

Yellowfin Tuna

History of the Fishery

Yellowfin tuna (*Thunnus albacares*) have been harvested, in the eastern Pacific, by commercial bait boat fisheries since the early 1900s, and later by commercial purse seine, longline, gillnet, troll and recreational fisheries. Yellowfin tuna, frequently caught in schools mixed with skipjack and bigeye tuna, are highly migratory and have been fished in the eastern Pacific by many different countries. U.S. fisheries that land yellowfin tuna in California operate between 150° W longitude and the coast of the Americas and between 40° N and 20° S latitude. California landings of yellowfin tuna are important to both commercial and recreational fisheries.

California landings of commercially caught yellowfin tuna date back to 1919. These landings supplied canneries mainly in California, where yellowfin tuna were processed as light meat tuna. In recent years, some commercial, yellowfin tuna landings were also purchased by local markets and restaurants. Cannery prices paid for yellowfin tuna depend on fish size and canned tuna market conditions. During the early 1990s, prices ranged from \$200 to \$1,100 per ton. Commercial landings of yellowfin tuna in California, while fluctuating, generally increased from 350,000 pounds in 1919 to 280 million pounds in 1976. Since 1976, yellowfin tuna landings declined steadily to three million pounds in 1999. Assuming a cannery price of \$1,000 per ton, the estimated value of the 1999 California commercial yellowfin tuna landings was \$1.5 million. The decline in commercial landings in California can be attributed to the relocation of cannery operations to American Samoa and Puerto Rico and the re-flagging of some U.S. vessels. Currently, only one cannery is operating in California. Purse seine and bait boat fisheries supply the bulk of the California commercial yellowfin tuna landings. Some commercial landings are also supplied by longline, troll, and gillnet fisheries.

Before the 1960s, bait boats supplied the majority of the commercial yellowfin tuna catch. Initially, bait boats operated in coastal waters of southern California and Mexico. The vessels could only make short trips because they used ice to preserve catches and relied on catching bait close to the coast and offshore islands. In the 1930s, improvements in refrigeration methods and construction of larger vessels enabled the fishery to expand farther south and offshore. From 1984 to 1999, California bait boat landings averaged 11 percent of the total landings of yellowfin tuna in California. Bait boat carrying capacity ranged from 30 to 200 tons carrying capacity. The U.S. fleet that operated in the eastern Pacific ranged from 75 bait boats in 1976 to one in 1999. While bait boat fisheries dominated landings in the early days of the eastern Pacific yellowfin tuna

fishery, catches and effort from this fishery gave way to the more efficient purse seine method.

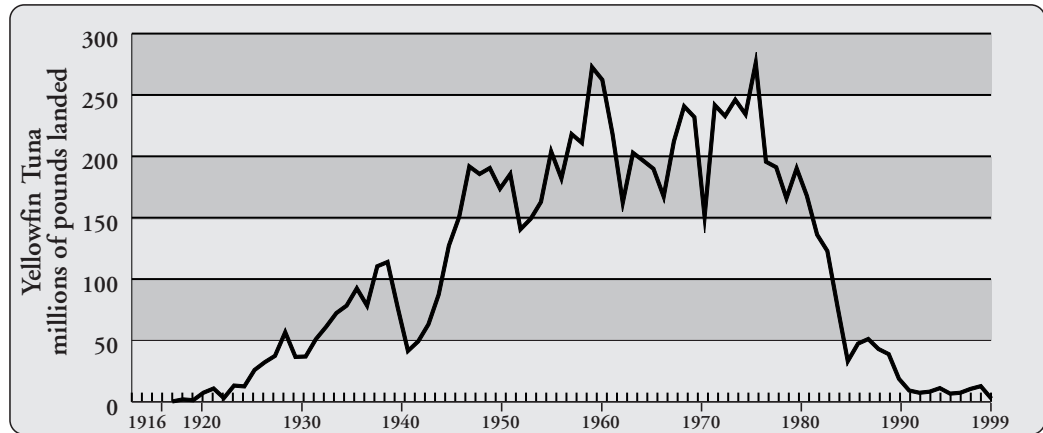
Purse seiners started to replace bait boats in the late 1950s, and by 1961, supplied the majority of the commercial yellowfin tuna landings in California. Purse seine carrying capacity ranged from 150 tons to 2,000 tons. Purse seiners, because of their size and ability to stay at sea for long-periods of time, expanded the fishery to areas between southern California and Peru and out to 150° W longitude. Historically, three types of sets have been used to catch yellowfin tuna: sets on fish associated with schools of dolphins, sets on fish in free-swimming schools and sets on fish associated with floating objects. Until the 1990s, U.S. purse seiners in the eastern Pacific primarily caught yellowfin tuna in sets associated with schools of dolphins. Purse seiners employed a standard purse seine with the exception of a porpoise panel that was used to reduce entanglement of dolphins. The purse seines were deployed with a seine skiff and, when fishing dolphin schools, speedboats were used to herd the dolphins into a compact school so that the net could be set around them. Once the schools of tuna and dolphins were surrounded, the net was pursed and a backdown procedure was used to free the trapped dolphins. In the mid 1970s, marine mammal regulations were enacted to reduce dolphin mortality associated with purse seine fishing and in the 1990s canneries stopped buying yellowfin tuna caught on dolphins. The canneries "dolphin safe" policy drove many U.S. purse seiners to the western Pacific and as a result, the U.S. fleet that operated in the eastern Pacific decreased from 141 purse seiners in 1976 to nine in 1999. From 1984 to 1999, purse seine landings averaged 86 percent of the total yellowfin tuna landings in California.

Longliners, based in California, started fishing in the eastern Pacific in 1991. These vessels usually targeted bigeye tuna or swordfish outside the California 200-mile Exclusive Economic Zone (EEZ) and yellowfin tuna are an incidental catch in this fishery. Longliners usually fish between 30° N



Yellowfin Tuna, *Thunnus albacares*
Credit: DFG

Commercial Landings 1916-1999, Yellowfin Tuna
 Data Source: DFG Catch Bulletins and commercial landing receipts. Data includes shipments and landings from areas south of the state between 1916 and 1969.

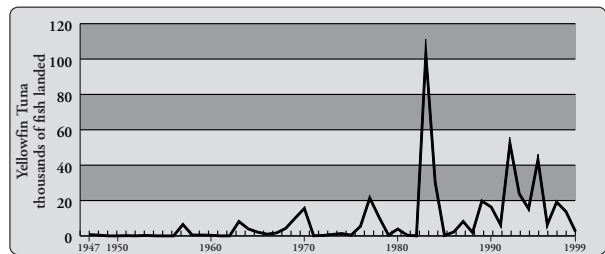


and 40°N latitude between Hawaii and the U.S. West Coast EEZ. The U.S. longline fleet uses standard longline gear with floats and branch lines. The gear is deployed at various depths, depending on the target species sought, and light sticks are used to attract fish. From 1991 to 1999, longline-caught yellowfin tuna were less than one percent of the total yellowfin tuna landed in California.

From 1984 to 1999, commercial troll and gillnet fishing gears supplied less than three percent of the annual yellowfin tuna landings in California. These gears incidentally catch yellowfin tuna inside the EEZ south of San Francisco. Gillnet fisheries usually target swordfish and sharks, while troll fisheries typically target albacore.

California recreational fisheries for yellowfin tuna typically operate in waters off southern California and Mexico. The duration of trips is usually from one to seven days. The fleet consists mainly of commercial passenger-carrying fishing vessels (CPFV) and some private fishing vessels. Recreational anglers use rod and reel fishing gear. Yellowfin tuna landings from the CPFV fishery, reached a record high of 120,000 fish in 1983, decreased to 4,000 fish in 1985, and averaged 81,000 fish from 1995 to 1998. Since the recreational catch cannot be sold, the value of the recreational fishery is difficult to determine, but must reach millions of dollars and extend to many sectors of the business community. Anglers buy equipment, fly in from various locations and stay in local hotels. Vessel operators collect fares that are based on trip length but also collect fees for food and equipment rentals. Anglers may catch yellowfin tuna, but they also catch bluefin, skipjack, bigeye and albacore tuna, and other fish.

U.S. commercial vessels that fish for yellowfin tuna in the eastern Pacific must abide by all federal and state regulations, including those proposed by the Inter-American Tropical Tuna Commission (IATTC), and any other international regulatory agency in which the U.S. is a member. These include a mandatory logbook program under the



Recreational Catch 1947-1999, Yellowfin Tuna

Data Source: DFG, commercial passenger fishing vessel logbooks.

High Seas Fishing Compliance Act of 1995, which requires a license and submission of the IATTC logbook. U.S. purse seiners fishing for yellowfin tuna associated with dolphins in the eastern Pacific must also abide by dolphin quotas stipulated in the Marine Mammal Protection Act, and all large purse seiners (greater than 400 tons) must carry observers.

Status of Biological Knowledge

Yellowfin tuna in the eastern Pacific are distributed throughout areas between 40°N and 40°S latitude and between 150°W longitude and the coastlines of the U.S., Mexico, Central, and South America. The eastern Pacific stock is generally considered a separate population that is not believed to interact appreciably with stocks in the central and western Pacific. Yellowfin tuna are typically found in sea surface temperatures between 65°F and 88°F and are usually confined to the upper 330 feet of the water column, or between the surface and the thermocline. Seasonal migrations are primarily along the coast. Surface schools of small yellowfin tuna in the eastern Pacific can be found aggregated around floating objects or in free-swimming unassociated schools, while larger yellowfin tuna are usually found in schools associated with dolphins. Small yellowfin tuna (less than 40 inches)

are frequently found in schools mixed with skipjack and bigeye tuna, whereas larger yellowfin tuna usually do not mix with other tunas.

Yellowfin tuna spawn throughout the year and across their entire range. However, 75°F is probably the lower temperature limit for yellowfin tuna spawning. Off Mexico and Central America, spawning can occur throughout the year, with peak spawning occurring at different times in different areas. Spawning is likely abbreviated and more sporadic in coastal areas than in offshore northern equatorial areas. Most females mature at sizes above 36 inches and produce from two to seven million eggs per spawn.

Yellowfin tuna can grow to approximately 83 inches. The larger fish have very large anal and second dorsal fins that may extend to over 20 percent of the fork length. Approximately 20 broken, nearly vertical lines cross the sides of the fish and a yellow coloration are present on the sides, dorsal and anal fins and finlets. Yellowfin tuna enter surface fisheries at approximately 10 inches and commonly reach lengths up to 60 inches. Growth is rapid at these approximate sizes at and ages: one year, 19 inches; two years, 34 inches; three years, 50 inches; four years, 59 inches; five years, 68 inches. Maximum age is probably around 10 years.

Yellowfin tuna are opportunistic feeders and therefore have a very diverse diet; however, a few fish, cephalopods and crustaceans are dominant in stomach samples from fish in the eastern Pacific. The most dominant are bullet tuna and pelagic crabs. Other organisms include fish commonly found around flotsam such as skipjack tuna, black skipjack, flying fish, light fish, and squid. Predators of yellowfin tuna include sharks, billfishes and other large tuna, including yellowfin tuna.

Status of the Population

In general, the population of yellowfin tuna in the eastern Pacific is being fully utilized by fisheries operating in the area and is at levels that will produce the maximum sustainable yield (MSY). The IATTC has recommended an annual yellowfin tuna catch quota in the eastern Pacific since 1966 to maintain the stock at MSY. Catches peaked at 277,300 tons in 1976, decreased to 111,500 tons in 1983, peaked again in 1989 at 337,000 tons, and then decreased to 301,400 tons in 1997. Because of management-imposed measures, it is difficult to use strictly catch as an indicator of overall population abundance. However, four abundance indices, one based on estimates of standardized catch-per-days fishing, two based on age models, and one based on a searching-time method, have been developed and indicate that abundance dropped steeply from the late 1960s to historically low levels in the early 1980s. Abundance estimates rebounded substantially in 1986 and

since then have remained fairly constant at slightly lower levels than in 1986.

Stock assessments for yellowfin tuna in the eastern Pacific are conducted annually by the IATTC. The latest assessment indicated that the eastern Pacific yellowfin tuna fishery could continue to harvest approximately 297,000 tons annually without further lowering the stock size. In accordance with these findings, the IATTC set the annual 1998 yellowfin quota at 231,000 tons, with 16,500 ton increments added at the discretion of the IATTC. Closure of the fishery based on this quota in 1988 was in November.

Management Considerations

See the Management Considerations Appendix A for further information.

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