

### **Case Study Description:** (From Runge et al. 2011<sup>1</sup>)

The Glen Canyon Dam is located on the Colorado River in Arizona, USA, upstream of Grand Canyon National Park and is managed by the Bureau of Reclamation (Reclamation). The Glen Canyon Dam Adaptive Management Program GCDAMP was established in 1997 to provide input to Reclamation and the DOI on the effects to the downstream ecosystem resulting from the dam.

In the 2008 Biological Opinion on Reclamation's proposed experimental dam operations for Glen Canyon Dam, the U.S. Fish and Wildlife Service (Service) found that the actions may affect humpback chub. As part of this Biological Opinion, the Service included nonnative fish control as a conservation measure, to address the threat to humpback chub posed by rainbow trout and brown trout. Mechanical removal of trout at the confluence of the Colorado River and Little Colorado River (LCR) was experimentally implemented in 2003–06, and was shown to be effective at controlling trout populations. An increase in humpback chub adult abundance was observed over the same period of time, but the causal connection is in dispute.

Several Native American Tribes (the Pueblo of Zuni, Hopi Tribe, Navajo Nation, Hualapi Tribe) raised serious concerns about the lethal removal of thousands of fish from the treatment reach, an area sacred to the Tribes and fundamental to their religious beliefs and ceremonies. In response to this concern, Reclamation decided to forego planned mechanical removal in 2010 and initiated a National Environmental Protection Act (NEPA) process that would use an Environmental Assessment (EA) to evaluate alternative methods for non-native fish control.

There are a number of cooperating agencies and Tribes interested in this EA process. Reclamation is responsible for operation of Glen Canyon Dam and is the decision-making agency for this non-native fish control EA. The Service is responsible for administering the Endangered Species Act (ESA), including recovery of the humpback chub; and the Fish and Wildlife Coordination Act for conservation of fish and wildlife resources. The National Park Service (NPS) administers both the Grand Canyon National Park (GCNP) and the Glen Canyon National Recreation Area (GCNRA), and is responsible for trust resources and public recreation in those areas. The Bureau of Indian Affairs (BIA) has a trust responsibility to the Tribes. The Western Area Power Administration (WAPA) is responsible for marketing and delivery of power generated by the dam. The Arizona Game and Fish Department (AZGF) regulates sport fishing statewide, including rainbow trout in the Lees Ferry tailwaters reach and rainbow and brown trout throughout the Canyon. The USGS Grand Canyon Monitoring and Research Center is responsible for scientific investigations that provide information to the GCDAMP about the status of key resources of the river below the dam, as well as ecosystem modeling that serves to help guide monitoring and experimental design decisions.

The problems related to non-native fish control are multi-faceted and complex. One problem is the many competing objectives within and among agencies and Tribes. Other problems are that all the management options have not been clearly defined and the ecological science about the effects of potential management alternatives on the natural resources is uncertain. Also there is uncertainty about the effects of potential management alternatives on cultural resources.

The Assistant Secretary of the Interior for Water and Science, in a letter to the Adaptive Management Working Group dated September 17, 2010, asked that Reclamation undertake a Structured Decision Making (SDM) process to evaluate options for non-native fish control, as an additional means by which the cooperating agencies and Tribes could submit their input to Reclamation as it prepares its EA.

*Other information:* The Reclamation (decision maker) and is conducting a one-time decision and requests for a single alternative to be identified. The alternative will be conducted for 5 years.

<sup>1</sup> Runge, M. C., Bean, E., Smith, D., & Kokos, S. (2011). *Non-native fish control below Glen Canyon Dam-Report from a structured decision-making project* (No. 2011-1012). US Geological Survey.