Geoduck

History of the Fishery

The geoduck clam (*Panope generosa*) fishery is entirely a sport fishery in California. Geoduck clams are the largest burrowing clam in the world and also the deepest-dwelling clam in California. The geoduck is an important sport and commercial species in Washington state and British Columbia. It is considered uncommon throughout California but is found in Humboldt Bay, Bodega Bay, Tomales Bay, and Drakes Estero. In the past, Bolinas Lagoon and Morro Bay had beds of geoducks which supported a sport fishery; however, geoduck and other clam species have declined significantly in abundance in these locations over the past decade.

Very few clammers in California take a sport limit of geoducks. Their rarity in most California bays and estuaries usually causes them to be taken incidently when clamming for gaper clams. As with gaper clams, they are often located on the mudflats by the streams of water they shoot several feet into the air. They differ from the gaper clams by not having chitinous flaps or pads at the siphon tip, no fringing tentacles on the inner edge of each siphon, and are a light brown in color. Clammers can check undisturbed clams by their siphons at the surface for this feature. The bulk of the geoduck population is subtidal which makes it harder to locate a geoduck. Only the lowest tides provide the chance of encountering many geoducks. In Tomales Bay, less than one percent of the catch consists of geoducks; about one out of three hundred clammers takes a geoduck while clamming in this location.

Geoducks can reach a weight of 10 pounds or more. Because of their size, a limit of three clams is considered an adequate bag limit throughout the state. Geoducks are one of the finest food clams in California. They are highly esteemed for their fine flavor and large size and are considered a trophy clam to sport diggers.

Skiffs are generally used to transport clammers to intertidal areas where these clams live buried in sandy mud at depths of four feet or greater. Lengths of PVC pipe or metal tubes, approximately 12 to 15 inches in diameter and about three feet in length, are needed to shore up the sides of the deep holes required to take these clams.

Geoduck clams may be ground for use in fritters or clam chowder, or pounded and fried and served as a main dish.

Status of Biological Knowledge

Geoduck clams are distributed from Forrester Island, Alaska to Scammon's Lagoon, Baja California and in the northern Gulf of California. They are found from the lower intertidal zone to depths of 360 feet in bays, estuaries, and sloughs, in bottom types ranging from mud to pea-sized gravel, but mostly in unshifting mud or sand.

Shells are whitish and covered with a dull, yellowish-brown periostracum, which is often badly eroded in large clams. Shells are sculptured with a number of unevenly spaced, concentric growth lines. Siphons are united to form a tube, extremely long and impossible to withdraw into the shells. Valves gap widely on all sides except on the hinge area. Flesh exposed between the gaping valves is covered with a heavy reddish-brown epidermis or skin.

Geoducks are long-lived and slow growing. Growth is rapid for the first four years then greatly decreases. In prime habitat in Washington state, geoducks can reach an average weight of 1.9 pounds in five years. Both male and female geoducks are usually sexually mature by age five. Maximum shell size is over nine inches, with a total body length (from foot to extended siphon) of 59 inches, and a weight of over 20 pounds.

The sexes are separate and spawning takes place in late spring to early summer. Fertilization is external and takes place in the water column. Larvae remain in the water column for several weeks before metamorphosing into juveniles and settling to the bottom. Larval clams eat phytoplankton while juveniles and adults filter-feed on plankton and detritus.

Predators include moon snails and spiny dogfish, which prey on small individuals. Juveniles and adults are eaten by pink seastars , sunstars, and various crab species. Sea otters are a major predator on geoduck clams within their range in California. Siphon tips are eaten by cabezon and starry flounder.

Status of the Population

While larvae of geoduck clams experience extremely high mortality, resulting in a low recruitment rate, the natural mortality rate of adults is low. Information on distribution and density of these clams comes from studies in Washington state and British Columbia, where com-

Geoduck Clam, *Panope generosa*
Credit: Windy Montgomery, University of California

mercial and sport fisheries exist; very little is known about geoduck beds in California. These studies showed that geoduck clams are contagiously distributed or clumped. In a Washington state study, the average geoduck density was 1.4 clams per square yard with a range of zero to 18 clams per square yard. In British Columbia, clam densities as high as 31 clams per square yard were found. Intertidal clam densities in California would be expected to be considerably less than one clam per square yard. Fluctuations in population size result from natural mortality and appears not to be influenced by sport clammers, whose take is very low. Geoduck populations in California will be impacted by the expansion of the southern sea otter over its historic range.

Management Considerations

See the Management Considerations Appendix A for further information.

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References

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