Bonytail and Razorback Sucker in the Colorado River Basin

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Bonytail (*Gila elegans*) and razorback sucker (*Xyrauchen texanus*) are large river fish found only in western North America's Colorado River basin. The bonytail is nearly extinct and the razorback sucker is becoming rare.

The bonytail (Fig. 1) is a large, streamlined minnow (family Cyprinidae) that may reach 50 cm (18 in) in length and weigh up to 0.5 kg (1 lb). The razorback sucker (Catostomidae; Fig. 2) may grow to 75 cm (2.5 ft) in length and weigh up to 5 kg (10 lb). Both species have evolved a unique dorsal keel or hump, a characteristic shared by few other fish. Individual life spans approach 50 years.

Historically, both species were common and were used by Native Americans and early settlers as food and fertilizer. Physical and biological changes to their habitat and direct competition and predation from non-native fishes are responsible for their decline. Young fish no longer survive to replace adults as they die of old age.

Status

Information about these fish is found in sources ranging from scattered personal journals of early travelers to more recent biological reports and scientific literature. Bonytail and razorback sucker were first described by scientists in the late 1850's. Comprehensive studies were not conducted in the lower Colorado River until 1930, while similar investigations upstream were delayed until the 1960's because the area is rugged and remote.

Dill (1941) reported an alarming decline of endemic fish in the lower river; Miller et al. (1982) reported similar trends farther upstream. Three years after the 1973 passage of the Endangered Species Act, the Colorado River

Fishes Recovery Team was formed. The Colorado River Fishery Project was established in 1978 to recover threatened and endangered fish in 965 km (600 mi) of the upper Colorado and Green rivers. Recovery efforts intensified in 1987 with the Recovery Implementation Program. These and other projects have funded major research on the biology and habitat needs of these species.

Bonytails were historically common in the mainstem Colorado, Green, Gunnison, Yampa, Gila, and Salt rivers before the construction of large dams. Bonytail became rare in the lower river system by 1935 and suffered similar declines farther upstream by the mid-1960's. The last confirmed bonytail taken from any river was in 1985. Bonytail continue to be captured in low numbers from Lake Mohave in Arizona and Nevada, a reservoir on the Colorado River downstream of Hoover Dam.

Razorback suckers were historically common to abundant in the Colorado mainstem and portions of the Green, San Juan, Animas, Duchesne, Gila, Salt, and Verde rivers. Razorback suckers also had begun declining in the lower river by 1935, but were commercially harvested near Grand Junction, Colorado, and Phoenix, Arizona, until 1950. Numbers dramatically declined in the upper Colorado River during the 1970's and 1980's, and today the fish is very rare. The largest river population is in the Green River, Utah, and is estimated (1993) at fewer than 500 adults.

Large populations of razorback sucker developed in some newly created reservoirs in the lower river before fish predators became abundant. For example, populations that numbered into the hundreds of thousands became established in the Salton Sea, Roosevelt Lake, Saguaro Lake, Lake Havasu, Lake Mead, Lake Mohave, and Senator Wash Reservoir. Predation by non-native fishes eventually proved overwhelming, and, without recruitment (addition of individuals to a population through reproduction and immigration), populations disappeared after 40 to 50 years.

Razorback suckers are now rare except in Lake Mohave, which supports the last large population. Spawning is successful there, but as was true at older reservoirs, young razorback suckers are eaten by sunfish, bass, and other fish. The reservoir population declined by 60% between 1988 (59,500) and 1991 (23,300). Remaining suckers are expected to die by the end of the decade.

It is unlikely that the bonytail and razorback will survive in the wild. No measurable recruitment is evident in any part of the drainage and old individuals are reaching the end of their life span. Bonytail are found in less than 2% of their former range, and razorback sucker in less than 25% of their former range (Fig. 3).

Reasons for Decline

The Colorado River ecosystem has been dramatically altered by water development that transformed an erratic and turbulent river system into a series of calm reservoirs and channelized river reaches. Eight dams were built across the lower 563 km (350 mi) of the river by 1950. The historical habitat of these fish is now controlled by 44 large dams and is being drained by hundreds of miles of diversion canals. Nursery areas, critical for early life stages, have been flooded by reservoirs, and upstream migration is physically blocked by dams. Seasonally warm and turbid flows of the natural hydrology of the basin were replaced by cold, diminished reservoir releases governed by hydroelectric and downstream water demands.

Although physical habitat changes have been dramatic, subtle ecological changes may have been even more damaging. Reservoirs and cold tailwaters presented favorable conditions to develop recreational fisheries. Although the bonytail and razorback sucker were once valuable food sources, they became viewed as trash fish when more desirable sportfish (e.g., trout, catfish, and bass) became established. Resource agencies stocked and promoted recreational fisheries, often at the expense of native fishes. For example, in 1962, 723 km (450 mi) of the upper Green River was poisoned to improve trout production. Today, over 90% of all fish found in the river system are species introduced for recreational fishing. Uncounted other aquatic plants and animals, pathogens, parasites, and

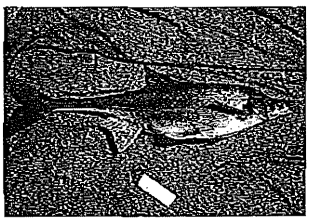

Fig. 1. Bonytail (*Gila elegans*).

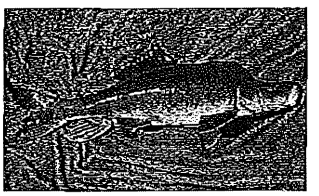

Fig. 2. Razorback sucker (*Xyrauchen texanus*).

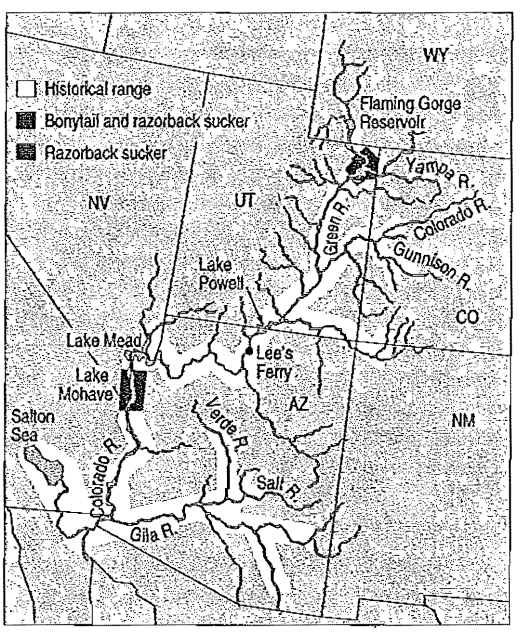

Fig. 3. Historical range and current concentrations of bonytail and razorback sucker (Minckley and Deacon 1991).

chemical contaminants were introduced and have changed the river's delicate ecosystem.

The dramatic decline prompted the listing of the bonytail as endangered in 1980, and a similar listing for the razorback sucker followed in 1991. Although both fishes are federally protected and recovery programs began over 15 years ago, these species continue to edge toward extinction. The problem lies in the complexity of the environmental and legal issues, combined with possible conflicts in land-, water-, and fishery-management philosophies. Controversy and debate have slowed, stalled, and complicated recovery effort. While sociopolitical issues of recovery are debated, old relict populations are not being aggressively protected through management and they continue to die off.

Recovery and Management

The goal of recovery is to reestablish species or enhance their ability to maintain self-perpetuating populations in native habitat, which may require both physical and biological habitat restoration. Many scientists believe recovery of bonytail and razorback sucker will take an aggressive and long-term commitment. Recovery efforts in the upper river are being intensified to restore adequate spring flows and develop nursery habitat. Stocking of bonytail and razorback sucker is being postponed until these habitat changes are made, and guidelines for stocking recreational species and possibly reducing their populations are being negotiated. Whether these actions will be sufficient to recover these fish is unknown.

While bonytail and razorback sucker are not being stocked in the upstream recovery program, they are being stocked farther downstream. A 10-year stocking program reintroduced razorback sucker into Arizona streams, but although nearly 15 million razorbacks were stocked between 1981 and 1990, the effort failed because most small suckers were believed to have been eaten by catfish and other non-native fishes. This emphasizes the need for predator removal or the stocking of larger fish.

Removal of non-native species is virtually impossible and sometimes undesirable. Larger bonytails and razorback suckers are being stocked by the Native Fish Work Group to attempt to maintain the Lake Mohave population by replacing the old population with young adults that exhibit the genetic characteristics of the remnant population. Bonytail and razorback suckers are being raised in isolated coves where other fish have been removed. Fish grow to about 30 cm (12 in) in length in a year and are then released into the reservoir. At this size, many should escape predation and could potentially survive 40 to 50 years.

Stocking is not an alternative to recovery, but if done properly, it can be used to maintain, expand, or reestablish long-lived endangered fish populations. Lake Mohave is not pristine habitat; however, maintenance of its population can help preserve genetic diversity, enhance species diversity in the reservoir, help ensure against catastrophic loss of hatchery brood stocks, and provide opportunities to study these fish in the wild.

Aggressive management of remaining populations is essential to provide the time to complete and test habitat restoration programs. If remnant populations are not saved, we stand to lose important pieces of a very complex ecological puzzle.

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