

THE LINGCOD

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Lingcod are valuable to both recreational and commercial fishermen. Anglers like these big toothy fish because they are fun to catch and good to eat. To Oregon's commercial fishermen, lingcod were worth nearly 200,000 dollars in 1974, from a catch of 1.9 million pounds (852 metric tons). Regardless of whether fishing is your fun or your occupation, lingcod are an asset.

### LIFE HISTORY

#### Maturity

Female lingcod spawn for the first time when they are 3 to 7 years old, which corresponds to between 23 and 31 inches (58-79 cm) in length. Males mature at about 23 inches in length and will be 2 to 4 years old when they first mate.

#### Fecundity and Spawning

Newly matured females produce 100,000 to 150,000 eggs, but older, large (40 inches or more) females can spawn up to 500,000 eggs. As much as one-third of its body weight can be eggs in a large ripe female. Although the larger females may spawn up to five times as many eggs as younger, smaller fish, they are also much rarer in populations, a situation common in most fish species. The younger females therefore probably contribute most of the total spawning in a given year.

Lingcod spawn in the winter, from December to March. Spawning occurs from the intertidal zone to a depth of at least 65 feet (20 meters), and probably much deeper, but the maximum depth is unknown. The female deposits her eggs in crevices or beneath overhanging boulders. The pinkish opalescent eggs are about 1/8 inch in diameter and there may be as many as a half million in a mass or "nest". The eggs adhere strongly to one another and to rocks, forming large porous masses up to 30 pounds (13.7 kg) and two feet across. The male lingcod guards his territory against intruders, fanning the eggs with his large pectoral fins, thus assuring a constant flow of oxygenated water over the nest. The egg masses become greyish white as the embryonic larvae develop. Winter storms sometimes bring chunks of lingcod eggs to the beach where the "mysterious substance" is often found and sometimes mistakenly believed to be valuable ambergris. The eggs begin hatching in about seven weeks. Hatching is progressive with the outside eggs hatching first and takes from three to seven days to complete.

#### Larvae

The newly hatched larvae are 3/8 inches long, have a bright yellow oil globule near the liver and noticeably blue eyes. The larvae have a small yolk sac on the abdomen with a ten day supply of food. About two weeks after hatching the larvae leave the bottom cover near the nest and become free swimming in their search for food.

#### Juveniles

Juveniles feed primarily on copepods and other small crustaceans. During the spring, juveniles up to 2-3/4 inches (7 cm) long can be caught at night by attracting them with a light and using a dip net. By July they are no longer encountered on

or near the surface, becoming bottom dwelling. In California juveniles are normally found on sand bottom adjacent to reef areas on the open coast and in shallow bays. The same is probably true for Oregon and other waters as well. They gradually move into the rocky areas when they reach about 14 inches (35.5 cm) in length and are slightly over a year old.

### Migrations

Very few lingcod have been tagged in Oregon. From tagging studies in other states it was evident that young fish move about more than adults. Many adult lingcod are very sedentary, being recaptured at the site of tagging after years at liberty. However, there is evidence of a seasonal spawning migration in the late fall from deeper water to shallower areas. It has been shown that not all lingcod take part in this inshore migration. Some portion of the stock remains resident in shallow water the year round.

### Distribution

Lingcod occur from Pt. San Carlos, Baja California, to Kodiak Island, Alaska. In depth they range from the intertidal area to at least 233 fathoms (426 m), but are most abundant shallower than 80 fathoms (23 m). They exhibit a preference for "hard" bottom and are commonly found among reefs. Although they forage about at times, lingcod spend considerable time lurking on the bottom watching the surrounding environment for prey.

### Food Habits

Lingcod are voracious and opportunistic feeders on fishes and are definitely cannibalistic. They eat herring and sand lance when available and a variety of bottom fish, such as flounder, hake, cod, and rockfishes. They also eat octopus, squid, shrimp, and crab.

### Age and Growth

The largest lingcod on record weighed 105 pounds (47.6 kg) and was taken in British Columbia. Lingcod average about 10.5 inches (27 cm) in length at one year old and by the end of their second year are about 18.5 (47 cm) inches long. Later growth in males is at a rate of about 2.7 inches per year, and for females 3.1 inches per year. Growth rate gradually slows with increasing age. Males seldom exceed 36 inches (91 cm). Females reach 36 inches in length at 10 to 14 years old. The age of a lingcod is determined by counting the annual growth rings on otoliths ("earbones"), which are small cranial bones in the ear cavity and thin sections of the dorsal fin rays.

### Recreational Fishery

Lingcod are held in high esteem by sport fishermen. Although much sought by sportsmen, there are no estimates of the number of fish taken by Oregon anglers and scuba divers. A daily bag limit of 5 lingcod was imposed in Oregon in 1976 to help protect inshore populations of high use. As a result of the growing popularity of reef fishing, charter boats are offering more bottom fishing trips. Jigging for lingcod is a common fishing method. Scuba divers take some lingcod and during the late winter months, divers spear mostly males. Territorial nest guarding behavior

increases the vulnerability of the males to both divers and anglers, while on the other hand the females' "love them and leave them" behavior is a distinct survival advantage in the near vicinity of dive shops. Recreational use will continue to grow as long as the economy and population pressures allow.

### Commercial Fishery

The commercial catch of lingcod is taken almost entirely by groundfish trawl in Oregon. The 1965-74 average landing of lingcod is 1.3 million pounds (590 mt). Lingcod landings are greatest at Astoria, followed by Newport and Coos Bay. The landings of lingcod are roughly 6% by weight of Oregon's trawl catch of food fish. Since lingcod normally inhabit rugged "untrawlable" reef areas, where a fisherman's nets would be destroyed on the rocks, they are usually caught incidentally while fishing for other species. However, sometimes large catches of lingcod do occur. These are sometimes made by fishing on smooth bottom close to a reef after the wave surge of a winter storm has driven the fish out of their normal area. Lingcod landings are very low during the spawning season, usually the result of bad weather during winter. The landings peak in August, with the bulk of the catch occurring in 40 to 90 fathoms (73-164 m). The significance of the depth of most trawl catches is that most sport and commercial catches are coming from separate areas; however, the extent of the interchange between the areas is unknown.

A much smaller, but in some areas significant, commercial fishery is also pursued by troll and jig fishermen on near-shore reefs. Most of this fishery occurs in winter months when salmon are not available or legal to take.

### ACKNOWLEDGMENTS

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