harm information would be useful to DFO's Fish Habitat Management Group, SARA permit issuers and Recovery Teams.
- AHA applies to COSEWIC-listed Endangered or Threatened species, as well as those species listed as Extirpated where they have been reintroduced. Other species included at the workshop were those likely to be listed by COSEWIC as Endangered or Threatened. It was recommended that both the Arctic cisco (*Coregonus autumnalis*) and least cisco (*Coregonus sardinella*) be removed as they are not likely to be listed as Endangered or Threatened due to their vast distribution. It would seem both species are quite healthy.

Proposed Methodology for Allowable Harm Analysis for Freshwater Species in C+A

- The proposed AHA method was presented to workshop participants. A complete description of the methodology is currently being drafted as a CSAS Research Document. Much discussion centered on the outcome of the Characteristics of Recovery Workshop held in August 2005. The resulting table defining zones of health (critical, cautious or healthy) is an adoption of a fishing mortality scheme that may not adapt easily to species at risk. Doubt was also expressed regarding the ability to meet historical recovery targets for most of the species due to large-scale changes in habitats and populations over time. It was determined that, despite little or no data, decisions will still need to be made.
- Allowable harm could mean a multitude of measures from human-induced impacts (not all habitat-related), including such metrics as productive capacity, changes within the populations (e.g. age at maturity).
- Several items within the proposed AHA method will need to be peer reviewed for each species:

⇨ Population identification, status and trajectory
⇨ Categorizing importance of a population as related to the recovery of the species as a whole in Canada (e.g. metapopulation dynamics).
⇨ Long and short term timeframes with respect to percentage of harm
⇨ Incorporation of certainty into AHA decisions

- Concerning certainty: this is very important to incorporate, but quantitative criteria are much better than qualitative criteria. However, it was noted that best or worst case scenarios need to be considered; therefore, quantitative efforts also have uncertainty built within them. Expert opinion is difficult to develop through consensus. An AHA decision should include all possible uncertainties to make the best decision (provide for the best advice) to proponents. Defining confidence intervals around a point on the AHA matrix may help incorporate uncertainty.
- References: important to include literature references and important to include closely-related species, as this is better than not having a reference at all.
- Monitoring and assessment were also raised as important feedback mechanisms to the AHA method. This need to be incorporated to decrease uncertainty and to allow for adaptive management.
- Important to keep in mind that recovery of the species is key.

Linking threats to Fish Habitat Management's Pathways of Effect

- It was decided to focus on the end points of each activity's pathways, rather than the activity itself. It is not necessarily the activity that is a threat, but the outcome of the pathway of effect from that activity.
- It was determined that expert opinion, information unknown/no information, and not applicable should be explicitly identified.
- FHM always first considers relocation, mitigation and alternatives to activities rather than first requiring an AHA.

Interfacing AHA and Fish Habitat Management

- It was decided that Science would provide guidance for FHM to develop AHA implementation documents

- Case studies may be useful for practical application of the AHA method – this is being developed for the national AHA-FHM workshop. It was recommended that case studies should be highly contrasting to force different thinking.
- Key references and thresholds would be useful for developing tools, and tables should be sent out to key experts to review, contribute to, and to fill in knowledge gaps. It was noted that the level of detail requested by FHM does not exist for most, if not all, species.
- Dealing with proponents: Science would provide best advice possible, FHM would take advice and tools to develop a strategy to deal with a specific project, but onus of proof lies on the proponent that they did not, in fact, harm the species
- All needs cannot be anticipated. Generic tools are required and information summarized for FHM to make decisions.
- Tools are required to help eliminate case by case decisions, and to streamline the methodology.

Recovery Strategies

- Can list activities that do not require an AH permit, but not all activities can, or should, be listed in a recovery strategy. To predict and incorporate all potential activities in a recovery strategy is impossible.

BREAK-OUT GROUPS:

Fishes

- Population by population (recognizing all populations) assessment is important. In some case, designatable units need to be incorporated if recognized by COSEWIC
- It was suggested that the threats to species be ranked. This information can be found in recovery strategies, in the case of an AHA being conducted prior to a recovery strategy being completed, threats need to be summarized and ranked somewhere – a synthesis document incorporating elements from the CSAS 048 report and this information would be useful for those species without a recovery strategy.

This led to a discussion on when a synthesis document should be initiated in order to be used in the Regulatory Impact Assessment Statement (RIAS) and helpful to the Minister in making decisions. An approach (a “Big Picture” methodology) was developed (Figure 1).

Month	Steps
0	Draft status report submitted to COSEWIC
2 to 4	Jurisdictional reviews of draft COSEWIC report
2 to 4	Upon completion of DFO jurisdictional review, DFO discussion of potential designation; if Threatened or Endangered, then initiate development of synthesis report as basis for AHA/RPA
6	NAP/ZAP (if held)
<12 (April)	COSEWIC designation

15	Minister's Response Statement
15	Synthesis report completed
15-27	AHA/RPA RAP/ZAP; clients develop implementation guidelines with the guidance of Science
18-30	Regulatory Impact Assessment Statement (RIAS)
24-36	Listing decision
24-36	SARA listed
36-60	Recovery strategy prepared
60	Repeat methodology based on updating COSEWIC report

FIGURE 1. Proposed approach for AHA/RPA for freshwater species at risk. Key AHA/RPA steps are shaded; other steps are related to timing of AHA/RPA steps.

- Synthesis report: incorporate detailed, up-to-date information on the species status, population status, recovery target, threat summary (ranked) and Maximum Sustainable Mortality. This would, therefore, comprise all of the known existing information and can be compared to the PoE outcomes for an AHA. This report will also greatly contribute to recovery strategy development and client implementation documents. This should help FHM streamline the decision methodology.
- However, if no resources are provided to do this, then this can't be done regardless of timelines or regulation requirements.
- Should prioritize species: AHA needs to be done for species that already have a recovery strategy in place, or in development. For the other species, we need to develop synthesis documents. SARA timelines should also be taken into account in prioritizing species.
- Implementation document – to be developed by client with the assistance of Science on how to make decisions and can outline a mechanism on how to ask for advice when challenged

<u>Mussels</u>

- The original PoE and other human-induced effects did not suit the issues surrounding allowable harm and mussels.
- General threats to mussel species should be separated from those species-specific threats.
- Species-specific material needs to be clear and presented up front.
- Threats vary in severity by watershed.
- Population threats could be "beefed up" and summarized.
- Population estimates need clear definitions regarding how the data were collected and analyzed so managers can help to ascertain the uncertainties around this information.
- Work that was determined to be done was divided among the mussel break-out group participants.

NEXT STEPS

- Revised AHA method for freshwater species in C+A to be drafted as a CSAS document
- Synthesis format finalized, to be added as an appendix to previous document
- Prioritize species list for conducting AHA and synthesis document
- Develop a couple of case studies for next workshop
- Run through the entire Science Approach at next workshop
- Discussion with FHM to develop implementation reports

PART 2: AHA WORKSHOP #2 (FISHES) – FEBRUARY 8-9, 2006

DISCUSSION OF KEY ISSUES

Recovery Targets

- There was some concern about the disconnect between the AHA process, which deals at the population level, and recovery targets (RT) which are usually determined at the species level. FHM needs information at the population level, and it was agreed that there must be a link between the two levels. It was generally agreed that the RT should be determined for the population or DU level, as a link between activities and their impacts on the species.
- For many freshwater species, there are not enough data to quantify a RT but, where possible, population RT could be identified from the Recovery Strategies (RS). There are watershed-based RS in progress that already have established RT; however, the uncertainty associated with the threats is high as they are not based on detailed analyses and have not been tested. It was asked whether or not RS, and particularly RT, are peer-reviewed by Science. It was determined that they are peer-reviewed by the Recovery Team but not by Science. The advice in C+A is to have RS peer reviewed by Science. FHM needs for sound science support (i.e. substantiated threats), for effective management was emphasized. It was stated that ranking and verification of threats will be done in the future.
- There needs to be more effective communication between Science and Recovery Teams.
- RT should be based purely on peer-reviewed science; socioeconomic factors should not be considered.
- Although RT for freshwater species may not always be possible as a result of data deficiency, Science advice is still required in the interim.
- Recovery Target Model (RTM) – a discussion arose regarding the labels on the axes and it was suggested that the RTM should be at the population level with the number of individuals on the x-axis.
- Research and monitoring are very important – 5-yr COSEWIC cycle notes any recovery; SARA conditions to require monitoring. Monitoring is the mechanism needed to assess the assumptions science is making.

AH Analysis

- During discussion of the actual AHA analysis (i.e. the last column in the Population Status table), a common question arose regarding past and compound threats and how they are to be dealt with (grandfathered activities?) It was mentioned that past threats are identified in Action Plans and can be dealt with there. Future threats linked to permitting are what is being considered here; Science can only deal with the harm at this moment [and take into] account background level threats or harms.
- Risk Matrices: the High Risk category was clarified to mean that activities that cause harm would not be allowed i.e. no permit would be issued. It was decided that the phrasing of the High Risk category should be changed to read "Any, and all, additional harm may jeopardize…"
- Discussion regarding the distribution of colours in the Risk Matrices: it was suggested that the Risk Matrices need to be connected to the threat ranks on an activity by activity basis.
- It was suggested that there was a logic error in the Risk Matrix for a healthy population – the 'unknown' scenario in the medium and low importance categories, is dealt more harshly than the worse case scenario of 'decrease'.
- Questions regarding when AH permits are issued: if there is no harm allowed or no harm will occur due to mitigation measures, then there is no harm or HADD either.
- The RPA should be done earlier when doing a synthesis document as well.
- The importance of having the AHA Science advice peer-reviewed was emphasized. Legally, if the Science advice is that harm will occur if the activity is allowed, a permit cannot be issued. This hinges on the importance and credibility of the Science advice which is provided by the peer-review process. Science can provide the likely consequences of doing or not doing the activity or harm.

Assessing the Tables within the AHA Document

- Ranked Threats Table:
  - It was decided that the probability of the threat occurring within the range of the species as well as the magnitude of the threat if it did occur, needed to be added to the Ranked Threats Table. For closely related species, it was agreed to include magnitude and probability ranks for only those threats possibly impacting the specific SAR.
  - It was determined that probability and magnitude ranks should be given for all threats, even those that can be controlled, as Science has no control over how their advice will be used.
  - The need to assess threats by population was discussed and it was agreed that a Threat by Population will be added to the AHA document, which will be completed by the species experts after the workshop.
- Pathways of Effect (PoE) Tables:
  - FHM suggested that it would be most useful to them if Science provided a ranking of the 26 unique endpoints in the PoE on a species by species basis. For each unique endpoint the magnitude, direction/sensitivity, duration and threshold, should be determined where possible, and the

source and certainty of the information should be clear. It was agreed that a new table for each species would be created with these factors added, which would be circulated and completed by species experts after the workshop.

- It was suggested that the term 'importance' in the Population Status table be changed to 'relevance', which should be decided by researchers knowledgeable of the species. The option of 'unknown' should be added to the table as well with respect to status and importance.
- The reasoning behind the certainty ranks (i.e. expert opinion, qualitative and quantitative data) needs to be expanded upon.

Definitions

- What is the definition of a population? – This was a common question posed by workshop participants and it was suggested that this be addressed on a species by species basis. Generally, the population is defined at the watershed level; however, in the case of fragmented sections of rivers, which may have limited gene flow, it could be argued that there may be multiple populations present within the watershed. However, in many cases there is not enough data to support the existence of metapopulations. The final decision was that if river fragments have a different risk level in the AHA than the watershed as a whole, it is likely that metapopulations exist and there is good cause for protecting one section more than another section in the same river.
- It was suggested that a definition of harm needed to be developed, but the feeling was that there could be thousands of interpretations of harm and that it could not be done here. It was clarified that the harm is to the population not the individual.

Extirpated Populations

- The question of whether or not to include extirpated populations in the AHA was posed: It was generally agreed that they should be included as the AHA must apply to the habitat and watershed where the species occurs, not just to the species itself. Including extirpated populations would protect important habitat towards the recovery of the species, as well as providing context for the AHA. However, it is usually difficult to say with certainty that a population is in fact extirpated. It was decided that the burden of proof must lie with the species expert; if they are confident that a population is extirpated it should be deemed extirpated but if they are not confident then the population should be deemed critical.
- If extirpated populations are to be included in the AHA then risk matrices are required for them. It was suggested that these be based on importance with the colours red, yellow and green indicating high importance, medium importance and low importance. Importance should be based on the RT (i.e. how important is this population to meeting the RT?).

PART 3: AHA WORKSHOP #2 (MUSSELS) – FEBRUARY 13-14, 2006

DISCUSSION OF KEY ISSUES

Recovery Targets

- The chair of the freshwater fishes AHA workshop noted that Recovery Targets (RT) that have already been developed by Recovery Teams should be deferred to first. It was also emphasized that the COSEWIC criteria used to list the species should be kept in mind, since these criteria will have to be addressed to de-list them as well.

Population Status Table

- Before the group conducted the AHA on individual species, it was decided that the definition and/or criteria of the terms 'status', 'trajectory', 'importance' and 'certainty' should be defined and agreed upon to ensure consistency in the AHA process.
    - *Status* – The group discussed the criteria that should be used in designating populations as Healthy, Cautious or Critical. It was suggested that to designate a population as Healthy, a high degree of certainty and good data are required; if the group is guessing at the health of the population, it should be designated as Cautious at best. How naturally fragmented populations are to be designated was discussed, since in their natural 'healthy' state they are less able to endure negative impacts compared to a species that has a more continuous distribution. It was decided that, in most cases, the criteria for designating a Critical population would be the opposite of that for a Healthy population and that a Cautious population would have combinations of Critical and Healthy criteria. A few criteria were recommended as automatic triggers for certain statuses: Demonstrated negative effects of AIS = automatic Critical; Naturally fragmented = automatic Cautious. Extirpated populations will always be deemed Critical. The criteria for assessing the health of mussel populations as determined by workshop participants are in Table 1.

Table 1: Criteria for assessing mussel population status.

Critical	Cautious	Healthy
• narrow size/age distribution (particularly if skewed towards large old individuals) • no recruitment • no hosts • severely skewed sex ratio (particularly towards males) • fragmented distribution • relatively low abundance • occupies a single/few sites • no live animals (only shells) • degraded habitat (quality, area, extent) • demonstrated effects of Aquatic Invasive Species (AIS)	• naturally small population (area or abundance) • naturally fragmented • AIS present but no demonstrated effects	• full length distribution • balanced sex ratio • recruitment • continuous non-fragmented distribution • relatively high abundance • occurs at multiple sites • good habitat (quality, area, extent) • contiguous sites • occupies historical range • healthy host population (diversity and abundance) • no evidence of AIS, pathogens, pathogens, parasites, hybridization • high genetic variability • rich or abundant mussel community

- *Trajectory* – There was a debate as to whether trajectory referred to the current or historical trajectory of the population. It was felt by some that trajectory meant the present trajectory (i.e. the population could have declined in the past to a low level but that level could now be stable as opposed to a population that is low and still declining). For mussels, it was suggested that the presence of many dead shells and few live specimens might be a good indicator of decline. Another indication might be low recruitment levels or size-class distributions skewed towards older individuals. It was stated that a lack of data on declining population size does not mean there is no other evidence of a decline. The final decision of the participants regarding trajectory was that it should reflect the best knowledge available of what is currently happening in the population, regardless of the time scale, but ensure that this information is included in the assessment (i.e. decline since

1970). In future, it is hoped that trajectory will be assessed at the 5-yr cycle of the recovery strategy.

- *Importance* – participants did not like the term 'Importance' as stated and felt that it should be defined explicitly as 'Relative Importance to the Recovery Goal'. It was suggested that using genetic information, it is possible to determine populations with high or low genetic variability and, from this, identify populations that are a high priority to maintain. It was noted that this information is not available in most cases but, when it becomes available, it can be added to the criteria that help to define the relative importance of a population. The criteria put forward and accepted for assessing relative importance of mussel populations are in Table 2.

Table 2: Criteria for assessing mussel population importance.

Relative Importance
Definition must relate to the overall recovery goal for the species Attributes • source/sink • overall genetic variability • unique characteristics (genotype, phenotype etc.) • 5 or fewer locations or severely fragmented • candidate for reintroduction (recovery habitat)

- It was noted that certainty ranks were being defined differently for mussels than for fishes. The chair of the freshwater fishes AHA workshop stated that they should be the same for both.
    - *Certainty* – certainty ranks were discussed and there was some confusion over what the ranks of 1, 2 and 3 meant. The group thought that a rank of 1 should mean best guess, 2 would be any demographic information and 3 would be a population model. However, it was originally intended that 1 represented low certainty, 2 medium certainty, and 3 high certainty. It was agreed that the more detail about the data (i.e. how it was collected), needed to be included in the document somewhere. It was suggested that certainty not be assigned a rank, and, instead, just describe the data that the decision is based on. However, it was stated that there needs to be a rank assigned to certainty. It was agreed by the group to rank certainty in the population status tables as 1 – low, 2 – medium and 3 – high, and to record details about the data and how it was collected elsewhere. The criteria for evaluating certainty developed by workshop participants are in Table 3.

Table 3: Criteria for evaluating certainty.

Low 1	Medium 2	High 3
Expert Opinion (minimal data)	CPUE quadrat-density mark-recapture	
qualitative ⟷ quantitative		
low spatial/no temporal ⟷ high spatial/ high temporal		
low effort ⟷ high effort		

- AHA for 10 mussel species was conducted by workshop participants once an agreement was reached as to the definitions and/or criteria of the above mentioned terms. No major issues were raised during this analysis.
- Directed mortality on host fishes was examined at the freshwater fishes AHA workshop held on February 8-9th. It was determined that the magnitude and likelihood of directed, or by-catch, sport or bait fisheries on the fish hosts would be low to medium, indicating that the fish experts did not feel that the host populations were in jeopardy. There is the possibility of localized effects, such as a baitfish harvester collecting directly over a mussel bed while the mussels are releasing glochidia. This many not impact the host fish population as a whole but could potentially have a larger effect on the mussel population. Potential mitigation activities were suggested:
    - Complete closure of the fishery
    - Closure during a portion of the season
    - Closure at specific locations
    - Classify hosts as illegal baitfish
    - Gear restrictions
    - Mandatory live release of host fishes
    - Outreach and education
- More information is required to determine the full impact of localized effects on mussel populations and to ensure proper mitigation measures are taken. Required information would include:
    - Site-specific host infestation rates
    - Site-specific timing of glochidial release
    - Site-specific host demographics
    - Site-specific harvest rates, gear use, collection techniques, fishing pressure

NEXT STEPS

- Finalize AHA methodology document
- Finalize AHA for 12 fish species and 10 mussel species
- For each species, complete a ‘threats by population’ table and develop new tables to rank the 26 unique PoE endpoints.

Appendix A. Workshop participants.

Participant	Agency*	October	February [F,M]
Barnucz, Jason	DFO - GLLFAS, Burlington	X	
Berman, Reva	DFO – FHM, Ottawa	X	X[F]
Casselman, Steve	Ontario Ministry of Natural Resources		X[F]
Cudmore, Becky[SC]	DFO - GLLFAS, Burlington	X	X[F]
Daniels, Marion	Ontario Ministry of Natural Resources	X	
Dextrase, Alan	Ontario Ministry of Natural Resources		X[F]
Edwards, Amy	DFO contractor	X	X[F,M]
Franzin, Bill	DFO - Freshwater Institute, Winnipeg	X	X[F]
Harvey, Harold	University of Toronto	X	X[F]
Hnytka, Fred	DFO - Freshwater Institute, Winnipeg	X	
Koops, Marten	DFO - GLLFAS, Burlington	X	X[F]
Mackie, Gerry	University of Guelph	X	X[M]
Mandrak, Nick[SC]	DFO - GLLFAS, Burlington	X	X[F,M]
Meerburg, Dave	DFO - Ottawa		X[F]
McGoldrick, Daryl	EC – National Water Research Institute		X[M]
McNichols, Kelly	University of Guelph	X	X[M]
Ming, Debbie	DFO-FHM, Ontario-Great Lakes Area	X	X[F]
Morris, Todd[SC]	DFO - GLLFAS, Burlington	X	X[F,M]
Pratt, Tom	DFO - GLLFAS, Sault Ste. Marie	X	X[F]
Randall, Bob	DFO - GLLFAS, Burlington	X	X[F]
Reid, Scott	Ontario Ministry of Natural Resources	X	X[F,M]
Reist, Jim	DFO - Freshwater Institute, Winnipeg	X	X[F]
Rose, Alwyn	DFO – FHM, Peterborough		X[M]
Schaefer, Heidi	DFO-FHM, Halifax	X	
Smith, Janice	EC - National Water Research Institute	X	X[M]
Staton, Shawn	DFO - GLLFAS, Burlington	X	X[F]
Stoneman, Mike	DFO - Environmental Science, Ottawa	X	X[F]
Stringer, Lisa	DFO – Policy, Winnipeg		X[F]
Watkinson, Doug	DFO - Freshwater Institute, Winnipeg	X	X[F]
Wilson, Chris	Ontario Ministry of Natural Resources	X	X[F]
Wright, Dennis	DFO – Freshwater Institute, Winnipeg		X[F]
Zanatta, Dave	University of Toronto/Royal Ontario Museum		X[M]

*DFO = Fisheries and Oceans Canada; GLLFAS = Great Lakes Laboratory for Fisheries and Aquatic Sciences; FHM = Fish Habitat Management

[F] denotes attendees at the February 8-9, 2006 freshwater fish workshop

[M] denotes attendees at the February 13-14, 2006 freshwater mussel workshop

[SC] denotes steering committee members