

Spot Prawn

History of the Fishery

The fishery for spot prawn (*Pandalus platyceros*) originated nearly 68 years ago in Monterey when prawns were caught incidentally in octopus traps. It was a minor fishery with landings averaging around 2,000 pounds annually until the early 1970s. In 1974, trawl fishermen fishing out of Santa Barbara caught over 182,000 pounds. Trawl landings steadily grew as more fishermen entered this new fishery and new areas were explored reaching a peak of more than 375,500 pounds in 1981. Landings fell drastically in the next few years causing concern by fishermen and DFG biologists. An area and season closure was instituted between Point Conception and Point Mugu during the peak egg-bearing months of November, December and January in 1984. Following the implementation of an area closure, trawl landings remained low until 1993 averaging about 54,000 pounds annually. The low catch rates for the trawl fleet were due in part to the development of other fisheries such as ridgeback prawn, sea cucumber and the increased demand for fresh fish, which caused growth in the groundfish trawl fishery.

In 1985, a trap fishery for spot prawn developed in the Southern California Bight. The trap fishery was concentrated around all of the Channel Islands and along coastal submarine canyons in water depths between 600 and 1,080 fathoms. Fishing was now occurring in areas of southern California that the trawl fleet did not have access to because trawling was not allowed within three miles of the shore. The advent of the trap fishery also meant the start of a live prawn fishery for the Asiatic community locally and overseas. With traps, prawns could be kept alive using holding tanks set at optimum water temperatures. Annual landings in the trap fishery grew from 8,800 pounds in 1985 to over 247,000 in 1991. During this period, trapping accounted for 75 percent of statewide landings; trawling accounted for the remaining 25 percent.

Two years of declining landings in the trap fishery and the continued low landing levels by the trawl fleet lead fishermen and biologists once again to address management of California's spot prawn resource. The Fish and Game Commission, with the support of the trap and trawl fishermen, expanded the trawl area and season closure to include the entire Southern California Bight in 1994. They also instituted the first regulations for the trap fishery by requiring a one inch by one inch trap mesh size, limiting traps per vessel to 500, and initiating an area and season closure for the same area and time period as the trawl fishery.

Following these management measures, the spot prawn fishery underwent significant changes in composition and statewide growth. The spot prawn fishery was now comprised of four fishery components: northern California

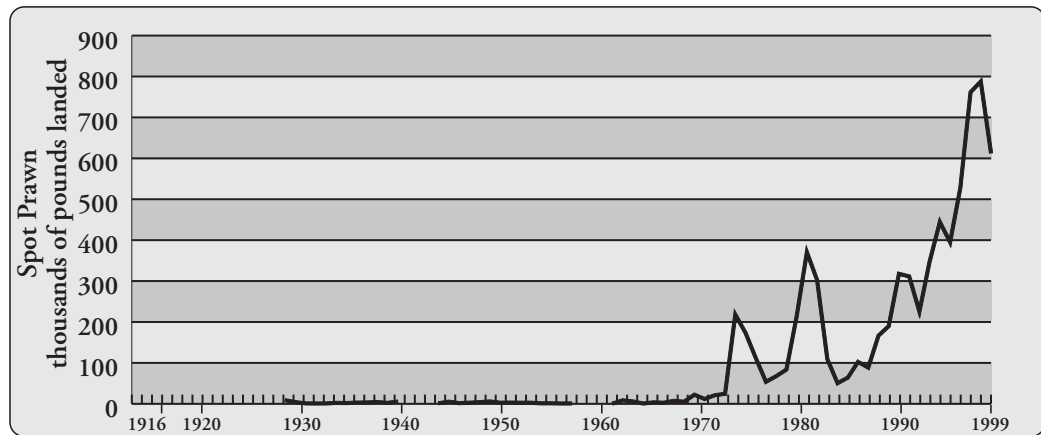
trawl, northern California trap, southern California trawl and southern California trap. From 1994 until 1998, statewide landings nearly doubled from 444,000 pounds to a historic high of 780,000 pounds. All of the fishery components showed some growth with the northern trawl fishery experiencing a 14-fold increase in landings while southern trawl and northern trap showing a four-fold increase and southern trap almost doubling its landings. There were several reasons for this rise including increased market demand, which raised the average price for live prawns from \$6 per pound to \$8; increased effort by California and Washington fishermen displaced from other fisheries; changes in gear design, specifically the use of large rollers (rock hopper gear) on the groundline of the trawl nets; and increased availability due to strong spot prawn recruitment in 1996 and 1997.

The advent of rock hopper gear allowed fishermen to fish areas once off limits because of the rocky nature of the bottom. These areas had previously acted as de facto reserves, providing new recruits for adjacent areas traditionally worked by trawl vessels. The rise in the number of participants and a 21 percent decline in statewide 1999 landings, prompted fishermen once again to ask for further regulation and a limited access plan. An ad-hoc committee of trap and trawl fishermen and department biologists developed several management recommendations, which included a limit on the size of roller gear to 14-inches. In 2000, the Commission adopted some but not all of the proposed regulations with slight modification. Instead of a simultaneous closure for trap and trawl fisheries north of Point Conception, a May to August closure for the trap fishery was selected by the Commission. While northern California trappers can catch prawns during the peak egg-bearing season, they are limited to 300 traps within state waters. Other regulations adopted by the Commission for this fishery included a requirement for bycatch reduction devices on trawl nets, and an observer



Spot Prawn, *Pandalus platyceros*
Credit: DFG

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



program for all components of the spot prawn fishery. A control date for limited entry was established, but the rest of the plan was put on hold.

The 1999 price for live prawns ranged from \$6 to \$10 per pound, whereas dead (heads-on) prawns bring only \$4.50 to \$5.50 per pound. Live prawns are now taken by trap and trawl vessels and account for 95 percent of landings. The change from a trap-only live fishery follows experimentation by trawl fishermen on net design and tow duration, which maximizes prawn catch while reducing or eliminating incidental take of non-target species.

The trawler fleet consists of approximately 54 vessels operating coast-wide from Bodega Bay to the United States-Mexico border. Most vessels operate out of Monterey, Morro Bay, Santa Barbara, and Ventura, although a number of Washington-based vessels participate in this fishery during the fall and winter. The vessel length of the trawl fleet ranges from 28 to 85 feet with an average vessel length of 47 feet. Standard gear is a single-rig shrimp trawl of a semi-balloon, or Gulf Shrimp Act, design. Occasionally, double-rig or paired shrimp trawls are used. The body of the trawl net is typically composed of a single layer of 2.5- to three-inch meshes with a 36-square inch bycatch reduction device, and a minimum codend mesh size of 1.5 inches. Many fishermen prefer to use a double codend composed of two- to three-inch mesh. A variety of roller gear is added to the groundline of the trawl net, which keeps the ground off the bottom and prevents a variety of benthic invertebrates such as sea stars, sea fans, and anemones as well as rocks from being scooped into the net. Standard roller gear, which spins freely around the groundline, varies in size from eight-inch disks to 28-inch tires.

The spot prawn trap fleet operates from Monterey Bay to southern California. The northern trap fishery continues to produce prawns, although it has never reached the large volume of the southern California fishery. Monterey-area

boats are about 30 to 60 feet in length and usually fish for salmon during the summer. Currently, there are about six boats fishing the Monterey Bay area, and they fish 10 months a year. The southern California trap fleet ranges between 30 and 40 boats depending on prawn availability. These boats range in size from 20 to 75 feet with an average of 34 feet. Trap designs are limited either to plastic oval-shaped traps or to the more popular rectangular wire traps. The dimension of the single chamber plastic traps is approximately 2.5 feet by 1.5 feet while the typical size of the wire traps is 3.0 feet by 1.5 feet by 1.0 foot with two chambers. Normally, a fisherman will set 25 to 50 traps attached to a single groundline (string) with anchors and buoys at both ends. In both fishing areas, traps are set at depths of 600 to 1,000 feet along submarine canyons or along shelf breaks.

Status of Biological Knowledge

Spot prawns range from Alaska to San Diego, California, in depths from 150 to 1,600 feet. Areas of higher abundance in California waters occur off of the Farallon Islands, Monterey, the Channel Islands and most offshore banks. This species is a protandric hermaphrodite, beginning life as a male. Sexual maturity is reached during the third year averaging 1.5 inches carapace length (CL). By the fourth year, many males begin to change sex to the transitional stage. By the end of the fourth year, the transitionals become females averaging 1.75 inches CL. Maximum observed age is estimated at over six years but there are considerable differences in age and growth of spot prawns between areas. Animals from Canada live no longer than four years, whereas the prawns from southern California can reach six years. Studies indicate that prawns grow faster in a temperate environment than in a cold environment.

Spawning occurs once a year, and each individual mates once as a male and once or twice as a female. Females spawn at a carapace length of 1.75 inches. Spawning takes place at depths of 500 to 700 feet. September appears to be the start of the spawning season, when the eggs are extruded onto the female's swimmerets. She carries the eggs for a period of four to five months before they hatch. By April, only 15 percent of females still carry eggs. Fecundity varies with size, ranging from 1,400 to 5,000 eggs for the first spawning down to 1,000 eggs for the second spawning. Eggs hatch over a 10-day period and the larvae are planktonic. As they develop into the juvenile stage, they begin to settle out at depths as shallow as 175 feet, but move deeper as they reach adulthood.

Spot prawns feed on other shrimp, plankton, small mollusks, worms, sponges, and fish carcasses. They usually forage on the bottom throughout the day and night.

Status of the Population

Exploratory surveys conducted by the DFG during the 1960s revealed the presence of prawns along the coast, but no estimates of population size were made. During the 1980s, additional surveys were conducted in southern California to further define distribution and range. The development of the southern California trap fishery in the mid-1980s detected sizable aggregations of this species, which were previously unknown. The introduction of roller gear on trawl nets in the 1990s led to the exploration of even more areas and location of additional habitat suitable for spot prawns. Thus, it appears that this species is more numerous and widespread than previously believed as attested by the geographic expansion and rise in total landings.

Management Considerations

See the Management Considerations Appendix A for further information.

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