Fishery Basics – California Fisheries

Pacific Sardine (Sardinops sagax)

Photos courtesy of NOAA Fisheries Service Southwest Fisheries Science Center.

Life History

Members of the herring family, Sardines are a small schooling fish. They inhabit most of the **pelagic** coastal waters of subtropical and temperate oceans worldwide. **Pacific Sardine populations** are found along the west coast of North America from the southern tip of Baja California to southeastern Alaska, with mostly seasonal appearances in the northern portion of the range. Three **subpopulations** of Sardines have been identified, with a possible fourth subpopulation identified to the far north of the range. Pacific Sardines are highly mobile and move seasonally along the coast. Pacific Sardines may live to 13 years and reach a maximum size of 41 cm (16 in), but most live 5-6 years reaching a size of 23 cm (9 in). Sardines are **oviparous** (See Biology & Ecology) and female fish will spawn multiple times per spawning season, with individual females releasing 30,000-65,000 eggs. Spawning can occur year round in the upper 49 m (160 ft) of the water column. Locally in California, the peak of the spawning season occurs between April and August.

Fishery History

The west coast fishery for Pacific Sardines began in 1916, as the demand for new food sources increased during World War I. During the 1930s and 1940s, the Pacific Sardine fishery was the largest fishery in the western hemisphere, accounting for almost 25% of all the fish landed in the United States. At its peak in 1936-37, more than 100 **canneries** existed between San Diego and San Francisco. These canneries employed thousands of workers who would **eviscerate**, can, and package 726,000 t (1.6 billion lbs) of Pacific Sardines landed by 350 vessels. By the 1940s, Monterey was known as the **Sardine Capital of the World**, boasting 19 canneries and 20 **reduction** plants. At the time, 70% of Pacific Sardine catch was reduced for **fishmeal** and the remaining 30% packaged for food.

The Pacific Sardine stocks began to disappear in the late 1940s due to the compounding impacts of natural oceanographic cycles and fishing pressures. Canneries that once processed 250,000 t (550 million lbs) annually were processing less than 1,000 t (2.2 million lbs) per year by the 1950s. **Fossil evidence** going back 1,700 years suggests that Pacific Sardine abundance naturally

Fishery Basics – California Fisheries

fluctuates over time. These cycles average about 60 years, with a period of recovery lasting on average 30 years. The most recent period of abundance began in the late 1970s.

The traditional gear used to capture Pacific Sardines is a **roundhaul net**, most often **purse seines and lampara nets** (See Fishing Gear – Surrounding Nets). However, small quantities were also caught by **trawl** (See Fishing Gear – Trawl Nets) and **gillnets** (See Fishing Gear – Gillnets & Entangling Nets).

A comprehensive list of important historical dates regarding the Pacific Sardine fishery can be found **here**.

Current Fishery

The Pacific Sardine **fishery** is federally managed by the **Pacific Fishery Management Council (PFMC)** (See National Management) under the **Coastal Pelagic Species Fishery Management Plan**. Annual harvest guidelines, or catch **quotas**, based on current estimates of **biomass** are presented to the PFMC every June, in order to establish limits for the following season (January 1 to December 31). The **coastal pelagic species** fishery is a **limited entry fishery** (See Management Approaches), where the number of vessels or operators is restricted to reduce the potential of **overfishing**. The U.S west coast fleet that once had over 200 fishing vessels participating in the Pacific Sardine fishery has now been restricted to **61 vessels**.

The most **commonly used method** of catching Pacific Sardines in California waters is the use of purse seines. **Seiners** (See Fishing Vessel Types – Seiners), are typically 15-25 m (49-82 ft) in length. The typical crew size is 5-7 members, and the vessels can hold 18-36 t (40,000-80,000 lbs) of fish.

Current Challenges in Fishery

The primary challenge in the Pacific Sardine fishery is accurately estimating **stock** sizes and setting appropriate annual **harvest guidelines**. In June 2010, the **Southwest Fisheries Science Center (SWFSC)**, **Northwest Fisheries Science Center (NWFSC)**, and **stakeholders** in the Pacific Sardine fishery held a workshop in order to improve the methods and models used to conduct **stock assessments** (See Stock Assessments). A discussion of the **workshop** is available on the NOAA Fisheries website.

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Fishery Basics – California Fisheries

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