Humpback Chub Methods Review

An Independent Panel Assessment of Methods Being Used By GCDAMP and the Upper Basin Endangered Fishes Recovery Program

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Conducted as Part of Project 17 of the FY04 HBC Comprehensive Action Plan- Approved by AMWG

- Implications for FY04 Work Plan

- Implications for FY05 Budget and Work Plan

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Report of a Workshop Conducted During 6-7 November 2003 at the National Center for Ecological Analysis and Synthesis, Santa Barbara, California

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Report to the Adaptive Management Work Group, Glen Canyon Dam Adaptive Management Program

An Independent Review of Ongoing and Proposed Scientific Methods to Assess the Status & Trends of the Grand Canyon Population of the Humpback Chub (*Gila cypha*)

NCEAS

NATIONAL CENTER for ECOLOGICAL ANALYSIS and SYNTHESIS UCSB

Process

- Scope of Work Prepared By GCMRC and Provided to Kitchell
- Kitchell Invites and Organizes Panel
- Kitchell Invites Participants and Provides Written Materials to Panel
- Workshop Convened at NCEAS
- Report Submitted to AMWG (USBR)

Two Day Workshop

- First Day Devoted to Information Gathering and Clarification Opportunities for Panel Members
- Second Day Closed to Panel and Invited Observers
- Subsequent Report Developed by Panel Members

Workshop Participants

- Panel Members & Chair

- Presenters
  - Upper Basin
    - Tom Chart, USBR; Tom Czapla, USFWS, Kevin Bestgen, Colorado State University, Doug Osmundsen, USFWS
  - Grand Canyon
    - Carl Walters, University of British Columbia; Lew Coggins, GCMRC

Participants Continued...

- Discussion Participants
  - James Rice and William Pine, North Carolina State University
- Observers
  - Randy Peterson, BOR; Steve Gloss, GCMRC

Summary of Findings
(see handout)

2. Are Upper Basin methods appropriate for use in the Grand Canyon?

- The ASMR is most appropriate for the Grand Canyon work because it takes advantage of spawning aggregations in the LCR and efficiently uses the extensive data collected over a longer period of sampling there. Work in the Upper Basin is limited by the shorter time series, less extensive sampling, and the consequent constraint on providing estimates of recruitment, mortality rates, and/or trend in abundance.

Summary of Findings
(see handout)

2. Are Upper Basin methods appropriate for use in the Grand Canyon? ....

- As more data become available in the Upper Basin studies, more complex models such as the ASMR can be applied. *Upper Basin methods should not replace those currently employed in the Grand Canyon. There is no compelling scientific reason to change the basic spring sampling schedule for Grand Canyon/LCR work to a fall schedule. Doing so might create more problems than solutions.*

Summary of Findings
(see handout)

3. Are there ways to improve methods used in the Grand Canyon work?

The Panel encourages consideration of telemetry approaches to address questions about migration to and from the LCR, use of simulation studies to evaluate potential biases in ASMR population estimates, and recommends that results from well-established open population age-structured methods (Jolly-Seber models) be compared to results from the ASMR models. Similar analyses of Upper Basin closed model methods will also be informative.

Summary of Findings
(see handout)

4. Do Grand Canyon methods provide rigorous data pertinent to HBC Recovery Goals?

The ASMR method is appropriate for getting estimates of abundance, population growth rate (i.e., trend), and recruitment, if assumptions about capture probabilities are reasonable. *Upper Basin methods do not provide as much information about these three criteria because of much lower capture rates.* In both cases, the Panel recommends that emphasis be placed on estimates of population growth rate in determining if a population is to be down-listed or de-listed.

FY04 and FY05 Work Plans & Budget

Technical Work Group Has
Recommended Revised
Project 17 To Implement
Panel Findings

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As an overview, the five charges presented in the Scope of Work and the Panel's findings are paraphrased in the following[1].

1. *Are methods used in the Grand Canyon appropriate for determining status and trends of the humpback chub population there?*

The ASMR model is a variant of well-established and proven approaches. Its purpose is to reduce the bias in abundance estimates by accounting for changes in both juvenile and adult vulnerabilities to capture as adults move into or out of the LCR, and to utilize information on survival from previous tagging in estimation of capture probabilities for each year. The ASMR method accounts for those dynamics, but can be improved to remove potential biases due to additional sources of variation in capture probabilities.

2. *Are Upper Basin methods appropriate for use in the Grand Canyon?*

The ASMR is most appropriate for the Grand Canyon work because it takes advantage of spawning aggregations in the LCR and efficiently uses the extensive data collected over a longer period of sampling there. Work in the Upper Basin is limited by the shorter time series, less extensive sampling, and the consequent constraint on providing estimates of recruitment, mortality rates, and/or trend in abundance. As more data become available in the Upper Basin studies, more complex models such as the ASMR can be applied. Upper Basin methods should not replace those currently employed in the Grand Canyon. There is no compelling scientific reason to change the basic spring sampling schedule for Grand Canyon/LCR work to a fall schedule. Doing so might create more problems than solutions.

3. *Are there ways to improve methods used in the Grand Canyon work?*

The Panel encourages consideration of telemetry approaches to address questions about migration to and from the LCR, use of simulation studies to evaluate potential biases in ASMR population estimates, and recommends that results from well-established open population age-structured methods (Jolly-Seber models) be compared to results from the ASMR models. Similar analyses of Upper Basin closed model methods will also be informative.

4. *Do Grand Canyon methods provide rigorous data pertinent to HBC Recovery Goals?*

The ASMR method is appropriate for getting estimates of abundance, population growth rate (i.e., trend), and recruitment, if assumptions about capture probabilities are reasonable. Upper Basin methods do not provide as much information about these three criteria because of much lower capture rates. In both cases, the Panel recommends that emphasis be placed on estimates of population growth rate in determining if a population is to be down-listed or de-listed.

5. *Are the current methods providing scientifically rigorous data to inform decisions of the Glen Canyon Adaptive Management Program's Adaptive Management Work Group?*

Yes. Given the current constraints to work in Grand Canyon, the Panel views the basic structure of the ASMR model as the appropriate approach. Several potential enhancements in the approach should be pursued.

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[1] Copied verbatim from the final report of the HBC Independent Review Panel Report to the AMWG – Dec. 5, 2003