

FOSSIL FISHES OF THE ANZA BORREGO REGION

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Fossil marine invertebrates of the Imperial Group are well documented. Except for the record of *Carcharocles megalodon* (large extinct great white shark) by Hanna (1926), little is known of the fossil fishes of the Imperial Group. Recent collecting by paleontologists from Anza Borrego Desert State Park and the San Diego Natural History Museum has yielded new records.

Based on the presence of fossil corals and sea urchins, the Latrania Formation in the basal portion of the Imperial Group was probably deposited in clear marine waters of ancestral Gulf of California on the western edge of the Salton Trough. The age of this rock unit is thought to be 5 to 7 million years in age. In addition to the record of *Carcharocles megalodon*, teeth from *Odontaspis* sp. (sand tiger shark), *Isurus cf. I. oxyrinchus* (shortfin mako), and *Myliobatis* sp. (bat stingray) have been recovered. Today, in the western hemisphere, there are two species of *Odontaspis* sp. In the western Atlantic Ocean there is *Odontaspis taurus* (sand tiger shark) and in the eastern Pacific and other areas, *Odontaspis ferox* (ragged tooth shark). The lingual surface of the teeth of these sharks is smooth. On the other hand, the fossil *Odontaspis* sp. has fine striations from the root to the tip of the tooth and probably represents an extinct species. Also numerous teeth of Balistidae (triggerfish family) and dentary of *Semicossyphus* sp. (sheepshead) were recovered. Today, there are at least 3 species of triggerfish in the Gulf of California. Also, a single symphyseal tooth of a great barracuda (*Sphyræna*) was recovered.

From the overlying Deguynos Formation, there are records of *Carcharodon* sp. (white shark), *Odontaspis* sp., *Carcharhinus* sp. (large requiem shark) and *Myliobatis* sp. from the Yuha Member. Based on biostratigraphy and paleo magnetics, the Deguynos Formation ranges from 4.0 to 5.3 million years in age and its base the muddy sediments chronicle the Colorado River entering the Salton Trough and building its delta. Geologists interpreted rocks of the Yuha Member to represent a delta front with oyster beds.

At least three species of freshwater fish occur in the Pliocene and Pleistocene deposits of Palm Springs Group. This rock unit represents sediments of the Colorado River delta and locally derived basin fluvial and lacustrine deposits. Based on an ash date and paleo magnetic samples, the age of the Palm Springs Group ranges from .9 to 4 million years in age. From the Diablo Formation one of the more interesting fossil freshwater fish records is that of *Xyrauchen texanus* (razorback sucker) in the family Catostomidae (suckers). A nearly complete fossil razorback sucker skeleton was collected by Ruth Coyle in mid 1970's on the north side of the San Felipe Hills. The Diablo Formation rocks are roughly 2-4 million years old and according to Hoetker and Gobalet (1999), the San Felipe Hills *Xyrauchen* is indistinguishable from the modern *X. texanus*. Other younger occurrences

of this species in the Palm Spring Formation consist mainly of isolated bones and vertebrae. The present-day razorback is one of the largest member of the sucker family (Catostomidae) and in the Colorado River reached lengths up to three feet. The numbers of this fish and other native species in the Colorado River drainage have been greatly reduced by water reclamation dams and the introduction of exotic game fishes.

Another fossil freshwater fish recorded from the Palm Spring Formation is that of the modern pike minnow, *Ptychocheilus lucius*, (formerly called squawfish). In the Colorado River, the pike minnow is one of the largest member of the family Cyprinidae (chubs) reaching length up to 5 feet. Fossils of *Ptychocheilus* are rare and consist of isolated vertebrae. Age estimates based on stratigraphic occurrence place the age of the earliest occurrence of pike minnow remains at about one million years. This is the first fossil record of this species.

From isolated pharyngeal teeth and vertebrae, a second cyprinid fish was identified as *Gila* sp (chub). Today, there are three species of *Gila* (*elegans*, *cypha*, and *robusta*) in the Colorado River drainage. Until more diagnostic elements of this genus are found, identification of these fish remains will be only to the generic level. The earliest occurrence of *Gila* remains in Anza-Borrego sediments is about one million years. This is the first fossil record of the genus *Gila* sp.