AN ECOLOGICAL ACCOUNT OF THE GREAT SCULPIN, WITH ANECDOTES FROM ALASKA

Nate Cathcart

Alaska Freshwater Fish Inventory, Alaska Department of Fish & Game, Anchorage

An epiphany struck me while bobbing in a packraft on glassy swells in Resurrection Bay, Alaska, jigging off the sea bottom. Sculpin stories must be told. The first Great Sculpin *Myoxocephalus polyacanthocephalus* I caught in September 2019 puked the remains of a Dungeness Crab *Cancer magister* all over me. The next Great Sculpin I caught in November 2020 had a mouth overflowing with Pacific Sand Lance *Ammodytes hexapterus* (Figure 1). I've seen them puke shrimps *Pandalus* spp. and Walleye Pollock *Theragra chalcogramma*. They've shown me their Southern Rock Sole *Lepidopsetta bilineata* lunch like a nasty child (Figure 2). But beyond the vomit, there is much to appreciate about the Great Sculpin.

As the largest member of their genus, the Great Sculpin is one of dozens of sculpin species that call the north Pacific Ocean home (Figure 3). Their looks impress with a wide mouth in an armored face with spiny cheeks and soulful, bulbous eyes (Figure 4). Front-loaded, heavy-headed, and mottled bodies taper to a squared caudal fin. They even lack a gas bladder, so forget barotrauma. Though there is some mystery to its name (see Scharpf 2024), the genus fits a Greek derivative for muscly or beefy (*Myoxo-*) with head, *-cephalus*. The species name refers to the several (*poly*, many) preopercular and opercular spines (*-acantho-*, thorny) about the head (*-cephalus*). If I could be Linnaeus for a day, I hope this essay's opening vignette sells the

Figure 1: Great Sculpin with a mouthful of Pacific Sand Lance on a snowy November 27, 2020, on Resurrection Bay, Alaska.

Photos by the author unless otherwise indicated.

Nate Cathcart leads the Alaska Freshwater Fish Inventory (AFFI) program as a Habitat Biologist with the Alaska Department of Fish & Game in Anchorage. He joined the AFFI program in 2018 and served as the technician for two seasons before being promoted to project biologist. Earning a Bachelor's degree from Colorado State University and a Master's from Kansas State University, Nate has performed conservation-minded research spanning suckers, minnows, and salmon. His newest project is exploring the distribution of Pacific Lamprey in Alaska.

Figure 2: Jig-caught Great Sculpin with a sole and kelp frond in its gullet on May 7, 2023, from Resurrection Bay, Alaska.

Figure 3: Great Sculpin caught January 11, 2022, in Resurrection Bay, Alaska.

Figure 4: Great Sculpin caught on jig from Kachemak Bay, Alaska, July 11, 2020.

Figure 5: Great Sculpin nest guarding in Auke Bay, just offshore of Juneau, Alaska. (Photo by Annette E. G. Smith)

Figure 6: Great Sculpin head and entrails from Derby Cove in Resurrection Bay, Alaska on October 24, 2021.

reader on a less redundant and more fun species name for Great Sculpin: *hyperemesis*, or "super vomit."

Great Sculpin biology is not well defined, but we know some basics (e.g., TenBrink and Aydin 2009; Tokranova and Orlov 2013). Their range wraps around the north Pacific Ocean from Washington to Alaska as far north as the Bering Strait, then westward toward Siberia, Kamchatka, and the Sea of Japan. Typical Great Sculpin habitat associations involve mud, sand, and rocky bottoms from the intertidal zone to 250 m depths. They grow to 90 cm and 10 kg, exhibiting strong sexual dimorphism with females much larger than males that are generally under 52 cm long and weigh less than 3 kg. Individuals mature at 5–8 years. Females will, on average, release 250,000 eggs during wintertime crevice-spawning events followed by parental nest guarding (Figure 5). Otolith aging suggests Great Sculpin live up to 17 years. My accounts of Great Sculpin diets corroborate other findings: juvenile Walleye Pollock in summer, spawning flatfishes in late-winter, and crabs or fish offal year-round. Indeed, my most effective Great Sculpin fishing hole is next to Resurrection Bay Seafoods, a fish processor in Seward, AK.

Great Sculpin are more than hungry fish. They are eaten by pinnipeds (fancy word for seals), Pacific Cod *Gadus macrocephalus*, and Pacific Halibut *Hippoglossus stenolepis* (Spies et al. 2014). I found a disembodied head onshore after an apparent River Otter *Lontra canadensis* kill was scavenged by Ravens *Corvus corax* (Figure 6). The roles of Great Sculpin as predator and prey adjust with their seasonal bathymetric migrations between shallower

Figure 7. A Great Sculpin bites a Pacific Staghorn Sculpin *Leptocottus armatus* at the edge of a seagrass meadow off Prince of Wales Island near Craig, Alaska. (Photo by Lia Domke)

Figure 8. Still life with fillet knife: Great Sculpin and Red Irish Lord *Hemilepidotus hemilepidotus* harvested from Resurrection Bay in January 2022.

coastal habitats and deeper continental slope areas (Tokranov and Orlov 2013). Other species in the genus *Myoxocephalus* move more in the summer compared to winter yet generally remain in areas less than 25 km² (Hermann et al. 2023). A hypothesis that Great Sculpin do not migrate long distances may help explain why they have antifreeze proteins in their blood as a cold-water adaptation (Yamazaki et al. 2019).

Given their benthic orientation, Great Sculpin are bycatch in bottom fisheries. From my halibut fishing experiences, charter fishing captains collectively refer to sculpins, usually Great Sculpin or Irish lords *Hemilepidotus* spp., as "mother-in-law" fish. This derogatory colloquialism may insult fish and mothers-in-law. Worse yet, it suggests the fishing community lacks identification skills. At least they release the sculpins. Similar to sport fisheries, Great Sculpin are one of the most commonly caught sculpins in commercial trawl fisheries but in another magnitude, sometimes exceeding 2,000 metric tons per year

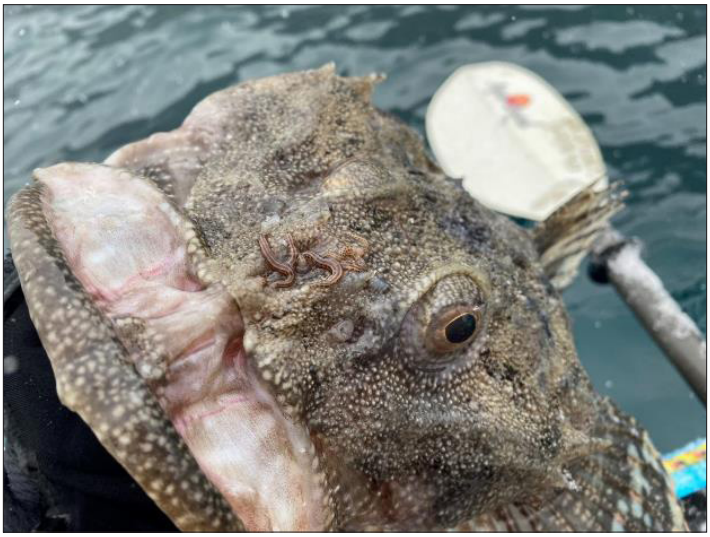

Figure 9: Great Sculpin face infested with Striped Sea Leeches on March 15, 2023, in Resurrection Bay, Alaska.

(TenBrink and Aydin 2009). Though bycatch could support untapped consumer markets with cheap protein, the Great Sculpin has little commercial value. If Great Sculpin overcome the current aversion by catchers and consumers, their flavor will be a reason it reaches your plate.

Sculpins taste great. Anglers from California to British Columbia who catch and eat Cabezon *Scorpaenichthys marmoratus* know, and to them I preach to the choir. Heck, even Great Sculpins don't turn down an opportunity to eat another sculpin (Figure 7). Sculpin meat flavor, texture, and appearance rival those of Pacific Cod and Rockfish *Sebastes* spp. (Vandever 2012). My taste tests of Great Sculpin and other species confirm this (Figure 8). Consumer beware, Great Sculpin can contain mercury levels exceeding the US Environmental Protection Agency guideline depending on their size, age, and location (Jewett and Duffy 2007). But for what it's worth, the McFish, I mean Walleye Pollock, can as well.

Aside from their contributions to my angling and eating behaviors, Great Sculpin taught me new facets of marine biology. I now know their parasites, such as leech and louse. The Striped Sea Leech *Notostomum cyclostomum* sucks blood from Great Sculpin faces, among other spots (Figure 9). Copepods, *Lepeoptheirus* spp., latch onto cheeks or inside gills to feast (Figure 10). Bright rusty- or red-colored patches on Great Sculpin have also caught my eye (Figure 11). These patches range from one to several blotches of varying sizes and may just be color variations. Other hypotheses are that they are spawning colors or an encrusting sponge. As a stream fish ecologist, I am out of my element here and welcome any input.

A vomiting mother-in-law sounds more repellant than inspiring, but catching Great Sculpin has led to more than a lapful of puked crab parts. I've learned about their biology, ecology, and role in fisheries. I hope you learned something too. Better yet, much remains to be discovered about Great Sculpin and their community ecology, life history patterns, and fisheries potential. Perhaps an inspired intrepid scientist will one day answer questions that further enlighten us to the ways of the Great Sculpin.

Figure 10. Great Sculpin with copepods sticking out of gills on January 11, 2022, from Resurrection Bay, Alaska.

Figure 11: Blotchy bright-rust pattern on Great Sculpin head, note the parasitic copepod attached to the preopercle area in the bottom center of the image. Sculpin is from Thumb Cove, on the east side of Resurrection Bay, outside Seward, Alaska.

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Suggested reading

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