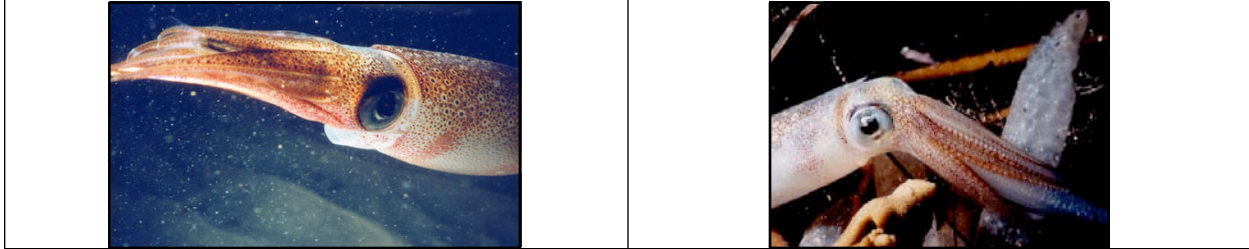


Market Squid (*Doryteuthis opalescens*)



Left photo: squid swimming. Right photo: squid laying eggs. Photos courtesy of NOAA Fisheries Service Southwest Fisheries Science Center.

Life History

Squid, Octopuses, Clams, and Oysters belong in the taxonomic [phylum Mollusca](#) and are characterized as having soft bodies with a hard shell portion. California [Market Squid](#) are small [pelagic mollusks](#) that inhabit the waters of the eastern Pacific Ocean from the southern tip of Baja California to southeastern Alaska. The highest abundance of squid occurs between Punta Eugenia, Baja California and Monterey Bay, California.

Squid can be found in open waters above the [continental shelf](#) (See Biology & Ecology – Ecosystems Where Fish Live) from the surface to depths of at least 700 m (2,300 ft). Market Squid have a life span of approximately one year and reach a maximum total length of 30 cm (12 in). They are a [semelparous](#) species that spawn multiple times during the last few weeks of their lives. When adults reach maturity they move into shallow waters, usually semi-protected bays, where they congregate in dense schools over sandy bottoms. Spawning seasons are dependent on environmental conditions, like water temperature and water clarity. In Monterey Bay, mass spawning during the night usually occurs in April through November, while in southern California it occurs in October through April or May.

When [spawning \(video\)](#) occurs, a male grabs a female and holds her in a vertical position and then uses a specialized ventral arm to transfer and deposit [spermatophores](#) into the female's [mantle](#) cavity. The females lay eggs in elongated capsules, which each may hold up to 300 eggs. The capsules are attached to the seafloor where they are aerated by the ocean surge. A female produces between 20 and 30 capsules. Depending on surrounding temperatures, the eggs hatch within 2 to 5 weeks. The newly hatched [larvae](#) begin to swim immediately and resemble miniature adults. By 2 months, the [juvenile](#) squid are strong enough to swim and hunt in groups and reach sexual maturity between 4 and 8 months.



Fishery Basics – California Fisheries

Fishery History

The California Market Squid **fishery** began in 1863, when Chinese immigrants began to **harvest** small quantities of Market Squid from Monterey Bay. Using simple **surrounding nets** (See Fishing Gear – Surrounding Nets), torches (as a light attractants), and small **skiffs**, the Chinese would harvest the squid, dry it, and export most of the catch to China. By 1905, Italian immigrants began fishing for squid using **lampara nets** (See Fishing Gear – Surrounding Nets) and soon after surpassed the Chinese in **landings**. The fishery remained relatively unchanged in terms of annual landings, usually less than 270 t (595,250 lbs), until the mid 1920s. Between 1923 and 1932 a significant export market to China existed and thus annual landings increased to 1,900 t (4.12 million lbs). After the export market collapsed, landings decreased significantly over the next decade. It was not until the 1950s that the Market Squid fishery developed in southern California.

From 1960 to 1980, landings remained approximately equal between the southern and northern fisheries. In the late 1970s, **purse seines** (See Fishing Gear – Surrounding Nets) were introduced in the southern California fishery and annual landings increased from an average of 9,000 t (19.8 million lbs) in the 1970s and early 1980s to over 41,000 t (90.3 million lbs) by the end of the 1980s. The purse seine was not introduced into the squid fishery in Monterey Bay until 1989 when it was legalized. The purse seine was a more efficient gear for high volume catches, thus fishermen stopped using lampara nets.

Throughout the squid fishery history, the use of lights, as means of attracting the squid to the surface, has been **allowed and disallowed** multiple times in Monterey Bay. However, the use of lights has never been prohibited in the southern California fishery.

In 1993, the Market Squid fishery became the largest California commercial fishery by volume and by 1996 it was the most valuable fishery resource in the state. In 1998, legislation created a moratorium on the number of vessels participating in the fishery and required vessels to have a permit to land more than 2 t or use lights to attract squid for harvesting. In 1999, further restrictions regulated the maximum wattage of the lights and required that lights be shielded to reduce the impacts on other **species**, especially nesting seabirds.

Current Fishery

The Market Squid fishery is managed by the **California Fish and Game Commission** under the **California Market Squid Fishery Management Plan (CMSFMP)**. In addition to the CMSFMP, Market Squid are included in the federal **Coastal Pelagic Species Fishery Management Plan** authored by the **Pacific Fishery Management Council** (See National Management). The fishery has a catch limit of 118,000 t (260 million lbs) and has a vessel capacity of 55 Market Squid vessels (e.g., purse seiners), 18 **brail**/scoop boats, and 34 lightboats.



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The fishery is open year-round, but closes on weekends from Friday at noon through Sunday at noon. The 1999 restrictions on attraction lights still remain.

Current Challenges in Fishery

The primary challenge affecting the Market Squid fishery is making sure enough squid have spawned and laid eggs before capture. Currently, **stock assessments** (See Stock Assessments) are conducted based on mathematical models that estimate the **biomass**, or amount of market squid that are in the ocean. These estimates can help determine if a particular **stock** is being

fished too heavily. However, these estimates do not consider egg **escapement**, which is the proportion of squid allowed to spawn prior to capture. Also, little information is available on the extent and distribution of spawning grounds throughout the range of the Market Squid along the California coast.

Recognizing the need for better scientific information on squid, the **California Department of Fish and Game** and **NOAA Fisheries** have conducted **cooperative research on Market Squid** since 1997. Additional information regarding the spawning grounds and the potential impacts of the gear used to capture the squid would provide more effective management measures to maintain a healthy fishery.

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