KODIAK

Geography

The Kodiak Archipelago is comprised of numerous islands. The largest, Kodiak Island, is surrounded by the Trinity Islands, Afognak Island, and Shuyak Island, among many smaller ones. Kodiak Island is the second largest island in the United States and the largest in Alaska.

The Kodiak region is located in the western border of the Gulf of Alaska amid rich fishing grounds. Storms frequent the island during the winter months, often disturbing air and marine travel. The Kodiak Archipelago is home to an average of 25 million adult pink salmon, nearly four million sockeye salmon, and nearly a half-million coho salmon.



Mean Elevation per Watershed: Kodiak

Jared Kibele, Rachel Carlson, and Marie Johnson. 2018. Elevation per SASAP region and Hydrologic Unit (HUC8) boundary for Alaskan watersheds. Knowledge Network for Biocomplexity. <u>doi:10.5063/F1D798QQ</u>.

Early people and salmon systems

The Alutiiq, or Sugpiaq, people have inhabited this region for at least 7,500 years, supported by the maritime environment (Crowell et al. 2001). Archaeologists have identified three periods of Kodiak's prehistory that refer to differences in cultural practices and activities, known as the Ocean Bay, Kachemak, and Koniag periods. All time periods incorporated ritually elaborate subsistence hunting and fishing practices (Mason 1995). In large part due to the inhospitably of the interior of the islands, early Indigenous people depended upon coastal marine resources for survival including marine mammals, waterfowl, fish, and intertidal species. Early migratory hunting and foraging patterns (Fitzhugh 2003) developed into later sedentary coastal villages, often near salmon producing streams that allowed for surplus production and food storage (Steffian et al. 2006; Knecht 1995).



Credit: Alaska State Library, L.P. "Phil" Callahan Photo Collection (P518-172)

The Alutiiq peoples were able to successfully repel several armed attempts by Russians to land their ships between 1760 and 1780 (Black 1992; Pierce 1981). But in 1784, Gregorii Shelikof led a violent attack and they established their first

permanent colony in Alaska at Three Saints Bay nearby the village of Old Harbor. Many Alutiiq people were killed or enslaved and forced to hunt to supply the sea otter fur trade. This is a devastating history resulting in much death and violence throughout the archipelago. Though Indigenous people were at first forced into fur harvesting, they were later forced to work wage labor, where wages were comprised of food and other Russian items (Pullar 2009).

Continued exploitation, loss of sovereignty, and the influx of disease plagued the Kodiak Indigenous population until colonial rule transformed into a cultural mixing of Alutiiq and Russian families and the widespread adoption of the Russian Orthodox religious faith. During the end of the Russian era, Alutiiqs lived a bicultural existence, blending traditional subsistence practices with the increased normalization of activities introduced by the Russians, such as wage labor and the incorporation of the Russian language (Pullar 2009).

The sale of Alaska from Russia to the United States in 1867 continued cultural change. The U.S. military heavily established its presence and American companies moved in to take advantage of the sea otter trade and subsequent salmon canning industry in the 1880s. The twentieth century brought U.S. government schools into Kodiak's villages and forced cultural assimilation through the prohibition of the Alutiiq language and cultural practices in schools. American churches and missionaries also inundated the region and created tense relations with the already established Russian Orthodox faith (Crowell et al. 2001).

Environmental disasters have also impacted Kodiak region residents across the entire island chain with massive sociocultural and fisheries related effects. The 1912 Novarupta volcanic eruption near Katmai on the mainland spread ash throughout the archipelago and stories tell of a darkening sky that some believed to be "the biblical Judgment Day" (Crowell et al. 2001:65). The 1964 Good Friday earthquake and tsunami severely damaged Kodiak's fishing fleet and largely destroyed the Kodiak Archipelago villages of Afognak, Kaguyak, and Old Harbor. Several decades later in 1989 the Exxon Valdez Oil Spill (EVOS) halted commercial and subsistence fisheries and also introduced deep social schisms between fishermen who were hired for clean up efforts and those who were not.

Large-scale commercial fisheries have been established around the Kodiak Archipelago since the first salmon cannery was built in Karluk in 1882 near one of the largest natural sockeye salmon runs on Kodiak Island (Roppel 1986). There are over 800 salmon producing streams within the Alaska Department of Fish and Game (ADF&G) Kodiak Management Area that contribute to an incredibly productive fishery (Himes Cornell et al. 2013), in addition to the Kodiak Regional Aquaculture Association hatchery that supplements wild salmon runs.

Prior to statehood, commercial fisheries in Alaska's waters were heavily fished by outside entities resulting in questions about how to manage fishery resources for long-term sustainable yield. In 1972 the Alaska State Constitution was amended to allow for limited access to commercial fisheries within state waters. Contemporary

commercial fisheries drastically changed with the creation of the Limited Entry Act (AS 16.43) and in 1974 the newly created Commercial Fisheries Entry Commission began to implement and oversee the purchase and transfers of limited entry permits. Permit transfers may occur by gift, inheritance, by sale on the open market or special circumstance medical transfers. Kodiak's commercial salmon fisheries include purse seine (SO1K), beach seine (SO2K), and set gillnet (SO4K) limited entry permits (Gho 2016). The value of salmon limited entry permits held by Kodiak Island Borough residents has fluctuated greatly since implementation and has increased over the last decade, while local permit ownership itself had declined. In 2005, Kodiak region residents owned 398 permits worth about \$11 million. Ten years later, local ownership decreased to 289 permits but were valued at \$29 million (McDowell 2016).

Regional Snapshot Today

Salmon and habitat



Jeanette Clark and Robyn Thiessen-Bock. Estimate of total Alaskan salmon abundance by region, 2000-2015. Knowledge Network for Biocomplexity. <u>doi:10.5063/F1BR8QG4</u>.

Kodiak is the 4th largest salmon producing region of Alaska with habitat most well suited to pink salmon (short coastal streams) and sockeye salmon (large rearing lakes). The region has a temperate, and some may say temperamental, climate with 640 cm (21 feet) of precipitation recorded in an average year, and an average summer air temperature of approximately 10.5°C (51°F).

Although the human population is small compared to regions such as Cook Inlet, the high density on the eastside of the island near the hub of Kodiak translates into the 4th highest index of human activity, though no active mining occurs on the island. An estimated 49% (92) of the 189 known culverts on the island are known to or have the potential to negatively affect fish passage. Though among the smaller regions of Alaska (18,061 km²), Kodiak has approximately 2700 km (1677 miles) of streams and rivers known to contain at least one species of Pacific salmon.

Salmon and people

The Kodiak community has a culturally and ethnically diverse demographic population with the largest U.S. Coast Guard base and a substantial Filipino community tied to commercial fish processing work (NOAA 2010). There are six predominantly Alutiiq villages around the archipelago including Ouzinkie, Akhiok, Karluk, Larsen Bay, Port Lions, and Old Harbor. In 2010, 55% of Borough residents identified as White, 19.6% as Asian, and 13.2% as American Indian or Alaska Native.

The sport fishing and hunting industry has become an important driver of the regional economy in many of the communities, where all five species of Pacific salmon are targeted. In 2010 there were 65 guide businesses out of the City of Kodiak and six lodges in Karluk in 2011 (Himes-Cornell et al. 2013). Subsistence and commercial fishing activities remain extremely important to regional community members for economic stability and cultural activities. Such practices, impacted by the privatization of fisheries access since the mid-1970s, are intricately linked to well-being and occupational identity among residents (Carothers & Chambers 2012; Ringer 2016).

Percent Change from Number of Initially Issued Commercial Permits to Number of Permits in 2016



Percent change from number of initially issued (ranging from 1975-1982) permanent commercial salmon permits held by Alaska residents to number of permits in 2016 by community. Alaska Department of Fish and Game, Commercial Fisheries Entry Commission. 2017. Commercial Fisheries Entry Commission CFEC Public Permit Holders by Community of Residence 1975-2016. Knowledge Network for Biocomplexity. <u>doi:10.5063/F189144V</u>



Upper Buskin River Weir, Kodiak Island. September 2016. Photo by Peter Westley



Percent of population living below the poverty line in Kodiak communities, 1980 - 2015. United States Census Bureau, Juliet Bachtel, John Randazzo, and Erika Gavenus. 2018. Alaskan Population Demographic Information from Decennial and American Community Survey Census Data, 1940-2016. Knowledge Network for Biocomplexity. <u>doi:10.5063/F1XW4H3V</u>



Total population size of Kodiak communities, 1950 - 2015. United States Census Bureau, Juliet Bachtel, John Randazzo, and Erika Gavenus. 2018. Alaskan Population Demographic Information from Decennial and American Community Survey Census Data, 1940-2016. Knowledge Network for Biocomplexity. <u>doi:10.5063/F1XW4H3V</u>



Median household income, by region (data for 2010). United States Census Bureau, Juliet Bachtel, John Randazzo, and Erika Gavenus. 2018. Alaskan Population Demographic Information from Decennial and American Community Survey Census Data, 1940-2016. Knowledge Network for Biocomplexity. <u>doi:10.5063/F1XW4H3V</u>

Salmon and economy

Salmon fisheries in the Kodiak region are the state's fifth largest in value, having generated \$1.7 billion in revenue since 1975 (inflation-adjusted 2017 dollars), and are the state's fourth largest in volume. Historical fishing revenue variability in the Kodiak salmon fisheries has been low and is associated with the diversity of species available to the commercial fishery. Sockeye salmon are the primary target species early season, followed by pink, chum, and coho salmon in the fall. Over the past 15 years, the state started issuing loans to salmon enhancement programs in the region ranging between \$0.5 million and \$1 million.



Number of new entrants to commercial salmon fisheries in the Kodiak region, 1995 - 2016. Commercial Fisheries Entry Commission CFEC and Tobias Schwoerer. 2016. Commercial Fisheries Entry Commission Public Permit Database from 1975-2016. Knowledge Network for Biocomplexity. <u>doi:10.5063/F1CV4G17</u>



Salmon fisheries real harvest revenue, by fishing region and permit owner type in the Kodiak Region, 1990 - 2010. Tobias Schwoerer. Regional commercial salmon permit earnings by residency status, Alaska, 1975-2016. Knowledge Network for Biocomplexity. <u>doi:10.5063/F1WW7FZ2</u>



Mean horse power of the salmon fishing fleet in the Kodiak region, by owner residency (purse seine). Alaska Department of Fish and Game, Commercial Fisheries Entry Commission and Tobias Schwoerer. 2018. Commercial vessel characteristics by year, state, Alaskan census area and city, 1978-2017. Knowledge Network for Biocomplexity. doi:10.5063/F14F1P2Q

Salmon and subsistence

State regulatory framework

Participants in the Kodiak Management Area subsistence salmon fishery must obtain a permit from the Alaska Department of Fish and Game (ADF&G), record their harvests on the permit, and return the permit to ADF&G at the end of the season. In the area generally along the Kodiak Island's road system, harvest limits are 25 salmon for the permit holder and 25 additional salmon for each member of the same household, although households may obtain an additional permit upon request. There are no annual harvest limits in the remainder of the management area. Legal gear under state regulations includes set nets and seines. For a complete summary of state subsistence regulations, see 5 AAC 01.500 – 549. There is also a small state personal use fishery targeting enhanced salmon at Settler Cove; salmon may only be taken with dip nets, and there are no bag or possession limits (5 AAC 77.468).

Federal regulatory framework

Federal regulations are similar to state regulations, except rod and reel is recognized as legal subsistence gear. In approximately 2010, Kodiak National Wildlife Refuge (the primary federal land owner) began issuing separate permits to federally-qualified rural residents; in 2015, 19 federal permits were issued with a reported harvest of 63 salmon (Fall et al. 2018:174). This federal harvest monitoring program has not been integrated with that of the state.

Subsistence salmon harvest patterns

The Kodiak Area subsistence salmon fishery is one of the few in the state for which harvest estimates are not produced based upon expanded reported harvests. Because no record is kept of the number of permits issued, only the harvests reported on returned permits appear in annual summaries of the fishery (Fall et al. 2018:170-171). The Alaska Board of Fisheries established an ANS for the Kodiak Management Area of 26,800 to 44,700 salmon (5 AAC 01.536(b)); this ANS finding does not distinguish among species.



Fig. 7-1. Alaska Department of Fish and Game, Division of Subsistence. Subsistence and personal use harvest of salmon in Alaska, 1960-2012. Knowledge Network for Biocomplexity. <u>doi:10.5063/F18P5XTN</u>

From 1986-2016, the annual reported subsistence salmon harvest in the Kodiak Management Area averaged 30,549 fish, with a range of 16,177 (1988) to 41,737 (1997) (Figure 7-1). The reported harvest from 1994 through 2016 was composed of 79% sockeye, 15% coho, 4% pink, less than 1% chum, and less than 1% Chinook (Figure 7-2). Most participants in the Kodiak Area subsistence salmon fishery live in Kodiak Island Borough communities. For the period 2012-2016, on average, 1,655 permits were returned each year, with an annual average of 1,375 permits held by Kodiak Island Borough residents (83%) and 280 (17%) by other Alaska residents (Figure 7-3). Over this same period, the average harvest per subsistence permit was 16 salmon, with local residents averaging about 18 salmon and other Alaska residents about 4 salmon.



Fig. 7-2. Alaska Department of Fish and Game, Division of Subsistence. Subsistence and personal use harvest of salmon in Alaska, 1960-2012. Knowledge Network for Biocomplexity. doi:10.5063/F18P5XTN.

Fig. 7-3. Alaska Department of Fish and Game, Division of Subsistence. Subsistence and personal use harvest of salmon in Alaska, 1960-2012. Knowledge Network for Biocomplexity. doi:10.5063/F18P5XTN.



Harvests under subsistence regulations (primarily with set nets or seines), rod and reel harvests (considered sport harvests under state regulations), and retention from commercial harvests for home use ("home pack") are all important sources of salmon for home use in Kodiak Management Area communities (Marchioni et al. 2016). Comprehensive surveys conducted in Kodiak Road system communities found that for the 3-year period 1991-1993, 45% of the salmon harvest as estimated in numbers of fish was taken with rod and reel; 35% with subsistence gear, and 20% removed from commercial harvests. For the six communities that are off the island's road system, most salmon during the 1991-1993 study period was harvested with subsistence nets or seines, ranging from about 60% in Old Harbor to about 90% in Akhiok and Karluk. Commercial retention of salmon for home use was notable in Larsen Bay (15% of total), Ouzinkie (22%), and Old Harbor (27%) (Figure 7-4). In 2012, random samples of Kodiak road system households with and without subsistence salmon permits were interviewed (Marchioni et al. 2016). For the former group, subsistence gear provided over 50% of the total salmon harvest and for the latter set of households, rod and reel was the primary harvest method (57% of total). In 2012, commercial retention was the primary source of salmon for home use in Larsen Bay, while subsistence nets or seines provided most 60% of the salmon harvest for Old Harbor (Figure 7-5). Although findings have varied by community and year, survey results show the importance of rod and reel and commercial "home pack" harvests, in addition to subsistence harvests, for Kodiak communities' supply of salmon. (See, for example, Marchioni et al [2016:140,147] for multiple study years' findings for Larsen Bay and Old Harbor.)



Fig. 7-4. Alaska Department of Fish and Game, Division of Subsistence. Subsistence and personal use harvest of salmon in Alaska, 1960-2012. Knowledge Network for Biocomplexity. <u>doi:10.5063/F18P5XTN</u>.



Fig. 7-5. Alaska Department of Fish and Game, Division of Subsistence. Subsistence and personal use harvest of salmon in Alaska, 1960-2012. Knowledge Network for Biocomplexity. doi:10.5063/F18P5XTN.

Based upon most recent comprehensive household harvest surveys, salmon comprise approximately 35% of the total harvests of wild resources for home use by residents of the Kodiak Management Area (the Kodiak Island Borough) (Figure 7-6). This includes salmon harvested in subsistence fisheries, sport fisheries, and retained by commercial fishers for home use ("home pack") (ADF&G 2017). Salmon play a larger role in subsistence harvests in the six primarily Alaska Native communities than in the harvests of the borough's population along the road system. In the villages, salmon provide 47% of a total annual harvest of 289.6 lbs. per person of subsistence foods (Figure 7-7); along the Kodiak road system, salmon provide 33% of a total of 155.2 lbs. of subsistence foods (Figure 7-8).



Fig. 7-6. Alaska Department of Fish and Game, Division of Subsistence. 2018. Subsistence harvest information by region, community, resource, and year, 1964-2015. Knowledge Network for Biocomplexity. <u>doi:10.5063/F1575DNC</u>.



Fig. 7-7. Alaska Department of Fish and Game, Division of Subsistence. 2018. Subsistence harvest information by region, community, resource, and year, 1964-2015. Knowledge Network for Biocomplexity. <u>doi:10.5063/F1575DNC</u>.



Fig. 7-8. Alaska Department of Fish and Game, Division of Subsistence. 2018. Subsistence harvest information by region, community, resource, and year, 1964-2015. Knowledge Network for Biocomplexity. <u>doi:10.5063/F1S75DNC</u>.

The permit system has likely underestimated subsistence harvests by residents of the six remote, largely Alaska Native communities within the Kodiak Management Area. Reasons for underreporting are complex, but include difficulties with permit availability, harvest limits, and concerns about misuse of harvest information (Williams, Coiley-Kenner, and Koster 2010:37; Marchioni et al. 2016:37-41). In response, the Alaska Board of Fisheries eliminated annual harvest limits in areas off Kodiak Island's road system beginning in 2008, and ADF&G has attempted to make permits available through vendors or tribal offices in the remote communities. Outreach has also occurred in local communities to discuss how harvest information is applied in the salmon management system (Marchioni et al. 2016:2-3). For descriptions of subsistence salmon fishing and processing in Kodiak Island Borough communities, see Mishler 2003:172-186 and Marchioni et al. 2016.

Salmon and governance

Governance topics recently of significance in the Kodiak region include sportfishing regulations, commercial fishing area opening timing, and salmon habitat protection. Governance topics addressed at the Board of Fish include commercial fishing and sportfishing questions. The Kodiak National Wildlife Refuge dominates land holding in this region, while state fisheries management play the largest role. State representative Louise Stutes submitted HB 199 in 2014 the purpose of which was to

improve protections for salmon and salmon habitat by strengthening the permitting system for salmon stream changes and expediting determinations about the status of streams as salmonid habitat. The bill was not addressed by the legislature and was then advanced by public interest groups to become statewide Initiative 1, Stand for Salmon, on the ballot in the 2018 election. The initiative was defeated on Nov. 6, 2018. Between 2000-2018, the Kodiak salmon fisheries were declared a disaster on one occasion.

Land Ownership

In the Kodiak region, the federal government is primary land owner. On Kodiak Island and the southwest coast of the Alaska Peninsula, the Fish and Wildlife Service administers the Kodiak National Wildlife Refuge as well as portions of three other refuges in the region. The National Park Service administers the portion of the Katmai National Park on Alaska Peninsula to the northeast of wildlife refuge lands. The Alaska Native corporations, village and regional, are the second largest land owners with substantial holdings in the northeast, northwest, and southeast portions of the region. Traditional village sites were associated with highly productive salmon streams thus Alaska Native owned lands adjoin and often encompass these systems. The state owns substantial lands near the City of Kodiak and has established state parks in the northeast part of the region. The state has also established an island refuge.

The Kodiak borough covers all of the lands of the Kodiak archipelago and the south shore of the Alaska Peninsula across Shelikof Straits. There are ten federallyrecognized tribes in the Kodiak region, six of which function in smaller village communities situated around the archipelago.

The Northwest Setnetters Association, Kodiak Seiners Association, and the Kodiak Salmon Workgroup represent the interests of the primary salmon harvesting gears in the Kodiak region. The Kodiak Association of Charterboat Operators represents the guided sport fishing interests located in the region.

There are no regional based watershed or environmental conservation specific organizations. There is a Kodiak Water and Soil Conservation District.

There are two salmon hatcheries currently operating in the region. They are owned and operated by the Kodiak Regional Aquaculture Association. Founded in 1983, the association has a Board of Directors composed of Kodiak region permit holders and other stakeholders in salmon enterprises. Operational funds are obtained from costrecovery fishery and a 2% tax on commercial salmon permit owners directed to the state general fund at point of sale. In addition to the hatcheries, the association has also conducted lake fertilization as a means of stock enhancement.

Federal, State, and Native Land in Kodiak



Emily O'Dean and Jeanette Clark. Land status in Alaska, 2018. Knowledge Network for Biocomplexity. doi:10.5063/F1NK3C9X.

Board of Fisheries

Kodiak regional proposals rank fifth among the regions with 137 proposals. Categories addressed by proposals most frequently are boundaries/closed waters, fishing seasons, and gear specifications/vessels. While the majority of proposals have come from commercial fisheries, sport fishing sector interests have submitted nearly as frequently. A few subsistence proposals were submitted.

Kodiak proposers other than ADF&G have had very low rates of success. Individuals have the succeeded about 20% of the time. Village council/tribes submitted only four proposals, all of which failed.

There is one Advisory Committee for the Kodiak region composed of at-large members in Kodiak with designated seats for Kodiak proper and three of the outlying smaller communities. Since members derive from many different fishing interests, from trawlers to set netters, the committee serves as a sounding board for possible proposals but does not submit proposals as an entity due to the divergent interests represented. It may, however, take a position on proposals submitted by individuals from the region. See the communities and boundaries of the Kodiak Advisory Committee here.

Federal Subsistence Board

Kodiak regional interests participate in region 3, Kodiak/Aleutians, in the federal subsistence program. Only five proposals were submitted to the FSB by Kodiak interests over the study period and none after 2011. Only one RAC proposal passed. Village council/tribes did not submit any proposals.

Enforcement

Kodiak ranks fifth among regions in terms of the number of citations for salmon fishing violations. Sportfishing violations are the most numerous and the region has the third highest number of such violations at 85. By contrast, commercial violations at 26, rank sixth among regions. In 2017, violations declined nearly 50% from the 35-40 range characteristic of the three previous years to 21.



Stephen Langdon, Taylor Brelsford, Jim Fall, and Jeanette Clark. 2018. Salmon Proposals to the Alaska Board of Fisheries, 2000-2017. Knowledge Network for Biocomplexity. doi:10.5063/F1D21VW7



Stephen Langdon, Taylor Brelsford, Jim Fall, and Jeanette Clark. 2018. Salmon Proposals to the Alaska Board of Fisheries, 2000-2017. Knowledge Network for Biocomplexity. doi:10.5063/F1D21VW7



Stephen Langdon, Taylor Brelsford, Jim Fall, and Jeanette Clark. 2018. Salmon Proposals to the Alaska Board of Fisheries, 2000-2017. Knowledge Network for Biocomplexity. <u>doi:10.5063/F1D21VW7</u>



Taylor Brelsford, Steve Langdon, and Jeanette Clark. 2018. Alaska Federal Subsistence Board Proposals 2000-2015. Knowledge Network for Biocomplexity. doi:10.5063/F1HT2MMN



Kodiak: Proposal Result by Proponent Group, Federal Subsistence Board, 2000-201

Taylor Brelsford, Steve Langdon, and Jeanette Clark. 2018. Alaska Federal Subsistence Board Proposals 2000-2015. Knowledge Network for Biocomplexity. doi:10.5063/F1HT2MMN



Alaska Department of Public Safety, Division of Alaska Wildlife Troopers. 2018. Violations and Enforcement of Salmon Fishing Regulations, Alaska, 2014-2017. Knowledge Network for Biocomplexity. doi:10.5063/F1VH5M32

CASE STUDY

Loss of Rural Fisheries Access and Graying of the Fleet

A critical issue for Kodiak's salmon-people relationships is the dispossession of local salmon fishing rights from the region's communities and related community well-being implications. Since limited entry permits were implemented in state commercial fisheries, permit holdings by rural residents local to their fisheries have declined by 30%. The exodus of local fishing rights is compounded by persistent aging and succession trends, a problem referred to as the "graying of the fleet" (Carothers 2012; Donkersloot & Carothers 2016; Ringer et al. 2018). This issue threatens the healthy succession of fishing as an economic and cultural mainstay in Alaska's communities, and creates a public policy problem. In 2012, the Alaska State Legislature passed a resolution stating that the graying of the fleet is a pressing area of concern for the entire state. In

response, the Graying of the Fleet study began in 2014 to better understand and address this problem (<u>http://fishermen.alaska.edu</u>) and provide recommendations on potential policy alternatives (Cullenberg et al. 2017).



Photo: Kodiak salmon seiner making a set, 2015. By Danielle Ringer

In 2017, the average age of all Alaska state permit holders was 51.1, up nearly 10 years since 1980 (Gho and Farrington 2018). What this demographic change means for many coastal fishing communities is that far fewer younger people are engaged in commercial fishing than in decades past. In the rural fishing villages of the Kodiak region there has been an 84% decline of people under 40 years old holding salmon purse seine limited entry permits (CFEC 2015). These trends represent a suite of concerns including global trends in fisheries management towards the commodification of fisheries access rights and the outmigration of rural youth from their home communities. The current climate in Alaska's commercial fisheries for a young person to enter and diversify their fisheries is tenuous and distinguished by markedly different pathways than those of their predecessors. Multiple barriers for those in Kodiak, and elsewhere in Alaska, to entry in commercial fishing stem from the privatization of fisheries access, including financial and other socioeconomic challenges. High capital costs, lack of access to loans and business management skills, and varying degrees of exposure to fishing from an early age are a few of many barriers experienced by those now interested in commercial fishing careers, particularly as owner-operators (Coleman et al. 2018).

The Graying of the Fleet study included a student survey component and over 800 surveys were completed within the Kodiak and Bristol Bay regions. Results show that factors associated with

surveyed youth holding a positive view of commercial fishing included student experience in commercial fishing, family ties to commercial fishing, the importance of commercial fishing income to their family, and subsistence fishing ties. Overall, results suggest that the more plentiful a young person's ties to fishing, the more positively they view commercial fishing. Current and historical family ties to commercial fishing emerged as key predictors impacting attitudes towards fishing and how they view opportunity within the career (Figure 1). As generational ties to fishing have changed, largely decreasing, through time post-limited entry and IFQs (see Apgar-Kurtz 2015; Langdon 1980; Reedy-Maschner 2007; Carothers 2008), important periods of exposure for future generations were lost (Coleman et al. 2018). Even with the multifaceted changes throughout time in the Kodiak region, family connections and social networks (informal mentors) continue to serve as mechanisms to gain access to fishing livelihoods.



Fig. 1 Generational ties to fishing by community for surveyed students in the Kodiak Archipelago (bottom panel) and Bristol Bay (top panel) regions, from Coleman et al. 2018.

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