

***Hydrolagus colliei* – Spotted Ratfish**

The line slackened as the weight settled on the sea floor. One foot above it, a piece of herring, concealed by a hook, floated, its silvery scales adding to the lure of smell and form. Or so we hoped. We sat 40 feet above, secure in our small, seaworthy boat, which rocked gently on the ruffled water. A mile away, the shoreline of a city little resembled that of the past, but here on the water, time seemed to reverse; one could almost imagine a forest of giant firs and spruce crowded at the edge of the sea. Even the roar of the cars and trucks seemed diminished. On the water modern life seemed to fade.

Yet it was not the aesthetics of a life on the sea that had brought us out on a cold autumn day. Rather it was what lay below, out of sight, yet with a past deeply connected to those above. Surely the earliest humans must have sought sustenance from the sea; it offered so much, then as now.

Like those imagined but unknown ancestors, our immediate goal was a dinner of fresh fish, and in our case accompanied with mashed potatoes, fresh lettuce salad, and maybe a slice of berry pie. The fish we dreamed of was flounder, a strange-looking creature with its eyes on one side of the head and a flattened body that rendered it almost invisible in its sea bottom home. Sedentary, but capable of a quick dash to bring in prey, we hoped that the silvery herring would appeal to the wary flounder. Experience had taught us that here, so close to the city, they might be found.

There! A tug, a bent pole, a taut line. Not too vigorous, but probably a good-sized fish had taken the bait. Quiet waiting giving way to vigorous activity, as a young boy, his excitement palpable, worked the reel. This was our connection to a place that had been part of much of his life.

“Can you see it? How big?”

Big enough, but as the creature came near the surface, we could see that it was not flat and lacked the bulging eyes on a one-sided face. Rather the catch had a conventional shape — upright with large fins, a small tail, and white spots on the head and back. Most noticeable of all, large, otherworldly emerald-green, luminescent eyes stared at us without recognition.

“Rats. It’s a Ratfish. Watch out for the poisonous spine, that spikey piece near the front.”

Removed with care from the hook, we returned it to the sea, hoping it would be the only one of its kind encountered that day. And it was.

Fast forward a few years, when the beautiful flounder had become a rare encounter, and the ratfish as common as the gulls that swirled above.

A member of the Chimaeriformes Order, ratfish boast an evolutionary record extending back to the early Carboniferous, approximately 360 million years ago. The Chimaeridae family itself is known from 71-million-year-old fossils, with tooth plates dated at approximately 55 million years. The name refers to the “chimaera,” a monster of Greek lore with a lion’s head, a goat’s body, and a serpent’s tail. The Ratfish is most closely related to sharks and rays, although evolutionarily separated from them by about 400 million years.

“*Hydrolagus*” is from the Greek for “water” and “hare,” a reference to the supposed resemblance of the Spotted Ratfish to a rabbit. “*Colliei*” honors Doctor Alexander Collie, an early 19th century Scottish naturalist who traveled aboard the *HMS Blossom*, a converted British warship sent west to survey the Pacific Coast. Dr. Collie collected ratfish in Monterey Bay.

Also known as “ghost sharks,” the *Hydrolagus* genus is represented in the Atlantic, Indian, and Pacific, where species occupy variable habitats, including seas as deep as 3937 feet (1200 m).

Like their shark relatives, these are salt water cartilaginous fish that lack scales. The family is composed of 2 genera and approximately 45 species, 3 of them native to the north Pacific Ocean. One

***Hydrolagus colliei* – Spotted Ratfish**

species, the Spotted Ratfish (*Hydrolagus colliei*) inhabits the Salish Sea, including the Strait of Juan de Fuca. Ranging from the western Gulf of Alaska to southern Baja California, the Spotted Ratfish is a generalist species, living in a variety of habitats, from boulder fields to muddy bottoms. It also enters estuarine waters, including the Columbia River.

With a large venomous spine located in front of the dorsal fin, a sloping nose, and luminous emerald-green eyes, the resemblance of a ratfish to a furry rabbit is not in its smooth skin, which lacks hair, but rather with the protruding teeth. Even the “ratfish” designation in reference to the long, narrow tail doesn’t quite work; comparing the appearance of a fish to a mammal always seems a bit of a stretch. The pectoral fins are long and wing-like and the dorsal and caudal fins have dark edges. The mouth is small and lined with a single row of teeth below and a double set above; unlike the related sharks, these teeth are permanent. The bite is very strong, enabling the fish to consume a variety of prey. Sensitive pores on the head are used to detect a possible meal. Ratfish swim with a rowing motion of the large pectoral fins, rather than using their tails. Colored brownish to silver or greenish, accented with white spots on a narrow body, and a large head and eye make the Spotted Ratfish unlike any other fish.

Spotted Ratfish range widely throughout the water column, from the surface to 2995 feet (913 m). With a preference for water less than 50° degrees F (10° C), in the Pacific Northwest this distinctive fish is often encountered in shallow waters, although older individuals tend to range deeper.

Maximum size is 39 inches (100 cm) and 3.9 pounds (1.8 kg), but most Spotted Ratfish are considerably smaller, typically less than 25 inches (63 cm). The females are larger than the males. Ratfish are oviparous, but the number of eggs produced with each cycle is small by comparison to many other

fish species. Over a period of a week or more, the female lays several five-inch-long egg capsules in groups of two, each containing a single egg that may take a year to hatch. The five-inch hatchlings are fully formed. Successful fish may live to an old age of 15 years.

Spotted Ratfish are both solitary and schooling fish and may be most active at night. They eat a variety of sea life, including fish, crabs, urchins, worms, and shrimp. Prey for large mammals such as the gigantic Elephant Seal, they can inflict a nasty wound with the poisonous spine. Between 2006 and 2011 seven Harbor Seals (*Phoca vitulina*) were determined to have died from ratfish spine injuries in the Salish Sea. Humans who handle the fish must also be wary of a painful encounter.

Edible, but reportedly having an “aftertaste,” at least one adventuresome fisherman has prepared fried Spotted Ratfish fillets, using breadcrumbs for coating and olive oil and butter for frying, reporting the fish a little “spongy” but fine to eat. His enthusiasm notwithstanding, this species was never a target



Spotted Ratfish (*Hydrolagus colliei*)

***Hydrolagus colliei* – Spotted Ratfish**

fish for commercial fisheries, although in the past they were taken for purposes other than human consumption. These included processing the oil for use as medicine and as a lubricant. Often a bycatch in trawling fisheries, the meat was sometimes sold as mink food. Most often the fish were discarded.

Ratfish Domination Quantified

Since 1987, the Washington Department of Fish and Wildlife has undertaken trawl surveys throughout the Puget Sound Basin, north to the international border with Canada and west along the Strait of Juan de Fuca. Fifty-one sites are included in the survey, and data is collected on all captured fish, most of which are released; whenever possible, species are identified. Most of the catch are groundfish, including Pacific Cod, Pacific Hake, several sole and flounder species, and ratfish. Since the program was begun, Spotted Ratfish have dominated the survey, both in numbers of fish caught and estimated biomass. As an example, in 2019 the Spotted Ratfish constituted 64% of the catch by weight and 36% by number. English Sole (*Parophrys vetulus*) was a distant second, and other species accounted for only 4% of the weight and 5% of the total number of fish; at 12%, only the Walleye Pollock (*Gadus chalcogrammus*) contributed more. The disproportionately large number is in part the result of a large Spotted Ratfish population in the western Strait, where overall biomass increased by over 200 percent. From the weight, researchers estimate that 213 million Spotted Rockfish were present in the inland waters south of the U.S.-Canadian border. By any measure, this is a very large number. Given that the trawling method does not sample all species, including most rockfish, the results nevertheless seem to imply that the Salish Sea is a ratfish haven.

The question, of course, is has the ratfish population increased and what, if any, relationship is there to fishing — both recreational and commercial — in the region throughout the latter decades of the 20th century. Overfishing, both recreational and commercial, that led to the collapse of many species, particularly rockfish, may have provided unprecedented opportunity for other less-targeted fish. Cessation of trawling and other commercial methods perhaps is bringing about recovery, but among other factors, slow recruitment of many species, including rockfish, means that measuring any change is challenging. And while it is possible that increasing numbers of many exploited species are impacting Spotted Ratfish numbers, consistent surveys of the Salish Sea did not begin until much of the rockfish bonanza had ended, the Pacific Cod had all but disappeared, and fishing pressure had begun to decrease.

Those who fish the inland waters do report a healthy Spotted Ratfish presence; bringing one to the surface is a common experience. Yet it is possible that the decline of other species, especially rockfish and cod, both increased the awareness of Spotted Ratfish presence and its perceived take. Much of the information is anecdotal and some anglers report that ratfish seem to constitute less of their catch in recent years.

The state of the fish populations of the Salish Sea, including the Strait, is both dynamic, and difficult to assess. Ongoing anthropogenic practices certainly impact to the many species. These impacts include both fishing and other activities, such as increased building along the shoreline, dredging, mining filling, and runoff from degraded river watersheds. Even without the human impact, climate changes, short-term geological events, shifting continents — all contribute to the ever-changing composition of marine ecosystems.

Physical impacts, dynamic ecosystems, fishing — all of these factors and more emphasize the importance of surveying as an attempt to quantify what is transpiring beneath the surface. In the short

***Hydrolagus colliei* – Spotted Ratfish**

term, implementation of fishing regulations, always subject to pressures from many interested groups, are an annual requirement that depends on hard data as well as scientific inquiry. Relying on scattered reports is simply insufficient. It is not just the present complexities but the hope for ensuring healthy populations of all fish in the future that makes knowledge so very important.

For fish with such an ancient lineage, such as the chimera, there is an impression of a directed and nearly constant evolutionary pathway as well as change. In contrast to mammalian presence on Earth, which goes back 200 million years, the ancestry of the Spotted Ratfish is at least double that number, perhaps more. Life in the seas predates that on land by at least three billion years, a number even significant to geologists, at least in planetary terms. Ecosystems have modified, new species evolved, others gone extinct, sometimes in vast numbers. But the ratfish have carried on, evolving but remaining the same, expanding and contracting, always there.

Yet as abundant as they are today, the question is, can these strange animals, these “ghost sharks,” persist in the presence of change of unprecedented short time scales. Combined with the added hazard of attention from landed, upright creatures who have consistently turned to the sea, even the Ratfish may be vulnerable. Of spongy, earthy taste, only desperation might render the strange creature edible. But within its body, there is always the oil, and that is marketable.