

**Glen Canyon Dam Adaptive Management Work Group**  
**Agenda Item Information**  
**August 24-25, 2010**

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Agenda Item

Grand Canyon National Park Native Fish Restoration Plan Update

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Action Requested

✓ Information item only.

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Presenter

This item will be presented as informational write-up only with no presentation. However, time will be set aside for questions with regard to this item as well as other informational write-ups.

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Previous Action Taken

N/A

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Relevant Science

- ✓ The following describes the relevant research or monitoring on this subject:
- Coggins, L. G. 2008. Active adaptive management for native fish conservation in the Grand Canyon: implementation and evaluation. Ph.D. Dissertation, University of Florida, Gainesville, Florida.
- Coggins, L. G. and M. E. Andersen. 2008. The natal origins of rainbow trout in Grand Canyon: a lines of evidence review. PowerPoint presentation to the GCD AMP TWG.
- Glen Canyon Dam Adaptive Management Program. 2009. Draft comprehensive plan for the management and conservation of humpback chub (*Gila cypha*) in the Lower Colorado River Basin. Prepared by the Glen Canyon Adaptive Management Program Technical Work Group Humpback Chub Comprehensive Plan Ad Hoc Group, July 10, 2009.
- Gloss, S. P., J. E. Lovich, and T. S. Melis. 2005. The state of the Colorado River ecosystem in Grand Canyon: U. S. Geological Survey Circular 1282. 220 pages.
- Grand Canyon Wildlands Council and SWCA, Inc. 2006. Humpback chub translocations in Grand Canyon: feasibility, and experimental design, final report. Prepared for the National Park Service, Grand Canyon National Park. 30 pages.
- Hilwig, K. 2010. Nonnative fish data review. PowerPoint presentation to the 2010 GCDAMP nonnative fish workshop. Phoenix, Arizona, March 30-31, 2010.
- Hilwig, K. D., M. E. Andersen, L. G. Coggins. 2010. Nonnative fish in Grand Canyon – summary of nonnative fish control options and recommended monitoring and research activities. U.S. Geological Survey, draft planning document. 112 pages.
- Minckley, W. L., and P. C. Marsh. 2009. Inland fishes of the greater southwest: chronicle of a vanishing biota. The University of Arizona Press, Tucson, Arizona. 426 pages.
- Marsh, P. C., and M. E. Douglas. 1997. Predation by introduced fishes on endangered humpback chub and other native species in the Little Colorado River, Arizona. Transactions of the American Fisheries Society 126: 343-346.

## Grand Canyon National Park Native Fish Restoration Plan, continued

- Meffe, G. K. 1984. Effects of biotic disturbance on coexistence of predator-prey fish species. *Ecology* 65(5): 1525-1534.
- National Park Service. 2006. Management Policies 2006. United States Department of the Interior, Washington, D. C. 170 pages.
- Speas, D., and M. Trammell. 2009. Razorback sucker habitat and options for repatriation experiments in lower Grand Canyon and the Lake Mead inflow area. PowerPoint presentation, May 1, 2009.
- Stone, D. M., D. R. Van Haverbeke, D. L. Ward, and T. A. Hunt. 2007. Dispersal of nonnative fishes and parasites in the intermittent Little Colorado River, Arizona. *The Southwestern Naturalist* 52(1): 130-137.
- U.S. Fish and Wildlife Service. 2007. Final biological opinion for the proposed adoption of Colorado River interim guidelines for lower basin shortages and coordinated operations of Lake Powell and Lake Mead. Consultation number 22410-2006-F-U.S. Fish and Wildlife Service, Phoenix, Arizona. 84 pages.
- U.S. Fish and Wildlife Service. 2008. Final biological opinion for the operation of Glen Canyon Dam. U.S. Fish and Wildlife Service, Phoenix, Arizona. 88 pages.
- U.S. Fish and Wildlife Service. 2009. Supplement to the 2008 final biological opinion for the operation of Glen Canyon Dam. U.S. Fish and Wildlife Service, Phoenix, Arizona. 147 pages.
- Valdez, R. 2008. Life history and ecology of fish in the Grand Canyon area of the Colorado River, with emphasis on temperature requirements to evaluate a selective withdrawal structure for Glen Canyon Dam. Report prepared for Bureau of Reclamation, Upper Colorado Region, Salt Lake City, Utah. 164 pages.
- Valdez, R.A., and Speas, D.W. *In review*. An assessment of risks and benefits to fish from a selective withdrawal structure on Glen Canyon Dam: report to Bureau of Reclamation, Salt Lake City, January, 2009.
- Valdez, R., S. W. Carothers, M. E. Douglis, M. Douglas, R. J. Ryel, K. R. Bestgen, D. L. Wegner. 2000. Research and implementation plan for establishing a second population of humpback chub in Grand Canyon. Report prepared for Grand Canyon Monitoring and Research Center, U.S. DOI, Flagstaff, Arizona. 56 pages, plus appendix.
- Voichick, N., and S. A. Wright. 2007. Water-temperature data for the Colorado River and tributaries between Glen Canyon Dam and Spencer Canyon, northern Arizona, 1988-2005: U. S. Geological Survey Data Series 251. 24 pages.
- Webb, R. H., T. S. Melis, and R. A. Valdez. 2002. Observations of environmental change in Grand Canyon, Arizona. U. S. G. S. Water-Resources Investigations Report 02-4080. Tucson, Arizona. 33 pages.
- Yard, M. D., L. G. Coggins, and C. V. Baxter. 2008. Foraging ecology of nonnative trout in the Colorado River, Grand Canyon: predation on native fishes and the effects of turbidity. U.S. Geological Survey, PowerPoint presentation to the Glen Canyon Dam Adaptive Management Program, Technical Work Group, June 16-17, 2008.

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### Background Information

#### **Summary:**

The National Park Service has initiated the development of a non-native control and native fish restoration implementation plan for the Colorado River (with the exception of the areas covered by the BOR current EA and program for the Little Colorado River and the Marble Canyon Reach) and associated tributaries within Grand Canyon National Park, and Glen Canyon and Lake Mead

National Recreation Areas, downstream of Glen Canyon Dam to the inflow of Lake Mead. The Bureau of Reclamation (BOR), Arizona Game and Fish Department (AGFD), U.S. Fish and Wildlife Service (USFWS), Indian tribes, anglers, and other stakeholders have been involved in the development of management objectives and implementation tools. A recent (July 7-9) workshop was well attended by a diverse group of stakeholders where implementation actions were brainstormed and ranked by the workshop attendees. The implementation plan will comply with the requirements of the Grand Canyon Protection Act of 1992, National Park Service Organic Act and Management Policies (2006), and conservation measures implemented as part of relevant recent NEPA actions (USFWS 2007, 2008)

### **Background**

The NPS Organic Act, the Redwoods act, legislation pertinent to GRCA and NPS Management Policies direct superintendents to reestablish natural functions and processes in parks unless otherwise directed by Congress, which may include the removal of exotic species and restoration of native plants and animals. In addition, Grand Canyon Protection Act of 1992 called for Glen Canyon Dam operations to mitigate adverse impacts to Grand Canyon National Park and Glen Canyon National Recreation Area to “improve the values” for which the two park units were established, including the natural and cultural resources and visitor use.

### **Purpose and Need**

The development, prioritization, and implementation of short- and long-term management actions by the NPS and conservation measures (USFWS Biological Opinions 2007, 2008, 2009) are needed to help restore native aquatic systems and reduce the threat of non-native fish to native species, while being sensitive to the beliefs, values, and concerns of tribes and stakeholders. Native fish restoration management activities will be considered in context with other resources and values (e.g., wilderness values, water quality, wildlife, and recreation needs).

The primary purpose of this effort is to clarify management goals for fish communities, and to develop and prioritize a comprehensive list of fisheries management actions to restore and enhance, to the extent feasible, native aquatic communities to all waters within Grand Canyon National Park. This effort conforms to the NPS Organic Act of 1916, which mandates Grand Canyon National Park to conserve resources found within the Park to avoid impairment. In addition, NPS Management Policies directs superintendents to reestablish natural functions and processes in parks unless otherwise directed by Congress, which may include the removal of exotic species and restoration of native plants and animals. As a result of several human-caused factors, including the introduction of non-native fish species and Glen Canyon Dam construction and operations, several native species have been extirpated or reduced in number and distribution. Best available science indicates that non-native rainbow and brown trout have been found to selectively prey upon juvenile endangered humpback chub and other native species (GCMRC unpublished data, Yard et al. 2008 TWG). Sustainable solutions to native species management are needed for Grand Canyon National Park.

### **Scope**

For the purposes of this plan, restoration goals and objectives will be developed for fish species within Grand Canyon National Park. The restoration of populations of other aquatic species, such as amphibians, are not the focus of this plan, however in some cases native amphibians may benefit from management activities meant to achieve native fish restoration objectives. Invertebrate aquatic

nuisance species (ANS) will be addressed separately, but activities to prevent introductions or spread of ANS through public education or outreach efforts will be implemented.

### **Management Goals**

Management goals for native fisheries in Grand Canyon were developed to achieve a “natural condition,” or the condition of resources that would occur in the absence of human dominance over the landscape (NPS Management Policies 2006). In general, native fish communities and naturally functioning ecosystem processes will be restored to the extent feasible. Goals and objectives defined herein are meant to meet or exceed those previously identified within the Glen Canyon Dam Adaptive Management Program. The overall goals of the plan will include:

- Restore populations of native fish to a level that approximates natural conditions, and prevent adverse modification to their habitat (including critical habitat for ESA-listed species).
- Restore self-sustaining populations of extirpated fish species, including Colorado pikeminnow (*Ptychocheilus lucius*), razorback sucker (*Xyrauchen texanus*), bonytail (*Gila elegans*), and roundtail chub (*Gila robusta*), to the extent feasible within Grand Canyon National Park.
- Minimize the impacts of the recreational trout fishery in the Lees Ferry reach to downstream native fisheries in Grand Canyon National Park.

### **Objectives**

Specific objectives and priorities for native fish restoration in each tributary watershed or tributary inflow reach, and the Colorado River will be refined through the plan development process. A list of management tools that will be used to reach specific objectives will be developed through the Native Fish Restoration Working Group. Objectives and management actions will be consistent with the BOR EA under development with AMP and stakeholder input.

Several assumptions were considered when developing objectives:

- Site-specific restoration objectives for tributaries will be determined based on physical habitat requirements of native species and existing conditions within each tributary. For example, cold temperatures in Tapeats Creek will likely limit humpback chub reintroduction efforts there (Valdez et al. 2000).
- Recreational fisheries will not be promoted for nonnative fish species, nor managed for, however harvest of non-native fish through angling by the public will be encouraged.
- Additional surveys and feasibility studies may be required to develop objectives for many of the tributaries in the long-term (>5 years). Sufficient information exists to develop objectives and management actions for several tributaries to be implemented in the next 5 years or less, described below.
- Priorities were based on the importance of a tributary or mainstem reach in supporting native species, sources of non-native species, threats to endangered species, and potential for native species’ restoration in a particular river reach or tributary.
- A collaborative, watershed approach with outside landowners and land managers will be necessary to meet objectives for watersheds that expand beyond the boundaries of Grand Canyon National Park.
- Measurable indicators will be established for success monitoring through the workgroup process.

## Grand Canyon National Park Native Fish Restoration Plan, continued

- Source control and introduction prevention will be a key component of the plan. Public outreach and education efforts will be central to this effort.
- Ideally, all non-native aquatic species would be removed from Grand Canyon National Park, and their sources controlled, however it is recognized that this objective is unrealistic and infeasible. Nevertheless, sustainable solutions to restoration are preferred over continuous active management options (e.g., annual mechanical removal using electro-fishing), which may be appropriate and feasible in some tributaries.
- The native species restoration plan will use existing documents as foundations for which specific management actions will be developed, including:
  - Comprehensive Plan for the Management and Conservation of Humpback Chub (*Gila cypha*) in the Lower Colorado River Basin (GCDAMP TWG, 2009),
  - Draft Nonnative Fish in Grand Canyon – Summary of Nonnative Fish Control Options and Recommended Monitoring and Research Activities (Hilwig et al. 2010).
  - Biological Opinions for the Operation of Glen Canyon Dam (USFWS 2008, supplement 2009)
  - Biological Opinion for Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead (USFWS 2007)
  - Active adaptive management for native fish conservation in Grand Canyon: implementation and evaluation (Coggins 2008).
  - Extensive scientific literature is available from throughout the Colorado River basin to be synthesized in support of plan development as well

### **Native Fish Working Group Affiliations/Members**

Grand Canyon National Park (Lead) – Brian Healy/Steve Mietz/Martha Hahn/Rick Ernenwein  
National Park Service – Melissa Trammell/Chris Hughes/Mark Anderson/Kent Turner/Norm Henderson

Bureau of Reclamation – Dave Speas/Marianne Crawford

Bureau of Indian Affairs – Amy Heuslein

U.S. Fish and Wildlife Service – Sam Spiller/Pam Sponholtz/Randy VanHaverbeke

GCMRC – Kara Hilwig/Matthew Andersen/Bill Persons

AGFD – Bill Stewart/Andy Makinster

Zuni – Kurt Dongoske

Navajo – Curtis Yazzie

Hopi – Mike Yeatts

Hualapai – Kerry Christensen/Annette Morgan

Federation of Fly Fishers – John Jordan

Grand Canyon Wildlands Council – Emily Omana/Larry Stevens

Colorado Water Conservation Board – Ted Kowalski