Long-term effects of dam removal on aquatic biodiversity of the Colorado River

Michael E. Douglas, Ph.D.
Conservation Genetics, Biodiversity and Molecular Ecology, Department of Fishery and Wildlife Biology, Colorado State University, Fort Collins, CO

Marlis R. Douglas, Ph.D.
Conservation Genetics, Biodiversity and Molecular Ecology, Department of Fishery and Wildlife Biology, Colorado State University, Fort Collins, CO

Abstract. Glen Canyon Dam, authorized by the Colorado River Storage Project Act of 1956, was designed to store and deliver water according to dictates of the 1922 Colorado River Compact. While secondary dam functions (i.e., enhancement of recreation and the downstream environment; production of hydroelectric power; entrapment of sediment) were also identified, its ultimate "raison d'etre" was political. Regardless of motivation, the dam has inexorably changed downstream ecosystems. Cladophora, Gammarus, and new phyto- and zooplankton communities have made the silt-free river biologically more productive. Its regulated flows have allowed the riparian plant community to flourish, and have secondarily increased/ diversified insect, avian, and terrestrial animal communities. While reservoir and tailwater fisheries have also burgeoned, endemic fishes have not, and now balance on extinction. Most mitigation in the Colorado River (and in Grand Canyon) hinges upon restoration of endemic fishes now federally listed as endangered.

Following removal of Glen Canyon Dam, most components of the aquatic ecosystem in the upper- and mid-reaches of Grand Canyon will revert over time to a less productive and diverse pre-dam state. Those in the lower Grand Canyon will remain modified due to upstream influences of Lake Mead. Trout and other cold-adapted exotic fishes will be lost, but warm-water exotics will not. The fish community will thus remain a composite, and it is questionable if those endemics listed as endangered will ever fully recover.