Conservation Corner

Fish Introductions to California

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We are fortunate to live in an area of abundant and varied sport fishing opportunities. Our fresh water fishing venues include the Delta, many miles of rivers, high mountain lakes and streams, and numerous impoundments offering both warm water and cold water fishing. The richness and variety of our sport fishing opportunities are all the more remarkable because, with the exception of salmonids, the inland sport fish we value are not native to California; indeed, they are not even native to watersheds west of the continental divide. Had it not been for fish introductions sport fishing opportunities for the inland angler would be very limited.

With the exception of Florida, no other state has more introduced species than California. From 1871 through 1996, more than 90 species of nonindigenous fish have been planted in or gained access to the waters of California. The introduced species most familiar to us are: striped bass, American shad, fishes in the sunfish family that include the black basses and blue gill, catfish, many of our forage fish such as threadfin shad and golden shiner, and trout including brook trout, brown trout, and lake trout. One salmon species, the kokanee salmon, a land locked subspecies of the red salmon was also introduced.

The dominant species native to California were: seagoing (anadromous) and resident salmonids, fish of the minnow family (e.g. squawfish and pike minnows) and several species of sculpins. There was one native species of the sunfish family, the Sacramento perch, once widely distributed in the Sacramento-San Joaquin system but it could not compete with the introduced sunfish species and is now limited to Crowley Lake and other artificial impoundments.

Most of the fish introductions were made in the late 19th century. The earliest formal introduction was in 1871 when 10,000 American shad from the Hudson River were released in the Sacramento River near Tehama. Less than two years later the first adult shad was taken in California. Following the success of the American shad introduction, 135 striped bass from New Jersey were released in the Carquinez Strait in 1879. Both the striped bass and the American shad are anadromous fish. Possibly the most popular of the resident introduced warm water species are the black basses, smallmouth and largemouth. In 1874 less than 100 black bass, thought to be smallmouth, from Vermont were planted in the Napa River and Alameda creek. Catfish introduction records are confusing as to what species were first introduced but the first catfish introduction into California is reported to be in 1874. With all introduced species, additional fish were released into California waters over the years to bolster the initial plants.

Early fish culturists were fascinated with the idea of introducing fish from east of the continental divide into California and overall these introductions were successful and beneficial. There have been some harmful introductions, most recently when northern pike were illegally introduced into Frenchman Lake and Lake Davis requiring extraordinary and costly efforts to eradicate them. The interesting point here is that in 1891 there was an unsuccessful attempt to introduce pike into California by the U.S. Fish Commission.

One of the most controversial fish introduced into California is the white bass, a smaller non-anadromous "cousin" to the striped bass. White bass from Nebraska were introduced

into Lake Nacimiento in 1965 by the California Department of Fish and Game (CDFG). This lake was selected because it had no connection with the Sacramento-San Joaquin system and therefore the fish would not pose a threat to striped bass and salmon. However, in 1977 it was verified that white bass had been illegally introduced into Lake Kaweah, a reservoir in Tulare County. Record rainfall in 1982-83 filled the reservoir and white bass escaped into the Tulare Basin where a large population developed. Eventually farmers pumped water from the Tulare Basin to the Kings River to reclaim agricultural land, thereby creating an eminent danger of having white bass escape into the Delta. The CDFG responded with one of the largest rotenone treatments ever conducted in the United States. After an expenditure of $7.5 million dollars for barrier construction, rotenone poisoning, and law enforcement, white bass was eliminated from Lake Kaweah and the Tulare Basin. However the threat that white bass will escape into the Delta remains in that white bass still exist in Lake Nacimiento and a reproducing population has developed in Pine Flat Reservoir in Fresno County.

Recently striped bass and black bass have been blamed by water interests for the reductions of Delta smelt and Chinook salmon. While it is true that striped bass and black bass do prey on these protected species, past records clearly show that robust populations of salmon and Delta smelt once thrived in the Delta alongside striped bass and black bass. The culprit is clearly the over-drafting of Delta water. The same records that show the compatibility of these introduced species with salmon and smelt also show a clear correlation with Delta outflows and fish survival. Specifically, low Delta outflows result in low survival of Delta smelt and salmon.

The source for the above information on fish introductions is California Department of Fish and Game Fish Bulletin 178, **History and Status of Introduced Fishes in California, 1871 – 1996** by William A. Dill and Almo J. Cordone