

The Grand Canyon Comprehensive Fish Management Plan:

A Grand Compromise Between Indigenous and Invasive Fish Species

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The Grand Canyon Comprehensive Fish Management Plan (CFMP) mostly aims to satisfy two conflicting interests: Maintain the world-class rainbow trout fishery near Lee's Ferry, and restore the populations of native fish species in Grand Canyon National Park. Because invasive trout are well established on the river and prey heavily on native fish, management efforts under the CFMP are largely focused on reducing trout populations and promoting the expansion of native species.

Prior to the CFMP, several agencies and programs were responsible for fish management in the Grand Canyon section of the Colorado River. This arrangement worked, but was a hodgepodge of uncoordinated plans and resulted in poor communication between decision makers. Grand Canyon National Park wanted a unified plan, and the CFMP took over in 2013 by consolidating all the different programs that were already in effect. Before implementation, the plan was open to public input and received around 90 submissions from anglers, guides, tribes, state and federal agencies, and others, most of whom were in support of the management decisions.

Surprisingly, rainbow trout have posed few management problems. This species naturally tends to stay upstream near Lee's Ferry, outside of the park, near the dam in the Glen Canyon National Recreation Area (NRA). The major concern of the trout is their predation on young humpback chub, especially near their main spawning grounds at the confluence of the Little Colorado River. To investigate this issue, scientists tagged thousands of rainbow trout over three years to track their movements. They found that fewer than 1% ever ventured further than 20 km downstream from Lee's Ferry, much less than the 125 km distance to the Little Colorado River. Therefore, they present much less of a problem than originally anticipated.

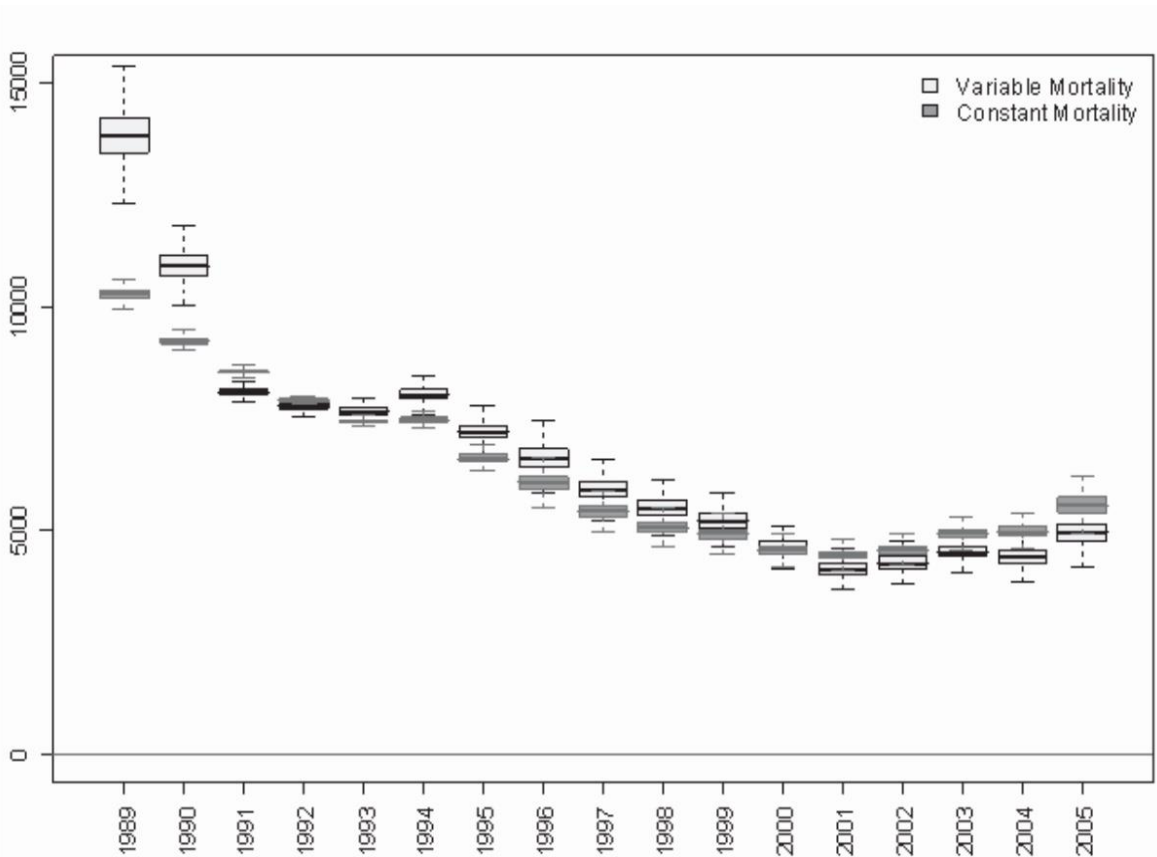
Restocking of sterile rainbow trout is also permitted under the CFMP in the Glen Canyon NRA to support the sport fishing industry should the population decline. Though the population has remained stable and this has not been required.

Brown trout, on the other hand, have required extensive management intervention. They have spread out over much of the river and are major predators of young humpback chub. To combat this, the CFMP calls for "mechanical removal" of brown trout, mostly near Bright Angel Creek. This process involves passing an electric current through the river that stuns nearby fish and allows for their easy capture. The plan requires that the fish are put to beneficial use, so they are usually given to tribes, fed to wildlife in recovery centers, or are ground up and returned to the river.

The humpback chub is one of several endangered species of native fish inhabiting the Grand Canyon, with the largest of six remaining populations living near the confluence of the Little Colorado River. Prior to the CFMP, populations of humpback chub had been

in steady decline since the 1980's, and multiple populations had disappeared entirely by 2014. Fortunately, early management efforts to reduce trout populations and unusually warmer waters on the river helped spur the first upticks in humpback chub populations sometime around 2003 (Fig. 1). Humpback chub are given significant (almost luxurious) spawning support under the CFMP. Biologists fly into the canyon via helicopter to capture young humpback chub and bring them back to labs where they are kept over the winter. Here, they are treated for parasites, reared to larger—more difficult to eat—sizes, and are finally flown back in to repopulate sparsely inhabited tributaries on the Colorado River. This strategy has resulted in the successful reintroduction of humpback chub at Havasu Creek.

Figure 1: Population size of humpback chub through the years. Note the slow population growth starting in the early 2000's.



Managers are also currently studying how to reestablish the populations of other native fish. For instance, the razorback sucker was thought to have been extirpated from the Grand Canyon in the mid 1990's, but five fish were captured in 2012, and larvae have been found in the river from 2014 onward. Tagged fish later showed that adult razorback suckers migrate up the Grand Canyon from Lake Mead, but because no juveniles have been found, something has been preventing them from surviving past their early growth stages. Future studies are needed to identify the cause of this and to decide what action to take. The Colorado pikeminnow was also extirpated from the Grand Canyon years ago, but is currently being considered for reintroduction. Though because it is a natural predator of humpback chub, an ecological study is needed to determine the potential impacts of its reintroduction.

Sustaining both the recreational trout fishery at Lee's Ferry and the native fish populations of the Grand Canyon has proven challenging, but management decisions made under the CFMP have proven largely successful. Continued monitoring will allow for refinements in the current management strategies, and shows promise for the reintroduction of extirpated species in the future.