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October 26, 2001

CERTIFIED MAIL -
RETURN RECEIPT REQUESTED

Dr. Robert T. Muth, Director
Upper Colorado River Endangered Fish Recovery Program
ES/Colorado River/MS 65115
U.S. Fish & Wildlife Service
P.O. Box 25486
Denver Federal Center
Denver, CO 80225

Re: GCMRC Comments on U.S. Fish and Wildlife Service's Recovery Goals for the Humpback Chub (Gila Cypha) of the Colorado River Basin A Supplement and Amendment to the Humpback Chub Recovery Plan (draft dated September 7, 2001)

Dear Dr. Muth:

We support the work of Region 6 in developing the draft recovery goals for the Humpback chub and appreciate the opportunity to comment on this draft. The development of effective recovery goals for the conservation of humpback chub is a monumental task. We acknowledge the work that has gone into this first step and hope that our comments can make a positive contribution to improving the final product.

On October 8, 1996, the U.S. Secretary of the Interior signed the Record of Decision concerning the operation of Glen Canyon Dam. This action, in combination with the Grand Canyon Protection Act of 1992, established the Glen Canyon Dam Adaptive Management Program (AMP). The AMP is composed of the Secretary of the Interior's Designee, the Adaptive Management Work Group (AMWG), the Technical Work Group (TWG), the Grand Canyon Monitoring and Research Center (GCMRC), and independent review panels. The AMWG and TWG have the responsibility of recommending management objectives associated with Grand Canyon resources and making recommendations for the development of a long-term monitoring program to assess those resources. GCMRC is charged with developing and implementing long-term monitoring and research programs to obtain information needed by the AMP.

The Humpback chub (Gila cypha) is one of a suite of resources that the AMP is charged with managing. Given that the largest and only known successfully-reproducing population of Humpback chub in the lower basin of the Colorado River is within the Grand Canyon and falls under the responsibilities of the AMP, it is appropriate that GCMRC offer comments on the Draft Recovery Goals. However, it should be noted that the comments contained within the attached document are solely the views of the scientists within GCMRC and may not reflect the views of all of the AMP participants.

The comments contained within the attached document are relevant to the September 7, 2001, draft of "Recovery Goals for the Humpback Chub (Gila Cypha) of the Colorado River Basin A Supplement and Amendment to the Humpback Chub Recovery Plan" (hereafter referred to as the "recovery goals"). The attached document is organized in 2 sections: (1) general comments on the process of developing the recovery goals, and (2) specific comments on the recovery goals. Within each of these sections, our comments are numbered to facilitate any responses that are forthcoming following the review process.

Sincerely,

/s/

Dr. Barry D. Gold, Chief
Grand Canyon Monitoring and Research Center

Enclosure

(Mailed 10-26-01 to R. Muth via USPS Cert. Mail/RRR #7099 3400 0014 4880 7756
w/attachment: Comments on: The Sept. 7, 2001 Draft Recovery Goals for the Humpback Chub of the Colorado River Basin [Oct 2001, Coggins/Gloss]
cc: GCMRC Program Managers; L. Coggins)

COMMENTS ON:
THE SEPTEMBER 7, 2001 DRAFT RECOVERY GOALS FOR THE HUMPBACK CHUB (Gila Cypha) OF THE COLORADO RIVER BASIN
A Supplement and Amendment to the Humpback Chub Recovery Plan

Prepared by:

Lewis G. Coggins, Jr.
and
Steven P. Gloss

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2255 North Gemini Drive
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October 2001

I. GENERAL COMMENTS ON THE DEVELOPMENT OF THE HUMPBACK CHUB RECOVERY GOALS

Comment 1: Evaluate applicability of DPS before finalizing recovery goals.

Section 2.2 of the recovery goals deals with recovery units for the humpback chub. A primary theme of this section relates to the 1996 distinct population segment (DPS) policy of the Endangered Species Act (ESA). Although the authors correctly state that application of the DPS policy can be considered during the 5-year status reviews of listed species required by the ESA, GCMRC believes that consideration of the applicability of DPS should be completed before recovery goals are defined. This comment is driven by the recognition that if the DPS policy is deemed appropriate, the recovery goals as presently written will need extensive revision. Because of considerations related to redundant populations in the lower basin, these revisions could have significant implications to a host of interested stakeholders. We therefore believe that the prudent and most responsible course of action would be to evaluate the applicability of the DPS policy before recovery goals are finalized.

Comment 2: Submit draft recovery goals to an independent, external scientific peer-review.

In a recent article published in the journal Conservation Biology, Gerber and Schultz (2001) conclude that diversity in authorship (i.e. authors with diverse affiliations) of endangered species recovery plans significantly improves the use of biological information and thus influences the eventual success of recovery efforts. They further note that the inclusion of sound biological information in recovery plans is not only significantly related to diversity in authorship, but also to the involvement of authors that have an academic affiliation. Gerber and Schultz (2001) attribute their finding to the fact that individuals with an academic affiliation are more likely to be familiar with "state of the art theories and techniques". GCMRC notes that all 18 of the individuals listed in the recovery plan as either principal authors; U.S. Fish and Wildlife Service project liaison, coordination, and legal council; or technical assistance, are federal government employees or consultants. Of the 54 individuals listed as providing data, information, and reports, as well as reviews and comments, only 1 has affiliation with an academic institution. Therefore, of 72 individuals directly involved (i.e. not outside reviewers) in developing the recovery goals, academia represented less than 2 percent. We therefore suggest that the recovery goals and the conservation of the humpback chub, may benefit from inclusion of authors from academia in the final recovery goals document. Finally, we recommend that an independent, external scientific peer review panel should be convened to review the draft recovery goals.

Literature Cited

Gerber, L.H. and C.B. Schultz. 2001. Authorship and the use of biological information in endangered species recovery plans. Conservation Biology 15(5): 1308-1314.

Comment 3: Provide a substantive response to comments with a rational for accepting or rejecting reviewer's comments.

The September 7th draft is the most recent in a series of draft recovery goals that have been provided to GCMRC and other interested parties for comments over the past year. In general, many of the comments that have been provided to the recovery goals authors associated with the earliest drafts have been provided again and again in subsequent reviews. It is therefore difficult to escape the conclusion that the authors have been unresponsive to reviewer's comments. GCMRC is troubled by this pattern and hopes that the authors will seriously consider and respond to the comments provided in our review, as well as comments provided by other reviewers.

Comment 4: Seek consensus between Region 2 and Region 6.

Both Region 2 and Region 6 of the U.S. Fish and Wildlife Service have jurisdiction over populations of humpback chub. Region 2 has commented on all earlier drafts of the recovery goals and has continually expressed concerns regarding the general approach that the authors have taken in developing these goals, as well specific attributes of the goals (Personal Communication, USFWS-Region 2 staff). GCMRC is concerned that these goals are provided for public review without consensus within the agency that has primary authority over the management of endangered species. Until consensus is reached, we believe that the public and the many fisheries professionals who have interest in this species will greet any recovery goals with skepticism.

II. SPECIFIC COMMENTS ON THE HUMPBACK CHUB RECOVERY GOALS

Comment 5: Make explicit the reasoning and assumptions the authors are using to formulate the recovery goals.

The second paragraph under section 3.1.1 in part justifies the reason that the authors chose not to consider using population viability analyses (PVA) in the development of the recovery goals. We agree that there are significant deficiencies in the knowledge base concerning humpback chub. We further agree that a comprehensive PVA would not only be difficult to complete, but that the resulting probabilistic statements concerning persistence time could be highly biased. However, Walsh (1995) and Akckaya and Burgman (1995) argue that the real value in PVA is not the absolute estimates of persistence time, but rather the process of formalizing thoughts and assumptions about how endangered species populations might change over time. Through this exercise it is often possible to examine the trade-offs and benefits that different management actions would impose. We agree and suggest that the recovery goals could benefit greatly by formalizing and making explicit the thought processes and assumptions that the authors are using, as is apparent in the development of the recovery goals for the southern sea otter (Ralls et al. 1996). We suggest that the authors engage in a PVA, apriori, and use the results to guide their reasoning and development of the recovery goals.

Literature Cited

Akckaya, H.R. and M. Burgman. 1995. PVA in theory and practice. Conservation Biology 9(4): 705 - 707.

Ralls, K., D.P. Demaster, and J.A. Estes. 1996. Developing a criterion for delisting the Southern Sea otter under the U.S. Endangered Species Act. Conservation Biology 10(6):1528-1537

Walsh, P.D. 1995. PVA in theory and practice. Conservation Biology 9(4): 704 - 705.

Comment 6: Humpback chub populations may not contain stable numbers of adults.

The third paragraph under section 3.1.1 suggests that the data available for humpback chub are useful in making the contention that populations contain stable numbers of adults. Although we are not extremely familiar with the data from upper basin humpback chub populations, we disagree that the data from the Grand Canyon humpback chub population can be used to infer stability. Indeed, the authors provide only one population estimate from the Grand Canyon humpback chub population. How can stability be inferred from a single point? If stability cannot be inferred for the Little Colorado population, which is perhaps the most studied population with the most extensive data set, how can stability be inferred for other populations? Ongoing analyses being conducted on the Little Colorado River population of humpback chub suggest that that this population may be subject to highly variable recruitment (unpublished analyses, GCMRC). The authors themselves cite references (page 25, paragraph 3) that suggest recruitment to the Little Colorado River population of humpback chub may be strongly influenced by environmental stochasticity (e.g. flooding; Valdez and Ryel 1995, Gorman and Stone 1999). Furthermore, the authors suggest in paragraph 1 under section A.7, "Survival rate of young fish apparently varies with presently unknown environmental factors". Given that recruitment may have large variability over time, it is not logical to assume that populations contain stable numbers of adult fish. We therefore disagree with the authors' contention that stability in humpback chub populations can be assured. We further disagree with the contention stated on page 11, "… it is doubtful that environmental uncertainty will affect populations that meet genetic considerations …".

Literature Cited

Gorman, O.T. and D.M. Stone. 1999. Ecology of spawning humpback chub (Gila cypha), in the Little Colorado River near Grand Canyon, Arizona. Environmental Biology of Fishes 55: 115-133.

Valdez, R.A. and R.J. Ryel. 1995. Life history and ecology of the humpback chub (Gila cypha) in the Colorado River, Grand Canyon, Arizona. Final Report to Bureau of Reclamation, Salt Lake City, Utah. Contract No. 0-CS-40-09110. BIO/WEST Report No. TR-250-08. 286 pp.

Comment 7: Validity of population estimates used to formulate recovery goals.

Table 1 under section 3.1.2 reports: Recent preliminary (emphasis added) population estimates for adult humpback chub in six populations. We question the use of preliminary data as a basis for proposing down- and de-listing criteria for an endangered species. We conclude from the use of preliminary data that these recovery goals are premature and further analysis and interpretation is appropriate. Furthermore, the table suggests that the abundance estimate provided by Douglas and Marsh (1996) is for only adult fish within the Little Colorado River population of humpback chub. The paper by Douglas and Marsh (1996) provides population estimates for fish larger than 150 mm. Although Douglas and Marsh (1996) title their estimates as germane to adult fish, the recovery goals have defined adult fish as 4+ years of age (e.g. section 5.3.1.1.1). In the third paragraph under section A.9, the authors define the length of age-3 to age-4 fish as between 250-300 mm. This clearly demonstrates that the population estimates that the authors are using are not germane to the adult population as in their definition. Data from Little Colorado River population of humpback chub suggest that the average length of humpback chub at age-2 is approximately 140-150 mm (Valdez and Ryel 1995). Therefore, the population estimate from Douglas and Marsh (1996) is roughly germane to fish 2+ years of age.

Assuming a stable age distribution and the annual survival estimates provided in the recovery goals (paragraphs 1 and 2 under section A.7) of 0.10 for fish from age-2 to age-3 and 0.755 for fish age-3+, one finds that if the abundance estimate for fish aged 2+ is 4,508, the abundance for fish aged 4+ would be 1,006. Adding the estimates of adult abundance from the other aggregations in Grand Canyon would provide an adult abundance of 1,232. This is clearly below the minimum viable population (MVP) based on genetic grounds that the authors define. One could argue that the annual survival rate from age-2 to age-3 in the Little Colorado River is substantially higher than 0.10. However, one must increase the age-2 to age-3 annual survival rate 3 times to 0.3 in order to obtain an abundance of age 4+ fish that is larger than the MVP of 2,100 fish. We recommend that the authors: 1) re-evaluate their information sources more carefully in light of how they propose to use the information 2) carefully evaluate and clearly state which segment of the population is being estimated for each study that they reference in Table 1, and 3) correct the population estimates presented in Table 1 to reflect adult population abundance.

Literature Cited

Douglas, M.E. and P.C. Marsh. 1996. Population estimates/population movements of Gila cypha, an endangered Cyprinid fish in the Grand Canyon region of Arizona. Copeia 1996(1), pp. 15-28.

Valdez, R.A. and R.J. Ryel. 1995. Life history and ecology of the humpback chub (Gila cypha) in the Colorado River, Grand Canyon, Arizona. Final Report to Bureau of Reclamation, Salt Lake City, Utah. Contract No. 0-CS-40-09110. BIO/WEST Report No. TR-250-08. 286 pp.

Comment 8: Evaluation of suitable populations for repatriation.

Section 3.1.3 discusses the concept of redundant populations of humpback chub to buffer against catastrophic events. We agree with the authors' contention that given the geographic distribution of humpback chub populations, it is unlikely that a catastrophic event would extirpate multiple populations. However, we question the proposition that the Westwater/Black Rocks, Grand Canyon, and possibly Desolation/Gray populations are presented as equally suitable for repatriation purposes. The authors make no distinction among these populations as to their genetic purity with regard to the humpback chub genotype. However, the authors clearly state in section A.3 that there are large differences in the proportion of intergrades among the Westwater/Black Rocks, Grand Canyon, and Desolation/Gray Canyons. Additionally, Valdez and Clemmer (1982) suggested that the genetic integrity of upper basin humpback chub populations was at risk due to hybridization. Why do the recovery goals not provide greater protection for the Grand Canyon population given that it is the only known "pure" population of humpback chub? For example, it seems logical considering genetic purity that if a catastrophic event extirpated humpback chub from Grand Canyon, the species as a whole would suffer a greater loss than if the Desolation/Gray population were extirpated. We suggest that the authors consult experts in the field of fisheries genetics and fisheries conservation to evaluate whether greater protection should be afforded to populations with a lower proportion of intergrades with other Gila species.

Literature Cited

Valdez, R.A. and G.H. Clemmer. 1992. Life history and prospects for recovery of the humpback and bonytail chub. In: W.H. Miller, H.M. Tyus, and C.A. Carlson (eds.) Fishes of the upper Colorado River system: present and future. Western Division American Fisheries Society. Bethesda, MD. pp: 109-119.

Comment 9: Use of the "50/500" rule to define MVP.

Sections 3.3.1 and 3.3.2 discuss the genetic effective population size and the concept of using genetic effective population size to define minimum viable populations (MVP) based on the "50/500" rule proposed by Soulé (1980) and Franklin (1980). We agree with the authors that populations must be protected against the deleterious effects of loss of genetic variability.

However, several published papers argue against using the simplistic "50/500" rule to define MVP (Shaffer 1981, Shaffer 1987, Simberloff 1988, Boyce 1992, Caughley 1994, Noss and Cooperrider 1994, Meffe and Carroll 1997). These papers and others argue that MVP must consider all extinction risk factors: demographic, environmental, genetic, and catastrophes. The "50/500" rule considers only genetic concerns. Indeed, Lande (1995) provides an argument that when considering wild populations under the influence of natural selection, the genetic effective population size should be approximately 5000 in order to maintain normal adaptive potential. Additionally, Frakham (1995) suggests that the ratio of genetic effective population size to adult population size is on the order of 0.10 rather than 0.30 as the authors have used in the recovery goals. The authors attempt to be conservative in defining MVP by incorporating an additional 400+ individuals in addition to the minimum viable adult population size they have calculated. This correction is justified by the notion that if a catastrophe occurs, a single year class may be lost and the fact that the authors are mimicking a strategy developed for southern sea otters. We question why the authors did not consider other adjustments to account for catastrophes such as assuming multiple year classes were lost or 90% of the adult population was lost. The authors' attempt to be conservative appears arbitrary and unsubstantiated. We suggest that this is an example where the application of PVA would be useful in exploring a range of scenarios to formalize how the authors are considering the effect of catastrophic events. In summary, we are concerned that the authors have relied on outdated and incomplete science to construct the estimates of MVP that are presented in the recovery goals. The draft recovery goals will be strengthened if the authors conduct a more thorough review of the literature and incorporate all of the ideas contained in the contemporary literature in order to define MVP sizes.

Literature Cited

Boyce, M.S. 1992. Population viability analysis. Annu. Rev. Ecol. Syst. 23:481-506.

Caughley, G. 1994. Review: Directions in conservation biology. Journal of Animal Ecology 63:215-244.

Frakham, R. 1995. Effective population size/adult population size ratios in wildlife: a review. Genet. Res., Camb. 66: 95-107.

Franklin, I.R. 1980. Evolutionary change in small populations. In: M.E. Soulé and B.A. Wilcox (eds.) Conservation Biology: An evolutionary-ecological approach, Sinauer Associates, Inc. Publishers, Sunderland, Massachusetts. pp:135-149.

Lande, R. 1995. Mutation and Conservation. Conservation Biology 9(5): 782-791

Meffe, G.K. and C.R. Carroll. 1994. Principles of conservation biology. Sinauer Associates, Inc. Publishers, Sunderland, Massachusetts.

Noss, R.F. and A.Y. Cooperrider. 1994. Saving nature's legacy: Protecting and restoring biodiversity. Island Press, Washington D.C.

Shaffer, M. 1981. Minimum population sizes for species conservation. BioScience 31:131-141.

Shaffer, M. 1987. Minimum viable populations: Coping with uncertainty. In: M.E. Soulé (ed.) Viable populations for Conservation, Cambridge University Press, Cambridge, UK.

Simberloff, D. 1994. The Ecology of extinction. Acta Palaeontological Polonica 38: 159-174.

Soulé, M.E. 1980. Thresholds for survival: maintaining fitness and evolutionary potential. In: M.E. Soulé and B.A. Wilcox (eds.) Conservation Biology: An evolutionary-ecological approach, Sinauer Associates, Inc. Publishers, Sunderland, Massachusetts. pp: 151-169.

Comment 10: Monitoring timelines for ESA status changes.

Section 5.1.1 discusses demographic criteria and monitoring strategies associated with the proposed recovery process. GCMRC agrees with the authors that only through obtaining population estimates over time will it be possible to understand the dynamics of these populations, and how management actions may affect those dynamics. However, we question the timelines associated with monitoring for down- and de-listing criteria and the rationale for selecting those timelines. In the second paragraph under section 5.1.1 the authors state, " The total 8-year monitoring period is equivalent to approximately one generation time for humpback chub, and is considered sufficient to determine if populations are stable increasing, or decreasing". GCMRC questions the validity of using one-generation time to assess long-term persistence and a change in listing status. The authors provide no justification for this decision. However, Mace and Lande (1991) suggest status changes to a less protected status (e.g. endangered to threatened) should proceed extremely cautiously. They suggest that a status change should be considered only when the species was judged to meet the lower risk category for a time period equal to that spent in the higher risk category. If the authors were to use this criteria, it implies that the humpback chub would be considered for reclassification to threatened status only after they had met the criteria for threatened status for a time equal to the time that they had been listed as endangered (i.e. ~28 years).

As a compromise between what the recovery goals suggest and what Mace and Lande (1991) suggest, consider the recovery plan for the okaloosa darter (USFWS 1998). The okaloosa darter is a small percid fish with a maximum longevity of 3 years. In this recovery plan, the authors consider a 20-year monitoring period for delisting even though the generation time of this fish is less than 2 years. The selection is based on recognizing that the population dynamics of the fish is related to environmental variability (i.e. hydrologic regime), and that monitoring to insure persistence past delisting should encompass the entire range of environmental variability. Therefore, they selected 20 years since it encompassed an entire hydrologic cycle.

We suggest that the authors examine appropriate monitoring timeframes beyond the notion of one-generation time and that they provide the rationale for whatever timeframe they propose.

Literature Cited

Mace, G.M. and R. Lande. 1990. Assessing extinction threats: toward a reevaluation of IUCN threatened species categories. Conservation Biology 5(2): 148-157.

U.S. Fish and Wildlife Service. 1998. Okaloosa darter (Etheostoma okaloosae) recovery plan (revised). Atlanta, Georgia. 40 pp.

Comment 11: Required level of accuracy and precision in population estimates.

The third paragraph under section 5.1.1 discusses methodology to obtain population abundance estimates. While the recovery goals provide significant detail about the overall methodology that will be employed to obtain population estimates, the document is vague about required levels of accuracy and precision. We suggest that the recovery goals should provide the quantitative criteria that will be used to define "acceptable estimates" so that the level of rigor in the detection of trend can be assessed. The authors may obtain guidance in defining these criteria by reviewing other finalized recovery plans (e.g. USFWS 1998, Ralls et al. 1995)

Literature Cited

Ralls, K., D.P. Demaster, and J.A. Estes. 1996. Developing a criterion for delisting the Southern Sea otter under the U.S. Endangered Species Act. Conservation Biology 10(6): 1528-1537.

U.S. Fish and Wildlife Service. 1998. Okaloosa darter (Etheostoma okaloosae) recovery plan (revised). Atlanta, Georgia. 40 pp.

Comment 12: Justification for criteria associated with down- and de-listing.

Sections 5.3.1 and 5.3.2 identify the specific criteria needed to achieve down- and de-listing. Under factors A-E of these sections, we note that the tasks to achieve down-listing to threatened status differ from those to achieve de-listing. Specifically, it is sufficient to evaluate the "Effects and feasibility… " of a temperature control device to down-list (Factor A: section 5.3.1.2.2.3), but the temperature control device must be implemented, if appropriate, to achieve de-listing (Factor A: section 5.3.2.2.2.3). We note that it is sufficient to identify actions that might be required to minimize overutilization to down-list (Factor B: section 5.3.1.2.1.2 and section 5.3.1.2.2.4), but these actions must be attained in order to de-list (Factor B: section 5.3.2.2.1.2 and section 5.3.2.2.2.4). It is sufficient to identify levels of Asian Tapeworm control needed in the Little Colorado River to down-list (Factor C: section 5.3.1.2.2.5), but it is necessary to attain some level of control over Asian Tapeworm in order to de-list. The remainder of the down- and de-list criteria are similar. Although it is reasonable to suggest that down-listing criteria need not be as stringent as de-listing criteria, the authors provide no rationale for the differences. We suggest that it is essential that the authors clearly describe the process by which they reached these distinctions.

We further suggest that the authors consider the work of Abbitt and Scott (2001) to assist them in developing down- and de-listing criteria for the items under Factors B-E and for the temperature control device under Factor A. Using meta-analysis, Abbitt and Scott (2001) looked at the differences between declining and recovering endangered species and found a significant relationship between the number of recovery management actions completed and the likelihood that a species was recovering. This suggests that if management is given the resources to improve conditions for endangered species, they will recover. However, they also show that the types of threats faced by the humpback chub (i.e. habitat alterations associated with dams and nonindigenous predators) were associated with a greater percentage of declining species than other threats (e.g. pollution, overexploitation). This finding suggests that down-listing criteria associated with threat Factors B-E and Factor A (as above) should be as stringent as de-listing criteria.

Literature Cited

Abbitt, R.J.F. and J.M. Scott. 2001. Examining differences between recovered and declining species. Conservation Biology 15(5): 1274-1284.