

## **U.S. Fish and Wildlife Service's Response to Westerns concerns over the Humpback chub 5-year Review**

This document is in response to your email dated December 12, 2012 that contained a discussion paper titled "Western Concerns with the Humpback Chub 5-year Status Review." The U.S. Fish and Wildlife Service (Service) recognizes the time and thought that Western Area Power Administration (Western) put into developing this document and appreciates the opportunity to respond to the concerns Western has identified in the 2011 5-year Review. These discussions are particularly relevant given the update on the Humpback Chub 5-year Review scheduled for the next Glen Canyon Dam Adaptive Management Technical Workgroup meeting scheduled for February 2, 2012. To address your concerns, we have reviewed our thought processes leading to the conclusions contained in the 5-year Review and expanded on our rationale as appropriate. A 5-year Review is not a full compendium of information on a species, but is intended to serve as a report card to gauge our progress to date in achieving recovery. It is, as with any Service document, subject to changes and updates provided by more current data in our attempt to provide information with the best and highest scientific integrity.

### Demographic Downlisting Criteria for Humpback chub

*Lower Basin Recovery Unit Criterion 1a/b:* The Service indicated that both these criteria were "partially met". However Western cites the 2008 Recovery Goals (which were never finalized) which suggest a recovery period beginning in 2003 due to 5 years of increasing populations. Western also notes inconsistencies with other Colorado River basin fish, particularly the Colorado pikeminnow. In regard to Criterion 1b, Western cites new information from the Nearshore Ecology study which has shown high, mainstem juvenile survival together with higher population growth in the Little Colorado River.

In making this determination of "partially met" for Criterion 1a/b, the Service felt that while the Age-Structured Mark Recapture model (ASMR) shows a clear upward trend in the Grand Canyon population since approximately 2003, there are factors with respect to humpback chub demographics throughout the occupied habitat that were still unresolved. At this time, data from recent aggregation sampling in the mainstem has shown no definitive increase or decrease in those populations away from the LCR. This is of particular importance since critical habitat for humpback chub extends nearly 181 miles in the mainstem Colorado River in Arizona, yet upwards of 90% of the population is centered in the Little Colorado River and inflow area. This disparate distribution is cause for concern given the large watershed above the Little Colorado River and the potential for catastrophic loss.

While we agree that the increases seen in the adult population is the real target, the ASMR has a 4 year lag time before which population fluctuations in adult numbers are manifested in the model output. Therefore, 2-3 years of life history failure could go unnoticed until several years later. Criteria that use a more "real-time" measure such as age-3 fish potentially provide a more responsive, "real-time" view of how the population is doing in response to different management alternatives. The ASMR is a valuable tool but has its limitations, particularly due to ageing errors and the resulting assignment of length at age. Its value is increased if these data are viewed in conjunction with more real time estimates of the age-3 fish

In the 2002 Recovery Goals with respect to the Lower Basin demographic criterion the Service wrote that “The Grand Canyon population is maintained as a core over a 5-year period, starting with the first point estimate acceptable to the Service, such that: a) the trend in adult (age 4+;  $\geq 200$  mm TL) point estimates does not decline significantly, and...”. That language directs the Service to consider all acceptable population estimates in this determination; not to limit the analysis to the most recent 5 years. Although it is not clear in the 2002 version of the HBC recovery goals what constitutes estimates acceptable to the Service, based on more recent discussions relative to the 2008 draft revisions, the Service intends to accept the ASMR estimates and has indicated so in the 5-year Review. Therefore the Service will consider the complete dataset (1989 – 2008) of population estimates in their determination of whether Criterion 1a has been met or not. Whether one looks at the slope of a trend line through those twenty consecutive population estimates or tracks Pradel’s lambda ( $\lambda$ ) the overall result would indicate a negative trajectory or trend. While the recent trend is very encouraging, the Service’s concern and determination is justifiable when the entire data record is considered.

While recent data from the Nearshore Ecology Study on juvenile survival rates in the mainstem is certainly encouraging, we advise that the area subject to project sampling was only a few kilometers and caution should be exercised in extrapolating these data riverwide. In addition, these data were not available at the time of the 5-year Review and hence were not incorporated into the review.

As part of the ongoing process to revise the 2002 Recovery Goals, all new, available information will be incorporated, and the draft recovery goals will be subject to peer and public review prior to finalization. This will include information on the distribution of humpback chub given recent translocations, and survival rates being generated from the inflow area (Nearshore Ecology Study) and the Little Colorado River above Chute Falls. In addition, we wish to refine the current minimum viable population (MVP) estimate and have received funding from the Bureau of Reclamation to derive this value using captive humpback chub at Dexter National Fish Hatchery and Technology Center. Further, we intend to review and if appropriate, revise the demographic criteria so that the distribution of the fish in the mainstem and Little Colorado River can be more accurately captured.

The Service cautions Western in applying upper Basin criteria for different fish species to criteria used in Grand Canyon for humpback chub. The reason for having definitive criteria specific to each basin is because these areas are much different with respect to management, recovery potential, and how threats are addressed. Colorado pikeminnow have some redundancy in the Upper Basin, providing more flexibility in the demographic criteria. Also as the recovery goals for pikeminnow are revised, our intention will be to include all acceptable population estimates in any future trend analysis. Grand Canyon is the largest given the high proportion of the total population found in the limited area of the Little Colorado River.

## Recovery Factor Downlisting Criteria for Humpback Chub to Minimize or Remove Threats to the Species

*Factor A, Criterion 2:* The Service indicated that this criterion had been “partially met”. Western felt that the Service’s justification for this determination was unclear given the ongoing and planned conservation projects under the 2008 Biological Opinion. Further, Western identifies a citation error in this section relevant to the incidental take statement that was remanded in September 2010.

While significant progress has been made on the conservation measures included in the 2008 Biological Opinion, uncertainty still remains about flow regimes and temperature that create “adequate spawning, nursery, and juvenile and adult habitat” per Criterion 2. While the conservation measures were designed to help answer these important questions, information to definitively resolve habitat and flow relationships for humpback chub is still largely unknown. To meet this criterion, we need to have a much better understanding of how flows and temperature regulate important habitat aspects for humpback chub. Implementation of the new 2011 Biological Opinion and the conservation measures contain therein, should further progress in this regard.

The error made regarding the incorrect citation is regrettable but does not change the outcome of this criterion determination. The correction will be made in the revision to the Recovery Goals.

*Factor C, Criterion 7:* Western requests that the Service clarify what is needed to meet this criterion.

In general, there is a poor understanding of warm water fish dynamics in the Little Colorado and mainstem Colorado Rivers. Monitoring programs used by the Grand Canyon Monitoring and Research Center (GCMRC) and others are not specifically designed to generate a comprehensive picture of warm water species but instead can only provide general trend information. Given the logistics associated with sampling difficult areas such as the mainstem Colorado River and the sampling frequency of general fisheries surveys, a sudden increase in a warm water species would largely go undetected before management efforts could be mobilized to address the issue. Further, there is no warm water sampling program in place in the Little Colorado River. Warm water species are by-catch during hoopnet monitoring aimed at sampling areas for humpback chub and other native fishes. Many warm water species such as channel catfish and carp are not susceptible to this method of capture so population levels of these species are unknown in the Little Colorado River or the Colorado River.

To meet this criterion, sampling programs should be in place to better detect rare or hard to find warm water species and implementation plans generated on how to address this should these species be found. Also a targeted sampling program in the Little Colorado River that focuses on sources of warm water nonnatives and their population levels in primary humpback chub spawning and rearing areas should be in place and providing information to answer that question before this criterion can be met.

*Factor C, Criterion 8:* Western requests what is needed to meet this criterion.

GCMRC has repeatedly indicated that reduction via mechanical removal in both brown and rainbow trout from 2003-2008 cannot be definitively linked to increases in humpback chub and other nonnative fishes. Due to a concurrent increase in river temperatures due to low reservoir levels at Lake Powell, the effects of these two factors cannot be separated. Further, there was a system-wide decrease in trout populations independent of mechanical removal efforts.

Mechanical removal of these species in cold water and without a system-wide decrease may not be feasible with projected immigration rates that may be encountered under current conditions. Therefore, this criterion is only partially met due to the uncertainty that surrounds mechanical removal and its apparent effect on humpback chub, particularly under current river conditions (high trout populations).