



Tidewater Gobies at Rodeo Lagoon

Importance: *Rodeo Lagoon in the Golden Gate National Recreation Area is one of the few places where the endangered tidewater goby is still found.*

The endangered tidewater goby (*Eucyclogobius newberryi*) is a small (2 inch) fish that only lives in coastal California. Gobies are bottom-dwelling, and prefer the sandy shallows of slightly brackish coastal lagoons, estuaries, and marshes—including Rodeo Lagoon in the Golden Gate National Recreation Area.



Tidewater goby (*Eucyclogobius newberryi*)

During the 1900s, gobies disappeared from about half of the places where they were once found.

While there were many reasons for this decline, the primary causes were loss of habitat caused by water diversion and development, changes in water quality, introduced predators, and drought.

Monitoring Program: *Annual sampling of gobies at Rodeo Lagoon gives park biologists an idea of how many fish there are and the quality of their habitat.*

The tidewater goby has not been very well studied and many questions remain about the role it plays in the coastal ecosystems where it lives. To help answer some of these questions, National Park Service staff and volunteers have been monitoring tidewater gobies and other lagoon-dwelling fish every year since 1995. Samples are taken at three shallow, near-shore areas in Rodeo Lagoon to see how many gobies there are, what kind of habitat they prefer within the lagoon, the condition of that habitat, and what other fish live there with them.

Key Findings: *Tidewater gobies are the most common type of fish in Rodeo Lagoon.*

Only three kinds of fish are normally found in Rodeo Lagoon: prickly sculpin (*Cottus asper*), threespine stickleback (*Gasterosteus aculeatus*), and tidewater goby. In 2005, the 9314 gobies captured accounted for 99 percent of all the fish sampled—the highest number ever found at this site.



Prickly sculpin (*Cottus asper*)



Threespine stickleback (*Gasterosteus aculeatus*)

There are wide annual variations in goby abundance (Figure 1). Park biologists are analyzing data collected through this monitoring program to try to understand what drives these fluctuations.

Gobies are most often found in shallow areas close to shore near underwater vegetation. Unlike many other species of fish, they thrive in areas where there is little water circulation from tides and currents, and can tolerate a fairly wide range of water depth, salinity, temperature, and dissolved oxygen. These unique characteristics allow them to occupy areas where other fish may not be able to live.

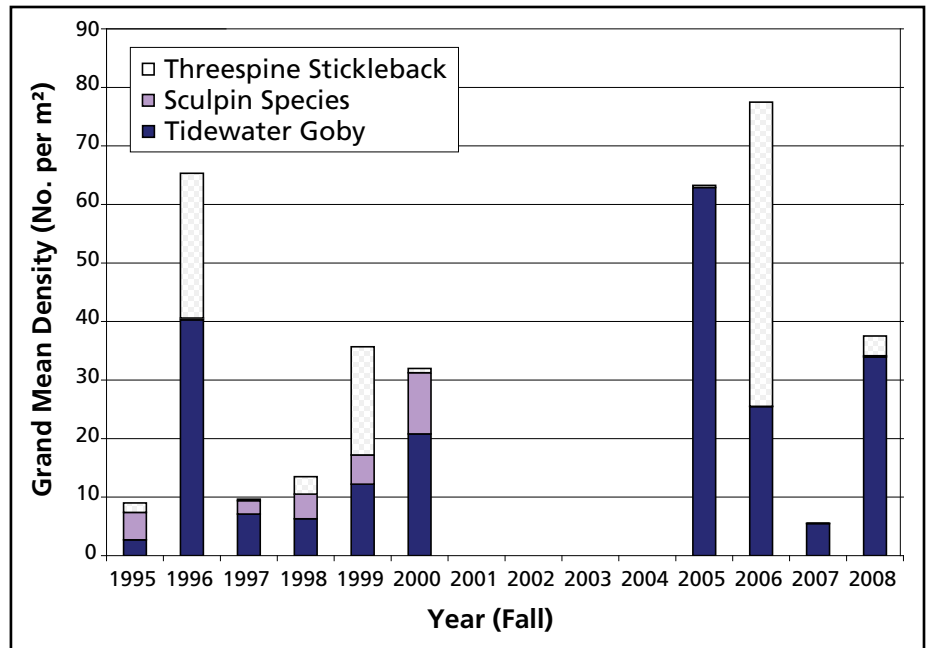


Figure 1. Density of tidewater gobies and other fish in Rodeo Lagoon 1995-2008



An algae bloom in 2005 dramatically reduced the amount of oxygen in Rodeo Lagoon

The water in Rodeo Lagoon was severely depleted of oxygen at the time of the 2005 survey (photo, left), and had been that way for some time. Biologists suspect that the reason there were so many more gobies than any other fish species that year is because of their greater tolerance for low dissolved oxygen. A similar pattern has been seen in the lagoon in the past.

Also in 2005, for the first time a substantial number of gobies had internal parasites called microsporidians in their muscle tissues. Park biologists have observed infected fish swimming erratically; however, questions about how the parasite got to the lagoon and its effect on the long-term health of the tidewater goby population remain unanswered.

Additional Resources:

To learn more about the tidewater goby see the U.S. Fish and Wildlife Service Species Profile <http://ecos.fws.gov> (enter “tidewater goby” where it says “Search for an endangered species by name”).

McGourty, K. R., et al. 2007. A new microsporidian infecting the musculature of the endangered tidewater goby (gobiidae). *The Journal of Parasitology* 93(3): 655–660.

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