Hexagrammidae – Greenlings and Lingcod

With a common name that combines the Old World and the New, the Lingcod seems forever destined to an identity of similarities rather than uniqueness. Even the scientific name, Ophiodon elongatus *— meaning "elongated snake-tooth" — refers to an animal from a different kingdom altogether. Large teeth rooted in an enormous maw that can engulf prey nearly as big as the fish itself undoubtedly offer some compensation; this voracious predator could just as well have been designated "Big mouth." It has in fact been called the "Buckethead," hardly an improvement over "Lingcod."*

The "ling" prefix apparently is in reference to the Molva molva, *a fish of the northeast Atlantic commonly named the Ling. This species, however, is a member of the codfish order (Gadiformes) and thus is more closely related to the Pacific Cod (*Gadus macrocephalus*) than to the Hexagrammidae family, to which the Lingcod belongs. Such a designation brings the Lingcod full circle, as the "cod" suffix points to similarities of the Lingcod to the Pacific Cod, but with respect to the quality of the meat, rather than the appearance.*

A big mouth that enables the consumption of nearly anything it desires, and a heavy long body that deters attack from many potential predators, certainly concern the Lingcod much more than its borrowed name. And being neither cod nor ling its kin are the greenlings, primarily shallow water marine species. Of course, scientists tell us that a small family can indicate one that is, evolutionarily speaking, on the decline.

But, diminishing or not, like the greenlings, the Lingcod has a distinctive bluish or greenish flesh, a brilliance that may give some pause to the human consumer, although the meat does turn white when cooked. And like the cod and the ling, it is reportedly quite delicious.

The Strait of Juan de Fuca provides shelter and food for at least four Hexagrammidae family species, with one other designated as uncommon. Three of these are Greenlings, members of the *Hexagrammos* genus, and one, the Kelp Greenling (*Hexagrammos decagrammus*) is abundant enough in shallow waters to support a recreational fishery, particularly near shore, as well as a commercial operation in offshore waters along the coast.

Hexagrammidae means "six" ("Hex") and "letter", "signal", or "line" ("gramma"), in reference to the five lateral lines that characterize the greenlings. It is strictly a Pacific Ocean family of only 9-12 species grouped in three genera. Of these, the Lingcod is the only species in its genus (the *Ophiodon*), but it is the most numerous of all family members in the temperate waters of its north Pacific home. And although it has a big mouth, sharp long teeth, and a hue that is more muted than the colorful greenlings, it shares many features in common with those species.

Included in these are dorsal and anal fin spines, all of them nearly the same length, and a single spine on each of the pelvic fins. Habitat is similar as well; both the Lingcod and the greenlings are shallow water fish, most typically in rocky inshore regions, often in kelp or eelgrass beds. Males are both territorial and "guarders," protecting the eggs from predation by other fish, including greenlings. Some juveniles mature quickly, reaching weights in the pounds rather than ounces, with lengths ranging from a foot or two; the Lingcod averages 2-3 feet (61-91 cm) and can potentially measure at five feet (1.5 m) and 80 pounds (36 kg), although such fish are rare.

Nevertheless, size alone makes the Lingcod a desirable catch and the Kelp Greenling a relatively easy one from shore, where with a very cosmopolitan diet they readily take a variety of bait. In their sea bottom home, greenlings eat crustaceans, polychaete worms, seastars, small fish, and mollusks, among other tasty delights. And in keeping with a variety scheme, greenling skin, although probably unrelated

to diet, is almost as colorful as rockfish. The Kelp Greenling was once believed to be two species, as the brighter and considerably larger female is quite different than the darker male.

Three species of greenling as well as the Lingcod are the most likely to be present in the Strait and its bays. At least one other species, the Longspine combfish (*Zaniolepis latipinnis*), has been collected; some authorities place this fish in its own family, the Zaniolepididae.

The Hexagrammidae (Zaniolepididae) species

Kelp Greenling (*Hexagrammos decagrammus*)

Most common of the greenlings throughout the rocky, shallow water habitat of the Salish Sea, Kelp Greenling ranges from 15-24 inches (38-61 cm) in length, with a weight of 2-5 pounds (.91-2.7 kg), and a potential life span of 18 years. As the common name implies, they often live in kelp forests, or sometimes on sandy bottoms or rocky substrates. The female Kelp Greenling is particularly flashy with yellow-orange fins and golden-brown spots against a brown to grayish background. The male is olive or gray with blue spots on the front part of his body; both sexes are yellowish on the inside of the mouth. There are cirri, little projections, one above each eye and the other located halfway from the head to the dorsal fin. Males guard the eggs but also, interestingly, demonstrate a tendency to attempt insemination of nests other than their own. The females do not hang around after egg laying, although they can produce three clutches per spawning season; in Puget Sound such clutches average about 434 eggs. The fish spawn in October and November, with hatching in the winter and spring.

Kelp Greenling are caught both recreationally and commercially. At one time this abundant greenling was discarded as bycatch, although today protective measures are in effect to reduce this waste. Kelp Greenling are heavily fished offshore from Alaska to California. In Oregon alone the harvest guideline was 130 tons (118.3 metric tons) in 2020. As with many commercial fisheries, the greenling catch has had its ups and downs, particularly with the advent of the so-called “live-fish” commercial fishery, begun in California in the late 1980s and in Oregon by the late 1990s. Prior to the beginnings of this market, most of the Kelp Greenling take over the years was attributed to recreational fishing. As an example, from 1980 to 1999, anglers caught an estimated 106,650 fish per year; by comparison the commercial catch was less than ten percent of that number. That proportion changed rapidly as the live-fish trade rapidly expanded.

Today, fishing for this market dominates the commercial Kelp Greenling catch. Popular in Asia, in the United States much of the live-fish clientele is in California. Desirable fish are typically dinner-plate size. Considered hardy, Kelp Greenlings command a higher price in this market.

In the Strait, Kelp Greenling is a recreational fishery, with a limited season (May – June) for hook-and-line as well as spear fishing. Minimum and maximum size are regulated, and daily limits are two fish. Designated as a groundfish, Kelp Greenling is not fished in waters deeper than 120 feet, and most are typically taken near the shore.

Rock Greenling (*Hexagrammos lagocephalus*)

With several records in the Strait, the Rock Greenling is closely related to the Kelp Greenling, occupying similar habits, although it has been found at a depth of 1955 feet (596 meters). Rock Greenling are darker than Kelp Greenling, with bright red blotches on the sides, and a bluish color inside the mouth. A single cirrus is located over each eye. Slightly longer on the average than Kelp Greenling (24 inches) and weighing in at close to two pounds, Rock Greenling are shorter-lived than their cousins. They range from the Bering Sea to southern California, although are uncommon south of San Francisco.

Whitespotted Greenling (*Hexagrammos stelleri*)

Named for Georg Wilhelm Steller, a German scientist who spent most of his short life working for Russia, this Arctic explorer may be best known for the common northwestern Pacific bird, the Steller's Jay. Because most of his travels were in the Bering Sea, naming the Whitespotted Greenling for this naturalist seems appropriate, as it is a northerly fish, ranging from Russia to the Chukchi Sea, across to Unimak Island and south to Oregon.

The Whitespotted Greenling has a light brownish-green body, tinged with red, and dark bars or blotches and streaks on the fins. The common name comes from the white spots on both the body and head. As with the Kelp and Rock greenlings, there are five lateral lines, two of them short. Smaller than the other two greenlings, Whitespotted Greenling reaches a maximum length of 18.8 inches (48 cm) and a weight of 3.53 pounds (1.6 kg). Occurring at maximum depths of 575 feet (175 m), it is most commonly an inshore species, showing a liking for pilings, rocky habitat, and eelgrass beds. Juveniles are typically found in shallow waters while larvae are present near the surface. Whitespotted Greenling migrates upward at night to feed. Wintering may occur in deeper waters. It is a minor commercial species and much less likely to be caught by recreational anglers.

Longspine Combfish (*Zaniolepis latipinnis*)

Known from collections taken in Discovery Bay, located in the eastern part of the Strait, this species dwells over a wide depth range of 122-659 feet (37-201 meters). With a maximum length of 12 inches (31 cm), although typically much smaller, the Longspine Combfish ranges from Vancouver Island to central Baja California where it is most often found on muddy substrates. The common name refers to the substantial dorsal spines, of which the first three are particularly elongated. It is one of two species in the genus. The color is pale beige to gray, accented with brown spots that form a "saddle" along the back. The snout is pointed, the mouth small, and the skin roughened by small scales. Eating a varied menu of invertebrates and fish eggs, Longspine combfish are preyed upon by birds, mammals, and other fish. They live to about 7 years.

Lingcod (*Ophiodon elongatus*)

The largest of them all, it is not surprising that the Lingcod is historically an important commercial species and one that has been consequently subjected to the inevitable see-saw of intensive fishing. Considered by some to be a "poster child" of recovery, as with many other species, Lingcod was so

desirable to commercial fisheries that conservation became a necessary if not a welcomed reality. Also an important recreational fish, historically the impact of so many anglers seeking this long, heavy greenling family member, was a significant factor in its abrupt decline.

For a commercial fisher, Lingcod is money by the pound; for the private individual, it is most simply a great tasty catch — along with salmon and halibut, this is one of the largest fish species in the north Pacific. Potentially as long as five feet (1.5 m) and tipping the scales at a maximum of 130 pounds (59.1 kg), typical sizes are also impressive, with a two-foot (63 cm) fish a real possibility for the optimistic (and prepared) angler. But how does a lowly Hexagrammidae get so large?

A big mouth and a ready willingness to use it certainly contribute to a size that may attract attention from a human predator but can limit the impact of other fish; most simply are not large enough to take on a Lingcod, although sharks and big mammals are always a danger. Considered a voracious feeder, with eighteen sharp teeth, the Lingcod will seek out any prey that it can wrap its mouth around, including species as varied as octopus (a favorite), other fish, invertebrates (preferably large ones), and even their own kind. Large pectoral fins provide a means of elevation above the ocean floor; from such a position the lingcod can launch a swift attack on the unwary.

Lingcod (*Ophiodon elongatus*)

Although primarily nonmigratory, Lingcod range from shallow waters to depths of 1560 feet (475 meters) and undertake forays to nearshore spawning grounds, beginning most often in October. Larvae feed at the surface, and juveniles are often present in eelgrass beds and may remain in shallow habitats for several years. Spawning in areas of strong tidal currents, and along rocky substrates, eggs are guarded by the male; the female quickly departs the site. Without the presence of the male, nests would be quickly emptied. Males can mature as young as two years and 20 inches (51.8 cm) in length; females are larger, maturing at 3 years and 30 inches (76 cm) or more.

Fishing and the decimation of a species

Sometimes greenish or bluish in color, the flesh of the Lingcod transforms to appealing white flakes when cooked, resembling Pacific Cod or Halibut. With an evolutionary record dating to millions of years, Lingcod has provided a nutritious, tasty meal for humans for thousands. In the past, the impact on this species' population was certainly small, one that the Lingcod could easily overcome with its replenishing spawning cycles. In time, as human population increased, the large fish was subjected to more

recreational fishing, but its rocky home provided a defense, albeit short-lived, against the pressure of the commercial industry. Beginning in the 1870s, Lingcod was taken with trawl-like "paranzella nets," a method that involved two boats towing a wide-mouthed net over the bottom. However, large-scale Lingcod fishing was limited by the tendency of nets to get hung up on the rocky habitat preferred by the large fish. As fishing in the twentieth century expanded to a scale never anticipated, in the 1960s people got the idea to place tires on the fishing nets. Now the trawls would bounce over the rocks; this addition opened the Lingcod fishery to an unprecedented scale.

The fishery rapidly increased its impact on the Lingcod and other groundfish species. It was inevitable that with the lack of sufficient regulations and the pressure of an increasing human population, particularly in California, the bounty could not last. Peaking at an amazing ten million pounds per year during the 1980s, at the time the Lingcod provided more pounds to central and northern California anglers and commercial fisheries than any other species. Bycatch was huge, affecting many species, and the fall-out predictable. Dropping to half of the earlier take in the 90s, by 1999 the Lingcod stock was considered to be at 7.5 percent of historic levels.

Thanks to the Magnuson-Stevens Act, renewed in 1996, rebuilding of the Lingcod population was mandated. Initiated in 2000, by 2001 the take was less than one million pounds. Limits restored the Lingcod population to targets set by the plan, and fishing resumed. In 2020, the commercial fishery totaled 1.7 million pounds, while recreational fishers landed 1.1 million pounds.

Clearly an important fish for anglers, limits in the inland waters of Washington, including the Strait, are hopefully enough to preserve the species. From May to June, two fish per day may be taken, subject to certain minimum and maximum sizes; the spearfishing season is shorter. There is also a requirement that fishing not take place deeper than 120 feet (to protect rockfish and other groundfish, although there are exceptions). These regulations hopefully limit the Lingcod catch sufficiently to guarantee the continued presence of a species that has provided food for so many for thousands of years. The question is — do administrators and scientists implement their knowledge, however comprehensive or conversely, limited, in a consistent manner that will ensure that future.

Enough concern about the loss of the Lingcod has resulted in its being considered a "priority species" under the Priority Habitat and Species program of the Washington State Department of Fish and Wildlife (WDFW); such a designation is advisory only but may influence local regulations. What this program attempts to do is offer scientific insight into habitat restoration for the designated species. Surveys by biologists are part of the program; such endeavors may include a range of habitats such as riparian, and nearshore areas.

What does this mean for the Lingcod, if anything? The Lingcod may have been selected as a priority species because of its importance to fisheries, rather than habitat concerns. Thus this species may carry that designation, but any implementation to preserve it within a regulatory umbrella is not clear.

The Lingcod does not have an "endangered" or "threatened" status in the United States or Canada that could be utilized for protection. But hopefully, the ongoing concerns of regulatory agencies, the negotiations between sometimes conflicting interests, and a commitment to scientific research will ensure its future. Such a large and important, in terms of dollars alone, fishery, would always imply pressure on the target fish, and the twin goals to a commitment of preservation and the continued availability for a recreational and commercial fishery will always create a tightrope for those responsible.

Considered "ugly" by many, tasty by knowledgeable diners, and historically important to people dependent upon the bounty of the sea, the Lingcod remains a source of deep satisfaction for those who pursue it cross the boundary between the shore and the salty, sometimes turbulent waters.

Hexagrammidae – Greenlings and Lingcod

Search for photos of greenlings or the closely related Lingcod, and you will find many of big-mouthed fish held by smiling humans. It is easy to imagine that if cameras had been available in the past, such smiles would have brightened the faces of those who lived near the sea. These people praised the fish for providing sustenance while bringing them to shore was more than simple acquisition. As ancient as our species, fishing offers the experience of a primordial connection to the place from which we came. It is a hope for continuance, a look to the future, and a remembrance of the past. The preservation of a species ensures at the very least a fragment of that connection.