

California Spiny Lobster

History of the Fishery

Since the late 1800s, there has been a commercial fishery for California spiny lobster (*Panulirus interruptus*) in southern California. Commercial fishermen use box-like traps constructed of heavy wire mesh to capture spiny lobsters. Traps of other materials, such as plastic, are allowed, but wire traps remain the most popular. About 100 to 300 traps per fisherman is common, but some fish as many as 500 at the peak of the season. The traps are baited with whole or cut fish and weighted with bricks, cement, or steel. They are fished on the bottom, and each trap is marked with a buoy bearing the fisherman's license number followed by the letter P. High-speed boats in the 20 to 40-foot size range are popular in this fishery, but everything from 15-foot skiffs to 50-foot fishing boats are used. Most trap boats are equipped with a davit and hydraulics to assist in pulling the traps.

Commercial lobster fishing occurs in shallow, rocky areas from Point Conception to the Mexican border and off the islands and banks (such as Cortes and Tanner banks) of southern California. Some marine life refuges and reserves are closed to the take of lobster, as are areas in Santa Monica and Newport Bays and at Santa Catalina Island. Sophisticated electronic equipment enables trappers to find suitable lobster habitat and relocate their traps there. Traps are fished along depth contours in waters less than 100 feet, or clustered around rocky outcrops on the bottom. At the beginning of the season the traps are usually very close to shore. By the end of the season they are in 100 to 300 feet of water.

Seasonal landings in the 200,000 to 400,000 pound range rose following World War II and peaked in the 1949-1950 season, with a record 1.05 million pounds landed. A general decline followed for the next 25 years, reaching a

low of 152,000 pounds in the 1974-1975 season. Landings started back up the next season, but remained between 400,000 and 500,000 pounds for nine consecutive seasons from 1979-1980 to 1987-1988. The next nine years the landings ranged from 600,000 to 800,000 pounds with a peak of 950,000 in the 1997-1998 season. Landings dropped back down after that. The peaks and valleys that have characterized this fishery are not unexpected in a fishery that is strongly influenced by the weather, El Niño and La Niña events, and the export market.

About 90 percent of the legal lobsters taken in the commercial fishery weigh between 1.25 and 2.0 pounds, which produces the size of tail desired for the restaurant trade. Most of the harvest in recent years has been exported to Asian countries and France. However, depressed economies overseas have resulted in an effort to re-establish domestic markets. The price paid to the fisherman is in the range of \$6.75 to \$8 a pound. The largest portion of the commercial and sport harvest is always taken during the first month of the season, October, which also is the highest month of trapping effort. The effort and catch drop off sharply in January through the middle of March (the season's end). San Diego County, being the most central to the spiny lobster's range, usually produces the highest landings, followed by Los Angeles/Orange, and Santa Barbara/Ventura counties.

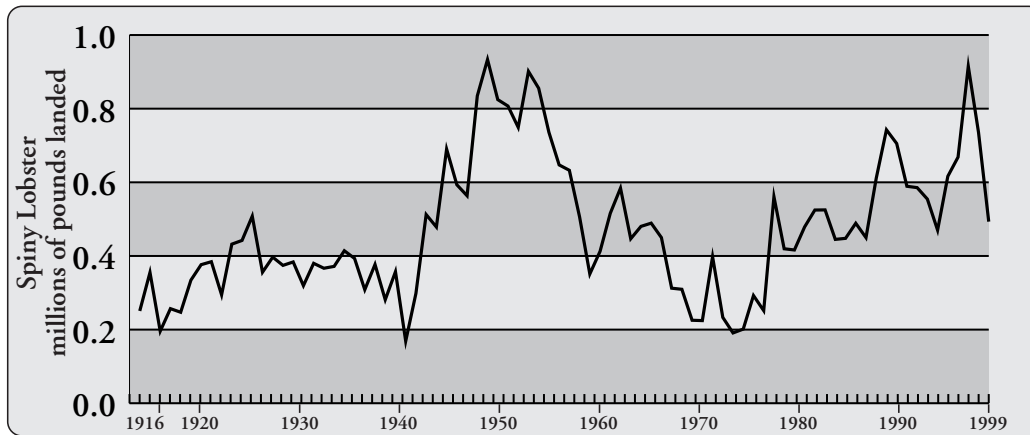
Commercial and recreational lobster fishermen are restricted to a minimum size limit of 3 1/4 inches carapace length (CL). Historically, the season for both has run from early October to mid-March. Since 1992, the sport season has opened the weekend before the first Wednesday in October, the official commercial season opener. Commercial fish traps, including lobster traps, must have a destruct-device of a type approved by the Department of Fish and Game. This is to ensure that lost or abandoned traps do not continue to capture marine life indefinitely. Since the 1976-1977 season, it has been required that lobster traps be fitted with rectangular escape ports (2 3/8 by 11 1/2 inches) to minimize the retention of undersized lobsters. This requirement has been credited with reversing the long downward trend in landings previous to that.

A formal commercial restricted access program was initiated in April of 1997. All lobster fishermen are required to have an operator permit (\$285). Deckhands that assist them must have a lobster crewmember permit (\$125).

Recreational harvesters need a valid sport fishing license with an ocean enhancement stamp, and may use hoop nets or bare (gloved) hands when skin or scuba diving for lobster. No appliance, such as a fish spear or a short hooked pole, may be used to snag the animals from deep crevices or caves. The daily bag limit for sport fishing is seven lobsters, reduced from 10 in 1971.



California Spiny Lobster, *Panulirus interruptus*
Credit: DFG



**Commercial Landings
1916-1999, Spiny Lobster**
Data Source: DFG Catch
Bulletins and commercial
landing receipts.

Status of Biological Knowledge

The California spiny lobster ranges from Monterey Bay, California to Manzanillo, Mexico. There is also a small, isolated population of this species at the northwestern end of the Gulf of California. The majority of the population is found between Point Conception, California and Magdalena Bay, Baja California. Adult lobsters usually inhabit rocky areas from the intertidal zone to depths of 240 feet or more.

Spiny lobsters mate from November through May. The male attaches a putty-like packet of sperm, called a spermatophore, to the underside of the female's carapace. When the female releases her eggs, she uses the small claws at the end of her last (fifth) pair of walking legs to open the spermatophore and fertilize the eggs with the sperm inside the packet. Fertilized eggs are attached to the underside of the female's tail primarily in May and June. "Berried" females are generally in water less than 30 feet deep and carry their eggs for about 10 weeks. The larger the size of the female, the more eggs she produces. Females sampled at San Clemente Island carried between 120,000 (2.6 inches CL) and 680,000 (3.6 inches CL) eggs.

Spiny lobster eggs hatch into tiny, transparent larvae known as phyllosomas that go through 12 molts. They have flattened bodies and spider like legs, and drift with the prevailing currents feeding on other planktonic animals. They may drift offshore out to 350 miles, and may be found from the surface to a depth of over 400 feet. After five to nine months, the phyllosoma transforms into the puerulus or juvenile stage. The puerulus is still transparent, but now looks like a miniature adult with extremely long antennae. The puerulus actively swims inshore where it settles to the bottom in shallow water and starts to grow if the habitat is suitable.

The spiny lobster's outer shell serves as its skeleton, and is referred to as an exoskeleton. To grow, a lobster must

shed its exoskeleton. This process of molting is preceded by the formation of a new, soft shell under the old one. An uptake of water expands the new shell before it hardens. Lobsters are vulnerable to predation and physical damage right after they molt, until their new shell hardens.

Molt rates for the California spiny lobster are assumed to be similar to those of the Japanese spiny lobster. A 0.24-inch CL specimen goes through 20 molts to reach 1.18 inches CL at the end of its first year. Four molts during the second year will result in a carapace length of two inches, and there are three molts in the third year. It takes a lobster from seven to 11 years to reach a legal size of 3.25 inches CL. Spiny lobsters molt annually, following the reproductive period, once they reach 2.5 inches CL. Growth rates, or the period between molts, are highly variable. They have been correlated with food availability, size, and sex. The larger an animal, the slower it grows. Injuries or disease will often result in a slowing or complete cessation of growth until the injury has been repaired.

Juvenile lobsters usually spend their first two years in nearshore surf grass beds. Sub-adults have also been found in shallow rocky crevices and mussel beds. Adult lobsters are found in rocky habitat, although they also will search sandy areas for food. During the day, spiny lobsters usually reside in a crevice or hole, dubbed a den. More than one lobster is usually found in a den. At night, the animals leave their dens to search for a wide range of food. Adult lobsters are omnivorous and sometimes carnivorous. They consume algae and a wide variety of marine invertebrates such as snails, mussels, sea urchins, and clams as well as fish, and injured or newly molted lobsters. Lobsters are eaten by sheephead, cabezon, kelp bass, octopuses, California moray eels, horn sharks, leopard sharks, rockfishes and giant sea bass.

A large portion of the spiny lobster population makes an annual offshore-onshore migration that is stimulated by changes in water temperature. During winter months,

male and female lobsters are found offshore at depths of 50 feet and deeper, although individuals of both sexes have also been found in shallow water in winter. In late March, April, and May, lobsters move into warmer onshore waters less than 30 feet. The higher temperatures on shore shorten the development time for lobster eggs. Nearshore waters also have a more plentiful supply of food. In late October and November, the onshore waters cool, and most lobsters move offshore. Winter storms that cause increased wave action in shallow water encourage this movement. Lobsters generally move after dark and in small groups across the sand.

California spiny lobsters of both sexes reach maturity at five or six years and 2.5 inches CL. After maturity, male lobsters grow faster, live longer, and reach larger sizes than the females. Males can live up to 30 years, and females at least 20 years. There are records of male California spiny lobster weighing over 26 pounds and attaining lengths up to three feet. Today, lobsters over five pounds are considered trophy-size. Trophy-size animals are usually taken by recreational divers.

Status of the Population

Population size is unknown for the California spiny lobster. Commercial landings have fluctuated through the years and are influenced by some factors that are independent of the health of the population.

The closed season protects egg-carrying and molting female lobsters. The size limit ensures that there will be several year classes of broodstock, even if all legal-size lobsters are caught each season. The escape port has been effective in reducing the capture and handling of juvenile lobster. An illegal market has always existed for "shorts" (undersized lobsters). Public education and adequate warden enforcement are key elements in reducing this problem.

The Department of Fish and Game has had a commercial logbook system in place since 1973. Catch effort, the numbers of legal and short lobsters taken, number of traps fished, and depths where the traps are fished are required information on the logs. The presence of shorts is generally a good indicator of a healthy fishery.

Management Considerations

See the Management Considerations Appendix A for further information.

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