

RECENT CHANGES IN THE FISH FAUNA OF THE SAN JOAQUIN RIVER SYSTEM

Peter B. Moyle
University of California
Davis, California

Abstract. A survey was made of the distribution and ecology of the fishes in the San Joaquin River system from 1969 to 1971. The survey showed that native fishes were becoming increasingly restricted in their distributions. Although none of the species studied are currently rare or endangered, the need for further survey work and for managing some streams for native nongame fishes is clearly indicated.

It is becoming increasingly evident that management of California's inland fisheries has to include consideration for native nongame fishes, even those that are presently considered to have no or negative value to the sports fishery. The immediate reason for this is the increasing public concern for endangered species and habitats. There is also the increasing realization among fishery biologists that competition between game and nongame fishes may not be as severe as once thought and that game and nongame fishes may actually interact in ways that benefit game fish populations. Thus, proper management of a body of water depends on knowing what nongame species are present and what the status of each species is over its entire range. However, information on the distribution, ecology and status of most native nongame fishes, abundant and rare, is very limited. Unless this lack of information is rectified, a number of native species and subspecies may quietly become extinct or very rare, such as has happened repeatedly in the past. This process is well illustrated by the changes in fish distribution that have taken place in the San Joaquin River system.

The San Joaquin River and its tributaries are part of the Sacramento-San Joaquin system, which dominates central California. Seventy-five percent of the native fish species are endemic (Miller 1958). Rutter (1908) surveyed the San Joaquin system in 1897 and 1898, and found native fishes to be common everywhere. During 1969, 1970 and 1971, Robert Nichols, a graduate student at California State University, Fresno, and I surveyed much of the system

Table 1. Present status of native nonanadromous fishes in the San Joaquin River system, exclusive of the Kern River system. C = common, CR = common but more widespread formerly; P = present but status uncertain; O = absent but formerly present; E = extinct.

Species	Foothills	Valley floor	Delta ¹
Petromyzontidae			
Brook lampreys, <u>Lampetra</u> spp.	P	P	P
Salmonidae			
Rainbow trout, <u>Salmo gairdneri</u>	C	-	-
Cyprinidae			
Sacramento blackfish, <u>Orthodon microlepidotus</u>	-	P	P
Hardhead, <u>Mylopharodon conocephalus</u>	CR	O	O
Hitch, <u>Lavinia exilicauda</u>	CR	P	P
Sacramento squawfish <u>Ptychocheilus grandis</u>	CR		
Sacramento tui chub, <u>Gila bicolor formosa</u>	E	E	E
Thicktail chub, <u>Gila crassicauda</u>	E	E	E
Splittail, <u>Pogonichthys macrolepidotus</u>	O	P	P
California roach, <u>Aesoperoleucus symmetricus</u>	CR	O	-
Speckled dace, <u>Rhinichthys osculus</u>	O	-	-
Catostomidae			
Sacramento sucker, <u>Catostomus occidentalis</u>	C	P	P
Embiotocidae			
Tule perch, <u>Hysterocarpus traski</u>	O	O	CR
Centrarchidae			
Sacramento perch, <u>Archoplites interruptus</u>	O ²	O	O
Cottidae			
Prickly sculpin, <u>Cottus asper</u>	CR	P	C
Riffle sculpin, <u>Cottus gulosus</u>	CR	-	-
Gasterosteidae			
Threespine stickleback, <u>Gasterosteus aculeatus</u>	C	C	C

¹Based on Turner and Kelley, 1966.

²Sacramento perch have been introduced into farmponds in the San Joaquin system but are absent from natural waters.

Table 2. Fishes present in the San Joaquin River at Friant during 1898, 1934, 1940-41 and 1970. (?) indicates the species was not recorded but probably present; (X) the species was present; and (-) the species was absent. Names followed by (*) are introduced species.

Species	Rutter 1898	Needham and Hanson 1934	Dill 1940-41	Moyle and Nichols 1970
Pacific lamprey, <u>Lampetra tridentata</u>	?	?	X	X
Pacific brook lamprey, <u>L. pacifica</u>	?	?	X	X
Rainbow trout, <u>Salmo gairdneri</u>	?	X	X	X
Brown trout, <u>S. trutta*</u>	-	X	X	X
Chinook salmon, <u>Oncorhynchus tshawytscha</u>	X	X	X	-
Sacramento blackfish, <u>Orthodon microlepidotus</u>	?	X	X	-
Hitch, <u>Lavinia exilicauda</u>	X	X	X	-
Hardhead, <u>Mylopharodon conocephalus</u>	X	X	X	-
Splittail, <u>Pogonichthys macrolepidotus</u>	X	-	-	-
California roach, <u>Hesperoleucus symmetricus</u>	X	X	X	-
Sacramento squawfish, <u>Ptychocheilus grandis</u>	X	X	X	-
Carp, <u>Cyprinus carpio*</u>	-	X	X	X
Sacramento sucker, <u>Catostomus occidentalis</u>	X	X	X	X
Brown bullhead, <u>Ictalurus nebulosus*</u>	-	-	X	X
Mosquitofish, <u>Gambusia affinis*</u>	-	-	X	X
Tule perch, <u>Hysterocarpus traski</u>	X	X	X	-
Prickly sculpin, <u>Cottus asper</u>	?	?	X	X
Threespine stickleback, <u>Gasterosteus aculeatus</u>	X	X	X	X
Green sunfish, <u>Lepomis cyanellus*</u>	-	-	X	X
Bluegill, <u>L. macrochirus*</u>	-	X	X	X
Smallmouth bass, <u>Micropterus dolomieu*</u>	-	X	X	-
Largemouth bass, <u>M. salmoides*</u>	-	-	X	X
Percent native species	100	77	62	40

again, while gathering data on the ecological requirements of each species (Moyle and Nichols, In Press). We found that the native fishes were generally rather restricted in their distribution in the foothills (Moyle and Nichols, MS) and absent or rare from the Valley floor, although a number of species are maintaining populations in the Sacramento-San Joaquin Delta (Turner and Kelley 1966). The populations of all the native fishes have declined since Rutter's survey (Table 1). As the native fishes disappear, they are replaced by introduced species. This is well demonstrated by the changes that have taken place in the fish fauna in the San Joaquin River at Friant, Fresno County, just below Friant Dam which was completed in 1942 (Table 2). There an aquatic community once dominated by native cyprinids and anadromous salmon has been replaced by one dominated by planted trout immediately below the dam and one dominated by carp and centrarchids further downstream. Some of the species once found here (tule perch, splittail) are now confined to the Delta, while others (hardhead, California roach) are confined to isolated sections of foothill streams.

The decline of the native fishes has been caused by a combination of habitat alteration, such as creation of reservoirs in the foothills and the draining of lakes on the valley floor, changes in water quality and distribution, and the introduction of other fish species. Native fishes are now found primarily in undisturbed sections of foothill streams, a few reservoirs, and in the Delta. There is little reason to doubt that the rapid decline of the native fish populations have experienced since 1898 is continuing, since the "development" of the water and land resources of the San Joaquin Valley is proceeding at an accelerated pace. Similar declines of native fish populations are undoubtedly going on in other river systems in California as well. Thus it is obvious that (1) surveys are badly needed in all systems to determine the status of the native fishes, and (2) eventually some streams in each river system will have to be managed as much for the native nongame fishes as for game species.

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