Socioeconomic Impacts of Fishery Disasters and Pathways to Resilience for Subsistence Users in the Chignik Region

April 2025

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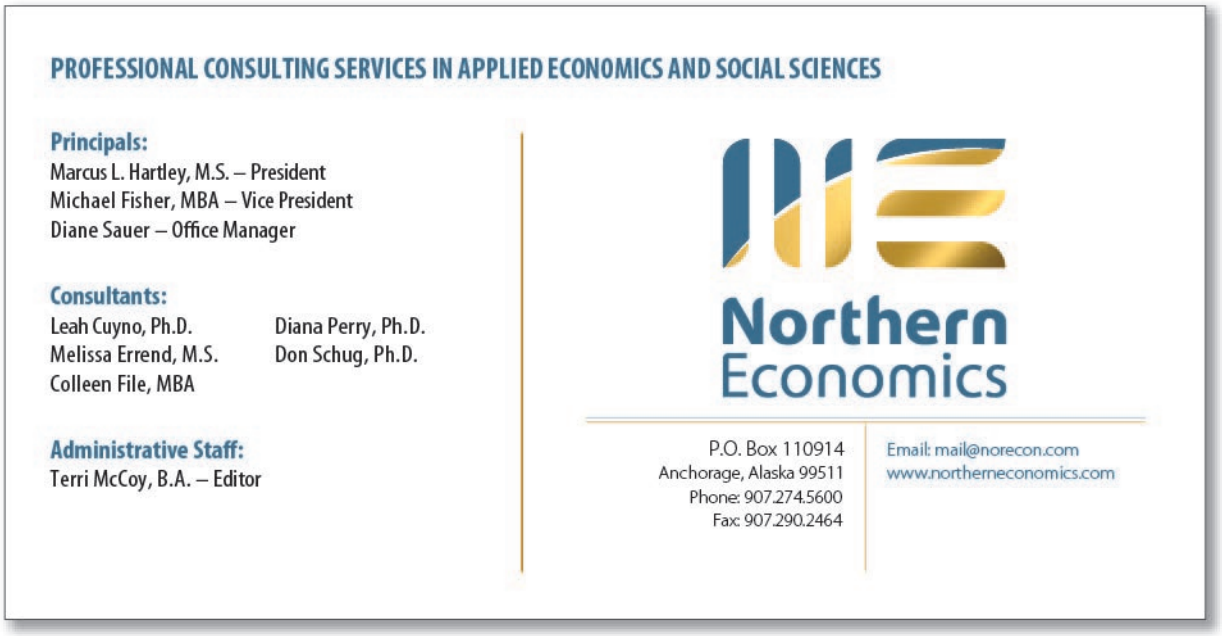

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We acknowledge that this project took place on, and the research team was welcomed on, the traditional lands of the Alutiiq and other Indigenous peoples who have lived in the region for thousands of years. We honor their history, their ongoing presence, and their stewardship of these lands and waters.

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Abbreviations

ADFG	Alaska Department of Fish and Game
ADOLWD	Alaska Department of Labor and Workforce Development
ASFT	Alaska Sustainable Fisheries Trust
ALFA	Alaska Longline Fishermen's Association
AML	Alaska Municipal League
ANCSA	Alaska Native Claims Settlement Act
BBNA	Bristol Bay Native Association
BBNC	Bristol Bay Native Corporation
CFEC	Commercial Fisheries Entry Commission
CIC	Chignik Intertribal Coalition
CMA	Chignik Management Area
CQE	Community Quota Entity
CRAA	Chignik Regional Aquaculture Association
DEED	Alaska Department of Education and Early Development
IFQ	Individual Fishing Quota
NOAA	National Oceanic and Atmospheric Administration
NMFS	National Marine Fisheries Service
PPP	Paycheck Protection Program
PSMFC	Pacific States Marine Fisheries Commission
PSP	Paralytic Shellfish Poisoning
PWS	Prince William Sound
QS	Quota Share
SDN	Seafood distribution network
SWAMC	Southwest Alaska Municipal Conference
USDA	United States Department of Agriculture
USFWS	U.S. Fish and Wildlife Service

Executive Summary

In 2018, historically low salmon escapement led to the closure of the Chignik region commercial sockeye salmon fishery and the federal subsistence fishery, leading to a federal fishery disaster declaration in 2019. In the following years, poor escapement led to additional fishery closures and additional fishery disaster declarations in 2020, 2021, and 2022. As of April 1st, 2025, an additional disaster declaration request for 2024 was pending approval. The dramatic and persistent loss of salmon resulted in catastrophic economic losses for resident Chignik region fishermen, processors, and support service providers, but also impacted local food security and community well-being, as sockeye is an important subsistence resource. In 2022, Northern Economics, Inc., Wislow Research Associates LLC, and the Chignik Intertribal Coalition received a grant from the Pacific States Marine Fisheries Commission to better understand how these changes affected subsistence users and to investigate lessons learned that may help prepare for any future fishery disasters.

The focus of this project is to examine how the ongoing sockeye fishery disaster impacted subsistence users in the Chignik region. This report considers the broad economic, social, cultural, and well-being related impacts of the fishery disasters on individuals and communities stemming from the disruption of traditional subsistence harvesting, sharing, and use practices. This project aims to document the ways in which individuals and households have attempted to cope with these impacts, along with any barriers to adaptation. The goal is to document impacts and identify strategies that will expand the capacity of communities to recover from the current fishery disasters and prepare for possible future disasters.

This report discusses findings from two distinct phases of work. The first phase focused on documenting impacts of the sockeye fishery disasters to subsistence users starting in 2018 as informed by available data and community member interviews conducted in the fall of 2023. The results from this first phase were presented as an initial draft report to Chignik region communities in June 2024. The second phase of the project built on these findings to explore strategies that may help enable communities to prepare for and withstand future disasters. Following community discussions, additional interviews with community members and organizational experts, and a literature review, these findings were synthesized into a summary of potential resilience pathways. This summary, along with updates based upon community feedback, has been included as a final section of this report.

Impacts to Subsistence Harvesting, Sharing, and Use

Negative impacts to subsistence harvesting, sharing, or use during the disaster years were described in 93% of interviews. While sockeye, or red salmon, subsistence fisheries remained largely open, 90% of community members interviewed described being unable to harvest enough red salmon, which have historically been the most harvested of the salmon species. Estimated subsistence harvest data indicate that the total amount of sockeye harvested for subsistence declined by approximately 38% between 2018 and 2020 compared to the previous 10-year average. Community members also described how the disaster caused them to travel farther or spend more time, energy, and resources to meet subsistence harvesting needs.

"Puts family in a world of hurt to not be able to get food themselves"
– Chignik Bay resident

"I'm sure there was a lot of people struggling with income since they rely on the salmon season, and they use some of that money to get what they need for subsistence."
– Perryville resident

Additionally, community members described several ways that the inability to fish commercially impacted the ability to harvest subsistence resources, through the loss of opportunity to retain fish for subsistence use or sharing from commercial catches, the inability to use their commercial vessels for a range of subsistence pursuits, or to generate income to be able to afford gear, equipment, and fuel for subsistence hunting, fishing, and gathering needs.

64% of community members interviewed described needing to harvest more of other resources, such as caribou, moose, shellfish, other fish, and other salmon species, but ultimately the majority of those interviewed described not being able to get enough subsistence foodstuffs and needing to buy more store food.

Over 75% of people interviewed said they were not able to get enough subsistence resources during the disaster years, and of the people who discussed food purchases, 78% described needing to buy more store food.

"You learn and you adapt. I adapted to learn to kipper silvers. And that works. And I learned if I freeze the silvers within six hours of catching them it's not that bad to pull out of the freezer as long as you eat it right away."
– Chignik Lagoon resident

"Bristol Bay salmon got flown in. We couldn't turn that down. But we still ended up needing to buy groceries. There just wasn't that much salmon"
– Perryville resident

Previous work in the Chignik region has demonstrated that sharing is central to the overall subsistence economy and way of life. Sharing was discussed in many interviews (27 of the 33) for this report; however, Chignik region community members described impacts to sharing in many different ways, some sharing or receiving less (5 interviews), some sharing more (3), and others explaining that sharing practices were not affected by the disasters, but there was just less to go around (4).

"There wasn't as much homepack or excess fish to go around, so we still took care of elders, but not as much as we would have if there was more of a catch. It was harder." – Chignik Bay resident

"Even when times get lean you share what's on your table" – Chignik Lake resident

Such differences in sharing impacts may be due to the role of the person interviewed, as either harvester or non-harvester, or their role in the community, such as if the person interviewed was an elder. The extent of local and non-local family connections may also affect an individual's sharing network.

Economic Impacts

In every community in the Chignik region, commercial fishing is the primary source of employment and local income. As a result, negative economic impacts of the fishery disasters stemmed from the interconnected nature of commercial fishing and subsistence activities, primarily through the loss of fishery income, loss of employment, increased costs related to subsistence activities, and broader economic impacts on communities.

Overall, negative impacts to income (to self or others in the community) were described in 16 interviews, while neutral impacts to income were described in 4 interviews. Fishery closures in 2018 and 2020 and low harvests in 2019, 2021, and 2022 resulted in a 44.2% loss in individual earnings for Chignik resident commercial fishermen between 2018 and 2022 compared to the previous 10-year average.

"[Since] 2017, 2018, for 4 years there was hardly no good fishing. It got to the point where none of the crew wanted go fishing because there was no fish… I didn't go fishing that year because there was no fish. I was used to making $60, 70k a year, then down to $0."– Chignik Lake resident

Negative impacts to employment resulting from the disaster were described by fishermen and other community members in 17 of 20 interviews that discussed employment impacts. Negative impacts were described in several ways including: the limited ability to find local non-fishery employment, limited ability to fish or tender in other fisheries, and reduced availability of crew for the local commercial fishery moving forward. Neutral impacts were described in three interviews, including those who were retired and therefore not directly affected, or those who spoke of their ability to find local job alternatives or other fishery employment.

In all communities, the lower availability of salmon has led to increased costs to hunt, fish, and gather subsistence resources or replace subsistence resources with store-bought food. Ways that the fishery disasters affected costs related to subsistence included additional travel costs to get subsistence; opportunity costs, or time away from work to engage in subsistence pursuits; subsistence fishing gear, equipment and storage costs; and replacement costs associated with purchasing store food. Several people noted how loss of fishery income exacerbated these impacts.

The broader economies of Chignik region communities also experienced impacts from the salmon disasters. The City of Chignik suffered a 50% loss in city tax revenue between 2018 and 2021 compared to the prior 5-year average, in part due to the loss of landing and processing taxes. The closure of Chignik Bay's school in 2022 following dropping enrollment during the disaster also led to the loss of local jobs. Furthermore, the closure of the last local shore-based processing facility meant greater uncertainty not only for the city's financial well-being, but also where people would be able to sell their fish and locally purchase their groceries.

"It's hard to do anything if your financials aren't straight. It's hard to get fuel to go out and do your subsistence and different activities if you don't have money to do that. Obviously, the financial aspect is the biggest hit that I would want to note." – Ivanof Bay community member

Social, Cultural, and Community Impacts

The fishery disasters resulted in broader social, cultural, and community impacts for subsistence users, stemming from population loss, increased difficulty in maintaining cultural practices, and adverse impacts on mental health and well-being, among others.

More than two-thirds of those interviewed discussed seeing negative population impacts on their communities during the disaster years. Of the 24 interviews that mentioned population changes, 22 of them described the impacts as negative, or described population declines, along with one neutral and one unsure response. While tracking Chignik population changes can be difficult due to an ongoing history of seasonal fluctuations, many community members spoke about seeing people leave during the disaster. This was supported by population data showing an 11% average decrease in regional population between 2018 and 2022, with Perryville and Chignik Lake experiencing the largest population decreases.

"With the decline of the fishery, everybody kind of moves away" – Chignik Lagoon resident

"So everybody moved out, there's no school, not enough kids. Everybody moved out for their jobs, for the winter." – Chignik Bay resident

Communities in the Chignik region are small and outmigration can have large impacts, particularly if those leaving are families with children. In Chignik Bay, residents described seeing families leave in search of stable jobs and schools during the disasters, and from 2020 onward, local school enrollment continued to drop until the school closed in 2022. As of the 2024-2025 school year, the school has remained closed, creating hardships for the families remaining in Chignik Bay and making it more difficult for the families who left to return.

For the residents who stayed, the disaster impacted their communities in other ways. Some residents discussed how the lack of subsistence salmon made it more difficult to pursue traditional community-oriented harvesting, processing, use, and sharing activities, creating fewer opportunities to teach and pass on those traditions to younger generations.

> *"People put on brave faces and act stoic, but the impacts have been severe. Feel bad for the families with children—hit the hardest" – Chignik Lake resident*
>
> *"I would probably stay here [even if there weren't salmon]. Barely any here now. I still feel the same. You just make do." – Perryville resident*

Subsistence practices have strong cultural ties and significance for people in the Chignik region, and several interviewees described how the disaster impacted their ability to be self-reliant and, in some cases, created a sense of helplessness that impacted their mental health and well-being. Despite this, it was common among those interviewed to express a desire to stay in the region even if disaster conditions persist. Several stated that they were determined to work through future challenges and had hope for their communities.

Individual and Community Responses to the Disasters

Community members often highlighted the ways that individuals, communities, and organizations responded to the fishery disasters, including the ways individuals adapted to the loss of salmon as a food staple, how commercial fishermen adapted their livelihoods, and programs and tools community leaders and organizations implemented to lessen financial and food security impacts.

Individuals reported adapting to the loss of salmon in several ways including spending more time obtaining subsistence resources for themselves and their family, such as harvesting different species; buying additional subsistence gear and equipment; and traveling to other places to hunt and fish. Other ways individuals adapted included buying more store food and seeking other employment opportunities.

Several commercial fishermen also discussed ways that they replaced lost income during the disaster years and actions they are taking to prepare for the future, including expanding sportfishing and guiding operations, investing in permits and gear for other fisheries, and tendering in other fisheries.

The program that people most frequently mentioned benefitting from during the disaster years was the seafood distribution network (SDN) that brought Bristol Bay salmon to each Chignik region community starting in 2020. As described in the *Seafood Distribution Network* section, the program was discussed in 30 interviews and in 27 of those, people described receiving fish from the program. The majority described it as being helpful, sometimes even critical, to filling the gap of local salmon.

> *"They brought salmon over from Bristol Bay to help us, which was, thank God for them. I mean, you know, we survive off of that." – Chignik Bay resident*
>
> *"For the last 3 or 4 summers, we've been smoking the Bristol Bay fish… I don't know who's sending all them fish from Bristol Bay, but it's a welcome sight, especially in 2018 and 2019." – Chignik Lagoon resident*

Another source of relief was funding stemming from the Coronavirus Aid, Relief, and Economic Security (CARES) Act in response to the COVID-19 crisis. Many interviewees discussed how CARES act funding assisted with groceries, fuel, utilities and other services while Paycheck Protection Program (PPP) loans helped pay fishing crew members during the disasters. Others discussed how many groups and community leaders worked together to organize food donation programs or food orders for community members. Unfortunately, with respect to fishery disaster relief payments, several of those interviewed described confusion about the application process, specifically concerning eligibility for subsistence relief, and reported low assistance availability when applying for relief. Additionally, even those who received payments described the process as being too slow to prevent major impacts, such as having to sell vessels or commercial fishing permits.

"Government assistance programs help a lot but getting paperwork done can be hard—lots of people of a certain generation have a hard time with that" – Chignik Lake resident

"Village put out newsletters about relief programs, but [we] had to apply on our own" – Chignik Lagoon resident

Preparing for Future Disasters

The final phase of the work focused on lessons learned from the fishery disasters and examined ways Chignik region communities can prepare for and withstand future disasters (in other words, decrease their vulnerability and increase their resilience). The process began by compiling actions being taken and potential ideas discussed during the first round of community visits (here, referred to as 'resilience actions'). During the second round of community visits, these resilience actions were presented for feedback, discussion, and prioritization. After incorporating community feedback, priority ideas were further explored in additional interviews with community members and organizational experts and refined with information gathered from a targeted review of related literature. This process was designed to explore how current community efforts can be expanded or bolstered, what other opportunities may be available, what challenges might exist, and what resources are available to help communities implement resilience actions.

The final set of resilience actions, grouped by topic area, are as follows:

Fishery Diversification

- Create a locally owned onshore processing facility
- Bring in externally owned mobile processing barges
- Implement small-scale and individual fish processing
- Offer youth crew training opportunities
- Create new halibut community quota entities (CQEs) and expand current CQEs

Economic Diversification

- Expand cruise ship visitor opportunities
- Implement mariculture and aquaculture projects
- Support new industries, like bottled water production and gravel production
- Expand marine services and commercial ice production
- Pursue remote work opportunities

Cultural and Heritage Programs

- Create a Chignik Heritage Center to act as a community and research center, promote local culture and practices, and provide cultural programs for visitors to the Chignik region
- Implement local Culture Camps and field schools to support cultural and subsistence practices with Chignik region youths

Building on Successful Programs

- Expand and support the continuance of the seafood distribution network
- Support practices to donate moose meat from hunters
- Support and expand programs to subsidize food, utilities, and subsistence gear during disasters

Enhanced Technical Assistance

- Increase outreach to community members during disasters
- Create a centralized catalogue of aid and grant resources
- Designate a centralized point person for technical assistance needs
- Provide funding for traveling technical assistance support personnel
- Create housing grants for community members struggling to return to their homes

Expanded Subsistence Opportunities

- Support research projects to gather better baseline fishery data and support fishery recovery
- Implement Paralytic Shellfish Poisoning (PSP) testing
- Expand culture camps to support subsistence practices and traditions
- Create a fishery liaison role to help communication between management agencies and communities

Increased Food Security

- Expand community gardens and greenhouses
- Explore mariculture and aquaculture opportunities
- Pursue food security grant programs

Climate and Environmental Resilience

- Conduct climate and environmental threat analyses in each Chignik region community
- Implement regional climate observation networks
- Implement local habitat rehabilitation strategies
- Design plans for emergency and/or preventative infrastructure and community relocation
- Support local climate outreach programs and education programs that build climate resilience technical capacity

Federal Aid Support

- Support efforts to reform the fishery disaster relief process
- Advocate for community and subsistence priorities through regional organizations and the Lake and Peninsula Borough

These resilience actions were synthesized into a series of potential pathways that examined the actions' current status, potential next steps, challenges to implementation, potential support components, and available resources. The aim of these pathways was to provide Chignik region communities with potential opportunities that may align with community goals, provide an overview of what resilience actions are already occurring within Chignik region communities that other communities may find helpful, and provide specific resources that may help implementation of those actions. The synthesis also discusses challenges noted during interviews, including lack of funding, institutional challenges, community coordination, economic vulnerability, community capacity issues, climate and environmental risks, and data and research gaps. While Chignik subsistence users are still recovering from the impacts of previous fishery disasters and dealing with continuing uncertainty, this project highlights how these communities are actively building resilience and ideally provides additional considerations for ways they can continue to build resilience in the long term.

Introduction

Northern Economics, Inc., Wislow Research Associates LLC (Wislow Research), and the Chignik Intertribal Coalition (CIC) received a grant from Pacific States Marine Fisheries Commission (PSMFC) under the Request for Proposals titled "Research to Assess the Productivity of Chignik Sockeye Salmon stocks and to Evaluate the Effects of the Disaster on Subsistence Users" issued April 18, 2022 (Federal award ID NA21NMF4770006). This grant is being administered by PSMFC in cooperation with the National Oceanic and Atmospheric Administration (NOAA) and Alaska Department of Fish and Game (ADFG).

This project seeks to investigate the impacts of the ongoing sockeye fishery disasters on subsistence users in the Chignik region and document the ways in which individuals and households have attempted to cope with these impacts, as well as any encountered barriers to adaptation. The goal is to document impacts and identify strategies that will expand the capacity of communities to recover from the current fishery disasters and better manage possible future disasters. The study combines available social and economic data with information gathered in confidential interviews with commercial and subsistence fishery users as well as other community members.

Focus of this Work

This project is divided into 2 phases, with the first phase of the report focusing on documenting impacts of the sockeye fishery disasters to subsistence users starting in 2018 as informed by community member interviews conducted in the fall of 2023. The second phase of the project explores strategies that will enable communities to prepare for and withstand future disasters as informed by community, organizational, and agency interviews conducted in the winter of 2024 and by a high-level literature review.

Project Phases

Research Plan & Project Outreach

This work began in the spring of 2023 with the development of a draft comprehensive research plan, which outlined research goals, tasks, and deliverables. The study then transitioned into outreach and engagement, where the team distributed and sought feedback on the research plan from local fishing organizations, municipal governments, tribal entities, Alaska Native Claims Settlement Act (ANCSA) corporations, and other relevant organizations and entities. All feedback received was incorporated into a revised final research plan.

Interview Protocol and Fieldwork Preparation

Throughout the summer of 2023 the team worked to prepare for the first round of visits to each of the Chignik region communities, including developing a list of key themes to be explored in

interviews; identifying residents to serve as community navigators to facilitate introductions and participate in interviews, if desired; and solidifying travel logistics.

First Round of Community Visits

In September 2023, team members traveled to Perryville, Chignik Lake, Chignik Lagoon, and Chignik Bay to conduct interviews with community members about how the disasters affected themselves or other members of the community. After returning from field visits, phone interviews were also conducted with Ivanof Bay community members.

Draft Report Preparation

Throughout the winter of 2023/2024, team members worked to summarize interview information and compile additional information on relevant community and regional socioeconomic trends including school enrollment, population changes, and patterns of commercial fishery participation, among others.

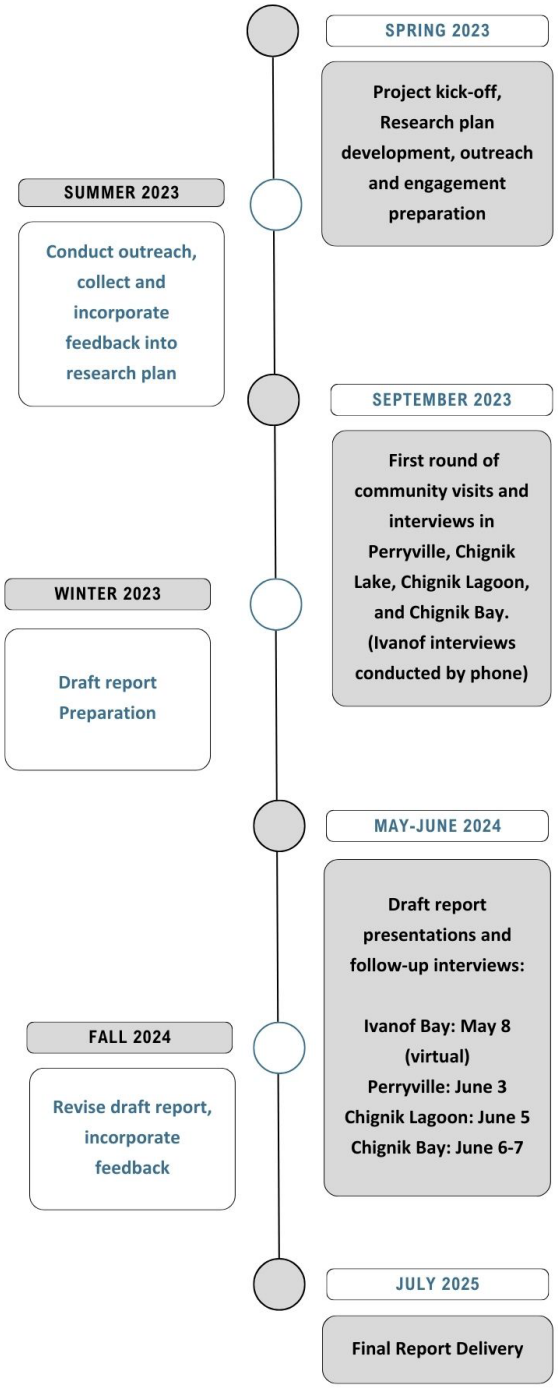
Second Round of Community Visits

In May and June of 2024, the initial draft report was presented to each of the Chignik region communities during community meetings to gather feedback, which was incorporated into the project report before finalization. In addition, during the second round of community visits, discussions were held on a preliminary set of actions that would be helpful to prepare for or respond to future disasters.

Report Revisions, Second Phase of Work

In the fall of 2024 and into the beginning of 2025, the project report was revised based on feedback from the community visits, and the project team began working to assess potential strategies or pathways for preparing for and withstanding future fishery disasters. For this purpose, the

Figure 1. Timeline of Major Project Phases



project team conducted 12 interviews with community members, government representatives, and other regional organizations to better understand actions already being taken and other strategies that may lessen community vulnerability to adverse impacts of potential future disasters and/or support or expand community resilience efforts. or expand community resilience efforts. The draft report was then revised to summarize and synthesize information on these interviews and other supporting information from the literature. This report was circulated back to communities, agencies, and organizations for feedback.

Final Report Delivery

This final 2025 report reflects the culmination of input and feedback solicited through multiple rounds of outreach and engagement with Chignik regional communities, agencies, and organizations. Over the course of the project, this included two in-person visits to four communities in the Chignik region; phone interviews and virtual presentations of the report to Ivanof Bay community members; three rounds of virtual review and feedback from communities, agencies, and regional organizations on workplan and draft report materials; and 12 virtual, targeted interviews with experts and community members on resilience action ideas.

Report Structure

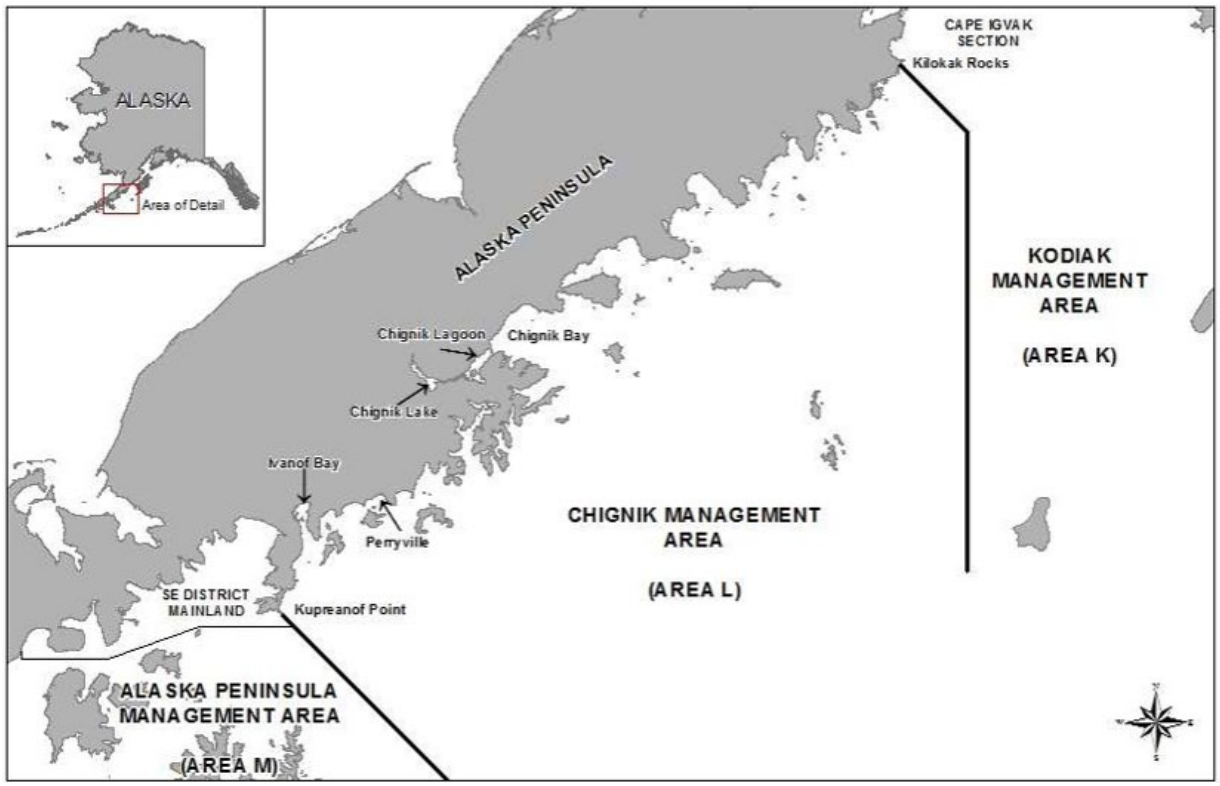
1. Background
2. Impacts to Subsistence Harvesting, Sharing, and Use
3. Economic Impacts
4. Social, Cultural, and Community Impacts
5. Individual and Community Responses to Disasters
6. Preparing for Future Disasters
7. Conclusions
8. Methods
9. References
10. Appendices

Background

Context

The Chignik region is about 450 miles southwest of Anchorage on the southern side of the Alaska Peninsula and is situated between the Aleutian Islands region to the west and the Kodiak region to the east. The five communities in the area are within the Lake and Peninsula Borough and the Alaska Peninsula National Wildlife Refuge and include Chignik (commonly called Chignik Bay[1]), Chignik Lake, Chignik Lagoon, Perryville, and Ivanof Bay. The regional salmon fishery management area is the Area L or Chignik Management Area (CMA) and is bordered by the Area M (Alaska Peninsula) Management Area to the west and the Area K (Kodiak) Management Area to the east (Figure 2).

Figure 2. Map of the Chignik Management Area and Chignik Region Communities



Source: ADFG 2021

Communities in this region have a historical connection with salmon fishing. There is evidence that people have lived along the Alaskan Peninsula for at least 9,000 years (Henn 1978 and VanderHoek

[1] Located on Anchorage Bay within the greater Chignik Bay, the City of Chignik was incorporated as a 2nd Class City in 1983 and remains the only incorporated community in the Chignik region. The local federally recognized tribe is the Chignik Bay Tribal Council. The community is commonly referred to as "Chignik Bay" or "the Bay" to differentiate it from Chignik Lake ("the Lake") and Chignik Lagoon ("the Lagoon").

2004, cited in Hutchinson-Scarbough et al. 2016). Archaeological evidence suggests that the first residents relied on marine mammals and fish and lived on or near salmon streams (Corbett 1995, cited in Hutchinson-Scarbough et al. 2016). After Russian fur traders came to the region in the 1760s, local people were used for their hunting skills and were also introduced to diseases, Christianity, and cash trade (Haycox 2002, cited in Hutchinson-Scarbough et al. 2016). The region remained under Russian control until it became part of the United States in 1867. In 1888, the first salmon cannery opened in the area and by 1890 commercial salmon fishing had become the Chignik region's primary industry. This remains true today (Partnow 2001, cited in Hutchinson-Scarbough et al. 2016).

Recent Historical Subsistence Harvesting, Sharing, and Use in Chignik

Subsistence as a term is used by both State and Federal management bodies to describe the "customary and traditional uses" of wild resources (ADFG 2024) and all state residents have qualified for subsistence harvesting (AS 16.05.940[32]) since 1989. Yet, for many in the Chignik region, this term may not capture the cultural importance of subsistence practices. Subsistence, as described by both Chignik subsistence users and in Alaskan subsistence literature, is more than just food, and subsistence harvesting, sharing, and use are rooted in important social and cultural traditions. Instead, subsistence practices are often described as a way of life that emphasizes the connection between people and the land, that underpin traditional value systems, are integral to spiritual connection well-being, and were (and remain) central traditional resource management systems (Langdon 2021; Liebach 2022; Carothers et al. 2021). For the Chignik region communities, salmon holds a special significance with deep historical roots as one of the central components of local subsistence practices (SASAP 2019; Liebach 2022). For these communities, maintaining that cultural, social, and spiritual connection with salmon can be integral to maintaining community health and well-being (Donkersloot, Black, et al. 2020; Raymond-Yakoubian and Raymond-Yakoubian 2015; Langdon 2021). Contention around the use of the term "subsistence", particularly among communities for whom salmon is a central component of their lifestyle, stems from the difficulty of management definitions to account for these non-consumptive dimensions (Donkersloot, Black, et al. 2020; Langdon 2021).

Historically, the Alutiiq people in the Chignik region have relied on subsistence practices involving the rivers, sea, and tundra to survive for an estimated 9,000 years (Fall 2018; Hutchinson-Scarbrough et al. 2016). However, these subsistence practices have changed over time through the influence of outside pressures such as the introduction of the fur trade and commercial fisheries and with the new use of income from selling furs or working in canneries to buy imported goods (Hutchinson-Scarbrough and Fall 1996). Yet, even as commercial fishing became the primary source of cash income for Chignik residents, subsistence harvesting and sharing remained the primary source of food for nearly all local families (Hutchinson-Scarbrough and Fall 1996).

This dependence on subsistence harvesting, sharing, and use has continued into recent years. Starting in the 1980s and continuing until 2016, regional patterns of subsistence harvesting, sharing,

and use have been well documented by researchers at ADFG, Bristol Bay Native Association (BBNA), and other organizations (Hutchinson-Scarbrough and Fall 1996; Davis 1986, cited in Hutchinson-Scarbrough et al. 2016, Davis 1986, cited in Hutchinson-Scarbrough et al. 2016; Hutchinson-Scarbrough et al. 2016; Partnow 2001; Hutchinson-Scarbrough et al 2020).

Pre-Disaster Subsistence Harvest Patterns and Use

Chignik region communities traditionally harvest a wide variety of wild resources for subsistence including various fish species, marine invertebrates, marine and land mammals, and plants (Fall 1999). Harvest activities for these species vary by season. Summer is usually the busiest, when people work together in large family groups to harvest and preserve salmon for the winter (Fall 1999; Hutchinson-Scarbrough and Fall 1996). Salmon fishing and preparation of dried salmon products often continues into autumn. With winter, activities switch over to hunting and trapping, collecting marine invertebrates along the beach, and marine fishing. The arrival of spring brings fresh runs of fish, like herring, halibut and cod, as well as octopus and clam, birds, and fresh eggs. Some communities will hunt harbor seals and sea lions as well (Fall 1999).

Fish play a vital role in subsistence for these communities. Household surveys conducted between 1984 and 2003 for Chignik Bay, Chignik Lake, Chignik Lagoon and Perryville found that fish averaged between 54% and 79% of subsistence harvests, depending on the community (Table 1). While only one recorded survey was conducted in Ivanof Bay in 1989, it found similar subsistence species compositions. At least 17 species of fish apart from salmon have been recorded in Chignik subsistence, including halibut, gray cod, candlefish (euchalon), and Dolly Varden (Hutchinson-Scarbrough and Fall 1996). However, the annual salmon harvest is the most important, both culturally (Carothers et al. 2021; Hutchinson-Scarbrough and Koster 2021) and for Chignik subsistence practices. All five species of Pacific salmon are found in the region, and except for chum salmon, all are typically used by Chignik region communities for subsistence (Hutchinson-Scarbrough et al. 2020). Salmon typically made up the largest proportion of subsistence harvests during survey years, ranging from 73% to 34% and an average of 50.1% (Table 1). However, most communities have also reported increases in their use of other subsistence resources since 1984.

Table 1. Composition of Resource Harvests by Community

Community	Resource	Percentage of Total Harvest			
		1984	1989	1991	2003
Chignik Bay	Salmon	72.80%	53.60%	47.90%	40.40%
	Other Fish	11.70%	26.20%	30.70%	33.40%
	Land Mammals	7.50%	7.60%	6.80%	8.80%
	Marine Mammals	3.10%	1.50%	0.70%	0.50%
	Birds & Eggs	1%	1.80%	1.20%	0.70%
	Marine Invertebrates	3.90%	7.50%	10.90%	13.30%
	Wild Plants	*	1.90%	1.80%	2.80%
Chignik Lagoon	Salmon	54.40%	47.40%	*	50.20%
	Other Fish	8.70%	21.10%	*	12.20%
	Land Mammals	26.60%	17.30%	*	17.80%
	Marine Mammals	1.30%	0%	*	0%
	Birds & Eggs	2.10%	2.50%	*	0.40%
	Marine Invertebrates	6.90%	9.80%	*	15.90%
	Wild Plants	*	2%	*	3.40%
Chignik Lake	Salmon	50%	33.70%	46.10%	54.20%
	Other Fish	5.80%	8.60%	9.40%	9.80%
	Land Mammals	40.40%	47.80%	34.50%	23.70%
	Marine Mammals	1.30%	1.40%	0.90%	1.70%
	Birds & Eggs	1.30%	3.40%	3%	1.50%
	Marine Invertebrates	1.20%	3.50%	4.70%	6%
	Wild Plants	*	1.60%	1.50%	3.10%
Perryville	Salmon	55.20%	51.30%	*	44.20%
	Other Fish	11.40%	17.60%	*	11%
	Land Mammals	23.90%	15.20%	*	28%
	Marine Mammals	5%	6.50%	*	4.90%
	Birds & Eggs	1.70%	2.10%	*	2.20%
	Marine Invertebrates	2.80%	5.20%	*	7.20%
	Wild Plants	*	2.20%	*	2.60%
Ivanof Bay	Salmon	*	38.1%	*	*
	Other Fish	*	13.3%	*	*
	Land Mammals	*	28.5%	*	*
	Marine Mammals	*	5.6%	*	*
	Birds & Eggs	*	2.9%	*	*
	Marine Invertebrates	*	9.5%	*	*
	Wild Plants	*	2.2%	*	*

*Note: Data not collected for years marked by *.*

Source: Scott et al. 2001, cited by Fall 2006; ADFG, Division of Subsistence; Household Surveys, 2004, cited by Fall 2006; Sepez et al. 2005

Though amounts vary by community and year, nearly all Chignik households use salmon as part of their subsistence. During surveyed years, between 83.3% and 100% of households consistently reported using salmon (Table 2). Sockeye is historically the most important subsistence salmon species for Chignik Bay, Chignik Lagoon, Chignik Lake and Perryville, making up an average 79.4% of total salmon subsistence catch from 1977 to 2017 (Figure 3), though Perryville residents harvest more coho, pink, and chum salmon than other Chignik region communities (Hutchinson-Scarbrough et al. 2020).

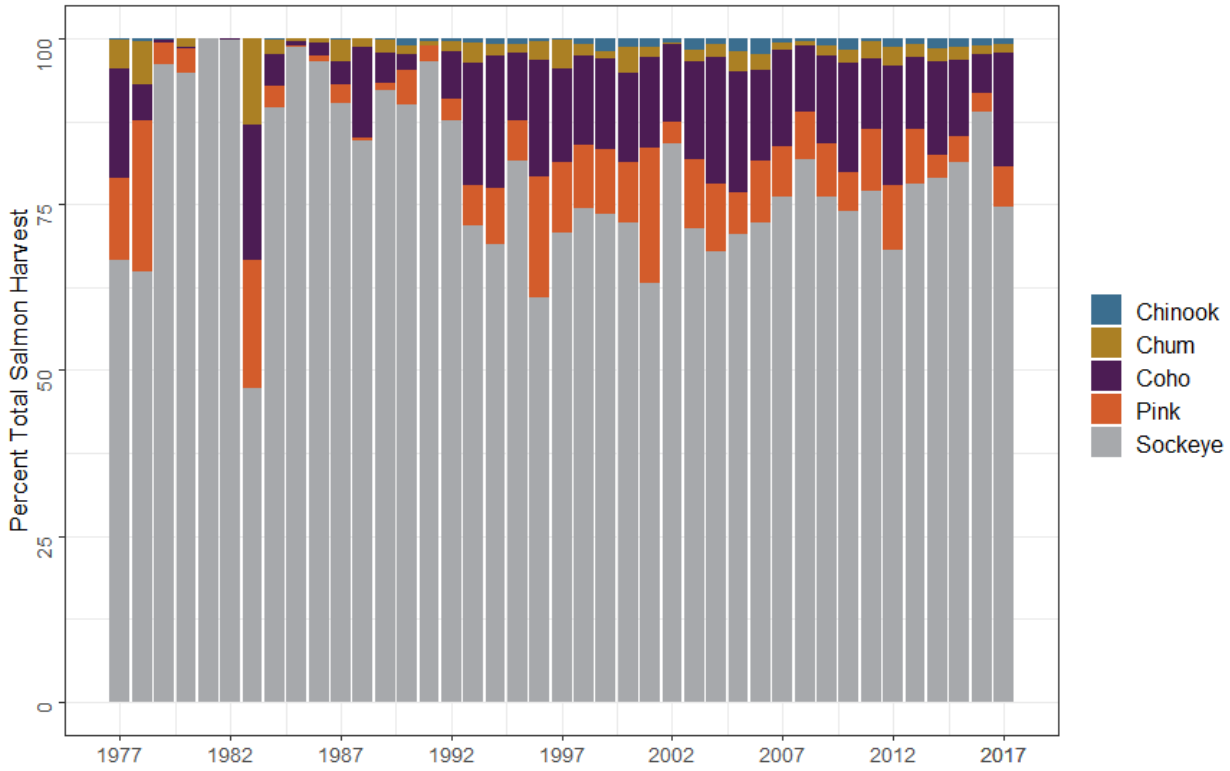
Table 2. Estimated Uses of Salmon by Community Households

Community	Percent of Harvested Salmon by Method	Survey Year							
		1984	1989	1991	2003	2011	2014	2015	2016
Chignik Bay	Using %	94.7	97.1	100	100	91.3	100	95.5	100
	Attempting Harvest %	78.9	80	80	59.1	65.2	36	50	62.5
	Harvesting %	78.9	77.1	80	59.1	60.9	36	50	62.5
	Receiving %	68.4	71.4	70	77.3	47.8	76	72.7	83.3
	Giving %	68.4	71.4	70	77.3	47.8	76	72.7	83.3
Chignik Lagoon	Using %	88.2	100	*	100	95	100	100	100
	Attempting Harvest %	70.6	60	*	87.5	75	75	84.2	85
	Harvesting %	64.7	60	*	87.5	75	68.8	84.2	85
	Receiving %	52.9	80	*	50	65	68.8	73.7	75
	Giving %	47.1	53.3	*	50	65	62.5	68.4	60
Chignik Lake	Using %	100	95.2	100	95.2	100	89.5	92.9	96.4
	Attempting Harvest %	100	85.7	95.8	81	96.4	84.2	75	75
	Harvesting %	100	85.7	95.8	76.2	81.8	73.7	75	71.4
	Receiving %	52.2	66.7	70.8	81	86.4	63.2	67.9	85.7
	Giving %	47.8	61.9	91.7	76.2	86.4	73.7	67.9	57.1
Perryville	Using %	100	100	*	100	96.4	97.1	100	100
	Attempting Harvest %	95	88.9	*	96.3	75	82.4	90.9	76.9
	Harvesting %	95	88.9	*	96.3	67.9	76.5	84.8	73.1
	Receiving %	60	51.5	*	81.5	75	73.5	63.6	84.6
	Giving %	60	63	*	85.2	60.7	82.4	60.6	53.8
Ivanof Bay	Using %	83.3	100	*	*	*	*	*	*
	Attempting Harvest %	83.3	100	*	*	*	*	*	*
	Harvesting %	83.3	100	*	*	*	*	*	*
	Receiving %	33.3	100	*	*	*	*	*	*
	Giving %	66.7	71.4	*	*	*	*	*	*

*Note: Data were collected as part of ADFG household surveys. Data was not collected for years marked by *.*

Source: Hutchinson-Scarbrough et al. 2016; Hutchinson-Scarbrough and Fall 1996

Figure 3. Historic Chignik Subsistence Salmon Harvest Composition



Note: This figure represents data from Chignik Bay, Chignik Lake, Chignik Lagoon, Perryville, and Ivanof Bay. See Fishery Data Methods for description of estimated data.

Source: Brown et al. 2023, Northern Economics, Inc.

Like other subsistence activities, sockeye harvests in the CMA are seasonal. In the spring, fresh sockeyes are processed through smoking, kippering, salting, and freezing (Hutchinson-Scarbrough and Fall 1996). Dried salmon products from these processes, like *tamuuq, uumatak,* and *ataneq,* are staples of local diets (Fall 1999). When the sockeyes return to spawn in the fall, Chignik residents target them just before or after spawning when they turn red. Red sockeyes are valued for their lower fat content which reduces spoilage during drying and the cooler autumn weather helps reduce disruption from blow flies (Hutchinson-Scarbrough et al. 2020). This process of coming together to harvest and preserve salmon has also traditionally served to maintain family and community bonds and pass on values and subsistence practices to new generations (Hutchinson-Scarbrough and Koster 2021).

Subsistence Sharing

As seen in Table 2, before the disasters, more households used subsistence salmon than fished for it. On average, over 96% of households in the studied Chignik region communities utilized salmon, while an average 83% of households successfully fished for it in Perryville and Chignik Lake, 75% in Chignik Lagoon and 63% in Chignik Bay (Hutchinson-Scarbrough et al. 2020). This highlights another facet of subsistence culture in the Chignik region: sharing. A 2020 Hutchinson-Scarbrough et al. study

looked at sharing patterns in Chignik region communities from 1984 to 2011. The study noted that subsistence connections are dynamic and built around many different resources, but at least for salmon, households that actively harvest often provide for households that are less active. Households that received fish this way were not expected to reciprocate in kind, as seen in Table 2, where the average number of households across years and communities receiving salmon was 69.8%, while giving was 66.4%. While sharing structures can vary between communities, these sharing networks connected most or all households in the community (Hutchinson-Scarbrough et al. 2020).

These sharing practices have persisted for hundreds of years into modern Chignik region communities as ways to maintain cohesion, care for elders and others in need, and connect with extended family (Fall 1999, Hutchinson-Scarbrough et al. 2020). Local sharing networks balance risk and help maintain community well-being (Hutchinson-Scarbrough et al. 2020). In contemporary Chignik region communities where relations are more spread out than they were generations ago, both throughout Alaska and to the broader US, several times more salmon flows out of Chignik region communities to extended family and relatives than it receives. This likely helps community members who move to places like Anchorage, the most frequent sharing location, preserve ties and interviews for this project suggested that it is not uncommon for former full-time residents of the region to return seasonally to help with subsistence harvests. Non-local sharing with other communities in the region can also help bring in resources that are rarer or more abundant in other communities (Hutchinson-Scarbrough et al. 2020).

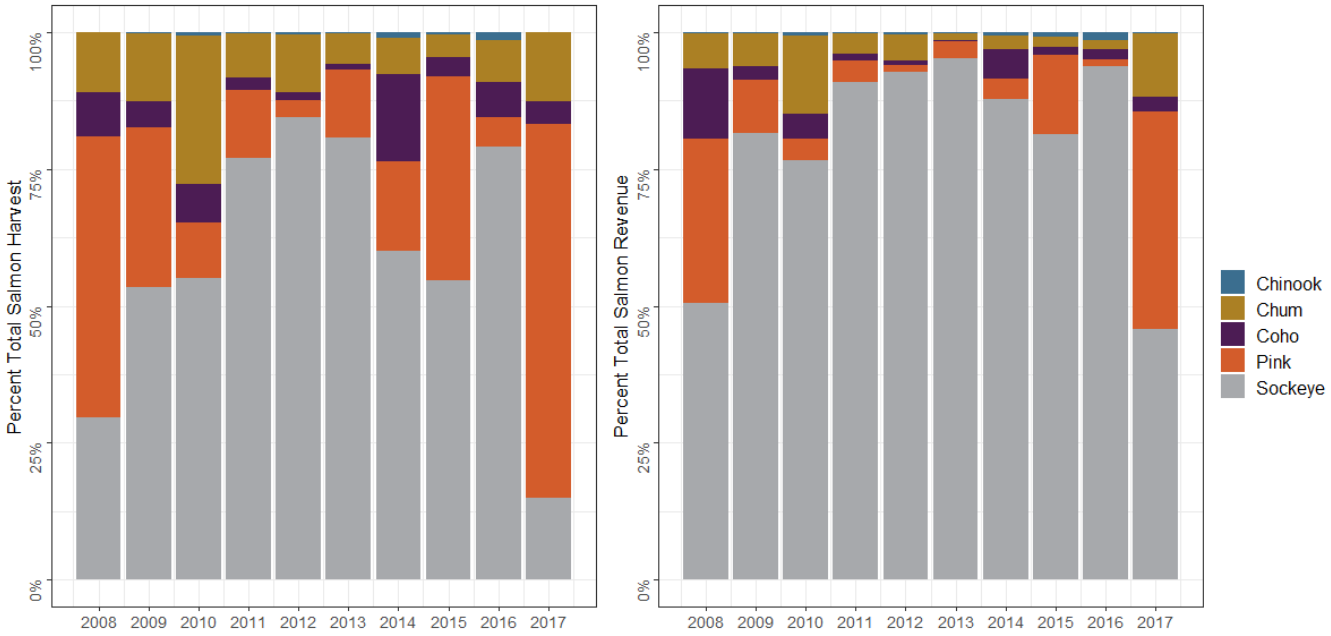
This system of sharing represents a different value set than those introduced by Western culture. As Hutchinson-Scarbrough et al. 2020 noted in these communities, "The ideal measure of 'wealth' is how much a person or family shares, and not how much is accumulated." However, despite its cultural roots, several potential challenges to subsistence sharing systems are emerging, including environmental change, regulatory changes in response to declining resources, demographic changes, and increased participation in the market economies (Hutchinson-Scarbrough et al. 2020).

Connections Between Subsistence and Commercial Fisheries

Commercial fishing became the main source of cash income for Chignik residents by 1940 while subsistence harvests continued to be their main food source, a pattern which continues today (Hutchinson-Scarbrough and Fall 1996). However, both practices share a strong connection in the Chignik region. Salmon is a top subsistence resource across all communities, ranging from 33% to 73% of all subsistence harvests (Table 1), and within salmon harvests, sockeye is historically the most abundant species (Figure 3). On top of sockeye's value for local food security, it is also the most important species for the local commercial fishery. In the Chignik salmon purse seine fishery (designated and permitted as the S01L fishery), sockeye is the regionally most abundant and valuable species (Figure 4), though all salmon species are harvested in both commercial and subsistence fisheries (Hutchinson-Scarbrough and Fall 1996). This means economic security and food security in

the region are tied to the same resource. Additionally, the economic opportunities afforded by the commercial fishery support many residents' ability to engage in other subsistence pursuits in the fishery off-season. Many of the other available paid jobs in these communities do not provide the same time off that subsistence harvest practices require (Hutchinson-Scarbrough et al. 2016). Without the cash inflow sufficient salmon runs provide to the region, Chignik region communities would likely struggle to remain sustainable (Hutchinson-Scarbrough and Koster 2021).

Figure 4. S01L Commercial Salmon Harvest and Revenue Composition



Notes: This figure does not include reported home pack catch.

Source: ADFG 2023, Northern Economics, Inc. analysis

As a result, management of salmon stocks is a critical concern for Chignik region communities. Commercial salmon fisheries are managed by ADFG Division of Commercial Fisheries and the Alaska Board of Fisheries to allow escapement into the Chignik river and lake systems, protecting both spawning and subsistence opportunities (Hutchinson-Scarbrough et al. 2020). Failure to meet predicted escapement goals can result in the closure of both commercial and subsistence fisheries. In February 2016, the Board of Fisheries adopted an amendment to increase the Chignik River sockeye escapement goal from 50,000 to 75,000 fish in August and September, specifically to meet late-season subsistence needs. ADFG was tasked with managing commercial fishery quotas and closures to meet those goals (Wilburn and Stumpf 2017:10, cited in Hutchinson-Scarbrough et al. 2020).

For some Chignik residents, subsistence efforts are also directly reliant on commercial fishing efforts. In Chignik Bay and Chignik Lagoon, resident commercial fishermen commonly use commercial purse seine gear to harvest salmon for subsistence just before the commercial season opens (Hutchinson-

Scarbrough and Koster 2021). According to 2016 regulations, commercial permit holders may also subsistence fish during the season any time except 12 hours preceding and 12 hours following a commercial fishing period (5 AAC 01.485), and they may also retain fish from their commercial catch for personal use, a practice known as "home pack" (5 AAC 39.010(a)). As seen in the category "% removed from commercial catch" in Table 3, these practices can provide a substantial proportion of a community's total salmon subsistence.

Table 3. Subsistence Catch Method Composition by Community

Community	Subsistence Method	2014	2015	2016	Average
Chignik Bay	% Removed from Commercial Catch	42.4	34.5	69.1	48.7
	% Set Gillnet	6.6	17.8	1.1	8.5
	% Seine	50.4	43.4	27.4	40.4
	% Rod and Reel	0.6	3.3	0.2	1.4
	% Other	0	0.9	2.2	1.0
Chignik Lagoon	% Removed from Commercial Catch	20.3	22	39.3	27.2
	% Set Gillnet	5.4	12.1	19	12.2
	% Seine	73.5	62.8	39	58.4
	% Rod and Reel	0.8	1.3	2.7	1.6
	% Other	0	1.7	0	0.6
Chignik Lake	% Removed from Commercial Catch	0.5	8.1	8.8	5.8
	% Set Gillnet	54.9	64	58.7	59.2
	% Seine	36.7	19.8	16	24.2
	% Rod and Reel	0	0.2	0	0.1
	% Other	7.8	7.9	16.5	10.7
Perryville	% Removed from Commercial Catch	7	7.6	8	7.5
	% Set Gillnet	78.4	65.7	72.9	72.3
	% Seine	11.8	9.2	15.8	12.3
	% Rod and Reel	2.8	17.4	0.9	7.0
	% Other	0	0	2.4	0.8

Note: Percentages represent the proportion of total subsistence harvests (number of fish). No data were collected for Ivanof Bay due to the high project and survey administration costs relative to that community (Hutchinson-Scarbrough and Koster 2021).

Source: Hutchinson-Scarbrough and Koster 2021, Northern Economics, Inc. analysis

Between 2014 and 2016, the average percentage of subsistence salmon retained from commercial catch across all communities was 22.3%. However, there is a large variance between communities. In Chignik Lake and Perryville, subsistence removed from commercial catch was relatively low, at less than 9% in each of the three years, ranging from 0.5% (Chignik Lake in 2014) to 8.8% (Chignik Lake 2016). In these communities, subsistence fishing can be done more easily from shore, making residents less reliant on commercial catch retention (Hutchinson-Scarbrough and Koster 2021). In Chignik Bay and Chignik Lagoon, the percentage retained was higher, ranging from 20.3% (Chignik Lagoon 2014) to 69.1% (Chignik Bay 2016). Yet, while the amount of subsistence obtained varies,

most individuals who commercial fish in these communities retain at least some catch for subsistence purposes (Hutchinson-Scarbrough et al. 2016). Loss of commercial fishing opportunities for these residents changes how they get their subsistence, forcing many to pursue methods which may be less efficient or economical (Hutchinson-Scarbrough and Koster 2021).

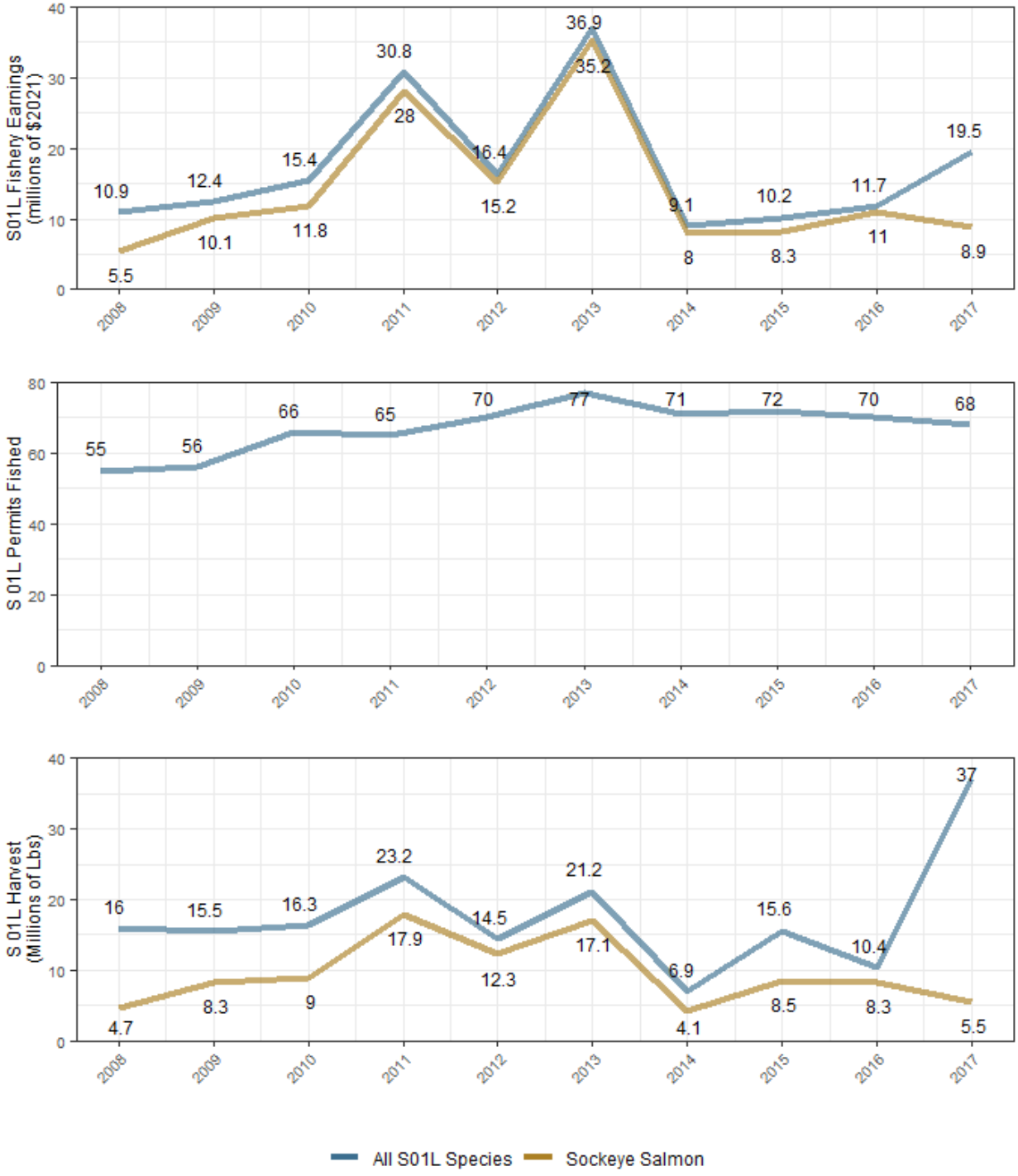
Pre-Disaster Fishery Conditions

Through 2018, CMA commercial fisheries management was based on the Chignik Salmon Management Plan (5 AAC 15.357), originally adopted in 1999 (Wilburn and Renick 2018). The plan is designed to manage two distinct sockeye salmon runs as well as local stocks of Chinook, pink coho, and chum salmon, and ensure enough resources for five subsistence communities. The critical sockeye runs are divided into early and late runs, with the early run, bound for the Black Lake watershed, arriving from June to mid-July, while the late run, bound for Chignik Lake, arrives between mid-June and September (Foster 2013; Wilburn and Renick 2018). These runs are not only genetically distinct but have different impacts on Chignik region community subsistence activities. Sockeye caught in the spring are kippered, salted, and frozen for storage. The fall run of sockeye is better for drying, as the cooler weather minimizes interference from blow flies and the sockeye tend to have less fat, making them better for drying without spoilage (Hutchinson-Scarbrough and Fall 1996).

ADFG seasonally manages both stocks through daily escapement counts using a weir operated on the Chignik River. Data collected are used to issue emergency orders based on in-season evaluations. The commercial fishing season may not open until at least 20,000 sockeye salmon have escaped into the Chignik River, or are anticipated to escape, giving subsistence fishermen the opportunity to fish first (Wilburn and Renick 2018).

Chignik salmon fisheries have historically been the seventh largest in the state and one of the most stable. It has the third lowest variability among Alaskan fisheries in year-by-year revenue and has generated almost $1 billion in revenue since 1975 (SASAP undated). Throughout its history, the commercial fishery has also seen a large proportion of participation from local residents. Historically, Chignik region community members have retained between a third and a half of harvest revenue, while another third has gone to Urban Alaska residents. The rest has been shared among nonresidents and other rural Alaskan communities (SASAP undated). While the value of the salmon fishery has fluctuated from 2010 to 2017, with a peak revenue of $36.9 million in 2013 (Figure 5), the fishery produced $18.8 million in average earnings during that period (Table 4). Notably, as seen in Figure 5, sockeye salmon has made up most of both revenue and total catch from 2008 to 2017, reinforcing its critical value to the fishery. The only year this differed was 2017 when an unprecedented run of pink salmon (Figure 4) buoyed the fishery despite a decrease in sockeye harvest.

Figure 5. S01L Pre-disaster Fishery Revenue, Permits, and Catch



Note: Revenue has been adjusted for inflation and represents real 2021 dollars.

Source: ADFG 2023, Northern Economics, Inc. analysis

Table 4. S01L Pre-disaster Permits, Earnings and Catch

		Year										
	Metric	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Average
All S01L Participants	Permits Fished	55	56	67	66	70	78	71	73	70	68	67.4
	Earnings (millions of $2021)	10.9	12.4	15.4	30.8	16.4	36.9	9.1	10.2	11.7	19.5	17.33
	Average permit value ($2021)	198,716	220,895	229,851	466,667	234,286	473,077	1281,69	139,726	167,143	286,765	268,570
	Catch (millions of Lb)	16	15.5	16.3	23.2	14.5	21.2	6.9	15.6	10.4	37	17.66
Chignik Resident S01L Participants	Permits Fished	35	36	34	36	38	37	35	35	35	36	35.7
	Earnings (millions of $2021)	6.7	8	7.1	17.7	8.9	18	4.7	5	6	10	9.2
	Average permit value ($2021)	190,063	223,524	209,724	491,852	233,654	487,115	134,618	141,676	171,740	276,425	256,039
	Catch (millions of Lb)	9.4	9.4	7	13	7.8	10.1	3.4	7.1	5.2	18.5	9.1

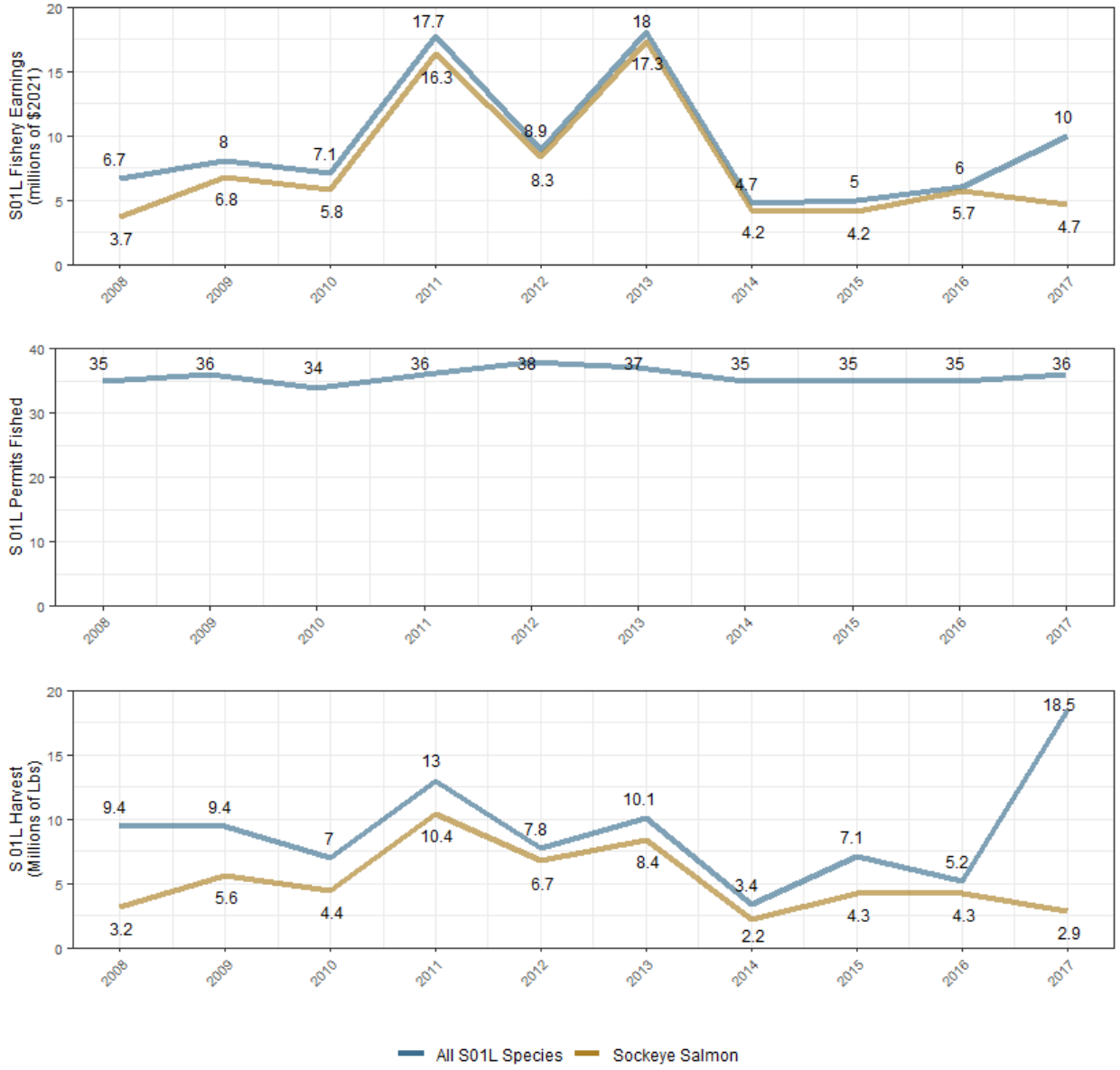
Note: Chignik figures represent data from Chignik Bay, Chignik Lake, Chignik Lagoon, Perryville, and Ivanof Bay. Revenue has been adjusted for inflation and represents real 2021 dollars.

Source: ADFG 2023, Northern Economics, Inc analysis

Since the 1970s, the fishery has been a competitive limited entry fishery with permits controlled and issued by the Commercial Fisheries Entry Commission (CFEC) (Knapp 2008). As seen in Table 4, from 2010 to 2017 the fishery supported an average of about 70 permits per year, with the peak number of permits occurring in 2013. With the fluctuation of fishery revenue, the average revenue per permit fished has fluctuated as well, with an average value of $267,045 between 2010 and 2017. Catch similarly fluctuated, with a peak total catch of 37 million pounds in 2017 and a lowest total catch of 6.9 million pounds in 2014. The average total catch for the fishery has been 18.2 million pounds. As seen in Figure 4, sockeye has been the most targeted and abundant species for the fishery, making up an average 63% of commercial catch. However, in 2017, sockeye made up only 15% of the fishery's record 37-million-pound catch. Pink salmon made up the majority at 54% of the catch.

The earnings and catch of Chignik region resident S01L permit holders follow the trends of the fishery at large (Figure 6). The 2013 peak in fishery earnings and the 2017 peak in catch are also peaks for Chignik region resident S01L permit holders. As seen in Table 4, this is likely because Chignik region resident fishermen make up a large proportion of S01L participation. Between 2008 and 2017, Chignik region resident fishermen held an average of 36 permits, just over half of the average total of 67 permits in the fishery for the same period. Similarly, Chignik region resident fishermen on average accounted for just over half of the total earnings and catch in the S01L fishery. The only departure from these parallel trends occurs in average permit value for Chignik region resident fishermen. While similar in value, the 2008–2017 Chignik region resident average revenue per permit was ~$256,000, less than the average permit value of ~$267,000 for the whole fishery.

Figure 6. Chignik Region Resident S01L Pre-disaster Fishery Revenue, Permits, and Catch

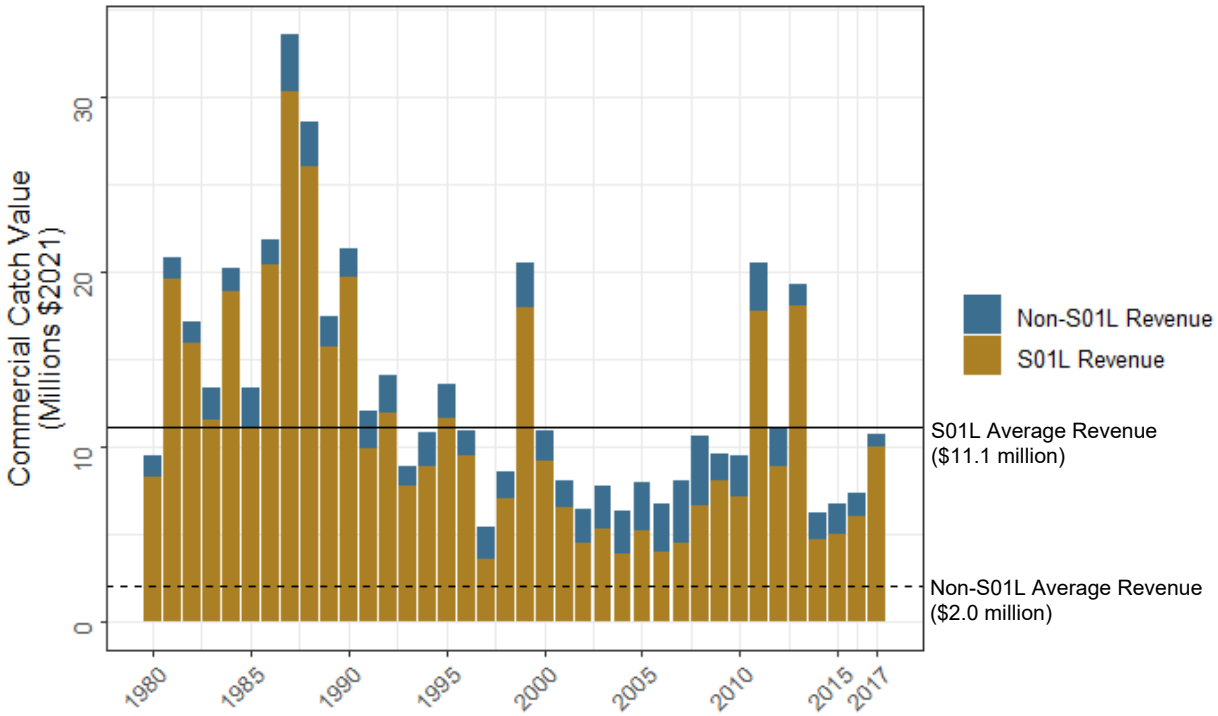


Note: This figure represents data from permit holders residing in Chignik Bay, Chignik Lake, Chignik Lagoon, Perryville, and Ivanof Bay. Revenue has been adjusted for inflation and represents real 2021 dollars.

Source: ADFG 2023, Northern Economics, Inc. analysis

While Chignik region fishermen contribute heavily to the S01L fishery, S01L earnings also historically make up the majority of Chignik region residents' commercial fishing revenue. As seen in Figure 7, even at its lowest point, S01L revenue made up 56% of total Chignik region residents' commercial fishing revenue and averaged 81% during the 1980–2017 period. At its highest points, S01L salmon made up 94% of Chignik region residents' commercial fishing earnings. In 2017, the year before the disaster, the S01L revenue contribution was near that level at 93%.

Figure 7. S01L and Non-S01L Chignik Region Resident Commercial Fishing Revenue

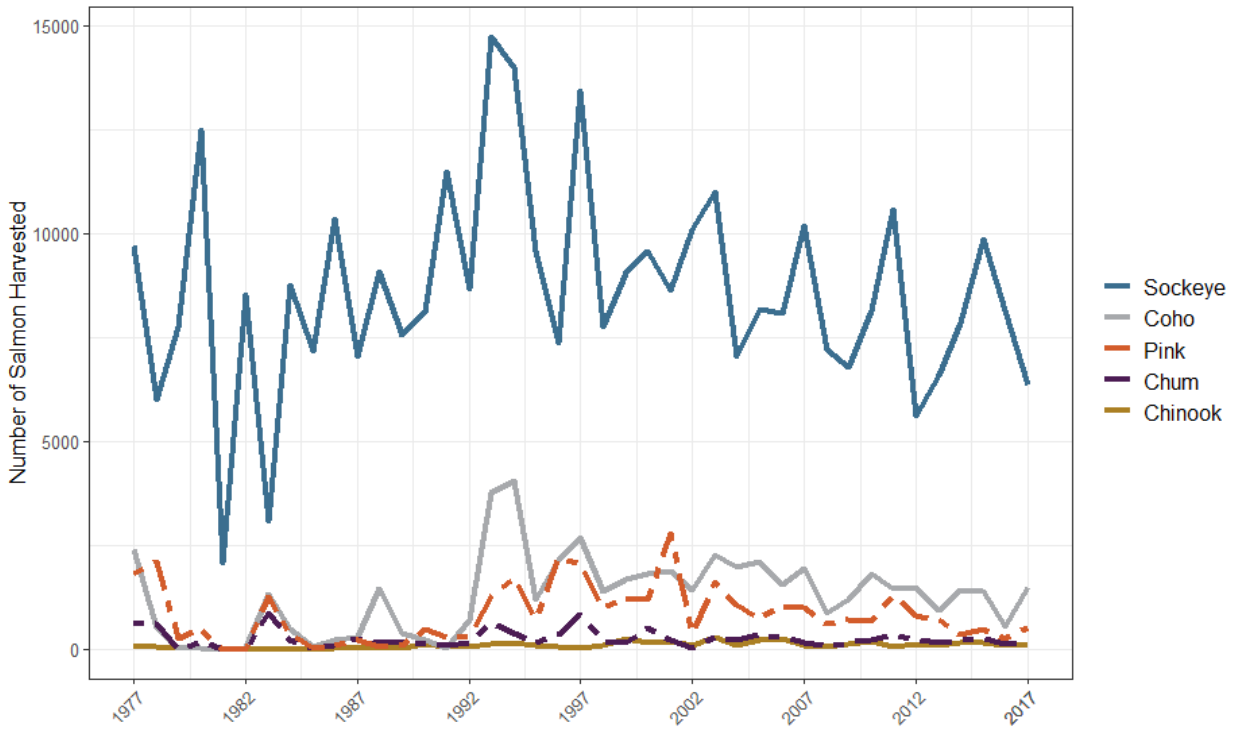


Note: This figure represents data from permit holders residing in Chignik Bay, Chignik Lake, Chignik Lagoon, Perryville, and Ivanof Bay. Revenue has been adjusted for inflation and represents real 2021 dollars.

Source: ADFG 2023, Northern Economics, Inc. analysis

Since 1977, the first year of available data, the Chignik subsistence fishery has also seen fluctuations in catch, though sockeye has remained the primary harvested species (Figure 8). From 2010–2017, Chignik region residents harvested an average of 7,891 pounds of sockeye a year, followed by an average 1,312 pounds of coho salmon. Chinook is the least harvested species, averaging only 114 pounds per year during the same period. Total subsistence salmon harvests have been relatively stable during that time as well. Total catch averaged 10,148 pounds per year, with a peak in 2011 at 13,732 total pounds and a low of 8,242 total pounds in 2012.

Figure 8. Estimated Historic Chignik Region Salmon Subsistence Harvests



Note: This figure represents data from Chignik Bay, Chignik Lake, Chignik Lagoon, Perryville, and Ivanof Bay. See Fishery Data Methods for description of estimated data.

Source: Brown et al. 2023, Northern Economics, Inc. analysis

Fishery Disasters and Disaster Declarations

In 2018, subsistence and commercial fishing opportunities were constrained by low sockeye runs returning to the Chignik River Watershed. In response to poor escapement the commercial sockeye fishery was closed for the entire year. The total run, including harvest and escapement, was the lowest recorded since 1969 (Brown et al. 2021), leading to a federal fishery disaster declaration on October 30, 2019, and relief payments were distributed to permit owners, crew, processors, and communities in 2022 (ADFG 2020b).[2]

The primary purpose of a fishery disaster declaration is to make federal relief funds available to assist those commercially impacted by the disaster. Federal fishery disasters can be designated if there is a commercial fishery failure, a catastrophic regional fishery disaster, a significant harm incurred, or a serious disruption affecting future production (Fishery Resource Disasters Improvement Act 2023). These declarations primarily assist impacted commercial users and associated entities, though

[2] *https://www.adfg.alaska.gov/index.cfm?adfg=fishing.2018_chigniksockeye_disaster_relief_fund*

subsistence users may also be included under certain circumstances. There is currently no separate framework for specifically designating a disaster for subsistence users.

For a fishery disaster to be declared, a commercial fishery must experience at least a 35% decrease in fishery revenue compared to the preceding five-year average (National Marine Fisheries Service [NMFS] Policy 01-122). By law, the process to declare a federal fishery disaster begins with a request to declare a disaster from a community or other representative, such as the governor of the state where the disaster occurred. This request goes to the Secretary of Commerce where then the National Marine Fisheries Service begins an evaluation of available information to determine whether a fishery disaster occurred. This review covers both causes and effects of the disaster. If impacts meet the allowable impact threshold (35% loss in revenue) and the disaster resulted from an allowable cause (including natural causes, undetermined causes, or man-made causes beyond the control of fishery managers), then the Secretary can issue a disaster declaration, which initiates a process where Congress can appropriate funds to fishery participants, processors, and communities. During the process of determining how much relief to issue and to what groups, impacts to and relief for subsistence users may be considered if subsistence has commercial components through selling, bartering, or trading, if they are part of affected fishery communities, or if they are considered alongside other non-commercial fishery users (NOAA Fisheries 2024). In the Chignik fishery disasters, relief payments were not issued to subsistence users.

While state subsistence fisheries for sockeye remained open year-round in 2018, subsistence fishing for sockeye was restricted in relevant federal waters, which include swaths of the upstream portions of the Chignik River and Chignik Lake, including the waters surrounding the village of Chignik Lake. While federally qualified subsistence users who were residents of Chignik Bay, Chignik Lagoon, Chignik Lake, Ivanof Bay, or Perryville were exempted, each needed to be in possession of a Social and Cultural Harvest Permit issued to designated fishers selected by the community (U.S. Fish and Wildlife Service [USFWS] 2018). A Social and Cultural Harvest Permit restricted harvest of sockeye salmon for a community to 100 fish (Pappas 2018).

In 2019, early season escapement was too low to allow for an early run commercial fishery to occur between June and mid-July, however a small commercial fishery was allowed on the late run (Brown et al. 2022). While ADFG did not close subsistence fishing for sockeye in 2019, there were again restrictions for subsistence fishing in federal waters from late June until the end of July, but federally qualified residents of Chignik Bay, Chignik Lagoon, Chignik Lake, and Perryville were exempted (USFWS 2019). While total commercial salmon landings in the CMA decreased by 39.8% in 2019 compared to the 2010-2017 average (ADFG 2020a), a federal fishery disaster declaration was not issued in that year.

In 2020, no commercial fishing was allowed for the entire year and in 2021 commercial fishing opportunities were not provided until August (ADFG 2021; ADFG 2020a). In both years state subsistence harvesting remained open, but restrictions like those in 2019 for subsistence harvesting

in federal waters were again put in place. In 2020, federal subsistence restrictions were in place from June 18 through July 31 and in 2021 restrictions were put in place from July 8 through July 31 (USFWS 2020; USFWS 2021). Ultimately, disaster declarations were issued for 2020 on January 22, 2022,[3] for 2021 on May 9, 2023,[4] and for 2022 on July 23, 2024.[5] On January 30, 2025, Alaska Governor Mike Dunleavy also requested that a disaster declaration be made for the 2024 fishing year.

[3] *https://www.adfg.alaska.gov/index.cfm?adfg=fishing.2021_chignik_salmon_disaster_relief_fund*

[4] *https://www.adfg.alaska.gov/index.cfm?adfg=fishing.2020_2021_salmon_disaster_relief_fund*

[5] *https://www.fisheries.noaa.gov/s3/2024-06/AK-141-Chignik-Salmon-Determination-2022.pdf*

Fishery Disaster Impacts on Subsistence Users

Using information from interviews with subsistence users from each of the Chignik region communities as well other available data and information, the following sections summarize how the fishery disasters have affected subsistence harvesting, sharing, and use, as well as economic, social, and community impacts stemming from changes in subsistence and commercial fishing activities. In addition, summaries regarding how individuals and communities responded to the disasters, initial ideas on lessons learned and ways to prepare for future fishery disasters, and high-level conclusions are presented. This portion of the report concludes with a summary of methods used in developing the information presented.

The rest of the report is organized as follows:

- Impacts to Subsistence Harvesting, Sharing, and Use
    - General Impacts
    - Impacts to Harvest
    - Impacts to Use
    - Impacts to Sharing
- Economic Impacts
    - Income Impacts
    - Employment Impacts
    - Increased Subsistence and Replacement Costs
    - Broader Economic Impacts
- Social, Cultural, and Community Impacts
    - Population Impacts
    - Generational Impacts
    - Social and Cultural Impacts
- Individual and Community Responses to the Disasters
- Preparing for Future Disasters
- Conclusions
- Methods

Impacts to Subsistence Harvesting, Sharing, and Use

General Impacts

As noted previously, while subsistence fisheries for sockeye largely remained open during the 2018 disaster and subsequent years, in 31 out of the 33 total interviews conducted with community members negative impacts to subsistence harvesting, sharing, or use during disaster years were described.

"The decline in fish is just unbelievable. I don't understand why it's happening" – Chignik Bay resident

"Puts family in a world of hurt to not be able to get food themselves" – Chignik Bay resident

Those interviewed described negative impacts caused by the challenges of getting salmon for themselves, their families, or communities specifically in the following ways:

- Inability to harvest enough salmon
- Needing to expend a lot more effort to harvest salmon
- Needing to travel farther to get access to additional subsistence resources, like caribou
- Inability to use commercial vessels to harvest subsistence salmon
- Inability to get salmon or other subsistence resources though the use of commercial vessels
- Inability to get subsistence due to loss of commercial fishery income and costs (such as fuel for skiffs)
- Social pressure to not take salmon to help the stock recover
- Having less salmon to share

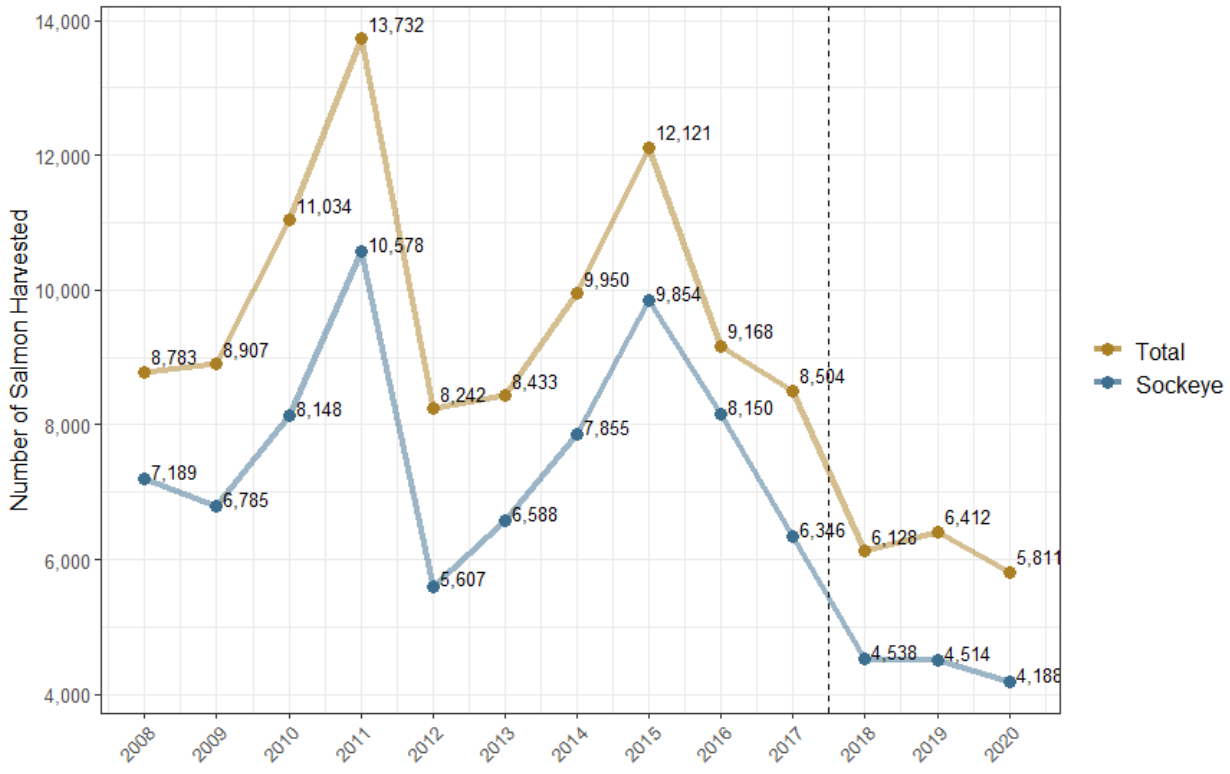
Impacts to Harvest

Most subsistence users described challenges of harvesting sockeye salmon and other subsistence resources in the disaster years. In each of the 31 interviews where harvesting was discussed, negative impacts to harvesting of either sockeye salmon or other subsistence resources were described. In 28 of these interviews (90%), people described how less harvesting occurred during disaster years. In the other three interviews, people described that they were able to harvest enough, but in two of these interviews people described how it took more time and effort than before the disasters. This result is consistent with a phone survey of community members conducted by ADFG in 2018, which found that of 27 people surveyed, 88% said that they harvested less sockeye salmon, and 85% described sockeye as being less abundant (Hutchinson-Scarbrough 2018).

This also aligns with the subsistence harvest estimates in 2018 and subsequent years. Estimated sockeye subsistence harvests decreased by 28.5% between 2017 to 2018 or by 1,808 fish (Figure 9).

During the disaster years of 2018, 2019 and 2020, the estimated total harvest of all salmon species averaged 6,117 pounds, a 38.1% decrease from the 10-year average of 9,887 pounds. In 2020, the total subsistence salmon harvest reached its lowest recorded point since 1981 at 5,811 fish (Brown et al. 2023).

Figure 9. Chignik Management Area Estimated Subsistence Salmon Harvests Pre- and Post-Disaster



Notes: This figure represents data from Chignik Bay, Chignik Lake, Chignik Lagoon, Perryville and Ivanof Bay. The dashed vertical black line represents the beginning of the salmon disaster period. See Fishery Data Methods for description of estimated data.

Source: Brown et al. 2023, Northern Economics, Inc. analysis

Factors described contributing to lower subsistence harvests overall:

- Using gillnets to harvest instead of commercial vessel is slower and harder
- Unable to harvest while away fishing or tendering in other fisheries
- Not enough fish to harvest
- Needing to fish more and harder
- Substitutes like moose and caribou hard to come by

Barriers to Harvest

Many of those interviewed described the challenges of harvesting enough of any salmon species in the disaster years, describing large changes in the general abundance of fish and the timing of

availability of resources have led to harvest difficulties. Several people noted that 2023 was the first year since 2018 that they were able to get enough to satisfy their needs to store salmon for the winter and share with others in their network, while others noted that it was still challenging:

> "Still not many reds here locally or in previous years, used to net over 100 reds in 15 minutes, only got 30 all summer this time" – Perryville resident

> "2018 I didn't take any subsistence fish. I don't even know that I had one to eat, like one personal use fish, until August that year... every year it's been hard to get subsistence fish. Even last year [2022] it was hard" – Chignik Lagoon resident

Some described that they are accustomed to getting their fish early in the season, from the early run of the stock, but that this run was too weak to get their subsistence fish from, leading to greater reliance on the late run in the fall:

> "The first fish that come into the Chignik Lagoon system are the ones that go the farthest in the lake system and they are probably the best ones for subsistence, and that still hasn't come back to us as far as I'm concerned. The run starts out weak and there is not the amount of fish that you would need for subsistence early, so it has a ways to go, it's not there yet." – Chignik Lagoon resident

This shift in the timing of subsistence harvesting was described as leading to other issues in processing or preserving their subsistence salmon, like flies, bears, heat, or rain, all of which can impact the ability to properly dry and smoke fish.

> "A lot of people like to take advantage of smoking fish early since there's not as many flies and not as many bear problems, but it's just not there yet, the early fish just straggle in." – Chignik Lagoon resident

However, shifts in the timing of harvest varied across communities with others describing a shift towards harvesting earlier in the season:

> "What we noticed too is that ever since the disaster people are targeting their subsistence as soon as the fish start coming in. They aren't waiting. We used to all subsist in October for our winter supply of fish. They go and get them while they can before Fish and Game says, 'no more'." -Chignik Lake resident

One interviewee noted that fewer fish impacted bears as well as people and created new barriers for subsistence harvesting and processing:

> "The pattern was very predictable. We would take the fish when the weather was cool, which gave us an opportunity to do some processing and then once the bears were satiated their behavior gets very amenable when they are well fed. During 2018 and 2019 the bears have had to adapt and that makes processing subsistence very difficult." – Chignik Bay resident

Additionally, in several interviews it was noted that the extra time and effort to harvest led to considerable expenses, whether for gear (e.g., gillnets), fuel for skiffs, time spent not working, or traveling to other places:

> "It cost us a lot of money to get these fish. Cause I was going on a lot more trips" – Chignik Lagoon resident

The timing and success of harvests may also have been impacted by the timing of the federal subsistence closures, which took place between late June and the end of July. In a few interviews residents spoke about the federal subsistence fishery closures, with some feeling as if they needed to choose between being compliant with the closures and feeding their families.

> "The Federal Subsistence Board and the State said we could not subsistence fish from the river, which we always did, and so me and my wife couldn't fish where we usually fish and we went to the Lagoon, and we couldn't hardly get any fish those years. And it was really, really hard. Not just for us but the whole village. And there wasn't enough work in the village to help everyone get everything they need for the winter like fuel, lights, stuff for the village and everyone was really hurting." – Chignik Lake resident

> "We all had to get federal permits to subsist. And we never used to have to do that before. And the problem that added to that is that it may have just been a misunderstanding, but some of us that spend the winters out we're saying we weren't eligible to get a federal permit to subsist." – Chignik Lake resident

Due to the timing of project interviews, many of those interviewed were year-round residents in the Chignik region communities. However, some of those interviewed, including all of those from the Ivanof Bay community, were seasonal residents, with their time in the community based largely around the timing of commercial salmon fishery. As a result, during the disaster years these residents often described staying in Anchorage or in other cities like Homer and Kodiak, either while waiting for the fishery to open, or to take advantage of alternate employment opportunities. Because of this, these seasonal residents described getting subsistence fish instead from other areas, like the Kenai, relying on donated Bristol Bay salmon, buying store food, and/or hunting more:

> "We got some fish from Kenai in those years…but they are not like our fish. Red salmon are good, Chignik has the prized fish" – Ivanof Bay community member

> "We got some fish from Bristol Bay, we got what we needed for winter, smoked them and put them away." – Ivanof Bay community member

Changes in Harvests for Other Species

In 64% of the 33 total interviews, people described how in response to the decreased availability of sockeye, they responded by harvesting more of other species, primarily to other species of salmon like silvers (coho salmon), humpies (pink salmon), dogs (chum salmon), or kings (Chinook); but also to other fish species like halibut, rockfish, candlefish and cod, as well as Dungeness crab, octopus, and clams.

Among other salmon species, silver salmon was discussed in the most interviews as the main substitute species for red salmon, even if it is less preferred.

"My boys brought in halibut, codfish, crab. Whatever we could get." – Chignik Bay resident

"You learn and you adapt. I adapted to learn to kipper silvers. And that works. And I learned if I freeze the silvers within six hours of catching them it's not that bad to pull out of the freezer as long as you eat it right away." – Chignik Lagoon resident

However, while increasing harvests of other salmon species was widely described, especially silver salmon, total estimated subsistence harvests of salmon decreased during the disaster years, and on average, less silver salmon was estimated to have been harvested in 2018, 2019, and 2020 compared to 2017 or the ten-year pre-disaster average (Table 5).

Table 5. Chignik Management Area Subsistence Salmon Harvests Pre- and Post-Disaster

Year	Chinook	Sockeye	Coho	Chum	Pink	Total
2008	41	7,189	877	57	619	8,783
2009	104	6,785	1,174	137	707	8,907
2010	188	8,148	1,820	222	656	11,034
2011	52	10,578	1,458	355	1,289	13,732
2012	116	5,607	1,488	220	810	8,242
2013	79	6,588	916	164	686	8,433
2014	148	7,855	1,401	207	339	9,950
2015	160	9,854	1,393	233	481	12,121
2016	97	8,150	552	118	251	9,168
2017	73	6,346	1,470	106	510	8,504
2018	68	4,538	966	157	399	6,128
2019	60	4,514	1,094	158	586	6,412
2020	64	4,188	1,000	123	436	5,811
Average 2008-2017	106	7,710	1,255	182	635	9,887
Average 2018-2020	64	4,413	1,020	146	474	6,117
Percent Difference	-39.5%	-42.8%	-18.7%	-19.7%	-25.4%	-38.1%

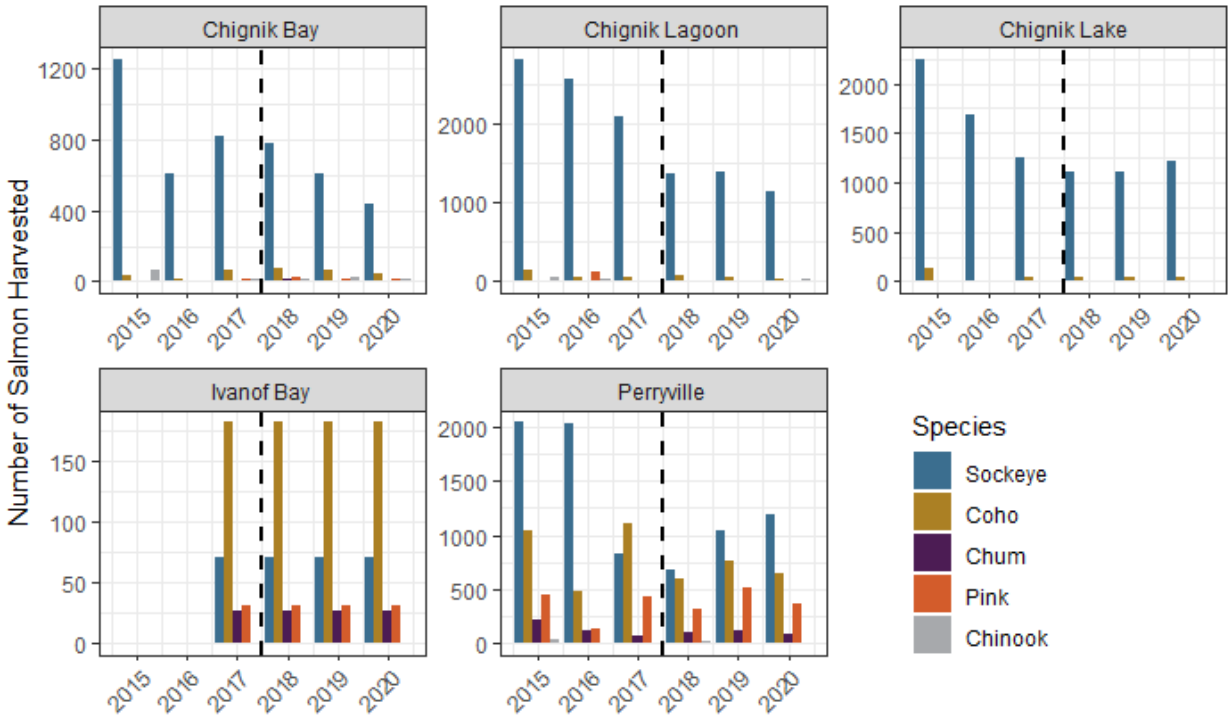
Notes: This figure represents data from Chignik Bay, Chignik Lake, Chignik Lagoon, Perryville, and Ivanof Bay. See Fishery Data Methods for description of estimated data.

Source: Brown et al. 2023, Northern Economics, Inc. analysis

Estimated subsistence harvests by community across salmon species also indicate that while less sockeye was harvested than before the disasters, harvests of sockeye outnumbered harvests of any

other species during the disaster years, except for Ivanof Bay (Figure 10). In Chignik Bay, Chignik Lake, and Chignik Lagoon, estimates of sockeye salmon harvested during the disaster years indicate that both before and after the disasters relatively few other salmon species were estimated to have been harvested (Figure 10). In Perryville, which harvested the most of other species of salmon before the disasters compared to Chignik Bay, Chignik Lake, and Chignik Lagoon, sockeye harvests still outnumbered harvests of any other species in the disaster years. In 2018 in Perryville, coho and sockeye were harvested in similar amounts. In Ivanof Bay, the estimated quantity of all salmon species did not change from 2017 to 2020, but it is also the community with the smallest number of subsistence permits (2 in each year), compared to between 18 (Chignik Lagoon) and 10 (Chignik Lake) in the other communities (in 2018, Brown et al. 2021). Ivanof Bay is notably also the only Chignik region community that primarily harvested coho salmon for subsistence during this period. Differences in Ivanof Bay reported subsistence harvests may also be because many community members reside in Anchorage for most of the year and may have access to different subsistence fisheries outside of the Chignik region. During interviews, some Ivanof Bay community members reported getting fish from the Kenai while waiting in Homer for the fishery to start while others reported not returning to Chignik to get their subsistence during the disaster years and going to Seward or Homer instead to get fish.

Figure 10. Estimated subsistence Salmon Species Harvested by Community of Residence During Disaster Years



Note: The black line represents the beginning of the salmon disaster years. Data are from annual Alaska subsistence and personal use reports for salmon fisheries across Alaska and are based on returned subsistence permits in each year by place of residence.

Source: Brown et al. 2023; Brown et al. 2022; Brown et al. 2021; Fall et al. 2020; Fall et al. 2019; Fall et al. 2018, Northern Economics, Inc. analysis

During interviews, these patterns of harvests created some mixed reactions about the availability of subsistence salmon. In communities like Chignik Bay, where sockeye was the primary source of subsistence, the impact seemed to be felt more severely:

> "There was not enough fish. We were not able to put enough away for the winter. It was scary" – Chignik Bay resident

However, in communities like Perryville, comments were more mixed. Though subsistence users always noted that the impacts were negative, the comments could be less severe:

> "We've seen fewer fish here…and now we're targeting coho. We get by okay [through the winter], yeah [but]… We definitely have to try harder." -Perryville resident

In interviews in each of the local communities with a year-round population in recent years (Chignik Lake, Perryville, Chignik Bay and Chignik Lagoon) people described challenges of locally accessing caribou, which are generally less abundant in the Chignik region than they have been historically. Several people interviewed described the need to go to the Port Heiden area to get caribou, which can be costly and be hard to get a permit for.

> "Because of the decline of the caribou they put us on Tier 2 permits. Unfortunately, I haven't been able to [get one], I had a permit for one or two years and after that I wasn't able to get a permit" – Chignik Lagoon resident

By contrast, those residing in Anchorage described more flexibility and availability to get caribou:

> "We subsist on other stuff too, up here in Anchorage we get caribou up in the 40-mile herd. We don't live [year-round] down in Chignik now anymore, we used to be able to get our Caribou down there. There's a Tier 2 permit there for residents. Up here is Tier 1, anyone can go up there and get them." – Ivanof Bay community member

Across communities people also described the limited local availability of other species ranging from king (Chinook) salmon, halibut, geese and ducks, and ptarmigan. People specifically noted that these resources appear to be less abundant than they were historically. In a 2022 climate risk assessment for the region, it was noted declining bird abundance for harvest was a key concern for the region. Also noted as key concerns in the same report were the loss of traditional berry supply and picking areas and the loss of bivalves as a food source (CIC 2022). Several people noted that harvesting clams and other shellfish is difficult and has inconsistent results due to the risk of PSP.

One difference across communities is in the substitution of moose for salmon. In Perryville, several people noted depending more on moose to fill in for less red salmon, but in Chignik Bay and Chignik Lagoon several people described how moose were challenging to find locally but shared widely when hunts were successful. In a couple interviews, it was noted that some are substituting moose with wild cattle from nearby islands.

In addition to local resident hunting efforts, arrangements with new owners of a hunting outfitter service have led to meat from moose taken by non-local hunters being dropped off across the Chignik Lake, Chignik Lagoon, and Chignik Bay communities, which has been credited with increasing availability of food harvested in the region.[6] Part of this is due to state regulations that require hunters to salvage all edible meat from big game animals, as well as prohibiting its sale (ADFG 2024a). From hunters primarily interested in prize racks from game like moose, recent upticks in guided hunting expeditions have led to new distributions of meat to Chignik region communities:

> "They brought us moose leg down and shared it… spread it out [around the community]… [Guided hunters] must have got it in the lagoon… I'm grateful for it. It will be nice in the cold winters to make some moose bone soup." – Chignik Bay resident

Unavailability of Commercial Fishing Vessels

While many described low abundances, changes in seasonal availability, effort to harvest, and availability of other species as primary factors contributing to low harvest levels, other mechanisms also affected the ability for people to harvest enough salmon and other subsistence resources. Several people, particularly in Chignik Bay and Chignik Lagoon, discussed how they would typically use their commercial fishing vessel for subsistence activities, either to use the fish specifically for subsistence, before or after the fishing season, or by taking homepack during the fishing season:

> "Not too many vessel owners here use their vessel to get them. They just take a gillnet and go off the beach... I'm sure people in Chignik use their vessels a lot more just to get it done in one whack." – Perryville resident

During the disaster years, it was described that commercial vessels weren't used for subsistence for a few reasons. One was that the boat was not planning on fishing for the year, so it was on blocks, uninsured, or otherwise not available to be used for subsistence. Others described that it was inefficient to use the boat for how few salmon would be caught and the costs to use the boat, while some indicated a desire to use gillnets that did not require a large vessel to deploy to support escapement and to leave more fish in the system:

> "We would go out there and make one set [with the seiner] and get enough for the whole family to stay busy all day long putting away fish in the smoker, canning, and salting. You could do it in one set. You can't do that anymore. When these returns are not coming back, we're out there for weeks trying to catch fish. Now we are using gillnets to try to catch our fish" – Chignik Lagoon resident

> "When there's no commercial fishing [the boat] is on the blocks" – Perryville resident

[6] This arrangement was not discussed in any of the Perryville interviews and as a result it is not known if Perryville residents also benefit from moose sharing agreements with hunting outfitters.

> "Traditionally, we would harvest all of our [subsistence] salmon with the seining boats, and we could make easy work of it. All of us would get together and we could process several hundred fish in a matter of hours. And [during the years of low abundance] we didn't feel comfortable going out with our gear because everyone wanted to stand down to get as much fish up the river as possible… nobody wanted to be that person to go and be the only person subsisting when everybody is waiting." – Ivanof Bay resident

Others described that fishermen needed to leave to go elsewhere to work or fish, and that this would prevent them from getting their subsistence, since they were not around when they would get their fish:

> "We do have good subsistence as the season goes on but then a lot of the subsistence users are commercial fishermen, and they have to get out and commercial fish so that little window there in the beginning is not there for them."- Chignik Lagoon resident

Some people also described how they would typically use commercial vessels to travel to nearby areas to hunt for moose or other species as well, and sometimes take the opportunity to gather other subsistence resources on these types of trips, so these subsistence-related activities may also have been limited by a lack of commercial vessel availability during the disaster years.

> "There was very few opportunities to hunt. What's unique about Chignik is that when we hunt, we use our commercial boats to hunt… so if you take out the use of commercial vessels to hunt, the take of subsistence meats drops… They don't have money for the insurance, they don't have money for the fuel, they're scrambling for making a living in another fishery or other opportunities, that in turn leads to less sharing within the community." – Chignik Bay resident

Others described how a main mechanism for getting subsistence fish was fish shared off commercial vessels, specifically in Chignik Bay, which in turn limited the ability to get salmon in the disaster years:

> "Fishermen they would come into the Bay "you want fish" I'd say "sure we want fish"" – Chignik Bay resident

> "And when they have fish, you know, they provide fish to us. Whoever wants to give us fish, we wouldn't say no" – Chignik Bay resident

> "When you don't have that abundance in your freezers that becomes a really big problem—there just wasn't enough" – Chignik Bay resident

> "We live off the salmon a lot. These days we hardly get anything" – Chignik Bay resident

> *"[Do people do that because it was an efficient way to get a lot of fish quickly and put it up?] "Yeah, do it all in one whack"*
> *– Perryville resident*

This result that Chignik Bay residents were more limited by the absence of commercial vessels is consistent with previous work on Chignik salmon sharing networks. Before the disasters, Chignik Bay obtained the greatest amount of salmon directly from the commercial catch, at 48.7% of subsistence catch between 2014 and 2016, compared to 27.2% in Chignik Lagoon, 5.8% in Chignik Lake, and 7.5% in Perryville (Table 3). This loss of subsistence opportunities from the use of commercial vessels impacted Chignik region communities in several ways. Several of the fishermen interviewed discussed getting subsistence for the season efficiently using commercial gear to harvest subsistence before or after the season.

Others discussed keeping a small portion of commercial catch for personal use, or homepack. While the specific volume data can't be shown due to confidentiality constraints, the homepack taken across all Chignik region communities decreased significantly during the disaster years, including no reported homepack in either 2018 or 2020 (ADFG 2023). From 2018 to 2021, the average homepack decreased by 57% compared to the previous 4 years (2014–2017) and by 93% compared to the previous 10 years (2008–2017).

Impacts to Use

Immediately after the 2018 disaster, Chignik subsistence users were surveyed to ask if they were able to get enough subsistence. 77% (20 out of 26 respondents) said they were not able to get enough (Hutchinson-Scarbrough 2018). In general, those interviewed for this project described limits to the amount of sockeye salmon able to be harvested or obtained in the disaster years. Here, we further describe how the use of sockeye, other subsistence, and non-subsistence resources changed during the fishery disasters. In general, people described changes in the following:

1. Changes in food storage (through the amount and type of food stored)
2. Role of donated salmon to compensate for less local salmon
3. Changes in the balance of non-subsistence foods

Changes to Storage

Storing subsistence food for the winter was discussed in the majority of interviews (79%, or 26), though responses varied considerably, ranging from those expressing that they felt that they were able to store enough after harvesting other species, those who were not able to get enough and described running out before winter's end, and those who described feeling like they got enough even though it was less than usual:

- No change in the amount of subsistence food stored and able to get enough for winter (4)
- Not able to store enough subsistence for winter (12)

- Stored enough subsistence to get through but less than before (6)
- Changed processing methods to store more (canning, freezing, 2)
- Purchased canned salmon instead of preserving own (1)
- Changes to storage unclear (1)

In some interviews, people described learning to adapt to the availability of different species by learning to process these species in new ways, such as by canning, while in others, people described working to store more and may have invested in additional freezers to store more food:

> "I just started canning recently. Maybe two years ago… to provide for my family. Last winter I canned four cases of red salmon and that didn't last the winter." – Perryville resident

> "People are storing more food, including freezing more. We bought two new freezers since 2018 and are also canning more" – Chignik Bay resident.

Those interviewees who said they were able to get by with the amount of food stored, explained that it was by working harder to harvest subsistence resources, so they were able to not have their food supply impacted, or that while there was less stored, they made do. For those with less than normal but still what they considered enough, factors enabling them to get through were sharing less with family members, purchasing more store food, or after 2020, taking advantage of donated fish from Bristol Bay.

"For the two of us, it doesn't take much, but normally we share with our kids" – Chignik Lake resident

Seafood Distribution Network

In 2020, 2021, 2022, and 2023, the Alaska Sustainable Fisheries Trust (ASFT) and the Alaska Longline Fishermen's Association (ALFA) provided donations of Bristol Bay sockeye salmon to each of the Chignik region communities. While the initial impetus was prompted by the COVID-19 pandemic, resultant food insecurity, and seafood production, logistical, and marketing challenges, the program also worked to address the food security impacts posed by the fishery disaster and has continued even after the pandemic subsided. The program has focused on distributing salmon to fishery affected communities, including Yukon River communities, Chignik region communities, and several other Southeast Alaska communities. Part of their rationale was not only to increase food security but also to allow families to continue to process salmon in culturally appropriate or favored ways. According to ASFT, 42,000 pounds of salmon were delivered to residents of the Chignik region communities in 2020, including those who had moved to Anchorage.

Based on feedback on the program during interviews, it appears that the donation program was hugely successful in its mission. The seafood distribution program was discussed in 30 interviews and in 27 of these interviews people described receiving fish from the program. In the three other interviews where fish was not received, only one person described not being able to receive the fish

(while away in Anchorage), with the others simply choosing not to take fish despite having the opportunity to do so.

While many people spoke about how the donated fish tased different from Chignik salmon and indicated it was not preferable to local fish, most people indicated that they took advantage of the availability and were grateful for the fish:

> "They brought salmon over from Bristol Bay also to help us out. Thank God for them. We survived off of that. A lot of us got skinny that year" – Chignik Bay resident

> "Some people didn't want them since they said they taste different. But I took what they gave me and salted and smoked them." – Perryville resident

> "Everyone was extremely grateful for Bristol Bay fish" – Ivanof Bay community member

In two interviews from different communities, people reported that they were able to take 3 boxes of fish or approximately 45 fish, though it is not known if this was in 2023 or one of the previous years, and that there was the ability for large families to take more if needed. While many people spoke about how useful the donated salmon was, responses varied from some saying that it filled an essential gap and they did not need to buy other food as a result, while others felt like it wasn't enough to compensate for what they lost:

> "Bristol Bay salmon got flown in. We couldn't turn that down. But we still ended up needing to buy groceries. There just wasn't that much salmon" – Perryville resident

Changes in the Balance of Other Foods

Even after many subsistence users responded to the disasters by harvesting more of other species or filling in what they couldn't harvest with donated fish, those interviewed often described needing to purchase more store-bought food during the disaster years than normal to get by. In several interviews this was described as being less preferred to Native or subsistence foods for a few reasons, including the increased costs of store food, especially for those living in the Chignik region, the less-healthy nature of store food, and the cultural importance of having Native foods in their diet. Needing to make more food purchases were described in 18 of the 23 interviews (78%) where food purchases were discussed. In the other five interviews, either they described that they did not need to buy more store food (3), or it was unclear (2).

> "So that was a big thing, you know, scrambling around to go to the different river and creek systems, but obviously we did have to buy more store food, inevitably, we don't love to do that, obviously the price is going up and up so that's terrible when you have a bigger family but obviously a lot of the products are not so healthy and not so great for you." – Ivanof Bay community member

> "In that year I noticed a lot more grocery orders coming in. Big grocery orders. But a lot of people here do try to live off the land, including me" – Perryville resident

Some people discussed that due to needing to change commercial fishing practices they were less able to get their subsistence and as a result needed to buy more store-bought food.

> "We did buy more store food compared to other years mostly because I was busy out fishing [in other fisheries] and couldn't do much subsistence" – Chignik Bay resident

In some cases, increases in store-bought food in their diet were attributed to other food donation programs. In Chignik Lake, one person discussed receiving food donations from a church, while in Chignik Bay people discussed a program organized by the CIC to take Costco food orders.

Impacts to Sharing

Previous work in the Chignik region has demonstrated that sharing is central to the overall subsistence economy and way of life. Before the disasters, 80% of Chignik region households received salmon from other households, and between 50% and 60% of households in each community gave salmon to others in 2016 (Hutchinson-Scarbrough et al 2020). However, Chignik region community surveys conducted in 2018 just after the first disaster noted some immediate changes to sharing. Only 15 out of 26 respondents (58%) reported receiving fish, and 96% reported receiving less. Just over 80% (21 out of 26) reported not receiving enough to share (Hutchinson-Scarbrough 2018).

Across the interviews for this report, Chignik subsistence users described impacts to sharing in many different ways, with some sharing or receiving less, some sharing more, while others described how sharing practices were not affected by the disasters. Such differences in sharing impacts may be due to the role of the person interviewed, as either harvester or non-harvester, or their role in the community, such as if the person interviewed was an elder. The extent of local and non-local family connections may also affect an individual's sharing network. Sharing was discussed in many interviews (27 of the 33) and general themes concerning impacts to sharing as a result of the fishery disasters included the following:

- Sharing occurred widely, just less to go around (4)
- People less able to share after providing for self and family (5)
- People who normally would share were not around (1)
- People sharing more to provide for community, elders, and other family members (3)

Less to Go Around

In several interviews, people described how despite the challenges in acquiring sockeye and other subsistence resources, people continued to spread what they did have to family and community members and underscored the cultural values around sharing and taking care of others in need. In Chignik Lake, one person described sharing the first red salmon of the year across six households.

"Fish taste better when you share" – Chignik Lake resident

"Even when times get lean you share what's on your table" – Chignik Lake resident

People often communicated the priority to take care of family members, including elders, before themselves. In some interviews, people noted that this was difficult to maintain during the disaster years:

> "There wasn't as much homepack or excess fish to go around, so we still took care of elders, but not as much as we would have if there was more of a catch. It was harder." – Chignik Bay resident

In other cases, some described that they still shared their catch, but because they expected that more would be caught later to provide for their own needs:

> "The first 10 I caught I handed all out thinking there would be more, and I never got them." – Perryville resident

Less Sharing with Others

In other cases, people described that they felt that they were less able to share with others especially with adult children or other family members living outside of the region, but also with the broader community:

> "We usually got enough to get by, but [our adult] kids [outside the community] didn't get any. We weren't able to share like we used to." – Chignik Lagoon resident

> "I remember [him] going out to fish many times, and he'd come back with maybe 10-20 fish, and we have, like, my granddaughter, my daughter and me to feed. Plus, we try to give a little bit to our other children who don't live here, and so pretty much we weren't able to. We had to keep it for ourselves because of the lack of red salmon." – Chignik Lagoon resident

> "It is pretty hard to take and share 10 fish. I mean you've got people who say, "I'll take some fish" and a person goes out using his seine and catches 10-15 fish he can't hardly take and give a bunch away because then he don't have nothing" – Chignik Lagoon resident

A common theme in these interviews was the need to first take care of personal or household needs for fish for the winter, and surplus beyond that need could be shared out more widely:

> "We used to share a lot more. Every smokehouse in the village every time they got say, three days smoke they'd just hand them out, give them to everybody. You don't see that much anymore. They are usually going into the freezer." – Chignik Lagoon resident

In addition to the impacts caused by decreases in subsistence abundance, it's worth noting that the disaster years coincided with the onset of COVID-19 in Alaska and the rest of the US. By March 2020, the same year the second federal fishery disaster in recent years was declared, Alaska state officials had officially shut down schools and began circulating CDC guidelines restricting gatherings (Boots 2020). Additionally, some rural villages reported that they would be exercising measures to self-isolate to protect their community and elders (Hopkins 2020). While none of the Chignik residents interviewed explicitly talked about COVID impacting their sharing practices, additional discussions with community members suggest that COVID may have deterred sharing, particularly for traditional gathering and processing practices. The need to isolate may also have further reduced sharing networks with outside communities and with extended family living outside of Chignik.

Gaps in Sharing Network

In some interviews, people described that they received fewer fish or lesser amounts of other resources through their existing networks because the people they would typically receive fish from were not around or were not fishing. As previously described in the section *Unavailability of Commercial Vessels*, a few people in Chignik Bay explained that a primary way for getting salmon was off commercial vessels. In one interview with a Chignik Bay resident, they described how people felt pressured not to take fish, which then disrupted the typical sharing or trading networks for other species:

> "The impacts were actually voluntary on the behalf of the community when they were looking at the threat of no commercial fishery there was almost a social pressure to not take subsistence in the same way that they did. So they really minimized their take and the structure of sharing foods with others outside the community in the fashion that they always had came to a stop. Just came to a stop. There were very few opportunities to get caribou from Port Heiden, as an example." – Chignik Bay resident

Based on previous work looking at the sharing of salmon resources in the Chignik region, it may not be surprising that interviewers mostly heard about these gaps from those in Chignik Bay, since out of all the communities they may be the most dependent on sharing. Before the disasters, it was estimated that 96% of households Chignik region used salmon, in Chignik Bay 63% of households successfully fished for it, compared to 83% in Perryville, 75% Chignik Lake, and 75% in Chignik Lagoon (Hutchinson-Scarbrough et al. 2020).

More Sharing with the Community

As previously described, impacts on sharing described in interviews were in part based on the age and role of the person being interviewed. Several people described that they shared more in order to take care of their relatives:

> "I guess for the older folks it might be a different answer because I guess on my end, we would be more conscious about your subsistence goods. We ended up sharing more of like our caribou and our moose with some of our older family members who didn't necessarily get stuff… Generally, in our culture it's an unspoken agreement that the nephews or younger guys in your family are going to produce and share those goods" – Ivanof Bay community member

In other interviews, people described that more sharing came from different sources. As previously described, people received more resources from the moose hunting outfitters, the Bristol Bay salmon donation program, people going to harvest wild cattle from nearby islands, and as noted in one interview, receiving more food from a small local farm:

> "He's got a farm down there, and he's been sharing with all his farm stuff, you know, all his vegetables and that kind of stuff. So there's lots of sharing in these hard times." – Chignik Lake resident

Economic Impacts

For many people in the Chignik region, commercial and subsistence harvesting are interdependent. Previous work has demonstrated that income from commercial fishing is used to purchase and maintain equipment and supplies needed for subsistence harvesting (e.g., skiffs, ATVs, gillnets, fishing tackle, firearms, ammunition, fuel), and in some cases commercial fishing vessels directly support subsistence needs during commercial use through retention from commercial harvests for subsistence use (homepack), and in other cases commercial vessels and gear are also used for subsistence harvesting and gathering outside of commercial harvest activities (Hutchinson-Scarbrough et al. 2020). As previously described, interviewees for this project often mentioned that each of these aspects was affected by the fishery disaster. Particularly by those who were involved in the commercial fishery, using gillnets more instead of taking homepack or using the commercial vessel to get subsistence fish was often described. Many also described needing to buy more food. This additional effort and expense came on top of a loss of income. For those unable to transition to commercial fishing or tendering in other fisheries or to find local alternative non-fishing employment in the village, this represents an additional economic impact.

This section describes the multiple ways that people described how individuals and communities were financially impacted as a result of the disasters and the connections between these impacts and subsistence use.

Both direct and indirect economic impacts as a result of the fishery disasters were described in several ways:

- **Income impacts:** Impacts from a loss of commercial fishery opportunities or other changes in income
- **Employment impacts:** Ability for people to find non-fishery employment, other employment impacts because of commercial fishery or subsistence changes
- **Increased subsistence costs:** Needing to spend more money on subsistence gear and supplies, needing to purchase more store food, increasing costs of food affecting dependence on subsistence
- **Broader impacts:** Loss of City of Chignik revenue (from fishery related taxes and fees), processing facilities' closure

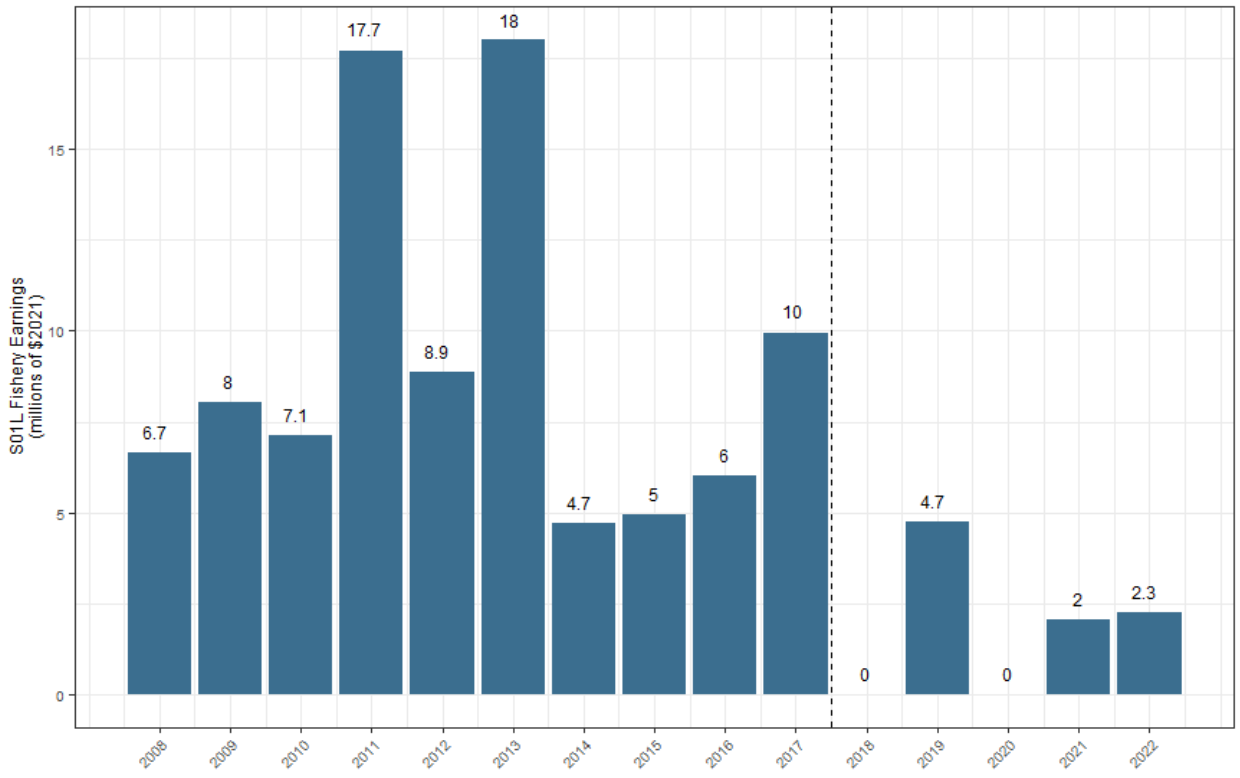
Income Impacts

Income impacts as a result of the fishery disasters were typically described as occurring for people directly involved in the commercial salmon fishery, but in Chignik Bay, where population loss during

the disaster years also led to low school enrollment and ultimate closure of the school, loss of school employment was also described. Overall, negative impacts to income (to self or others in the community) was described in 16 interviews, while neutral impacts to income were described in 4 interviews. Those describing neutral impacts were typically retired fishermen who either had paid off their vessel or otherwise sold or passed on their operations to others.

For Chignik region communities participating in the S01L fishery, commercial earnings were significantly impacted during the disaster period. Between 2008 and 2017, Chignik resident S01L fishermen earned an average total annual $9.2 million in revenue (Figure 11). Through 2018 to 2022, the average total annual revenue dropped to $1.8 million, marking an 80% decrease compared to the pre-disaster 10-year average. By 2022, total earnings were still less than 25% of what Chignik fishermen earned in 2017.

Figure 11. Chignik Resident S01L Commercial Fishery Earnings



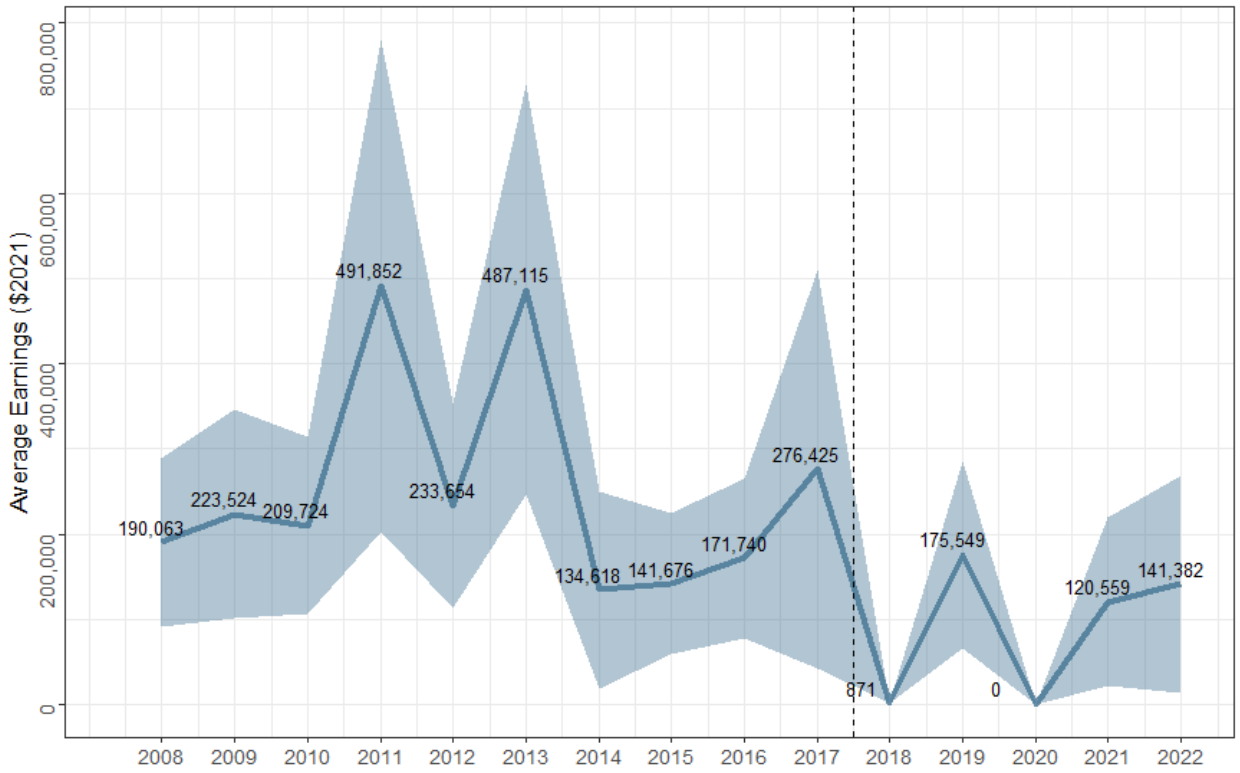
Note: Data represents total S01L commercial revenue earned by fishermen from Chignik Bay, Chignik Lake, Chignik Lagoon, Ivanof Bay and Perryville. The black line represents the beginning of the salmon disaster period.

Source: ADFG 2023, Northern Economics, Inc analysis

These losses are reflected on individual levels as well, as the average value per permit fished for Chignik S01L fishermen dropped significantly after 2018 (Figure 12). While variability in individual earnings has always been high, the average revenue per permit fished by Chignik residents between 2008 and 2017 was $256,039. Between 2018 and 2022, average revenue dropped to $87,672. This

represents an average loss of 65.8% in individual earnings for Chignik region commercial fishermen during the disaster period.

Figure 12. Average Earnings per S01L Permit by Chignik Fishermen



Note: The black line represents the beginning of the salmon disaster period. The ribbon represents the standard deviation. Data represents S01L commercial revenue earned by fishermen from Chignik Bay, Chignik Lake, Chignik Lagoon, Ivanof Bay and Perryville.

Source: ADFG 2023, Northern Economics, Inc analysis

Income Impacts Resulting from Commercial Fishery Closures

In interviews people often spoke about negative income impacts as a direct result of lost income due to the commercial fishery closures:

> "[Since] 2017, 2018, for 4 years there was hardly no good fishing. It got to the point where none of the crew wanted go fishing because there was no fish… I didn't go fishing that year because there was no fish. I was used to making $60, 70k a year, then down to $0." – Chignik Lake resident

In the 16 interviews where negative impacts to income were described, typically, these interviews described the difficulties of those who previously relied on the commercial sockeye fishery to make up for lost income, either by participating in other fisheries or by getting non-fishery employment either locally or elsewhere. When asked if they were able to make up lost income with other local

employment opportunities, several people said that they were able to find employment working for the village, but were not able to make the same level of earnings:

> "I actually worked for the village for one month, and after I got my paycheck, I told them I ain't working for this village. For $600, $700 for a month's worth of work, I told them forget it. – Chignik Lagoon resident

> "Fishing is way better. By far. I can make one year's salary all summer fishing compared to working [for the city]" – Chignik Bay resident

> "When something came up you had to take it, and it didn't last long. The pay was enough to get by… Especially in wintertime it's harder to find a job. In the village, everything is frozen. If anything happens, it happens in spring, summer, fall. Winter is pretty quiet." – Perryville resident

Some people described switching into other fisheries, like the Kodiak or Prince William Sound (PWS) salmon fisheries, or the Dungeness crab, Pacific cod, or halibut fisheries, while others described going to Bristol Bay to tender deliveries of salmon to processors:

> "To offset costs, I started going up to Bristol Bay and doing tendering and [have] been doing that the last three years. Gotta pay the [vessel] insurance, maintenance costs and all that." – Chignik Lagoon resident

As a result of lost income people described needing to sell permits or vessels or not making loan payments:

> "We depended on the commercial fishery for our income to help us survive the winter... we weren't able to make any state loan payments" – Chignik Lake resident

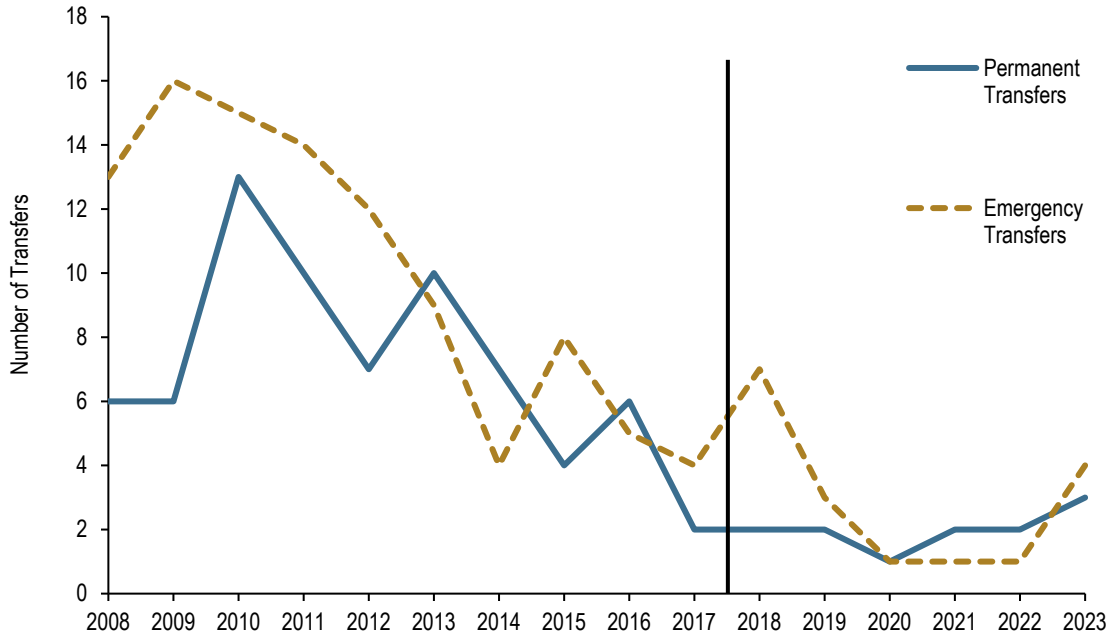
> "The ones that are commercial fishing this year, are still trying to get out of the hole from the last 3-4 years where they couldn't fish. They're having to sell their boats and permits now… we're still being impacted" – Chignik Lake resident

> "I had my boat, then and I paid out $10k for insurance that summer and I paid that out of my pocket because there was nothing else [before the relief]. I didn't have an income… I think the insurance is about 3 times as high if you go fishing now… I had my boat on the market for about 3 years before I was able to sell it." – Chignik Lagoon resident

The extent of income losses are reflected in the CFEC data showing permanent and emergency transfers during the period. Though in decline since 2009, both permanent transfers (including sales, gifts, and trades) and emergency transfers (temporary transfers due to unavoidable and unforeseen hardship), reached an all-time low during the disaster period (Figure 13). Between 2018 and 2023, the average number of permanent transfers per year decreased to two, from the average seven during 2008–2017 period. It wasn't until 2021 that permanent transfers began trending upward

again, supporting the assertion that selling permits during the disaster years became difficult and that the financial difficulties of the disaster are still catching up with the community.

Figure 13. S01L Permit Transfers Pre- and Post- Disaster



Note: The black line indicates the beginning of the 2018 salmon disaster. The count of transfers represents the number of transfers, not the number of permits. There can be multiple emergency and permanent transfers of a single permit in a year.

Source: CFEC (2023), Northern Economics, Inc. analysis

Other people directly discussed how lost fishing income likely led to challenges in affording supplies for subsistence:

> "I'm sure there was a lot of people struggling with income since they rely on the salmon season, and they use some of that money to get what they need for subsistence." – Perryville resident

Other Income Impacts

While the vast majority of impacts described were a direct result of the commercial fishery closures, in Chignik Bay after the school closed in 2022, at least two interviewees described losing their jobs as teachers' aides or maintenance workers. In one interview, it was mentioned that the school had provided six part-time jobs. Both people who lost their school-related jobs were able to find some local employment working for the City of Chignik but noted that City pay is less than previous positions, especially because of the fishery closure's effects on the City's finances.

Employment Impacts

Overall, negative impacts to employment resulting from the disasters were described by fishermen and other community members in 17 interviews compared to neutral impacts in three interviews. Negative impacts were described in several ways including:

- Limited ability to find local non-fishery employment
- Limited ability to fish or tender in other fisheries
- Reduced availability of crew for the local salmon fishery moving forward

Neutral impacts were noted by those who were retired and unaffected, or those who spoke about the availability of local jobs or the ability to find other fishery employment.

Like income impacts, many people we spoke with described the direct economic impacts because of the commercial fishery closures. In ten interviews we spoke with commercial fishing vessel owners or crew members about impacts to their employment. Of those ten people, half either fished in other fisheries and/or tendered during the disaster years (5), and equal numbers of people either found local employment (with the city or village, 2), or found non-local employment (2), while one interviewee indicated that they were not able to find other employment. However, it should be noted that in eight other interviews with commercial fishing participants, employment impacts to themselves were not discussed or the type of employment impact was not clear. It may be that other interviewees were unable to find other employment, but it was not discussed during the interview.

"I've been working for the city. Since 2018 I've been full time with the city… I prefer to be fishing."
– Chignik Bay resident

Availability of Local Employment

In each of the local communities and in eight interviews people described the difficulties of replacing commercial fishery jobs with village or city jobs, either due to the limited supply of local jobs or due to the comparatively lower pay (as previously described):

> "There wasn't enough work in the village to help everyone get what they need for the winter, like fuel, lights, stuff for the village. Everyone was really hurting." – Chignik Lake resident

> "It's really tough to have jobs here because there's not enough money in our community at all to provide jobs, you know, because there's not enough people. The only job available is for the city, but they can't hire enough people, because the city doesn't have a whole lot of revenue. So that makes it really tough when there's not enough money to pay employees." – Chignik Bay resident

> "No jobs really here. How many people here? 28? 30? During the winter" – Chignik Bay resident

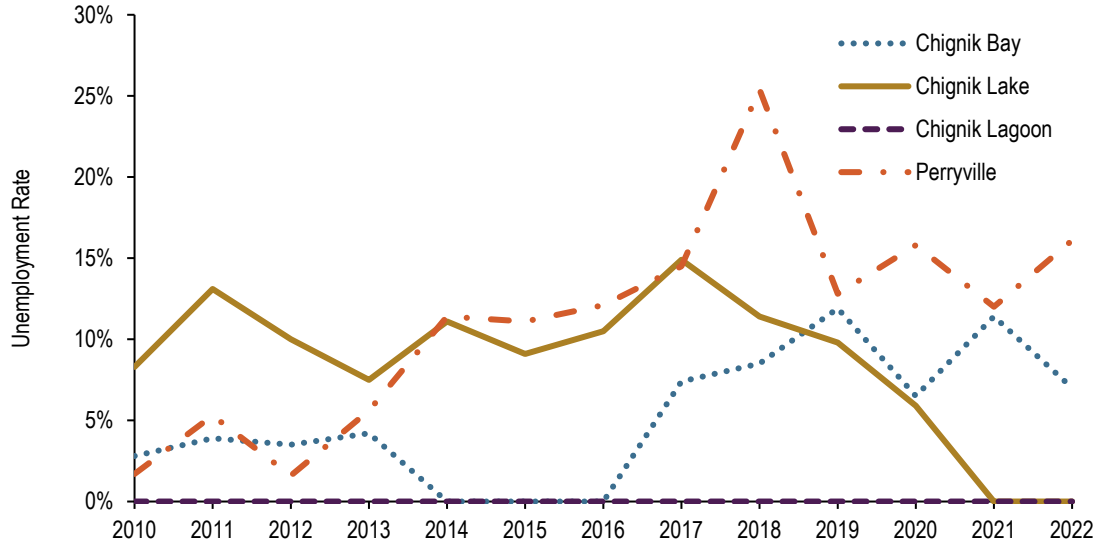
However, this view that there wasn't enough local employment was not universally held. In three Perryville interviews people described that they felt that jobs were made available if people wanted them:

> "The village here made jobs for people that wanted to work… but people did fly out and fish Kodiak. But I stayed here and worked whatever was available. I didn't want to get up and leave home."- Perryville resident

> "No, I don't think [the salmon disaster impacted employment in the community]. Maybe the guys who used to go and commercial fish. They [the community] would come up with some jobs for them." – Perryville resident

Estimated unemployment rates in Chignik region communities can be variable, though U.S. Census Bureau data does show that estimated unemployment increased for some communities during the disaster period. While Chignik Lagoon had an estimated 0% unemployment rate from 2010 to 2022, Perryville showed a spike in unemployment during the 2018 fishery disaster and retained the highest unemployment rate through 2023 (Figure 14). Chignik Bay also saw an increase in unemployment beginning in 2017 that lasted through 2022, while employment reportedly began decreasing in Chignik Lake in 2018, and continued to decrease until reaching 0% in 2021. Notably, as shown in Table 6, while Perryville had the highest unemployment rates from 2018-2020, Chignik Bay had the largest relative increase, recording a 69.6% increase in unemployment during the disaster period.

Figure 14. Estimated Chignik Region Community Unemployment Rates



Note: The black line indicates the beginning of the 2018 salmon disaster. No data was available for Ivanof Bay.
Source: U.S. Census Bureau (2024), Northern Economics, Inc. analysis

Table 6. Estimated Chignik Region Community Unemployment Rates

Year	Chignik Bay	Chignik Lake	Chignik Lagoon	Perryville	Ivanof Bay	Average
2010	2.8%	8.3%	0.0%	1.7%	ND	3.2%
2011	3.9%	13.1%	0.0%	5.3%	ND	5.6%
2012	3.5%	10.0%	0.0%	1.6%	ND	3.8%
2013	4.2%	7.5%	0.0%	5.6%	ND	4.3%
2014	0.0%	11.1%	0.0%	11.4%	ND	5.6%
2015	0.0%	9.1%	0.0%	11.1%	ND	5.1%
2016	0.0%	10.5%	0.0%	12.1%	ND	5.7%
2017	7.4%	14.9%	0.0%	14.5%	ND	9.2%
2018	8.5%	11.4%	0.0%	25.4%	ND	11.3%
2019	11.9%	9.8%	0.0%	12.8%	ND	8.6%
2020	6.5%	5.9%	0.0%	15.8%	ND	7.1%
2021	11.4%	0.0%	0.0%	12.0%	ND	5.9%
2022	7.0%	0.0%	0.0%	16.1%	ND	5.8%
2023	0.0%	0.0%	0.0%	7.7%	ND	1.9%
Average 2010-2017	2.7%	10.6%	0.0%	7.9%	ND	5.3%
Average 2018-2020	9.0%	9.0%	0.0%	18.0%	ND	9.0%
Percent Difference	69.6%	-16.9%	0.0%	56.0%	ND	41.1%

Note: No data was available for Ivanof Bay.

Source: U.S. Census Bureau (2023), Northern Economics, Inc. analysis

It is worth noting, however, that accurately tracking unemployment rates for Chignik region communities can be difficult. The estimated U.S. Census Bureau margin of error for unemployment rates in these communities can be large, up to 10% (U.S. Census Bureau 2024), and many members of these communities may not be full-time residents, making tracking them in community census data difficult. Additionally, as discussed in more detail later in the *Population Impacts* section, many community members left during the fishery disasters. Looking for work elsewhere was one of the reasons community members cited. Some of those facing unemployment may have been forced to leave and would not be included in these statistics, meaning these data could underestimate the unemployment Chignik region communities faced during the fishery disasters.

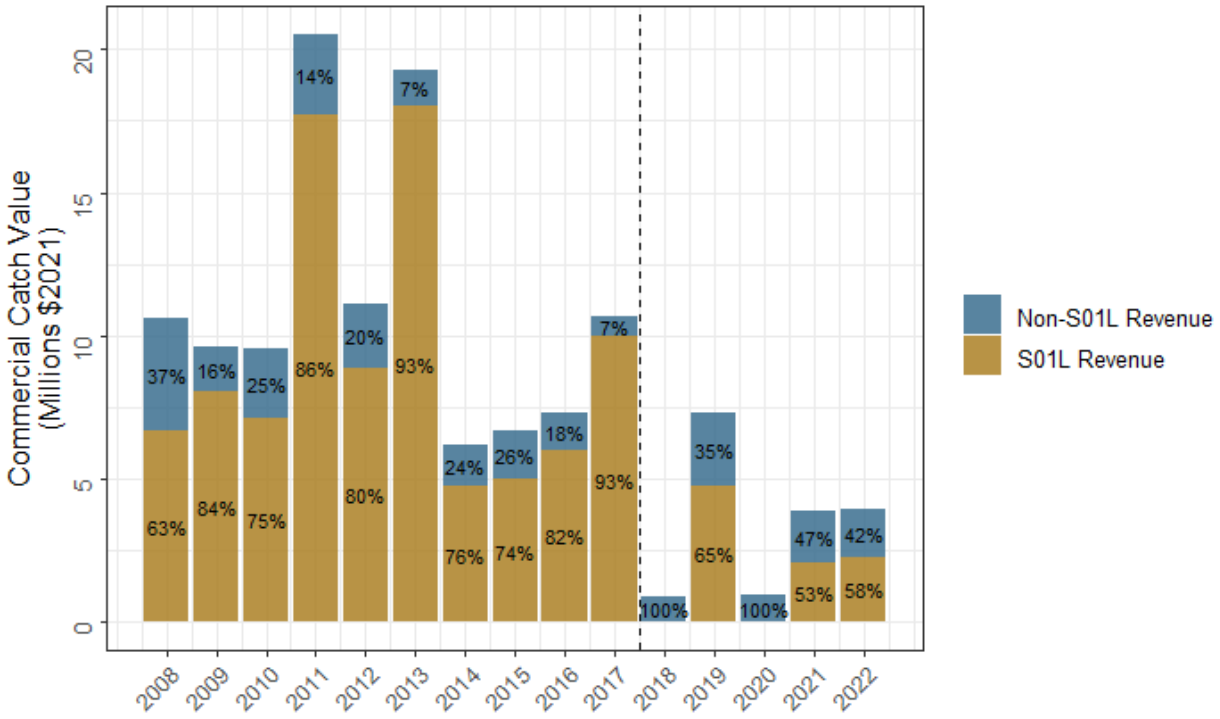
Ability to Switch into Other Fisheries

Several active and retired fishermen interviewed described how they themselves or others found employment in other fisheries during the disaster years, generally in non-local fisheries such as the PWS or Kodiak seine fisheries or tendering in the Bristol Bay salmon fisheries. While tendering and/or switching into other fisheries were discussed in similar numbers of interviews (in two interviews tendering alone was described, in three tendering and participating in other fisheries was described), it appears not many local permit holders bought into other fisheries during the disaster years. Only four of the approximately 35 active Chignik S01L permit holders purchased permits and

fished in the Kodiak or PWS purse seine fisheries after 2018 (ADFG 2023). However, it is not known how many people either worked as crew in other fisheries or tendered in the Bristol Bay fisheries.

During the disaster period, Chignik fishermen who relied on the S01L fishery took massive hits in their income. As seen in Figure 15, during the 2018 and 2020 declared disasters, almost no revenue was earned from S01L salmon. Any commercial fishing revenue earned during these years was earned in other fisheries such as crab, halibut, herring, or cod (ADFG 2023). In 2019, 2021 and 2022, the percentage of non-S01L earnings averaged 42% of all Chignik region commercial fishery earned revenue (Figure 15), which is more than double the historical average proportion of non-S01L earnings of 19.2% (Table 7).

Figure 15. Percentage of Non-S01L Earnings of Total Chignik Region Commercial Fishing Revenue



Note: The black line represents the beginning of the disaster years. This figure represents data from Chignik Bay, Chignik Lake, Chignik Lagoon, Perryville, and Ivanof Bay.

Source: ADFG 2023, Northern Economics, Inc. analysis

Total income earned from all commercial fisheries that Chignik fishermen were involved in decreased significantly during the disaster period, despite increases in proportional importance of non-S01L fisheries. Table 7 shows that total revenue earned for all fisheries Chignik region community members were involved in decreased by an average $8 million during the disaster years compared to the previous 10-year average. While the percentage of revenue earned from non-S01L fisheries increased during the disaster period, and particularly in 2018 and 2020, actual average revenue earned from those fisheries also decreased by an average $0.36 million compared to pre-

disaster years. This, coupled with lower average participation (Table 7), indicates that participation in other fisheries was not able to offset the lost income from S01L salmon and suggests that switching into other fisheries was not a primary way commercial fishermen responded to the disasters, though as noted above, this does not include tendering, or working as crew in other fisheries.

Table 7. Impacts to S01L and Non-S01L Fisheries for Chignik Participants

Period		S 01L	Non-S 01L	Total
2008-2017	Average Revenue (Millions of $2021)	$9.21	$1.93	$11.14
	Average Number of Permits	36	15	51
	Average Revenue per Permit	$255,833	$128,666	$218,431
	Average Percent of Total Commercial Revenue	80.80%	19%	100%
2018-2022	Average Revenue (Millions of $2021)	$1.81 *($3.02)**	$1.57 *(2.02)**	$3.39 *($5.03)**
	Average Number of Permits	13 *(20)**	9 *(10)**	22 *(30)**
	Average Revenue per Permit	$87,672 *($145, 830)**	$174,444 *($207, 964)**	$135,999 *($164,551)**
	Average Percent of Total Commercial Revenue	44.0% *(58.5%)**	64.8% *(41.5%)**	100%

*Note: This figure represents data from permit holders residing in Chignik Bay, Chignik Lake, Chignik Lagoon, Perryville, and Ivanof Bay. Figures marked by * represent averages with years 2018 and 2020 excluded, where the S01L fishery earned near $0 in revenue (2018) or was closed (2020).*

Source: ADFG 2023, Northern Economics, Inc. analysis

During interviews, some people also spoke about the difficulty of entering other local fisheries for species such as halibut, cod, or Dungeness crab and only in Perryville did interviewees mention coordinated community efforts to overcome those barriers through the establishment of a Community Quota Entity (CQE) (see *Expand the Use of Halibut Community Quota Entities*). Additionally, nobody described entering any of the other local fisheries as a response to the fishery disaster and described effort as more likely to be a part of their pre-disaster portfolio than something that they first entered during the disaster. This is consistent with fishery data, which show that a minority of local S01L permit holders fished in non-salmon fisheries during the fishery disasters. Less than a third of local S01L permit holders (10 total) had earnings from non-salmon fisheries between 2018 and 2022, and only 4 of them had landings in a fishery that they had not participated in during the 4 years (2014-2017) preceding the disasters (ADFG 2023).

One person described that a big barrier for participating in other local fisheries is the lack of local processors for these other species:

> "[No other commercial fishing opportunities] because a lot of the times…you have to run the fish out to Sand Point, because there's nobody around here to take the fish… And if too many people go out, there's not enough to go around [in crab]… It's a really hard life, and Pacific cod doesn't have the market… it doesn't equal out very well" – Chignik Lagoon resident

One other person explained that it did not seem feasible to switch into the crab fishery because of a lack of knowledge about the fishery as well as the initial costs for purchasing gear.

Several described how they were eventually able to switch into other summer salmon fisheries or tender in those fisheries, especially as the disasters continued, but in the initial disaster years (2018, and even 2020) they were not able to do so since they were waiting most of the summer for the fish to arrive and the fishery to open:

> "After 2020 we really realized, ok, this might be something that's going continue to happen or could happen again so after 2020 I… tender[ed] up in Bristol Bay, so instead of going to Chignik and waiting and hoping for fish to show up… I just flew to Bristol Bay and tendered that year and brought part of my seining crew with me." – Ivanof Bay community member

Unavailability of Crew

As a result of the disasters, several fishermen spoke about the ongoing challenges for finding qualified crew, even as the fishery improved in 2023. According to them, after several years of waiting to fish and receiving no income, crew don't view the fishery as a secure source of income any longer or have moved from the local area and/or moved on to other types of employment. This has in turn has affected some people's willingness to invest in the fishery:

> "You can't find a crew anymore. Even this year with a fairly good season you can't find a crew. Most of my friends that fished, just the skipper and two guys on deck most of the season. And a reliable crew, that's impossible... [Before the disaster] everybody wanted to work, used to have people standing in line to work… That's another reason I haven't bought into the fishery again." – Chignik Lagoon resident

> "Nobody wants to crew. That happened in 2018, 2019, where crew were just sitting on the beach for a month-and-a-half or something and there's nothing for them to do really. They were having a tough time even getting on the ferry, you know. No money." – Chignik Bay resident

Increased Subsistence and Replacement Costs

Across all communities, a commonly discussed economic impact resulting from the disaster was related to new or additional subsistence-related expenses or the replacement costs associated with buying store food when not enough subsistence resource-based foods were available. As previously discussed, many subsistence users reported needing to spend more time and effort hunting, fishing, and/or gathering subsistence resources, and even then, they may have also needed to buy more store food. Different ways people's costs were affected by the disasters included:

- Travel costs: spending more on skiff, ATV, or other vehicle fuel, purchasing airfare for fishing or hunting

- Opportunity costs: taking time off work to engage in subsistence pursuits
- Fishing gear costs: buying more fishing gear like gillnets
- Food storage equipment or supply costs: buying freezers, canning supplies, etc.
- Replacement costs: cost of store food

For those whose incomes were already affected by the disasters, it was noted that the increased subsistence costs were even more difficult to absorb:

> "It's hard to do anything if your financials aren't straight. It's hard to get fuel to go out and do your subsistence and different activities if you don't have money to do that. Obviously, the financial aspect is the biggest hit that I would want to note." – Ivanof Bay community member

For others, the high cost of living in the area already makes getting by difficult. Several people described the high costs associated with freight to get food and other supplies to their communities, on top of high food costs:

> "Plus, when you have to buy meat, can you imagine what the price of meat is? In Kodiak, the only meat you can get that's cheap is pork—pork and chicken, so we go back to that… If it's $5 a pound, you're actually paying $10 because the freight is so expensive. It's double what it normally is… the more you can subsist, the better" – Chignik Lagoon resident

> "More and more subsistence is becoming more important because of what's happening to the fishery. People are depending more on it now. We quit with flying [freight] how many years ago? Couldn't afford it anymore." – Chignik Lake resident

Many described relying on subsistence as a means to keep expenses low, so increased food costs could mean less for other bills and necessities:

> "Sometimes I feel like I have to make a decision to buy food or pay my light bill. That's what we're put up against. It's pay your bills or buy your groceries. Which is it?... If we had subsistence, we wouldn't have to worry about buying food" – Chignik Bay resident

Others explained that while they spent more time and to obtain sufficient subsistence resources during the disaster years, to them it was worth the additional cost to get Native food and to maintain cultural practices:

> "You have to spend more money traveling, dipnets and gear that I never had to invest in before… and I say it was an expense, but it was an expense well worth making because it's fun. And it brings the family together… and we don't do that anymore because the fish aren't coming in" – Chignik Lagoon resident

> "A big thing in those years was people [spending at least part of the year on the road system] ended up driving a lot to places like Seward, to places like Valdez, and to places like Homer,

where all those different runs come through. I know Seward has a nice red run early on and a nice silver run later on… that became a big thing." – Ivanof Bay community member

Broader Economic Impacts

In addition to individual economic impacts to income, costs, and employment as a result of the disasters, several larger scale economic impacts also occurred, including losses in revenue to the City of Chignik because of decreased harbor use and associated fee revenue as well as the loss of fish landing and processing-related tax revenues that accompanied the ending of local processing operations. In addition, in 2023, it was announced that the owner of the last remaining shore-based processing facility in the Chignik region was planning to transfer its facilities in Chignik Bay to the City of Chignik, including its closed processing facilities and a store where historically many residents would purchase at least some of their groceries, which could further impact the future vitality of the local economy.

City of Chignik Revenue

During the disaster years, the City of Chignik's tax base was greatly impacted by the loss of fish landing and processing related taxes. Total taxes dropped by over 50% from an average of $224,255 between 2014 and 2017 to $105,350 between 2018 and 2021, with a low of just $30,300 in 2021. With the opening of the commercial fishery in 2022, revenue increased somewhat in 2022 and in 2023. The City receives tax revenue from a combination of local fish landing and processing taxes (1% of ex-vessel value each), state raw fish taxes, as well as borough shared fish taxes. With respect to the local processing tax. However, even though fish are no longer processed locally since they are delivered to tender vessels and brought to Kodiak or other plants for processing, the seafood company that formerly owned and operated the processing plant in the community continued to pay the City of Chignik processing taxes, which local officials said was generous of them to do. However, it was also noted that this situation was temporary and that the company is no longer paying taxes to the City. With the transfer of the last processing plant's ownership to the City, however, it is not clear if and when local shore-based processing might leaving future tax revenues and the stability of the City of Chignik budgets in doubt.

Table 8. City of Chignik Bay Total Tax Revenue

Year	Total Tax Revenue	Landing/Proc	State Raw Fish	Borough Shared Fish
2014	$408,000	$97,600	$310,400	NA
2015	$166,400	$99,200	$62,800	$4,400
2016	$95,800	$60,200	$33,400	$2,200
2017	$226,700	$159,900	$65,200	$1,600
Pre-disaster average	**$224,225**	**$104,225**	**$117,950**	**$2,733**
2018	$132,600	$32,400	$98,900	$1,300
2019	$167,400	$158,800	NA	$8,600
2020	$91,100	NA	NA	$91,100
2021	$30,300	$13,100	NA	$17,200
2018-2021 average	**$105,350**	**$68,100**	**$98,900**	**$29,550**
2022	$87,700	$87,700	NA	NA
2023	$101,700	$101,700	NA	NA

Note: "Landing/Proc" stands for local landing and processing taxes. Not adjusted for inflation. No taxes were collected from 2019 onward for the state raw fish tax as Alaska ceased the program.

Source: City of Chignik 2024

In interviews, city officials described the loss of tax revenue as crippling the ability for the city to pay employees and provide services to residents, such as water and electricity, and oversee major infrastructure projects that are needed, such as a new dam. Other city officials described that an additional factor leading to financial instability is that some residents are unable to pay their utility bills. Fishermen were also struggling to pay harbor fees for electricity, water, and dockage/wharfage without incomes in the disaster years and even in 2023 many bills still went unpaid.

Processing Plant Closure and Changes

The closure of the last local shore-based processing facility means greater uncertainty not only for the city's financials, but also where people will be selling their fish and will be able to locally purchase groceries.. While the idle onshore processing facilities in Chignik Bay have gone through several owners, the last owner operated the plant until 2008, when it was destroyed by a fire. The company supplanted shore-based processing operations post-fire at different times with the local operation of a floating processor and tendering fish to other its other processing facilities in Kodiak as stop-gap measures until the plant could be re-opened (Seafood Source 2008). However, the plant did not reopen and by 2020, the operation was reduced to tenders and a seasonal beach crew of 35 employees working from an offshore processing vessel (Simonelli 2020). That same year, the only other tendering operation in Chignik closed, reducing local fishermen's options to only a single buyer for Chignik salmon (Ross 2022). While all salmon processing in Chignik had ceased, a shoreside fishery support facility remained in operation, including a seasonal local grocery store that was open and available to the public from May until August (Ross 2022). However, the store subsequently closed and in December of 2023, the company announced it would be selling off several of its Alaskan plants and "retiring or seeking buyers" for its Chignik facilities (DeMarban 2023). In July 2024, the

City of Chignik and the relevant seafood processing company executed an agreement that transferred local company-owned lands, infrastructure, and other remaining property to the City of Chignik, following an environmental assessment and agreement on responsibilities for specified site clean-up activities.[7]

Several people discussed how the plant was a substantial source of employment in the community, and with the move to nonlocal processing those opportunities were lost. During interviews, it was noted that direct employment by shore-side salmon processing had dropped to a skeleton crew that maintained facilities and that once the facilities were transferred to the City, even these jobs are more tenuous. That loss will impact more than just the few employed:

> "We were fortunate to have [a processing facility] store operate every year, but now I don't even know if it's going to open up… That was our only [local] means of getting groceries in the summertime… Now people order stuff off Amazon, from Anchorage. But the cost of freight is so high… you're paying most of your income to the airlines just to get your food. It's really devastating." – Chignik Bay resident

As previously discussed under the ability to switch into other fisheries, some fishermen described how the lack of local processors is a barrier to entering other fisheries, since there wouldn't be anywhere local to sell to. In 2022, the salmon processing and tendering operations dropped from two to one, reducing local fishermen's options for selling their salmon (Ross 2022). Several people in Chignik Bay also discussed how the lack of local processing has changed how many vessels come into the port and how many people are around, which has changed the nature of the community. Others observed that with the closure of shore-based processing operations, the demand for shipping to and from the community has decreased, which has reportedly increased the cost and decreased the frequency of shipping for local residents and businesses.

With the loss of shore-based processing also came the loss of vessel support services that the processor offered to the local fishing fleet (e.g., welding, hydraulics, marine hardware). While the processor was operating, there was not sufficient demand for a fishing support service sector independent of the processor to develop in the community. One has not developed following the closure of processing operations, likely due to the volatility of the fishery in recent years in general and during the disaster years specifically. This absence of a fishing support service sector, which can help increase the local economic multiplier for vessel related expenditures, may have an impact on community resiliency as the fishery recovers.

[7] The City of Chignik did not compensate the seafood company involved for the transfer of ownership, but did incur costs and fees incidental to the transfer process. As of December 2024, site cleanup activities for which the former owner is responsible were continuing. The City of Chignik has taken on responsibility for continued testing of the site and potential reuses of the site will need to consider the known presence of "no-dig" areas. Among other potential uses of the land and remaining infrastructure, the City is planning to renovate the building that formerly housed a store on the property and make it available for lease for operation once again as a store.

Ongoing Cost of Living Changes

Rural Alaska communities, like those in the Chignik region, often have very little in the way of infrastructure support. Chignik region communities are not road connected and are only consistently accessible by air or by sea, with limited road systems within the communities (Hutchinson-Scarbrough et al. 2016). This makes travel to and from these communities expensive for residents. During the fishery disaster years, when many local incomes were impacted, this made travel even more difficult, particularly with the inflating costs many interviewees noted:

> "There's a lot less traveling now. It costs too much to travel. Especially, it's over $1,000 roundtrip. Costs $1,400 to go to Anchorage….and foodwise, too. I've partnered with someone to do a food order, because the shipping is just as bad as the food prices" – Perryville resident

As noted in the previous quote, getting supplies is also expensive for Chignik residents. There is a small store in Perryville but the closure of a larger store that was part of the most recent local seafood processor's shore-based operations in Chignik Bay has further reduced easy access to goods in recent years. There are snacks and some staples available for purchase at the Chignik Community Hall in Chignik Bay, which is owned and otherwise operated by the City of Chignik as a community gathering space. While the inventory of staples sold there has increased somewhat since the closure of the processor-affiliated store in Chignik Bay, the City of Chignik is not well positioned to operate a grocery store on a continuing basis and, as noted above, is in the process of facilitating access to a leasable space for a commercially operated store. Stores in the region, and the communities they support, are usually resupplied by bi-monthly ferries (Hutchinson-Scarbrough et al. 2016). This means that many community members either travel by skiff to access the limited supplies available locally or are forced to have supplies shipped in at a significant cost. In some interviews people noted that the cost of both goods and the shipping of those goods went up during the disasters, increasing financial hardships even further.

"Since then the price of all the commodities has tripled, especially out here, for freight." – Chignik Lagoon resident

"Everything went up. The fuel, you know, for the village. Electricity. We're paying 400-500 bucks a month for electricity. We're adding it up to see if it's worth staying here. – Chignik Lagoon resident

Costs for utilities, such as fuel and electricity, were also noted in interviews to have increased. This has impacts across the community, especially for those already financially impacted by the disaster or for elders and retired community members who no longer have stable sources of income or are on fixed incomes. Several interviewees stated that this situation has affected their sense of stability within the communities and created pressure to move elsewhere.

Increasing costs of living also only adds further difficulty on the ability of subsistence users to gather subsistence resources. Many of those interviewed stated that with less access to subsistence resources obtained through various uses of commercial vessels, more reliance was placed on other

methods. These methods often involve more use of personal skiffs or ATVs to access regional waters or lands, flying to other communities or areas to conduct hunts for other sources of meat, or traveling to other communities where salmon is more available. With more travel needed to subsist, increasing fuel costs can greatly impact the cost efficiency of subsistence activities:

> "If you look at this house at night, you won't see any lights on. We cut back as much as we can on our electricity bill. And I don't do anything with the skiff that's not absolutely necessary, because [fuel] is $7 a gallon." – Chignik Lagoon resident

> "My family found ourselves spending a lot of time and resources—and by resources, I mean it takes a lot of gas to get up there—driving to places to do the different caribou hunts. So that's been a huge subsidy for us. You know, if we don't have other traditional meats, then we try to find something else to subsidize it that's traditional. That's been a big go-to… but it takes a lot of time, and it is expensive to do." – Ivanof Bay community member

Additionally, while community members often highlighted the impact of these cost increases during the disaster period, many also noted that these impacts are ongoing. Interviewees stated that the cost of living in Chignik region communities continues to be high, and many residents are still struggling with the financial burdens incurred during the fishery disaster, making it difficult to find relief.

Other Social, Cultural, and Community Impacts

In addition to the broader economic changes that occurred as a result of the fishery disasters, the size and composition of the local communities were also affected, with all communities experiencing population declines in the disaster years. This section discusses how seasonal and permanent population changes have impacted communities, including the ability for schools to remain open. This section also reviews how the disasters have affected younger generations, primarily through the ability to teach and pass down subsistence harvesting practices, as well as other social and cultural effects of the disasters relating to the ability to engage in traditional and culturally important subsistence activities, including impacts on well-being, mental health, and cultural identity.

Population Impacts

While discussing the impacts of the disaster, interviewees often mentioned broader impacts to their communities as a result of changes in year-round and seasonal populations. Many of the Chignik region communities experience natural seasonal fluctuations in population. Summer seasons were discussed by many of the interviewees as peak population times, as seasonal community members return from wherever they may be currently spending most of the year to visit family, participate in the commercial salmon season, and/or participate in subsistence activities, particularly if coming from places like urban areas where access to subsistence pursuits is more constrained.

> "My brother doesn't live here; he moved out. He lives in Anchorage and has lived there for a while… He puts his job on hold and comes down [to fish]. He does his subsistence here [as well]. – Perryville resident

> "Our daughter and her family come down here mostly and get their fish." – Chignik Lagoon resident

Interviewees discussed several reasons why community members may choose not to live in Chignik region communities year-round. Limited employment opportunities, a relatively high cost of living, and limited housing options can make the choice difficult.

> "That's kind of a seasonal thing for people. They leave for a multitude of reasons. Economics is a big one. Housing is another." – Chignik Lagoon resident

Many of the interviews discussed seeing people leaving their communities during the disaster years. Of the 24 interviews that mentioned population changes, 22 of them described the impacts as negative, or described population declines, along with one neutral and one unsure response. Chignik region communities are already small, and several people discussed seeing whole families leave during the disaster.

"Some of them got a bunch of money, with a big family, and said let's go [move] to Anchorage" – Chignik Lake resident

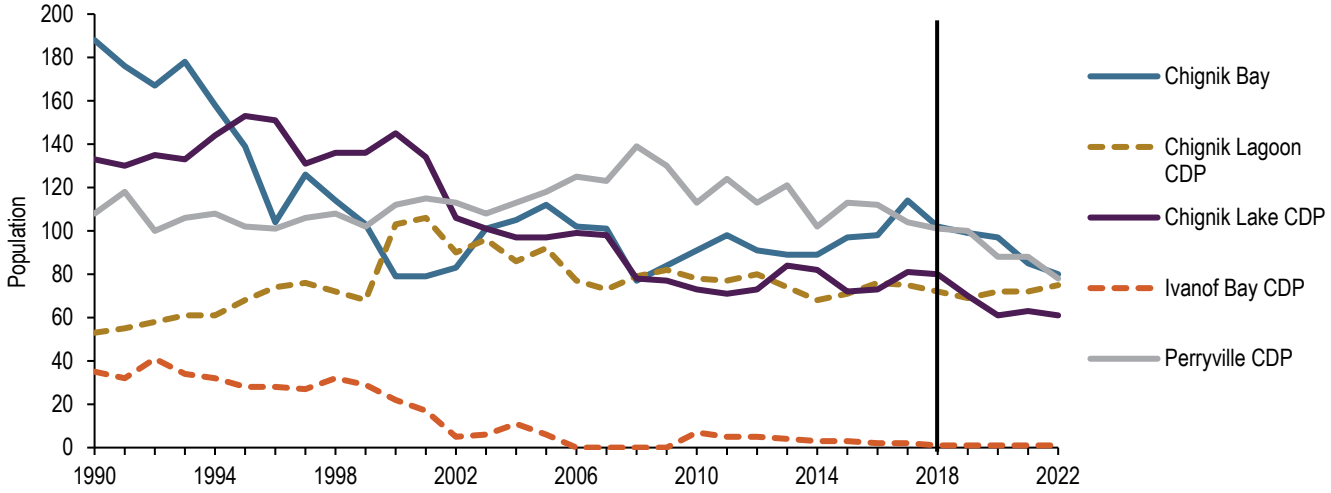
"With the decline of the fishery, everybody kind of moves away – Chignik Lagoon resident

"There were some families that moved out, but I don't know why they moved out, though. Better job, I guess." – Perryville resident

"There's people that left here, I don't know the reason why. Could be lack of jobs or income."-Perryville resident

In the years following the 2018 salmon disaster, populations decreased in nearly all of the Chignik region communities (Figure 16). While most Chignik region communities have shown a trend of population decline since 1990 (the earliest available data), between 2018 and 2022, the average population of all Chignik region communities decreased by 10.5% or 38 people compared to the previous 5-year average (Table 9). Except for Ivanof Bay, which had a very small year-round population before the disaster (4 people in 2013) and decreased to only 1 person in 2018, Perryville saw the largest population decline after the disaster, from 104 people in 2017 to 78 people in 2022. However, several people interviewed in Perryville did not attribute population decline to the disasters, and instead were more unsure of why people left.

Figure 16. Chignik Region Community Populations



Source: Alaska Department of Labor and Workforce Development (ADOLWD) (2023), Northern Economics, Inc. analysis

Table 9. Chignik Region Community Populations

Year	Chignik Bay	Chignik Lagoon	Chignik Lake	Ivanof Bay	Perryville	Total Population
2013	89	74	84	4	121	372
2014	89	68	82	3	102	344
2015	97	71	72	3	113	356
2016	98	76	73	2	112	361
2017	114	75	81	2	104	376
2018	102	72	80	1	101	356
2019	99	69	70	1	100	339
2020	97	72	61	1	88	319
2021	85	72	63	1	88	309
2022	80	75	61	1	78	295
Average 2013-2017	**97**	**73**	**78**	**3**	**110**	**362**
Average 2018-2022	**93**	**72**	**67**	**1**	**91**	**324**
Percent Change	**-4.93%**	**-1.10%**	**-14.54%**	**-64.29%**	**-17.57%**	**-10.56%**

Source: ADOLWD (2023), Northern Economics, Inc. analysis

By contrast, Chignik Bay's population did not change much on average (by 5%, or 4 people), but in interviews, Chignik Bay residents often indicated that many people, including multiple families, have left—enough to lead to the school closure. Similarly, Chignik Lagoon's population fluctuated throughout the disaster, but on average, was similar to pre-disaster levels (73 residents), though several residents spoke about population declines:

> "A lot of people left. As far as jobs here, what can you do? There's the school and the village council and that's about it. So, it's surprising we have so many people here now." – Chignik Lagoon resident

It may be that population estimates may not completely reflect the extent of population change, especially if people move out but retain a house in the community or retain the community as a permanent address. Multiple people we spoke with lived in the Chignik region only seasonally or had a house in one Chignik region community but were primarily residing in Anchorage.

However, in at least one community, population changes appear consistent with interviews. In Chignik Lake, most people interviewed indicated that many people have left, and population data indicate that there were 19 fewer people in Chignik Lake in 2022 than there were in 2017.

"People started taking off. Especially since Bristol Bay had all these good seasons. It was even hard to find a full crew to go fishing" – Chignik Lake resident

"This summer was a pretty good summer for fishing, and you can't tell around here that we had a good season. It looks like it was a bad season because there's no one around, but it doesn't correlate between people living here and the good seasons of fishing" – Chignik Bay resident

Finally, while some people were hopeful that portions of the population would return with the salmon, others were uncertain. Several people noted that their communities have large seasonal components, and even if commercial fishing improves, it may not translate to more permanent residents. In other interviews, people observed that it was tough for crew members who moved elsewhere during the disaster years to return to the community even for a season if it was uncertain that sockeye would be back in numbers sufficient to have a good year, especially given expense of air travel to get to the Chignik region communities.

Despite changes in populations attributable to the disasters, many people interviewed described that they would not consider moving, even if conditions worsened:

> "Roots are too deep here" – Perryville resident

Generational Impacts

During interviews, the primary way that those interviewed discussed generational impacts was through the loss of families and children from the communities, especially in Chignik Bay where the school was closed. The second way that generational impacts were felt was through changes in the ability to pass on subsistence harvesting and processing knowledge and experience to children and otherwise maintain cultural practices.

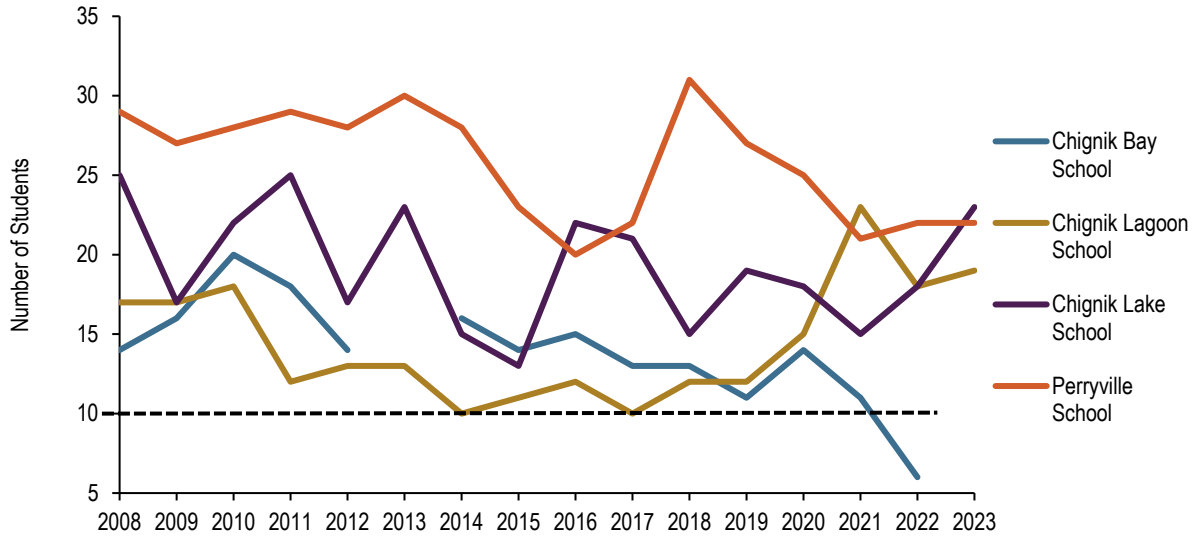
School Closures

To receive state funding, Alaska state public schools must have a minimum enrollment of 10 students (AK Stat § 14.17.450). Schools below that threshold have their public funding revoked. In rural communities, like the Chignik region, populations tend to be small (Table 9), meaning the out-migration of even a small number of families can have a disproportionately large effect. Loss of state funding due to the loss of students often results in the closure of rural schools, which can have serious impacts on the rest of the community. As noted by Bryce Edgmon, the state representative for Dillingham, "when schools go away, sometimes small communities go away" (Colton 2015).

As seen in Figure 17, Chignik Lagoon School, Chignik Lake School and Perryville School maintained the minimum necessary enrollments to keep the schools funded in the years prior to and preceding

the 2018 fishery disaster. Chignik Lagoon School enrollments fell to 10 students in both 2014 and 2017, with an average enrollment of about 13 students from 2008 to 2017 (Table 10). However, during and after the disaster years (2018–2023), average enrollment actually increased to 17 students. For Perryville School and Chignik Lake School, average enrollment decreased during the 2018–2022 period, though only slightly. Enrollment slid from 20 to 18 students in Chignik Lake and from 27 to 25 students in Perryville. Notably, the only Chignik school to be closed during the 2008–2022 period was the Chignik Bay School. The Ivanof Bay School has been closed since 2000 due to lack of enrollment (Alaska Department of Education and Early Development).

Figure 17. Chignik School Enrollment



Note: Numbers represent enrollment as of October 1 of each year. No attendance data available for Chignik Bay School 2013 or 2023 and the school was listed as closed for both years. The black line represents the minimum attendance required for a school to receive state funding.

Source: Alaska Department of Education and Early Development (DEED) (2023), Northern Economics, Inc. analysis

Table 10. Chignik School Enrollment

Year	Chignik Bay	Chignik Lagoon	Chignik Lake	Perryville	Total Enrollment
2008	14	17	25	29	85
2009	16	17	17	27	77
2010	20	18	22	28	88
2011	18	12	25	29	84
2012	14	13	17	28	72
2013		13	23	30	66
2014	16	10	15	28	69
2015	14	11	13	23	61
2016	15	12	22	20	69
2017	13	10	21	22	66
2018	13	12	15	31	71
2019	11	12	19	27	69
2020	14	15	18	25	72
2021	11	23	15	21	70
2022	6	18	18	22	64
2023		19	23	22	64
Average 2008-2017	15.6	13.3	20.0	26.4	73.7
Average 2018-2022	11	16.5	18	24.7	70.2

Note: Numbers represent enrollment as of October 1 each year. Years when the school was closed, or where attendance fell below the minimum 10 students required for state funding, are highlighted. Due to closure, no attendance data were available for Chignik Bay School in 2013 or 2023.

Source: DEED (2023), Northern Economics, Inc. analysis

Chignik Bay School closed in 2013 before reopening again the next year with 16 students but has seen a general downward trend of enrollment from 2008 to 2022. During the disaster years and continuing to 2022, the average enrollment decreased from 16 students (2008–2017) to 11 students (Table 10). In 2022, enrollment dropped to six, and the school closed again. The school did not open again in 2023. Several community members noted that this outmigration of families was likely financial and driven by the search for non-fishing jobs.

The 2022 closure, coupled with the long-term financial impacts of the disaster, was detrimental for families in Chignik Bay. Community members described the financial hardships of needing to relocate to find schools for their children and their impacts on well-being.

"So everybody moved out, there's no school, not enough kids. Everybody moved out for their jobs, for the winter." – Chignik Bay resident

"With no school, I ended up having to move… Had the clothes off of my back and I had to sell my car to make things work over there. It was really, really rough. Then having to move back here thinking we might have school, and we're not going to have it again. That's put a really big impact on me and my daughter." – Chignik Bay resident

As one interviewee stated, when it comes to Chignik region communities and fishing, "everything is tied together, one way or another," including schools. Families forced to move to find jobs make it

more difficult for the remainder of the community to maintain schools, which in turn can put pressure on the remaining families to leave as well:

> "Everybody gets really jittery, because you drop to nine and then school just shuts off and you don't have anywhere to go. So, you get down close to that number and that causes a lot of people just to pack up with kids and go…that causes a lot of people to leave." – Chignik Lagoon resident

Lack of opportunities like school and employment can make it difficult for community members to find incentives to come back once they leave. Several interviewees spoke about watching members of the community move to cities where school opportunities are more stable. Once they've left, the continued threat of instability can make the decision to return harder even if jobs and commercial fishing opportunities improve:

> "It hurts the communities; our schools are struggling. Chignik Bay shut down last year… [some people moved to Kodiak] and that's pretty much been the norm for a long time. A lot of people overwinter [in Kodiak], and they have a good high school over there, the kids will go to high school…or just move over there…because we don't have a high school." – Chignik Bay resident

Ability to Teach and Pass Down Traditions

Across communities, those interviewed described how teaching children how to subsistence hunt, fish, and gather is important to them and described several ways that the fishery disasters have affected how children are involved in these cultural traditions.

"[I take my grandchildren to subsist] on the beach, yeah. Picking berries, you know. Especially the younger one." – Perryville resident

In interviews, it appeared that those who were used to fishing with gillnets before the disasters described involving their children as much as possible in these activities, so to the extent that people spent more time getting their subsistence there may be increased opportunities for teaching. In Perryville, one resident spoke about how taking a local job instead of commercial fishing has meant more time at home and more opportunities to teach children subsistence related knowledge and skills.

However, for others, the change in methods or the amount of subsistence was described as altering their ability to continue family traditions. For example, for one family in Chignik Lagoon, they were used to getting their subsistence with their commercial vessel and getting one big haul all at once meant that they would then spend all day as a family processing the fish. With the loss of abundance, they switched to gillnetting, but sometimes were only able to get one or two fish at a time, greatly reducing the ability to get the entire family involved like they could previously:

> "You know how it's processed; you know how it's put up. You did that. It feels so good when you put up your own subsistence, and then you're teaching your children how to provide for

themselves as well… it brings the whole family together… and we don't [come together] like that anymore because the fish don't come in like they used to." – Chignik Lagoon resident

Similarly, in Chignik Bay, residents who are not involved in subsistence harvesting found that the reduced quantities of salmon they received would change the ability to prepare and process it in the ways they liked and created fewer opportunities to pass on knowledge to children and grandchildren.

"I want to pass that tradition down to my grandchildren to teach them how to process salmon" – Chignik Bay resident

Because the majority of interviews were with those in the communities, we were not able to get perspectives from those who moved as a result of the fishery disaster. It may be that these people would have different perspectives on how moving out of the region has affected their ability to participate in subsistence pursuits in general and passing their knowledge and skills on to younger generations in particular.

Additional Social and Cultural Impacts

For many in the Chignik region, subsistence practices are more than just putting food on the table as subsistence harvesting, sharing, and use are rooted in important social and cultural traditions. Interviewees that discussed these types of impacts described how the fishery disasters disrupted their traditional and cultural subsistence practices and negatively affected their well-being. Yet, compared to other topics around the disasters, these effects were discussed less frequently (6). Some interviewees appeared reserved or reticent to share personal details about the emotional, mental health, or well-being impacts they experienced, if asked. However, among those who did speak about these topics, they described negative impacts, such as to their mental health, self-sufficiency, and lifestyle.

In some interviews people described how the inability to get enough food through subsistence was challenging since it impeded their ability to be self-reliant:

"We're so used to putting up [salmon] ourselves. It puts us family members in a world of hurt when we can't go out there and forage for that food ourselves. It really does hurt a lot." – Chignik Bay resident

"When something like that happens, you're pretty helpless. You really are. There's no way to get an income, and the only way to do it is to leave Chignik and get a job there." – Chignik Lagoon resident

Other interviews described salmon as important to cultural identity, so an inability to harvest and process salmon like they had in the past represented a fundamental change to their way of life:

"Subsistence is my lifestyle"-Chignik Lagoon resident

> "It hasn't impacted us like we're starving to death. But traditionally, it's been a disaster. You know, what we're used to." – Chignik Lagoon resident

One resident described how people felt helpless about the disasters, in part due to the uncertainty about the causes:

> "So, if you combine the loss of opportunity with all the other factors, outmigration caused by the disaster, the economic inability to participate, it becomes a pretty bleak picture. One of the biggest things that myself and I believe others [have experienced], is sort of a depression that comes over us that when we aren't getting reliable information as to the causes, you don't feel like you can participate in the solution. And I believe that is why local people curtailed their subsistence dramatically in 2018 and that continued on." – Chignik Bay resident

While it was uncommon for people to describe negative impacts to their own well-being as a result of the disaster, one person suggested that negative impacts were likely widespread, particularly for those with families:

> "People put on brave faces and act stoic, but the impacts have been severe. Feel bad for the families with children—hit the hardest" – Chignik Lake resident

Several people described how the loss of salmon was challenging in multiple ways but expressed that despite the challenges they wouldn't consider moving. For several people interviewed who said that they would stay even if disaster conditions persisted, the cultural ties to the geographic area, family members, or other aspects of their community were described as central to their happiness.

"I would probably stay here [even if there weren't salmon]. Barely any here now. I still feel the same. You just make do." – Perryville resident

Individual and Community Responses to the Disasters

A key objective of this work was to identify lessons learned that may help Chignik region communities and potentially other fishing communities prepare for and respond to future fishery disasters. During interviews, interviewers took note of any actions that individuals, local governments, or other organizations took in response to the disasters. In addition, interviewers also asked what else community members thought was needed and for their thoughts on lessons learned in preparing for future disasters, which is discussed in the next section.

Individual Actions & Relief Efforts

As noted throughout the previous sections, those interviewed described a variety of actions that they took to respond to the disasters, including:

- Spending more time on subsistence activities for themselves and their families
- Harvesting different species
- Buying additional subsistence gear and equipment (e.g., gillnets, freezers, canning supplies)
- Traveling to other places to hunt and fish (e.g., Port Heiden, locations outside of Anchorage)
- Buying more store food
- Seeking other local or non-local non-fishing opportunities, as well as fishing opportunities in other regions

In addition, in several interviews community members discussed other actions that people took, including seeking financial assistance from various agencies or programs. Described later in this section, the most commonly discussed programs individuals discussed included the fishery disaster relief programs, the Bristol Bay salmon sharing network, and the COVID-19 relief programs under the CARES Act. In addition to these programs, others also described working with regional entities and other agencies for assistance:

> "Back in 2018, the City gave us a list of groceries to order… [and] every household received a certain amount of money… and they were able to get that amount of food… for a subsistence relief. That really helped with living expenses." – Chignik Bay resident

> "Yeah, the government assistance programs, those things really make a difference" – Chignik Lake resident

As described in the quotes above, those interviewees who were able to receive assistance, either as financial relief or material goods, characterized those programs as being useful for helping close gaps

in food or living costs during the "lean times" of the concurrent disasters and pandemic. However, Chignik region community members also described mixed results in getting assistance:

> "I got ahold of [the organization]. I could not believe it; they didn't even know we were having a disaster down here. So I talked to the guy and asked if they could get a team together and come down and have a meeting with the people in the village here to see what kind of help they needed for fuel, groceries." – Chignik Lake resident

> "I went to an office to get assistance and they asked, "do you own a boat or a permit" and I said, "yes I do" her exact words were "you're not poor." What am I going to do, chop up my boat and eat it?" – Chignik Lake resident

As illustrated in the quotes above, several people noted in interviews that they did not qualify for various assistance programs, ranging from the fishery disaster relief program to financial support for groceries and utilities. Others noted that a challenge for individuals securing relief was associated with the challenges of getting the paperwork completed:

> "Government assistance programs help a lot but getting paperwork done can be hard—lots of people of a certain generation have a hard time with that" – Chignik Lake resident

> "Village put out newsletters about relief programs, but [we] had to apply on own" – Chignik Lagoon resident

Another barrier was knowledge about what programs people could apply for assistance. As noted by one Perryville resident, during the disaster years they learned that the U.S. Department of Agriculture (USDA) Supplemental Nutrition Assistance Program (SNAP) could be used to buy subsistence gear.

In multiple communities, people also described applying for disaster relief through the PSMFC, but never received payment. For these people it is not clear what prevented them from getting relief.

Commercial Fishery Opportunities and Options

In response to the disasters, multiple people noted that they are looking beyond the salmon fishery to support their livelihoods in the future, but many noted obstacles for doing so. Options for either transitioning out or adding other sources of income including the following:

- Guiding for sportfishing operations
- Investing in permits and gear for other commercial fisheries
- Tendering in other fisheries
- Guiding for and supporting hunting outfitters

Throughout interviews several people spoke about sportfishing in the Chignik region; however, in most of these interviews people discussed how with the declining abundance of king (Chinook) salmon in the region, sportfishing has not been as viable as it once was, since kings are the most desirable recreational species. Despite this, some in Chignik Bay described how there has been a resurgence in interest in sportfishing, potentially because of the recent visits by cruise ships into the port:

> "I'm looking into other industries, because I'm not going to depend on salmon fishing commercially. I'm gonna go sport fishing next year instead of salmon fishing." – Chignik Bay resident

Additionally, other people are looking to the other commercial fisheries to support them both now and into the future:

> "It's partially our fault in Chignik, depending so much on one species. Personally, I'm looking at trying to diversify. I'm looking at buying Dungeness gear, I bought a ton of crab gear. Just looking at other fisheries to see what we can't do to get ready if one fishery fails to be able to transfer and do something else. But not everybody can do that… there has to be another option." – Ivanof Bay community member

However, as discussed in the section *Ability to Switch into Other Fisheries* above, while some people found opportunities in switching to other fisheries, particularly other salmon fisheries, others noted that moving into crab or cod fisheries is not simple or cheap:

> "There are some boats that if they don't go salmon fishing, they can go do other things. But the gear, the permits, you have to already be pre-set up for it… you have to have the pots, the equipment, and everything, and that's not, like, $30k, that's hundreds of thousands of dollars" – Chignik Lagoon resident

As discussed previously under employment impacts, the most commonly discussed change that commercial fishermen made to get through the fishery disasters was to work either in the PWS or Kodiak salmon fisheries or to tender in the Bristol Bay salmon fisheries:

> "So instead of going to Chignik and waiting and hoping for fish to show up, basically at the beginning of June I just flew to Bristol Bay and ran a tender, and I was able to bring part of my seining crew with me and get them some work." – Ivanof Bay community member

This underscores that these two options may have been the most viable to fishermen in terms of the timing of the fishery, knowledge needed, availability of permits, and conditions of the fishery. The relative health and strength of these fisheries may have played an important role in buoying incomes and livelihoods during the disaster years.

Seafood Distribution Network

The program that most people mentioned benefitting from during the disaster years was the SDN that brought Bristol Bay salmon to each community starting in 2020. The seafood distribution program was discussed in 30 interviews and in 27 of these interviews people described receiving fish from the program, and the majority described it as being helpful, sometimes even critical, to filling the gap of local salmon:

> "They brought salmon over from Bristol Bay to help us, which was, thank God for them. I mean, you know, we survive off of that." – Chignik Bay resident

> "For the last 3 or 4 summers, we've been smoking the Bristol Bay fish… I don't know who's sending all them fish from Bristol Bay, but it's [been] a welcome sight, especially in 2018 and 2019." – Chignik Lagoon resident

> "They sent quite a bit of fish down. Yeah, [that helped out], but their fish taste different and they're smaller. We took them because there was barely any fish. I took quite a bit, maybe 60 or more." – Perryville resident

While a majority of people said that the fish helped them get by, a few people expressed that because of taste they either didn't take the fish or didn't like it:

> "I didn't take any because I don't like red salmon from up in Bristol Bay… but they did send it and a lot of people used them and put them away for the winter. It helped." – Chignik Lagoon resident

> "I know it was a big help from the Bristol Bay area to get those fish… It's strange, when you grow up on a certain fish, folks swear they can taste a difference." – Ivanof Bay community member

Of those that talked about receiving fish, only one interviewee stated that it wasn't helpful for their community's needs:

> "They sent a couple hundred reds. It's not the kind of fish we're used to. It came frozen, so we thawed it out, processed it, and the salt fish didn't take no brine. When it came time to use it, it wasn't any good. We tried to thaw it out to make smoked salmon, and it fell apart. So they wasted 200, 300 fish by bringing it to us. We all thought it was a good idea and we know their intentions were good." – Chignik Lake resident

This highlights how cultural differences and experiences between communities and regions can impact their subsistence requirements and demonstrates the potential for refinement in future iterations of the program. Yet, the program was talked about positively by the large majority of those

spoken with. Even in the community where some felt it fell short, there were still members who said they benefited:

> "We joke around about it, but there's a huge amount of pride in Chignik reds, and so some people… don't want to eat any Bristol Bay fish. You can taste the difference… They sent down just cases of fish and our family definitely took advantage of that, because when you don't have anything, you're thankful for whatever you do get." – Chignik Lake resident

COVID-19 Aid

During interviews, many people described receiving support for groceries, fuel, utilities, and other services as a result of CARES Act funding provided in response to the COVID-19 pandemic in 2020 and how helpful this support was for reducing impacts as a result of the fishery disaster in that year:

> "It was [good timing]. The village itself was sent a whole bunch of money all at once. Our administrator and Council got together and decided where it was gonna go, how it could be used best. Everybody got their groceries, fuel, lights, and a check. Two checks, actually." – Chignik Lake resident

> "The villages got money and that helped a whole lot. We got money for the power and water, which was very expensive, still very expensive, but that helped, and a little bit for groceries. So, it all helped a little bit, that's for sure." – Chignik Lagoon resident

In addition, one individual spoke about using the programs, including PPP loans to pay crew while the fishery was closed:

> "I got the first PPP loan and I wanted to close out the first one before I applied for the second one, and then by the time I could apply for the second one the time had already passed so I didn't get in on that one… it was a big help. It helped the crews out 'cause we were sitting on the bank the whole summer" – Chignik Lagoon resident

Fishery Disaster Relief

Many active commercial fishermen spoke about the federal fishery disaster relief program and how the timing and amount of support affected their operations. Across communities, people spoke about how relief was very slow to arrive after the disasters, with payments arriving in 2021 for the 2018 disaster and at the time of interviews (2023), payments had still not been received for the 2020 disaster. Because of the lag, several people described that by the time relief arrived it was too late to help, since in the intervening time people had needed to pay crew, insurance, fuel, and other expenses:

> "It was good, great that it happened. No, [not enough to offset the losses]. It took 2 years to get it, and you figure you've got 2 years of insurance, and fuel, you get a crew in, and you pay their way… They left after 2 months, but you're feeding them and housing them and paid all those expenses." – Chignik Lagoon resident

Often people described that people needed to sell their vessels or permits before relief arrived, and underscored that the relief process must be sped up:

> "The disaster funds are great, but the timeline… I don't know if we received anything [from the 2018 disaster] till about 2021. I think that was about a 3-year period from disaster until we actually saw any relief funds. Some people would have to fold between the disaster and getting funds. That would be my biggest complaint about the whole process… The template for the disaster [relief] is all there, they should be able to process the whole thing faster" – Ivanof Bay resident

Based on permanent permit transfer data (Figure 13), it does not appear that the fishery experienced increases in permanent transfers during disaster years, though this may reflect difficulties in selling permits to willing buyers, as well as declines in permit values, reducing permit owner's willingness to sell. Vessel sales may have been more likely to occur if they can be used in other fisheries and were described more during interviews, though no data on vessel sales was available for this report.

Other Community Efforts

Across communities interviewees noted many efforts to help people during the fishery disasters. On top of the salmon sharing network and COVID-19 related aid, interviewees also spoke of food donation programs organized by churches and schools, as well as a CIC-organized effort to take food orders from Costco that people could use to pick their own foods. In Chignik Bay, several residents expressed considerable appreciation for the latter program.

In addition, while Chignik Bay and Chignik Lagoon interviewees did not mention any efforts to have technical support people available to help residents apply for various aid programs, in Chignik Lake it was noted that tribal organizations may have sent staff for this purpose:

> "[the organization] brought all the paperwork for people to fill out, if they qualify, to get services paid for. You know, light, heat, and a bunch of other stuff. Anything to make it through the winter. And probably 60-70% didn't qualify." – Chignik Lake resident

Preparing for Future Disasters

The final phase of this work focused on lessons learned and ways to increase the ability for Chignik region communities and subsistence users to prepare for and withstand future fishery disasters; in other words, how communities can decrease their vulnerability and increase their resilience if or when faced with future fishery disasters. While subsistence users remain the focus of this project, this work recognizes that building broader community-level resilience is an important component of resilience and well-being for Chignik region subsistence users. Thus, the scope of resilience actions and challenges examined in this section expands beyond subsistence-specific opportunities.

It is also important to note that defining resilience in the context of communities can be highly variable, as the needs and priorities of individuals within those communities may differ. Since individuals may not share a common idea of what resilience looks like, when discussing resilience for this work with community members, it was referred to in terms of strategies that will enable communities to prepare for and withstand future disasters. However, the more formal definition used by the Alaska Federation of Natives also aligns with the values of resilience as evaluated in this report:

> The ability of a community to absorb and recover from shocks whilst positively adapting and transforming their structures and means for living in the face of long-term stresses, increasingly rapid change, and uncertainty (Kitka 2018)

This section describes potential resilience actions and supporting ideas gathered through additional research, discussions that accompanied community presentations, and follow-up interviews with key stakeholders and organizations working with Chignik region communities. It also provides a list of resources in *Appendix D: Resilience Resources* that may help community members put potential ideas into action.

Overview of Second Project Phase

The second phase of the project was broken into several stages, summarized in Table 11. The end goal was to examine potential actions Chignik region communities and subsistence users can take to prepare for and withstand any future fishery disasters and provide resources that may help them do so—referred to in short in this section as "resilience actions."

Table 11. Summary of Phase 2 Steps

Step	Action
Step 1:	Draft list of resilience actions from first round of community visits
Step 2:	Revise list of resilience actions based on community feedback during second community visits
Step 3	Explore resilience actions in depth using information from the literature and targeted interviews with organizations, agencies, experts, and community representatives.

An initial set of potential resilience actions was gathered during the first round of interviews with community members in 2023. This list was then presented for discussion during community presentations in the fall of 2024. At the presentations, feedback on the resilience actions—including which might usefully be prioritized—as well as suggestions for additional actions were solicited. Next, an additional round of targeted interviews was held with community members, organizations, and institutional representatives to discuss the resilience actions in more depth, including actions being taken, potential actions, and barriers to or challenges in implementing the idea or action. Finally, key resilience action opportunities and barriers were identified using a combination of all community and interview feedback as well as a targeted review of relevant literature.

This section first describes the feedback received at the second community visits, then summarizes all feedback from community visits and interviews for each resilience action, and finally ends with synthesis of information, including information from the literature, to identify key opportunities and barriers for each resilience action.

Second Community Visits

In May and June of 2024, presentations were given to Ivanof Bay, Perryville, Chignik Lake, and Chignik Bay residents with the aim of eliciting feedback and validation on the findings of the report and discussing ideas on how Chignik region communities can better prepare for future disasters. Chignik Lagoon was also visited, though no presentation was able to be given. In total four Chignik region communities were visited, and four presentations and community discussions were held, including one virtual presentation and discussion held with Ivanof Bay community members. More details on these community visits can be found in *Community Presentations and Discussions* of the *Methods* section. This section focuses on the feedback received during resilience discussions following community presentations, as this feedback was critical for shaping the direction of follow-up resilience interviews. More information on the feedback received about the report, including changes made as a result of that feedback and recommendations for future work, can be found in *Appendix B: Report Revisions and First Draft Report Feedback*.

Presented Community Resilience Ideas and Feedback

During the second community visits, an initial list of potential resilience actions were presented to gain feedback on which actions might be most important and what additional actions should be considered (Table 12).

Table 12. Community Resilience Ideas Presented During Second Community Visits

Resilience Topic	Presented Resilience Action
Expand subsistence opportunities	Expand availability of hunting permits and access
	Support king salmon and other species recovery
	Facilitate testing of shellfish for PSP toxins
	Grow subsistence sharing networks for salmon, moose, and/or caribou
Diversify fisheries and economies	Support and expand additional local fishery opportunities, such as through halibut Community Quota Entities, crab, and Pacific cod
	Explore options for local ownership of processing facilities
	Support visitor industries through sportfish fisheries, hunting, and cruise ship traffic
	Develop and support remote work opportunities and training
Build on successful programs	Timing of COVID-19 relief was beneficial, provided funds for groceries and utilities
	Salmon distribution network filled critical gaps, helpful to many
Provide technical support	Ensure resources are available for applying for aid before and during disasters

While none of the ideas presented were discussed as non-viable or not potentially useful, several of these ideas were highlighted across communities, including:

- Providing more technical support for aid and grant application processes
- Investing in local processing capacity
- Expanding visitor industry opportunities
- Supporting online jobs and job diversification

During these discussions, Chignik region residents also presented additional potential resilience actions. The idea that recurred across most communities (during three out of four discussions) was funding community fishery research priorities. Additional potential actions that were highlighted across multiple communities include:

- Increasing relief fund distribution efficiency
- Increasing awareness of disaster impacts

These potential resilience actions, as well as additional actions and challenges discussed during individual community presentations on building resilience, were added to the list of topics discussed in the targeted follow-up resilience interviews. A summary of all feedback received on resilience actions, from the initial community visits to the follow-up resilience interviews, is provided in the

following section. More detail on the second community visits can be found in the *Second Community Visits* section of *Appendix B: Report Revisions and First Draft Report Feedback*.

Resilience Actions

This section discusses Chignik potential community resilience actions, including summarizing efforts already being taken to advance the action, as well as opportunities or challenges. These actions were gathered from discussions with Chignik region community members during initial interviews, community presentation discussions, follow-up interviews, and resilience-focused interviews with organizational and institutional experts. However, the latter make up the core of the information gathered for this section. In total, 12 semi-structured interviews were conducted with community members and experts from relevant organizations, institutions, and agencies. More information about interview methodology can be found in the *Interviews and Community Visits* section. Resilience actions are grouped within the following topic areas:

- Diversifying local fishing portfolios and economies
- Building on successful disaster response programs
- Expanding subsistence opportunities
- Providing technical support
- Increasing disaster relief fund disbursement efficiency

The next section summarizes and synthesizes key opportunities and barriers, including information from experiences in other Alaskan communities and the published literature. Additional resources that may be helpful for exploring or implementing the actions discussed in this section can be found in *Appendix D: Resilience Resources*.

Diversify Local Fishing Portfolios and Economies

One of the primary ways that interviewees discussed how Chignik region communities can prepare for future fishery disasters is to create more economic opportunities, both within fishery businesses and within the local economies more broadly. This section discusses the range of ideas that were raised relevant to this overarching goal.

Diversify Local Fishing Portfolios

During initial interviews, community members discussed several ways that residents have diversified their fishing operations in response to the fishery disasters, particularly by tendering or entering other salmon fisheries, but also identified some barriers to diversifying, especially with local fisheries like halibut, cod, or Dungeness crab. Some barriers included:

- Lack of capital for permits, gear, or vessels or vessel modifications
- Lack of viable local processing options

- Unfamiliarity and inexperience in prosecuting other fisheries

As a result, some ideas for increasing the ability to diversify operations could include:

- Taking advantage of any grant or low-interest loan programs for investing in necessary permits or gear
- Exploring options for local ownership of processing facilities or alternate approaches to local processing
- Developing apprentice or training programs for other fisheries

There are several resources that can potentially benefit Chignik region communities in these areas, and particularly young fishermen struggling to enter the fishery. Programs like the ALFA crew training program[8] and the AK On-Board: Young Fishermen Training and Apprentice Program[9] through NOAA and Alaska Sea Grant can bolster vital skillsets. While these opportunities may focus on regions outside of Chignik, it may help young fishermen build skillsets in other fisheries and provide a model for how similar programs can be implemented locally. The Local Fish Fund[10] administered by the ASFT can help reduce these economic barriers to entry by helping young fishermen fund the initial purchase of quota shares (QS).

During the initial community visits in September 2023, a couple of community members discussed ongoing conversations about what will happen to the local processing facilities and about hopes that the communities may be able to obtain ownership and run them:

> A big thing that's been tossed around, if all five or a handful of the Tribes, or the [ANCSA] corporations, or a combination of those entities could come together, and make some sort of land-based processor in Chignik, that will be the catalyst for Chignik to rebound…we need something that's going to provide actual economic growth and opportunity, different jobs for people to be employed in Chignik. That's what it's going to take for Chignik to rebound. – Ivanof Bay community member

Explore Local Ownership of Processing Facilities

In the follow-up resilience strategy interviews conducted in the fall and winter of 2024, supporting local salmon processing was still seen as one of the best ways to build resilience for Chignik region commercial fishermen. In several resilience interviews, the lack of a market for selling locally caught fish, including salmon, cod, halibut, and crab, was one of the primary factors hindering the recovery and growth of local fishing industries. While interviewed community members noted that salmon

[8] More information on the ALFA crew training program can be found here: *https://www.alfafish.org/crewtraining*

[9] More information on the Young Fishermen's Career Development Program can be found here: *https://seagrant.noaa.gov/how-we-work/topics/youngfishermen/*

[10] More information on the Local Fish fund through the Alaska Sustainable Fisheries Trust can be found here: *https://thealaskatrust.org/local-fish-fund*

runs continued to be inconsistent, and had just experienced another poor season in 2024, local stocks of crab and cod were strong but could not economically be prosecuted without a nearby processor.

Interviews with community members noted that the recent transfer of ownership of existing (but shuttered) processing facilities in Chignik Bay to the City of Chignik kickstarted discussions of how to implement local processing, including tentative discussions with several external seafood production companies. However, the most promising move toward local processing community members discussed were negotiations with a private seafood processor to bring a mobile flash-freezing processing barge to Chignik Bay to purchase locally caught salmon. Interviewees noted that this could be a potential first step toward incentivizing local commercial fishing efforts and providing limited shore-based jobs, such as dock work and maintenance. However, as of November 2024, community members stated that negotiations had stalled after the processing firm in question reportedly experienced an operational disruption.

However, community members interviewed noted that discussions of how to implement local processing continue, though some expressed concerns that continuing low salmon runs may further reduce interest from external partners, including the owners of the mobile flash-freezing processor barge. This has led to discussions of how to implement community-owned processing industries. The CIC Fisheries Committee is one of the organizations helping to guide these discussions and implementing local salmon processing facilities is one of their primary goals, along with supporting and expanding markets for Chignik fishermen in the short-term and engaging with fisheries policy for long-term sustainability. While funding and logistical issues including shipping are significant challenges if not barriers, other suggestions have included using the defunct processing facilities for halibut processing. This would have the added benefit of adding support for an additional Chignik fishery, giving local commercial fisherman more opportunity to diversify. Other discussed options included conducting small-scale processing operations on individual fishing vessels. While getting products to market is still a challenge, these operations could potentially be supported through either flying out shipments using local airlines or freezing product and using the ferry system to reach markets in Anchorage. Canning salmon was also discussed as an option and shipping it directly to buyers. One community member even discussed potentially attaining a USDA Food Inspector certification to reduce local product certification costs and logistics.

Expand the Use of Halibut Community Quota Entities

During initial community interviews, some Perryville community members talked about Native Village of Perryville efforts to assist local fishermen with entering the halibut fishery through a local CQE. CQEs are non-profit corporations formed to purchase catcher vessel QS and annually lease the individual fishing quota (IFQ) from that QS to local fishermen (NPFMC 2010). Species in the Gulf of Alaska covered by the CQE program include Pacific halibut, sablefish, and Alaska groundfish.

Perryville's CQE was established in 2016 under the name Perryville CQE, Inc. (Roberts et al. 2024) and since acquired IFQ in 2018 for 13,072 class-C halibut QS units in International Pacific Halibut Commission (IPHC) Area 3B (Kotlarov 2019; NOAA Fisheries 2024). As noted by Kotlarov (2019):

> This yielded 631 pounds of halibut quota to be fished by several small boats in 2019. It is anticipated that this poundage will be used, in part, to help young fishermen learn how to fish for halibut (Perryville 2019). The Perryville CQE plans to purchase an additional 57,349 QS units of IFQ halibut quota as funds become available.

This represents an effort to safeguard against one of the vulnerabilities identified by both local community members and fishery data in Chignik economies, which is the historical reliance on commercial salmon for the majority of incomes.

This aligns with the long-term efforts Perryville community members spoke about to future-proof their incomes through fishing portfolio diversification:

> There was a CQE that got started here, quota entity, and the village helped in building it. Just for an alternative to fishing, for halibut… The first time the shares got fished was a year ago… [but we've been] slowly adding to it for the last 3-4 years, we've been slowly building it. It was in the works for years prior to that. Some of that COVID money helped build it up… I think there's enough to do three vessels now, but last year they did it on one… just diversify a little bit. – Perryville resident

Additionally, while only Perryville community members spoke about actively building a local CQE to expand commercial halibut opportunities, there may be potential for other Chignik region communities to explore similar opportunities. While some community members said that there have been some discussions about building CQEs in other Chignik region communities beyond Perryville, they also stated that there were several challenges involved in doing so. Finding funding for IFQ was the most discussed challenge, especially for newer fishermen, and any CQE would likely need a federal grant to get started. Additionally, one community member noted that many Chignik fishermen would have difficulty proving qualifying participation for IFQ and that proving residence for local fishing rights would be difficult due to the seasonal variability of Chignik populations.

Some potential opportunities discussed include implementing a Chignik-wide CQE, working with the Perryville CQE, or restarting a local salmon co-op effort of several years ago to make coordinated action easier. However, Community members said that cultural differences and the relationships between Chignik region communities makes organizing difficult and that there is currently no clear way to reinstate the co-op. Additionally, even if the co-op could be reinstated, it would not receive unanimous support from Chignik fishermen. Yet, while organization is an issue, some funding opportunities are available. The state offers support for local CQEs in the form of low-interest loans to help purchase halibut and sablefish QS through NMFS (ADCCED 2024). While these loans have threshold requirements, such as having a CQE in good standing and being able to

provide collateral for the loan, this program is designed to help reduce the initial cost barriers of entry into new fisheries.[11]

Explore Mariculture and Aquaculture Opportunities

In addition, during a couple of the initial community interviews, kelp or shellfish aquaculture was described as another potential source of economic growth:

> In Chignik we are a bit behind places like Southeast [Alaska] and Kodiak, and other parts of the world in terms of aquaculture development, but we are at the inception of those talks. So, people are just starting to talk within the region about those different options, about oyster farms, about those different kelp farms… Chignik is a little bit slow to start, people tend to think old-school, so that's something that's just starting, and I think we have a handful of bays that would be more than perfect to accommodate a couple of operations. – Ivanof Bay community member

Also during resilience interviews, one City of Chignik official described increased interest in the feasibility of new aquaculture and mariculture projects in the bay that could help diversify local incomes, such as seaweed farming and shellfish aquaculture. While these projects are still in the "discussion phase," with some technical support being provided by the Alaska Municipal League (AML) and the Southwest Alaska Municipal Conference (SWAMC), some steps toward implementation have already been identified. Any mariculture or aquaculture project would need to conduct surveys to identify viable locations for an operation, find a local seed facility or seeds that can be economically imported, identify markets and economic ways to reach those markets, and secure dedicated salmon seiners that could switch into mariculture or aquaculture harvest efforts. However, the Chignik official noted that these were all challenges that could be overcome and that these projects had strong potential. While activities were currently only mentioned in connection with Chignik Bay, there may be viable mariculture or aquaculture opportunities for other Chignik region communities and additional resources can be found in the *Mariculture and Aquaculture Resources* section of *Appendix D*.

The Chignik Regional Aquaculture Association (CRAA) is another potential resource to support local aquaculture projects. CRAA has historically been involved in research projects to bolster the strength of local salmon stocks and support stock recovery. More of those efforts and potential opportunities are discussed below in the section *Support king salmon and other species recovery*; however, CRAA may be able to provide technical assistance for local aquaculture project implementation or habitat and siting assessments.

[11] Additional information, as well as links for the application, can be found at: *https://www.commerce.alaska.gov/web/inv/LoanPrograms/CommunityQuotaEntity.aspx*.

Support and Expand Local Visitor Opportunities

Chignik region communities have some experience supporting local visitor industries, such as sportfishing and guiding. However, several people noted during initial interviews that sportfishing for king salmon was more common in the past, but as the stock has declined, this has become less feasible. This was echoed in resilience interviews with community members. With the continuing weak king salmon runs, king salmon sport closures, and the weak silver salmon runs, much of the previous business earned from flying in to fish Chignik salmon has dried up. Currently, only one sport fishing outfitter operates in Chignik Bay, with limited market opportunities for expansion or additional businesses. Efforts to rebuild this resource may improve the ability of Chignik region communities to support viable recreational opportunities and provide another draw for visitors to the region. Sportfishing for other non-salmon species may be something that Chignik region communities can explore as well.

Other opportunities for local visitor industries are also available. In Chignik Bay, after a cruise ship visited the port in the summer of 2023, several interviewees discussed expanding visitor opportunities as a pathway for supporting economic growth. A few residents described how they worked quickly over the summer to sell souvenirs to visitors and other community members discussed selling locally caught salmon to the cruise ships, or taking guests to view the commercial fishery. During resilience interviews, interviewees indicated that cruise ship traffic is likely the most viable visitor-related opportunity, especially given obstacles for growing the sportfishing industry.

However, while community members noted that planning efforts to support cruise ship hospitality are ongoing, there are still significant barriers, including large investments in infrastructure that would be required. Some noted investments included a need for a commercial kitchen, dedicated transport (such as a van service) for elderly visitors, shoreside facilities and amenities, safe walking and hiking trails, and activities in general. Additionally, some of the community challenges discussed during the fishery disasters also present challenges for building large-scale industry in Chignik Bay. The community continues to struggle with lack of personnel and staffing capacity, as the community would need to provide dedicated staff for the service and support industries described above. Current housing and wage opportunities would also make it difficult to attract and retain local staff for these positions. Other concerns expressed by community members included a lack of cohesion in the planning process for projects of this size and that the potentially limited and seasonal number visiting vessels may not offset the large initial investment needed. One estimate provided during interviews expected around four vessels to visit Chignik Bay annually.

However, despite these challenges, community members still expressed that there was a lot of potential in cruise ship visitor opportunities for the community. One community member noted that the cruise ship industry is currently experiencing growth and that the fact that one vessel has visited already sets a good precedent. Additionally, one City of Chignik official noted that some town improvements that would benefit visitor industries are already planned in current drafts of the

Chignik Bay uplands site plan, such as restrooms, a welcome center, a heritage center, and a crafts gazebo where local goods can be sold (PND Engineers, Inc. 2024).

Activities such as kayaking, guiding, and boat tours were identified as easy investments to provide activities for cruise ship-based visitors. One community member even noted that Chignik's story as a community facing downturn and working to rebuild itself could be used as a way to attract visitors and investors. While there are significant challenges to implementing cruise ship visitor opportunities in Chignik Bay, including large investments in infrastructure and reported issues in the planning process, several community members expressed that Chignik region communities would likely benefit if those obstacles can be overcome.

Promote Remote Work Opportunities

In other communities, ideas for economic diversification stemmed from the recent improvements in internet availability and reliability provided by Starlink. The success of Starlink was widely described, enabling homeschooling and other internet capabilities that were not reliable in the past. In some interviews, residents expressed interest in providing job fairs for employers that might offer remote work opportunities for locals. Remote work may also provide additional income for Chignik region communities lacking the infrastructure or capacity to implement new, large-scale industry ventures.

In Chignik Lagoon, some initial planning work has already begun to explore what is needed to make remote work a viable option for the community (BBNA 2023). A report produced by BBNA identified several strengths that could help support remote work implementation for the community, including some familiarity among staff members with remote work, emerging use of Starlink, and active efforts to support shared working spaces and community facilities. It was also noted that the community faced several challenges for embracing remote work, including outmigration, lack of staffing capacity for training, lack of technical capacity and skill sets to meet local work needs, and poor mobile and landline infrastructure. To overcome these challenges, the key recommendations from that report were to invest time and resources into developing remote work training and local industry pathways, and supporting the development of sub-regional workforce development coordinators to foster relationships between communities and employers, maintain local job boards, and facilitate outreach about opportunities (BBNA 2023). Many of these challenges, such as capacity limits and outmigration, and strengths, like Starlink, were discussed by members of other Chignik region communities. Similarly, the recommendations for Chignik Lagoon would likely also help other communities better pursue remote work opportunities, and efforts like developing a sub-regional workforce development coordinator would be more effective with support from all communities in the Chignik region. Additionally, communities can begin building necessary skillsets for youths

through participation in the BBNC Caliaq[12] program, which provides internships to support local students' career development.

Support Cultural and Heritage Programs

During both initial interviews and community discussions, some Chignik region community members brought up concerns that these disasters limited opportunities to share and pass along subsistence practices and local culture. As discussed earlier in this report, Chignik region cultural and subsistence practices are inextricably linked to community and economic wellbeing, and finding ways to promote and preserve that culture is a measure of resilience and one of the goals of organizations like the CIC. Through its committee on cultural heritage preservation, the CIC is pursuing an NSF Regional Resilience Innovation Incubator (R2I2)[13] grant to build a Chignik Heritage Center in Chignik Bay.

The proposed Center would not only support a dedicated museum and research center that could bolster subsistence and local fishery research, but the Center could also support efforts to expand the Chignik region's visitor industry. Preliminary talks surrounding the Chignik Heritage Center have suggested that it could host programs sharing Chignik region art, dance, songs, and food with visitors and guests, such as those arriving from cruise ships, as well as act as an orientation and staging point for other activities in the community. A CIC representative also suggested that the Center could provide further utility to Chignik region communities by hosting field schools, culture camps, remote working and learning spaces, and potentially even a local charter school. As of January 2025, funding and plans for the Center had not been finalized.

Diversify Other Local Industries

Community members often described the need for additional ways to diversify local incomes, particularly in the face of continuing uncertainties for commercial fishing. Another need for diversification, however, stems from the need to diversify and increase tax and municipal revenue. In the City of Chignik, where fish landing and processing-related taxes and harbor fee revenue contribute to the local tax base, the fishery disasters, in combination with the loss of local processing capacity, have made a big impact on the city's financials (See *Broader Economic Impacts* for more information). Three main opportunities were discussed, including expanded harbor and marine services, opening a water bottling plant, and gravel production and export.

Additional marine services could include renting marina space for boat storage and investing in freezers and icemaking technology to become a local supply hub for commercial fishing ice needs. Water bottling was identified as a potential option as Chignik Bay has both access to clean water

[12] More information about the Caliaq program can be found here: *https://bbna.com/2023/03/27/project-bristol-bay-native-corporation-caliaq-program/*

[13] More information on the NSF 24-595: Regional Resilience Innovation Incubator (R2I2) grant can be found here: *https://new.nsf.gov/funding/opportunities/r2i2-regional-resilience-innovation-incubator/nsf24-595/solicitation#pgm_intr_txt*

through glacial melt and a potential local market. One community member noted that the region has historically had poor access to bottled water and that several communities are under boil water alerts. If implemented, Chignik Bay may be able to sell water to cruise ships, fishing vessels, and to other communities at lower costs than currently available. A bottling plant may even provide an alternative use for the currently defunct processing facilities, though any effort would likely require an external investment or business partner.

Further, a rock quarry may be able to produce gravel to be sold locally. While one City of Chignik official noted that Chignik Bay has produced and sold gravel in the past and that part of the dock improvement plan includes measures to make gravel export possible, several challenges remain. Current infrastructure makes landing and loading gravel barges difficult, there is limited capacity to provide dedicated staff and labor, and the work would be seasonal and contractor-dependent, meaning there would be a limited number of long-term community jobs the industry could provide.

Recent developments in Chignik power infrastructure should also support growth. In February 2024, Chignik Bay was selected as one of four US Department of Energy awarded hydropower projects. In total, the project will receive $7.3 million in federal funding to construct a run-of-the-river hydroelectric facility, replacing the current dam (NHA 2024). The new hydroelectric facility will produce 2.1 MWh of electricity, with the goal of replacing 100% of Chignik region communities' diesel consumption with renewable energy and reducing total electricity rates by 7%. One of the stated goals of the project is to use this power to support local economic development, such as fisheries and tourism, and the project will also create 10 construction jobs with a Tribal preference, with expected construction slated to begin in 2026 (NHA 2024; PND Engineers, Inc. 2024).

Build on Successful Disaster Response Programs

Several programs were mentioned during initial and follow-up resilience interviews to have provided useful, and sometimes critical, support during the disasters. The ability of Chignik region communities to rely on these programs in the face of future disasters or subsistence shortfalls is a measure of resilience. This section discusses the current state of these programs, barriers to their continuance, and potential ways these programs can be built-upon.

Expand Seafood Donation Network

As discussed in the *Impacts to Use* and *Individual and Community Responses to the Disasters* sections, the ALFA SDN was an often cited beneficial program for local food security and preserving cultural traditions. Ensuring such a network can persist, if not expand, would be important if fishery disasters occur again in the future.

Conversations with ALFA representatives for the SDN highlighted how the program has been working to expand and other opportunities the program is pursuing. The SDN has made concerted efforts to improve its reach and efficacy and received a USDA program grant to assist in strategic planning and operation. This also included survey efforts to gather feedback on SDN efforts and to

see how distributed products were used and how future donations can better meet community needs. Future iterations of this survey could also help the SDN adapt as community needs change. It was also noted that ALFA is pursuing several grants and regional partnerships that could help make operations more sustainable or even expand, including with the National Fish and Wildlife Foundation National Coastal Resilience Fund and with the Central Bering Sea Fishing Association. The SDN may also be receiving appropriations funding through the efforts of former US Congressional Representative Mary Peltola to establish a new distribution hub in Chignik or Dillingham, as well as potentially implementing mobile hubs or cold storage units which could be used to assist with distribution to Chignik region communities.

However, several factors limit the scope and capacity of the program. While speaking with an ALFA representative for the SDN, it was noted that salmon collected for distribution may come from a variety of sources. The program was not able to carry out distributions in the Chignik region during the summer of 2024, as the same operational disruption which reportedly postponed Chignik processing negotiations also disrupted the same seafood processing company's donations to SDN. These and other fluctuations highlight the SDN's dependence on a supply chain for donations, which may also be vulnerable to external factors. It was also noted that for the past two years, distribution has been aided by local air services providing free transport for donations and that continued efficacy depends upon relationships like these. Additionally, while organizations like the CIC have been able to assist with local distribution efforts, the current lack of regional distribution hubs limits the ability of the SDN to easily store and distribute larger donations into the Chignik region. Lastly, the need to secure long-term stable funding is also a limiting factor for SDN operations.

Support Subsistence Gear and Equipment Programs

Several people described getting subsistence gear during the disaster years for free, including nets, freezers, and canning supplies. As one community member noted, these supplies were purchased through COVID-19 funding given to the Tribes during the concurrent pandemic and were not part of fishery disaster or targeted subsistence assistance programs. However, as these programs were described as helpful for community members who had to rely more on subsistence practices during the disaster, finding ways to formalize this type of assistance for ease of activation in future disasters may build resilience and food security.

Expand Other Subsistence Sharing Networks

Like the SDN, moose meat deliveries from guided hunts were part of the successful sharing networks that helped buoy Chignik region communities through past fishery disasters (see *Impacts to Sharing*). Follow-up resilience interviews with community members showed that moose donations have since continued, with most donations occurring in either Chignik Lagoon or Chignik Bay. However, some challenges were also highlighted that may make this a less sustainable source of food in the long term. Resilience interviews noted that only a single guide provides moose that has been cleaned and is still fresh. While other moose hunting guides operate in the area, community members said that other guides were less concerned about the quality of the meat and community members felt less

comfortable accepting meat which may have been kept for a longer period before donation. Additionally, residents in more Chignik region communities are now meeting the plane and taking portions of donated meat. While this means more Chignik region communities are benefiting, it means the supply to any one community is smaller, with one Chignik Lagoon community member stating that they were only able to distribute ¾ of a moose in 2024, rather than the four moose they received in 2023. Additionally, there are concerns that regulation or management policy changes may place further limits on moose harvest.

Informal programs like moose donations may be able to be expanded. Discussion or incentivization may be able to increase usable moose donations from other guides in the region. One community member also mentioned that it may be possible to expand moose donations from hunts in other nearby regions, though transportation would need to be arranged. It may also be possible to grow these programs or create other ones that might increase sharing of other Native foods and resources. For instance, in Anchorage, Ivanof Bay community members spoke about the relative ease and abundance of access to caribou resources. The viability of creating formalized networks for sharing caribou and other subsistence resources could be examined, as well as seeing if networks like the SDN could accommodate community donations apart from salmon.

Expand Subsistence Harvesting Opportunities

Protecting access to subsistence harvesting was identified as a key concern for Chignik subsistence users at all project stages. During the disasters, reduced access and harvesting had a range of social, cultural, health, and financial impacts on Chignik region communities. This section discusses ways that sustainable access to subsistence harvesting can potentially be protected or expanded through state partnerships, external funding mechanisms, expanded hunting access, key salmon species recovery efforts, and increased community subsistence capacity.

Expand Availability of Hunting Permits and Access

Several people noted that getting permits for caribou in the Chignik region can be challenging, and that subsidizing or supporting access to similar resources in disaster times could be beneficial. During community discussions, hunting rights and access were discussed several times. One subsistence user suggested expanding moose hunting permits to attract more hunters to the region. While this could increase economic activity, it could also support subsistence donation programs like those discussed above in the section *Expand Other Subsistence Sharing Networks* by increasing the supply of donatable moose meat if further arrangements can be made with hunters. Another suggestion was eliminating the need for hunting permits for Tribal members and prioritizing Tribal hunting access. However, during discussions with ADFG affiliates, it was stated that there are currently no projects or movements that would impact Chignik permit access or projects aimed at increasing regional moose or caribou populations.

One subsistence user discussed Proxy Hunting[14] as a potential way to expand subsistence access, and as a program that other Chignik subsistence users may not be aware of. The proxy hunting program is sponsored by ADFG and allows Alaska residents who are blind, at least 65 years of age, or who are physically or mentally disabled to have another Alaskan resident hunt for them. Proxy hunting could help support food security for members of Chignik region communities most at risk during subsistence shortfalls.

Support King Salmon and Other Species Recovery

As noted above, king salmon recovery would have possible economic benefits by creating sportfishing opportunities, but it could also support subsistence. Many people noted their preference for king salmon, even over sockeye, but it is too limited to harvest. During the disaster years, federal restrictions were also in place for king salmon, limiting harvest in Chignik Lake.

Also noted above was the limited capacity of agencies like ADFG to conduct follow-up research and conduct recovery efforts under current budget restrictions. However, during interviews, ADFG affiliates mentioned that the agency may be able to provide support services and technical assistance for community-led or externally funded projects, though it would likely require coordination between communities, agencies, and organizations like the University of Alaska Fairbanks or the University of Washington. Unfortunately, many of these working relationships were also mentioned to be poor and would also likely require some level of repair.

Despite these challenges, research is still seen as a critical need by community members to identify causes of the fishery declines and as a component for planning resilience actions. Some proposed studies identified during interviews include expanded limnology studies, providing funding for outmigration smolt data collection, and research into Black Lake's carrying capacity and how it has been impacted by climate change. Potentially differentiating the first and second runs of sockeye salmon was also discussed across several community interviews and is a known source of tension between communities and ADFG. While this project has long been a priority for communities, one interviewee familiar with ADFG processes noted that it may not be as impactful as they hope, as managing based on sampling may be too slow for making real-time decisions.

Other community-led research projects are ongoing. The CIC is partnered with the US Department of the Interior Office of Subsistence Management (US DOI OSM) and the ADFG on a multi-year salmon escapement enumeration project to assist with local salmon management . The CIC has also either proposed or initiated projects for researching king salmon avoidance systems in sockeye fisheries, using eDNA to track invasive species within the Chignik Watershed, and initiating a Management Strategy Evaluation of fisheries in Chignik.

[14] More information on ADFG hunting licenses and permits for the disabled and elderly can be found at: *https://www.adfg.alaska.gov/index.cfm?adfg=huntlicense.proxy*

CRAA is another potential resource for salmon recovery and research efforts. Past projects have included habitat studies, king salmon migration pattern studies, and Black Lake physical studies. Newer potential projects CRAA has reportedly been discussing include bolstering sockeye runs with potential hatchery efforts and supporting king salmon runs with emerging egg box technologies. However, these projects also face barriers. Sockeye hatcheries are currently "controversial" and difficult to justify given volatile markets. Further, the king salmon egg box technology is still in development and would likely require legislative support to implement. Additionally, CRAA capacity is currently limited as their funding is derived from 2% of landed fish taxes and they are still searching for additional funding sources.

Other subsistence species like ptarmigan, ducks, and geese were also described as being less abundant and more difficult to harvest than in past years during initial interviews. It was suggested that they may also need to be examined for potential ways to increase abundance and harvest.

Implement Shellfish PSP Testing

During initial community interviews, many people discussed that in the past they would harvest clams and other shellfish, but the risk of PSP was perceived by many to be so widespread and persistent that many have stopped using these resources altogether. While one subsistence user stated that limited PSP testing had occurred in Chignik Lagoon, it may be that consistent testing needs to be put in place to improve information about when and what types of shellfish are safe to eat. Making these efforts more consistent and widely available across Chignik region communities may improve access to shellfish as a reliable subsistence resource. The Knik Tribe is offering testing services for subsistence harvests, according to a recent article (Cassandra 2024), which may be a good model for the Chignik tribes to explore.

Increase Subsistence Harvesting Knowledge and Capacity

The need to build capacity within Chignik region communities was also mentioned in several interviews. As one community member noted, "we really need to rely less on outside sourcing." As noted in the *Additional Social and Cultural Impacts* and *Changes in the Balance of Other Foods* sections, several of those interviewed indicated that the fishery disasters have contributed to the decline of Native foods in youth diets, as well as their knowledge and participation in subsistence harvesting and processing activities, which in turn may be negatively affecting physical and mental health, as well as social and cultural identities.

Several suggestions were offered for bolstering and expanding subsistence harvesting resources and practices. One suggestion included expanding Culture Camps, which are designed to connect youth and young adults to their culture[15] and may help support participation in subsistence practices by more generations. Culture Camps can be a way to reinforce skills like local food species identification, hunting, fishing, and gathering harvesting techniques, and processing practices. These camps can be

[15] See *https://www.bbnc.net/for-shareholders/youth-programs/culture-camp/*

useful for building these skills in both younger children and in young adults. It was noted that Chignik Lake already holds an annual Culture Camp in the summer, and that Chignik Bay has hosted Culture Camps in the past. BBNC also hosts Culture Camps.

Increase Local Food Security

In addition to bolstering knowledge and resources for subsistence harvesting, other suggestions from subsistence users for increasing broader food security in the region included developing knowledge and resources for growing more food locally. Providing support for community gardens and greenhouses can support food security, and community health and well-being. It was noted during interviews that Chignik Lagoon had purchased, though not yet put in place a greenhouse and that Chignik Bay was considering greenhouse projects. Other community-led examples can provide models for this. The Calypso Farm & Ecology Center[16] in Fairbanks works with Native and rural Alaskan communities to provide workshops and agricultural trainings, including in indigenous-led techniques. Additionally, mariculture and aquaculture projects like those discussed above can not only provide additional financial stability but can also potentially bolster local food security.

Pursue Grant Support

Several Chignik region community members highlighted ways that communities can receive external support to better meet subsistence and food security needs. One Chignik Lagoon community member noted that the community had received a 5-year grant to assist with food security through the Local Food Purchase Assistance Cooperative Agreement Program.[17] The funding took the form of distributed food boxes to households containing meat, vegetables, and other produce from small farms in the Matanuska-Susitna Borough. While this is short-term assistance that the community cannot consecutively apply for, these types of grants can still assist closing food security gaps while more long-term solutions are sought. Other grants Chignik region community members have applied for included the Alaska USDA food insecurity micro-grants, which can provide up to $5,000 for individuals pursuing gardening, greenhouse, livestock, or subsistence projects. Further grant and aid opportunities can be found in *Appendix D: Resilience Resources*.

Support State Agency Partnerships

The ADFG is one of the primary agency bodies Chignik region community members interact with for fishery and subsistence regulation and for investigating environmental changes to subsistence resources. During interviews with ADFG affiliates and those familiar with ADFG operations, discussions highlighted significant limitations to the support ADFG could offer. The most noted barrier was capacity, with funding being the primary limiting factor. One ADFG affiliate noted that the current ADFG budget was stretched thin across many projects, limiting the amount of effort that can be allocated. This also limits the scope of the work that ADFG can allocate resources to, such as

[16] More information about the Calypso Farm & Ecology Center can be found here: *https://calypsofarm.org/*

[17] More information about the Local Food Purchase Assistance Cooperative Agreement Program can be found here: *https://www.ams.usda.gov/selling-food-to-usda/lfpacap*

large-scale research and recovery projects, and instead is often forced to prioritize mitigation efforts. These capacity issues are reportedly exacerbated by high agency staff turnover rates, which make maintaining community relationships and effectively collaborating more difficult. Interviews with community members and with ADFG personnel also noted that these relationships have been historically strained with limited success reducing this tension. There are still opportunities for effective collaboration, though these are difficult challenges to overcome. One interviewee familiar with ADFG processes noted that many of ADFG's capacity issues cannot be resolved without greater funding allocation, which limits their ability to support projects communities have identified as priorities, such as research into the causes of king salmon population declines. Deteriorating community relations are also a serious barrier to effective community partnerships which require concerted efforts to repair. Some agency efforts have been noted to help and could potentially be expanded, including the donation of fish, gear, and boats to communities. Open communication was also cited as an essential component for repairing relationships, and greater interaction at community interfaces, like the weirs, was encouraged. A dedicated community liaison position at ADFG was also stated as a potential way to improve relations, though funding for the role is still a limiting factor. Increasing local representation in the agency was also identified as a potential strategy by giving preference to in-state and Tribal candidates over out-of-state biologists. It was also recommended that communities support education opportunities that build necessary skills for scientific work at the agency level. Lastly, one ADFG affiliate noted that examining food security was a current project focus and that efforts were planned for surveys in the Chignik region to better understand baseline conditions. Chignik region subsistence users are also encouraged to reach out to ADFG with proposals for expanding subsistence access and projects targeting food security needs.

Enhance Provided Technical Support

One of the most common challenges mentioned during initial interviews with community members was that they found aid application processes confusing, including who was eligible for aid, and that community members were unsure of where to turn for assistance for applying for aid, particularly fishery disaster relief. It should be noted that several organizations are currently in place to provide different levels of technical assistance to the Chignik region communities, and many did during the disasters. These include BBNA, BBNC, the Lake and Peninsula Borough, the Chignik Bay Tribal Council, and the CIC. However, these organizations often provide different technical assistance services, and in interviews, community members expressed not only confusion about the application processes but also uncertainty about what services were available to their communities, which created additional challenges in receiving support and resources.

Additionally, while organizations that provided technical assistance during previous disasters will likely be able to continue to provide some level of services during future disasters, many are facing capacity and funding limitations as well. One BBNA representative noted that limited staff capacity and new administrative costs have constrained the scope of some programs and that they would likely have little capacity to provide direct community assistance for grant or aid applications. Their

efforts are currently focused on helping communities navigate laws and regulations, crafting testimonials, facilitating public input on management and research priorities, and working to mend community relations with ADFG through the Chignik Fisheries Taskforce. The persistence of efforts that community members found helpful previously, such as food banks supported by the Chignik Bay Tribal Council and Costco food orders facilitated by the CIC, will likely also be determined by capacity and funding.

Create Resource Databases

From interviews with organizational representatives and community members, a common recommendation was to create an easily accessible online resource that would direct community members to available technical assistance resources. The online resource could include links to necessary support documents for aid applications and a directory of aid and grant opportunities. While potentially useful, this resource would require constant curation, as well as staff capacity to build and maintain this service. As a short-term solution, one Lake and Peninsula Borough representative noted that some of these technical assistance resources, such as assistance with aid qualifications and applications, are available at the Borough level and that signposting in communities (the act of placing signs, posters, or flyers in community spaces) can be improved to ensure community members know who to contact. These efforts can also be supported through other outreach efforts, such as community informational meetings, workshops and training sessions. Any new resource or database would also likely need similar support to create community awareness and usage.

Support Community Technical Assistance Liaisons

One Lake and Peninsula Borough representative noted that ideally, support for an organizational role that creates a technical assistance point person would help mitigate some of the confusion community members expressed. This role, along with a helpline where people can call to receive direct and timely assistance with an expert point person who can manage inquiries could reduce some of the challenges community members noted in navigating the aid process. This role, or additional similar roles, could potentially be expanded to function similarly to Tribal liaisons if they were supported by funding to allow them to travel between communities and provide technical assistance services directly. If implemented, these roles would need outreach support like the efforts described in the section above, as well as long term, sustainable funding to ensure these services would be available in the event of another disaster.

Assess Technical Assistance Needs

It may be useful to ensure that community feedback mechanisms are a part of technical assistance programs as well. Community needs will be contextually unique and evolve over time, and it is important to make sure that efforts are matching those needs. As one community member pointed out, some people displaced from Chignik region communities during the disasters are facing difficulties returning due to challenges with housing and may need additional support such as housing grants. It may also be good to explore what options are available to increase the periodicity

and level of technical assistance programs available, such as through other disaster organizations like the Federal Emergency Management Agency (FEMA).

Increasing Disaster Relief Fund Disbursement Efficiency

Increasing the efficiency of disaster aid disbursement was highlighted as a way to build resilience in several community discussions. Shifts in the laws surrounding how fishery disasters are determined and how disaster assistance is distributed since the initial 2018 and 2020 fishery disasters may improve this efficiency. The Fishery Resource Disasters Improvement Act (S.2923) was first introduced in September of 2021 and passed in November of 2022. The act aimed to streamline the disaster assistance process by giving sole authority of determinations to the Secretary of Commerce, eliminating the need for additional evaluations, and simplified the process for requesting aid. However, following a discussion with a NOAA representative familiar with the fishery disaster process, it was noted that Chignik region community members should not expect any major changes in how disaster relief is disbursed from the law. However, the Fishery Improvement to Streamline untimely regulatory Hurdles post Emergency Situation (FISHES) Act (H.R. 5103), which was first introduced in August 2023, aimed to create deadlines for NOAA and the Office of Management and Budget to respond to disaster assistance spending plans. The act is designed to speed up the process and help communities affected by fishery disasters receive assistance more quickly. This Act was signed into law (becoming Public Law No. 118-229) on January 4, 2025.

During discussion with a NOAA representative, it was noted that Alaska provides a high standard for how fishery disasters are addressed due to the quality of the data and information NOAA receives from ADFG on the affected fisheries. However, continued fishery disasters create administrative backups in the system which lead to longer timeframes for assistance disbursement. Any errors or miscalculations in the process can also further exacerbate delays for disbursing funds. In the meantime, other organizational representatives we spoke with offered some recommendations for how communities can become better involved with the disaster spending plan process to ensure aid better matches their needs. Banding together with organizations and communities from other regions experiencing fishery disasters can potentially create a stronger voice and have more of an impact in the disaster funding allocation process. More priority should be placed on how disaster aid spending benefits subsistence users and better accounts for the non-monetary community impacts of fishery disasters.

Community members can monitor ADFG webpages for information on public hearings to better understand where funds are going and advocate for research project priorities. Additionally, Chignik region community members can reach out to Lake and Peninsula Borough representatives to review spending plans and provide community input. As one Borough representative noted, they have been successful in changing allocation percentages before.

Additionally, as noted in the *Enhance Provided Technical Support* section, many community members stated that they felt uncertain about how to apply for federal disaster aid and confusion about who

qualified to receive it. This uncertainty is a challenge that can prevent communities from receiving available aid, slowing recovery. Enhancing the availability of technical support to help communities navigate the Federal application process can increase the number of community members who benefit from available aid. Advocating for community needs in the aid process should also be a priority and may require gathering more community data to support community narratives. In addition to socioeconomic and environmental data, baseline community data gathering could include health and wellness metrics and subsistence usage, which can help create a more holistic picture of community needs and develop strategies for addressing issues that may not receive much public discussion.

Synthesis: Resilience Action Pathways and Potential Challenges

To deepen the evaluation of potential resilience actions, including potential opportunities and challenges, this section draws from the published literature on how other Alaskan and non-Alaskan communities are working to become more resilient in the face of both fishery and broader environmental changes. In this section, literature review methods are summarized, then the following sections present combined insights with the community interviews about key challenges and opportunities for Chignik region communities to prepare for and withstand future fishery disasters. More detail on the specific insights from the literature review can be found in *Appendix C: Insights from the Resilience Literature*.

Literature Review Approach

For this phase of the project, interviews and community discussions about actions and challenges for increasing resilience capacity in Chignik region communities were supplemented by a high-level literature review. Examined literature included peer-reviewed literature, project reports, conference and workshop proceedings, and local news publications. The research focused on building community resilience in response to fishery disasters and climate issues. Since there is little published research specifically on the Chignik region communities, this review also looked at literature focusing on resilience topics in other rural Alaskan communities, and particularly Alaskan coastal fishing communities and especially those substantially engaged in subsistence harvesting, sharing, and use. The full review, included in *Appendix C*, is divided into two sections: *Challenges for Building Resilience*, which examines the challenges and barriers to building resilience in these communities, and *Resilience Actions*, which examines potential adaptive actions and actions already being taken in some communities to increase community resilience. A review of the findings of the literature review along with some synthesized insights is included in the following section. A list of reviewed literature can be found in the section *Resilience Literature Review References* and resilience resources gleaned from these and other sources can be found in *Appendix D: Resilience Resources*.

Literature Review Summary

The literature review revealed several common themes with respect to challenges and opportunities that communities often face when working to increase their resilience to fishery and/or climate changes. Many of these challenges are interconnected. Institutional challenges limit access to funding and technical support, which in turn exacerbates economic challenges (Hasert et al. 2024). Data gaps feed into institutional challenges, further hindering efficient decision-making (Holen 2023) while climate and environmental challenges strain limited resources, amplifying community capacity issues (Aktürk 2022; Holen 2016; Kelly and Holen 2024). The interconnected nature of these challenges necessitates holistic, multi-faceted approaches. While many of the actions discussed above address individual aspects of resilience, effective resilience planning requires integrating multiple actions that consider environmental, social, economic and cultural aspects of adaptation simultaneously (Hasert et al. 2024). The range of actions and challenges identified in this review also demonstrates that resilience is highly contextual.

While many of the ideas discussed in the literature may resonate broadly with rural Alaskan communities, the threats faced, availability of resources and long-term goals are community specific. This highlights the importance of community-led solutions and is represented by the common calls throughout the literature to better implement co-management and integrate local and traditional knowledge into management to prioritize place-based decision-making (Chapin et al. 2016; Meeker and Kettle 2017). However, while the literature emphasizes the central role communities should play in designing and implementing resilience strategies, it also demonstrates that one of the fundamental challenges is capacity (Hasert et al. 2024; Holen 2016; Oaster 2024). Significant constraints on funding, resources, technical capacity, and human capital in rural Alaskan communities create substantial reliance on external systems and resources, especially for larger-scale adaptive projects (Hasert et al. 2024; Meeker and Kettle 2017). Navigating these external systems is where institutional barriers and systemic inequities become challenging, and are often not structured to provide long-term, flexible and holistic support that matches the needs of rural Alaskan communities (Hasert et al. 2024).

Notably, there are also several potential gaps in these resilience areas that could use more discussion. Recognizing that many of the communities are at relative funding, capacity, and technical capability disadvantages, a large portion of the literature focuses on ways Alaskan communities can navigate institutional barriers, policies, and grant systems. A smaller portion of the literature focuses on internal ways communities can work to build capacity and sustainable resilience. Given that many communities may not be able to attain external support sufficient to meet all their needs, it may be useful for future literature to focus on these types of strategies. The role of community leadership in resilience planning and implementation is also not often discussed, and more thorough examinations of how to increase coordination and build networks between communities facing similar issues could be included. Lastly, community health and wellness received little discussion in the literature. As a valuable aspect of holistic community resilience, more consideration could usefully be given on how to measure, monitor, and include these metrics in resilience and adaptive planning.

From a Chignik regional perspective, many of the community challenges to building resilience highlighted in the literature align with barriers discussed during initial interviews and during community visits. The critical shortfalls of the availability of subsistence resources Chignik region community members experienced during the fishery disaster mirror many of the concerns emphasized in other Alaskan communities due climate impacts (CRCC 2016; Herman-Mercer et al. 2019; Holen 2016). Similarly, limited staff capacity, inconsistencies in management priorities across institutions, frustrations with federal aid, outmigration from communities, and concerns regarding loss of culture and traditions among newer generations were also cited as challenges in both the literature and by Chignik region community members (CRCC 2016; Meeker and Kettle 2017; Holen 2016). While bearing in mind that every community's situation is unique, some of the potential resilience actions suggested for addressing these challenges may also be useful for building resilience in Chignik region communities.

It is also important to note that resilience actions have been proposed or are already being taken in Chignik region communities as demonstrated by the CIC Preliminary Climate Risk Assessment and the Chignik Bay Climate Resiliency Action Plan (Chignik Bay Tribal Council 2023). These documents discuss actions which align with recommendations in the literature, such as protecting critical community infrastructure, conducting research on the causes of salmon shortfalls, implementing community gardens, conducting testing on local subsistence bivalves, and examining the viability of aquaculture. Further discussion of Chignik-specific resilience needs and potential actions can be found below.

Resilience Action Pathways

Across the different phases of this project, interviewees discussed the various ways that Chignik region communities have worked to respond to disasters that have occurred and prepare for future fishing disasters, and specifically in the last phase of the project, actions that community members would like to see implemented in the future. Here information gathered from all project phases is summarized to outline the current status (as of December 2024), potential next steps, key inputs, and available resources for advancing resilience actions discussed in the previous section.

This section is organized by resilience topic area and provides a table for each topic area which frames the resilience actions discussed in this report as potential pathways. These tables provide an overview of what has been done within Chignik region communities so far (as of December 2024), provides some potential next steps based upon discussions with community members and organizational experts and informed by our professional experience, highlights some potential components that may still be needed to perform these resilience actions, and lists some of the resources available to help communities implement them.

The actions in these tables represent actions identified during interviews, actions that have already received some community traction but may need additional support, actions that have been identified as potentially useful and have some resources available for implementation, and additional

actions identified in the literature that may be relevant for communities to consider for achieving their goals. While these pathways may not be applicable to every Chignik region community, this list is provided with the goal of emphasizing new opportunities, showing the work already being done by Chignik region communities, and providing potential ways that other communities may be able to implement them as well. While these resources are not comprehensive, those presented may provide some support mechanisms as discussed through community and subject matter expert interviews, literature, or independent research. The annotations provided with each resource refer to their location in *Appendix D: Resilience Resources* for easier reference.

Fishery Diversification

Given how integral commercial fishing is to the lives and livelihoods of Chignik region communities, these potential resilience actions present ways to support sustainable commercial fishing activities.

Resilience Action Opportunity	Current Status[18]	Potential Next Steps	Potential Support Components	Available Resources
Locally owned onshore processing facility	Discussions about implementing locally owned shore-based operations for salmon, cod, halibut, and/or crab CIC is working to develop a fisheries committee devoted to helping tribes explore options for local processor ownership	Identify which fishery local processing operations would be most beneficial Assess logistical, capital, and infrastructure needs for a processing operation Restore defunct processing facilities for local operations	A fishery assessment and processor business plan Economical methods for shipping product Funding for a processing facility If prosecuting non-salmon fisheries, funding for permits and gear	Saltonstall-Kennedy Grant Competition (1g) Seafood Processing and Technology Workshops (1h) USDA Seafood funding guide (1f) Coordination with CIC[19]
Externally owned mobile processing barges	Discussions with seafood companies are underway, though current discussions have reportedly stalled	Re-initiate negotiations with potential commercial partners Conduct site and engineering assessments	New industry partners if current discussions are not successful A stable fishery to attract investors/partners	Partnership with commercial industry partners Coordination with CIC

[18] Current Status as of January 2025.

[19] Throughout these resilience pathway tables, several organizations (like the CIC) are listed as available resources for specific resilience pathways. Many of these entities and organizations are already conducting work in that resilience area, are familiar with the resources needed to begin work in that area or may be a useful link for finding other experts and supporting organizations. Contacting and potentially coordinating resilience efforts the listed organizations may be useful and help prevent duplication of efforts.

Resilience Action Opportunity	Current Status[18]	Potential Next Steps	Potential Support Components	Available Resources
Small-scale and individual fish processing	Discussions are being held about methods for implementing processing on individual vessels	Identify small-scale markets for products Identify the most efficient processing techniques, such as canning or freezing Create organizational support for small-scale processing industries and distribution	Train a local USDA Food Certification expert to expedite product safety certification Funding and training for vessel-level processing equipment Assessment of shipping logistics and options	Seafood Processing and Technology Workshops (1h) Saltonstall-Kennedy Grant Competition (1g) USDA Seafood funding guide (1f) Coordination with CIC
Youth crew training opportunities	No current action discussed	Create training programs for youth fishermen Support opportunities for youth to train in new fisheries in support of new local opportunities	New entrant opportunities for young fishermen Funding for quota for new fisherman	Young Fishermen's Career Development Project (1i) Crew Training Program (1d) Local Fish Fund (1e)
Creation of new CQEs or expansion of current Perryville CQE	Some discussion about implementing a Chignik region-wide CQE or partnering with Perryville to expand their CQE	Coordinate between communities and community members interested in CQE participation Identify funding sources to support new fishermen entrants	Funding for additional IFQ Potential reinstatement of the co-op or creation of another body to facilitate organization between communities	State of Alaska CQE Loans Program (1c)

Economic Diversification

These potential resilience actions provide ways for Chignik region communities to grow local economies and explore industries that are supplemental or complementary to commercial fishing.

Resilience Action Opportunity	Current Status	Potential Next Steps	Potential Support Components	Available Resources
Visitor Industry Potential	Chignik Bay has experienced recent cruise ship activity Community infrastructure investments Discussions on best ways to expand community hospitality offerings CIC developing community to support visitor industries and enhance guest experiences	Identify what visitor activities communities can and would like to offer Community assessment of what infrastructure is still needed to support visitors Identify how visitor opportunities can be integrated with other potential industries (i.e., water bottling and salmon processing)	Funding for further community infrastructure expansion Investors and partners in the cruise ship industry Housing and a stable workforce	Coordination with Far West, Inc. Economic Adjustment Assistance Program (7f) Rural Economic Development Loan & Grant Programs (7b) Community Facilities Technical Assistance and Training Grant (3a) Denali Commission Funding opportunities (3d) Community Facilities Direct Loan and Grant Program in Alaska (3e)
Mariculture and/or aquaculture projects	Chignik Bay in discussion with AML and SWAMC on potential kelp and shellfish projects	Identify if other Chignik region communities can support mariculture/aquaculture opportunities Conduct siting assessments to identify viable locations for mariculture/aquaculture projects Identify potential markets for sale of product	Funding for projects Find a local seed facility or seeds that can be economically imported Economic ways to ship projects Dedicated seiners that can switch into harvest efforts	Alaska Mariculture Cluster (2a) Alaska Mariculture Research and Training Center (2b) Alaska Mariculture Alliance (2c) Mariculture and Seaweed Farming Resource Page (2d) FY2025 National Aquaculture Initiative (2e)

Resilience Action Opportunity	Current Status	Potential Next Steps	Potential Support Components	Available Resources
Gravel Production	Chignik Bay has produced and locally sold gravel in the past Dock improvement plans include measures to make gravel export possible	Identify local and regional markets Assess what additional infrastructure and equipment are needed Identify storage and distribution needs	Funding for additional infrastructure and equipment Dedicated staff and labor Complete required infrastructure construction	Economic Adjustment Assistance Program (7f) Rural Economic Development Loan & Grant Programs (7b) Community Facilities Technical Assistance and Training Grant (3a) Denali Commission Funding opportunities (3d) Community Facilities Direct Loan and Grant Program in Alaska (3e)
Local water-bottling plant	Discussions have been held about a potential local water bottling industry	Find potential industry partners or consultants who can provide technical consultation Identify local markets and market capacity Assess what renovations would be needed to repurpose defunct processing facilities	Dedicated staff and labor Funding for facility renovations and for industry equipment	Economic Adjustment Assistance Program (7f) Rural Economic Development Loan & Grant Programs (7b) Community Facilities Technical Assistance and Training Grant (3a) Denali Commission Funding opportunities (3d) Community Facilities Direct Loan and Grant Program in Alaska (3e)

Resilience Action Opportunity	Current Status	Potential Next Steps	Potential Support Components	Available Resources
Marine services and commercial ice production	Dock improvements are planned/underway	Assess market capacity for marina rentals and local ice production Assess power requirements for ice production and storage Assess if any additional infrastructure improvements would be needed	A plan for efficient utilization of existing infrastructure Dedicated staff and labor Funding for additional equipment, such as ice machines and cold storage	Economic Adjustment Assistance Program (7f) Rural Economic Development Loan & Grant Programs (7b) Community Facilities Technical Assistance and Training Grant (3a) Denali Commission Funding opportunities (3d) Community Facilities Direct Loan and Grant Program in Alaska (3e)
Remote work opportunities	Starlink internet support has expanded community access Discussions about the need for additional remote work opportunities are ongoing Chignik Lagoon has already begun assessing community needs to support remote work (BBNA 2023)	Create a catalogue of online remote work opportunities Host online job fairs Conduct trainings and workshops to help community members pursue remote work opportunities Support a sub-regional workforce development coordinator	Staff capacity for organizing online job events and coordinating with job fair partners Outreach to communities to promote opportunities Community facilities to support local remote work	BBNC Caliaq Program (7i)

Cultural and Heritage Programs

Resilience Action Opportunity	Current Status	Potential Next Steps	Potential Support Components	Available Resources
Chignik Heritage Center	R2I2 incubator grant submitted to support construction of Heritage Center in Chignik Bay Location identified as part of proposed Chignik waterfront improvements site plan (PND Engineers, Inc. 2024) Preliminary planning discussions of how the center can promote Chignik region culture and support the local hospitality industry Preliminary planning of how the center can provide additional community support via field schools, research, culture camps, etc.	Finalize funding for construction and operation of Chignik Heritage Center Finalize plans for how the center's spaces will be utilized and which community services it should provide Begin planning the best ways to showcase Chignik region culture at the center	Coordination with local artists, elders, and community members to design and implement cultural programs Coordination with local hospitality industries to provide services for visiting guests Expanded community infrastructure to support visitors Community capacity for administration, organization, and implementation	Coordination with CIC R2I2 Incubator Grant (7j)
Hosting Culture Camps to promote and preserve Chignik region practices and culture	Culture camps are currently held annually in Chignik Lake and have been held in Chignik Bay in the past BBNC conducts week-long youth Culture Camps for BBNC shareholders and descendants	Assess community interest in supporting local Culture Camps Organize between Chignik region communities to share culture camp resources and curriculum Identify what subsistence practices, traditions, and community-priorities should be emphasized in curriculum development	Funding for Culture Camp implementation and materials Community capacity for administration, organization, and implementation	Coordination with BBNC Rural CAP Youth Development & Culture Grants (7h)

Building on Successful Programs

During the 2018 and 2020 fishery disasters, several programs were noted by community members for helping close some food security gaps. These potential actions provide ways to support and continue these services through future disasters.

Resilience Action Opportunity	Current Status	Potential Next Steps	Potential Support Components	Available Resources
Seafood Distribution Network (SDN)	Operated during the disasters and has continued operating in subsequent years Conducted USDA assisted strategic planning and surveys Has continued exploring options for new donation sources and partnerships ALFA and CIC has been awarded a NFWF grant to continue and expand the network into the Bering sea	Implement distribution hubs or storage facilities nearer to the Chignik region Continue survey efforts to ensure donated products match community needs Solidify current funding and partnership opportunities Consider expanding donation networks to additional non-salmon subsistence resources	Funding for continued operation and expansion Stable sources for salmon donations Continued coordination with communities and community organizations Continued access to local air freight services	Food Security Grant Program (6a) Coordination with current SDN partners
Donation of moose meat from hunters	Donation network operated through the disaster and has continued operating in subsequent years	Identify if there any other guide services or hunters organizations that could be feasibly included in the network Explore the feasibility of subsidizing or otherwise supporting shipping for moose/caribou donations from nearby regions	Additional local hunters willing to donate quality meat Incentivization of moose donations to increase supply	Food Security Grant Program (6a)
Emergency subsidization of subsistence gear, food, and utilities as part of disaster relief	Some food, utilities, and subsistence gear/equipment was funded through COVID-19 relief during the disaster	Advocate for more consideration of these community needs in disaster relief funding allocations	Stable funding to create similar reliable relief funds Inclusion of these types of programs in disaster response funding	Food Security Grant Program (6a) Coordination with Lake and Peninsula Borough staff Coordination with BBNC Coordination with CIC

Enhanced Technical Assistance

The need for additional technical assistance, particularly during fishery disasters, was commonly cited by community members. The potential actions listed here provide actions that could help bolster critical technical support when communities need it most.

Resilience Action Opportunity	Current Status	Potential Next Steps	Potential Support Components	Available Resources
Increased communication directing community members to existing technical assistance resources and contacts	Discussed as a potential action	Identify communities where gaps in technical assistance were felt most during disasters Implement informational meetings, workshops and/or seminars on existing technical assistance resources and services Identify community public spaces where signposting would be most beneficial	Coordination between communities, community leaders and organizations that can provide technical assistance Outreach materials on existing technical assistance resources and services Funding for additional technical assistance outreach efforts Staff and community capacity to implement outreach efforts	Coordination with Lake and Peninsula Borough staff
Centralized online catalogue of aid and grant resources	Discussed as a potential action with communities and in literature	Curate federal aid resources and associated documents Curate a list of grant opportunities relevant to Chignik region communities Design an accessible online resource	Staff capacity to implement, curate listings, and update Outreach efforts to inform communities about its use Funding for outreach efforts	
Designated role for a technical assistance Chignik region community point person	Discussed as a potential action with communities and in literature	Identify central organization with capacity and sufficient networks to support this role	Staff and community capacity Sustainable funding for the role Support training in administering technical assistance Outreach efforts to inform communities about the service	Coordination with Lake and Peninsula Borough staff Coordination with BBNA Coordination with CIC

Resilience Action Opportunity	Current Status	Potential Next Steps	Potential Support Components	Available Resources
Funding for a traveling technical assistance community liaison	Discussed as a potential action with communities	Identify central organization with capacity and sufficient networks to support this role Identify candidates with technical skillsets and rapport with Chignik region communities	Staff and community capacity Sustainable funding for the role and for travel support Support training in administering technical assistance Outreach efforts to inform communities about the service	Coordination with Lake and Peninsula Borough staff Coordination with BBNA Coordination with CIC
Housing assistance or grants for community members struggling to return to their communities	Discussed as a potential community action	Assess the number and needs of Chignik region community members facing difficulties returning to their communities Assess the viability of administering housing grants Explore opportunities for ANCSA corporations or local landowners to subdivide or sell land to assist families who left and cannot afford to re-purchase homes	Baseline data on community members outside of the Chignik region facing barriers returning Funding for housing grants or other support programs Available housing in Chignik region communities	

Expanded Subsistence Harvesting Opportunities

As shown through community discussions and analysis, subsistence harvesting practices are heavily impacted by disruptions to local salmon fisheries. The actions shown were gathered from literature and community discussions and provide potential ways Chignik region communities can support sustainable access to subsistence resources.

Resilience Action Opportunity	Current Status	Potential Next Steps	Potential Support Components	Available Resources
Research projects to gather better baseline fishery data and support fishery recovery	The CIC is working with the Office of Subsistence Management and ADFG on a multi-year salmon escapement project CIC leading research in king salmon avoidance systems in sockeye fisheries CIC leading research in using eDNA to track invasives in the Chignik watershed CRAA discussing the potential of eggbox Chinook hatchery technologies and sockeye hatchery viability Past projects have included habitat studies, king salmon migration pattern studies, and Black Lake physical studies	Assess current data gaps in Chignik fishery research Coordinate with local research partners to prioritize research projects with community needs	Community capacity Funding for additional research projects and long-term monitoring Improved relations and coordination with ADFG and other agencies Increased funding and capacity on the part of agencies to collaborate on community research priorities	Pacific Coastal Salmon Recovery fund (7d) Alaska Sea Grant Biennial Research Call (7e) NOAA Bycatch Reduction Engineering Program (7g)
Implement shellfish PSP testing	Limited PSP testing has been conducted in Chignik Lagoon facilitated by the Knik tribe	Explore ways to expand PSP testing to other Chignik region communities Make PSP testing efforts more consistent	Funding and capacity for expanded testing efforts Local capacity for more efficient testing	Coordination with Knik Tribe

Resilience Action Opportunity	Current Status	Potential Next Steps	Potential Support Components	Available Resources
Expand Availability of Hunting Permits and Access	Discussed as a desired action by community members Discussed in resilience literature as a potential way to build more resilience in subsistence practices	Collect data on current hunting and subsistence use to highlight potential subsistence shortfalls Create regional advocacy group to engage with policy and management bodies with clear policy recommendations	Community capacity to organize efforts and engage with management and policy bodies	Coordination with BBNA Proxy Hunting Program (5c)
Culture camps to support subsistence practices and traditions	Culture camps are currently held annually in Chignik Lake and have been held in Chignik Bay in the past BBNC conducts week-long youth Culture Camps for BBNC shareholders and descendants	Assess community interest in supporting local Culture Camps Organize between Chignik region communities to share culture camp resources and curriculum Identify what subsistence practices, traditions, and community-priorities should be emphasized in curriculum development	Funding for Culture Camp implementation and materials Community capacity for administration, organization, and implementation	Coordination with BBNC Rural CAP Youth Development & Culture Grants (7h)
Support for a fishery liaison role to help rapport and communication between management agencies and communities	Discussed as a potential action with organizational experts and recommended in the literature	Collaborate with communities to identify potential candidates with sufficient cultural awareness and community trust	Agency funding and capacity to support a long-term liaison role Prioritization of community outreach in agency activities Training for community outreach, cultural sensitivity, and he development of handoff protocols in the event of turnover	

Increased Food Security

Interviews with Chignik region community members demonstrated that for many, subsistence is a vital component of their diet and that fishery disasters like those described above can impact local food security. The pathways discussed here provide potential opportunities to bolster food security in addition to subsistence opportunities.

Resilience Action Opportunity	Current Status	Potential Next Steps	Potential Support Components	Available Resources
Community gardens and greenhouses	Chignik Lagoon has reportedly purchased a greenhouse, but has not yet implemented Chignik Bay has discussed opportunities Supported in resilience literature	Conduct community site assessments for viable communications Identify produce or agricultural food security goals that these projects can support Discuss community participation systems and distribution of harvest	Funding for implementing community garden or greenhouse programs Community organizations that can lead implementation Community capacity for maintenance and harvest	Alaska USDA food insecurity micro-grants (6b) Calypso Farm & Ecology Center Indigenous-led agricultural trainings (6d) Native American Agricultural Fund (6c) Community Food Projects Competitive Grant Program (6f) Supplemental Nutrition Assistance Program (5b)
Explore Mariculture and Aquaculture Opportunities	Chignik Bay in discussion with AML and SWAMC on potential kelp and shellfish projects	Identify if other Chignik region communities can support mariculture/aquaculture opportunities Conduct siting assessments to identify viable locations for mariculture/aquaculture projects	Funding for projects Find a local seed facility or seeds that can be economically imported Dedicated seiners that can switch into harvest efforts	Alaska Mariculture Cluster (2a) Alaska Mariculture Research and Training Center (2b) Alaska Mariculture Alliance (2c) Mariculture and Seaweed Farming Resource Page (2d) FY2025 National Aquaculture Initiative (2e)

Resilience Action Opportunity	Current Status	Potential Next Steps	Potential Support Components	Available Resources
Food Security Grant Programs	Chignik Lagoon is currently utilizing the Local Food Purchase Assistance Cooperative Agreement Program Some Chignik region communities have applied for Microgrants for Food Security	Assess Chignik region community food security priorities to determine which grant programs match community goals Have communities that have successfully attained grants provide technical application support to other Chignik region communities applying for similar grants	Community administrative capacity for assessing, applying for, and tracking current grant status	Food Security Grant Program (6a) Microgrants for Food Security (6b) Native American Agricultural Fund (6c) Local Food Purchase Assistance Cooperative Agreement Program (6e) Community Food Projects Competitive Grant Program (6f) Supplemental Nutrition Assistance Program (5b) Value-Added Producer Grants (6h)

Climate and Environmental Resilience

Climate resilience actions were not commonly brought up by community members during interviews or community discussions. However, climate threats have been noted as part of Chignik region community resilience planning efforts and discussed in resilience literature. The climate resilience actions presented here provide potential pathways for building resilience against climate threats that have already been identified by Chignik region communities and against future climate threats.

Resilience Action Opportunity	Current Status	Potential Next Steps	Potential Support Components	Available Resources
Conduct climate and environmental threat analyses in each Chignik Region community	Chignik Bay has already conducted an analysis of potential climate hazards and potential mitigation strategies[20] Some initial assessment of climate-related threats to subsistence resources and infrastructure have occurred in other Chignik region communities[21]	Conduct climate hazard threat assessments for each Chignik region community Identify threatened infrastructure critical to community needs Create community-specific climate adaptation and mitigation plans	Funding for additional assessments, planning, and implementing mitigation strategies An environmental assessment and monitoring framework Technical assistance for conducting environmental assessments Community capacity for planning efforts	Tribal Climate Resilience Annual Awards Program (4b) Indian Environmental General Assistance Program (4c) Climate Resilience in Alaskan Communities: Catalog of Federal Programs (4g) Adapt Alaska: Resources (4d) Alaska Center for Climate Assessment and Policy: Resources (4e) Environmental Justice Thriving Communities Grantmaking Program (7c) Coordination with ACCAP (4f) Climate Smart Communities Initiative (4h) Coordination with CIC Coordination with UAF

[20] The Chignik Bay Climate Resilience Action Plan (Chignik Bay Tribal Council 2023) can be accessed here: *https://chignikwatershed.com/wp-content/uploads/2023/09/10b.-Chignik-Bay-Report-32220067-Final_r0.pdf*

[21] The Chignik Intertribal Coalition Preliminary Climate Risk Assessment can be accessed here: *https://chignikwatershed.com/wp-content/uploads/2023/09/5.-Chignik-Tribal-Resilience-Plan-4.0-small-file-size.pdf*

Resilience Action Opportunity	Current Status	Potential Next Steps	Potential Support Components	Available Resources
Implement regional climate observation networks	Discussed in literature as a useful method for boosting the effectiveness of local climate planning and modeling	Identify key climate priorities for monitoring (i.e., water temperature, water pH, precipitation, etc.) Identify other potential communities that can support a regional network Identify potential technical partners that can assist with implementation and creating useful data products	Funding for climate data collection and sustainable monitoring Technical assistance in conducting accurate data collection, monitoring, and analysis Community capacity for administrative efforts, monitoring, and data distribution	Tribal Climate Resilience Annual Awards Program (4b) Indian Environmental General Assistance Program (4c) Climate Resilience in Alaskan Communities: Catalog of Federal Programs (4g) Adapt Alaska: Resources (4d) Alaska Center for Climate Assessment and Policy: Resources (4e) Environmental Justice Thriving Communities Grantmaking Program (7c) Coordination with ACCAP (4f) Coordination with CIC Coordination with UAF

Resilience Action Opportunity	Current Status	Potential Next Steps	Potential Support Components	Available Resources
Implement local habitat rehabilitation strategies	Some initial assessment of climate-related threats to subsistence resources have occurred in Chignik region communities Some initial research has occurred on local impacts of erosion on salmon habitats Community priorities for climate-related salmon declines discussed	Implement rehabilitation efforts for habitats impacting subsistence resources (i.e., brush overgrowth and erosion affected eel grass beds) Conduct community assessments to identify additional local habitat threats and rehabilitation strategies	Funding for planning and implementing habitat restoration projects Technical assistance in designing effective rehabilitation strategies Community capacity planning, implementing, and tracking project efforts	Tribal Climate Resilience Annual Awards Program (4b) Indian Environmental General Assistance Program (4c) Climate Resilience in Alaskan Communities: Catalog of Federal Programs (4g) Environmental Justice Thriving Communities Grantmaking Program (7c) Coordination with ACCAP (4f) Climate Smart Communities Initiative (4h) Coordination with CIC Coordination with UAF

Resilience Action Opportunity	Current Status	Potential Next Steps	Potential Support Components	Available Resources
Design plans for emergency and/or preventative infrastructure and community relocation	Chignik Bay has already conducted an analysis of some relocation strategies for threatened infrastructure Relocation has been discussed in literature for infrastructure and communities that cannot be protected in-place	Assess critical infrastructure in each Chignik region community that likely cannot be protected in-place Conduct site assessments for viable relocation projects Design relocation plans for threatened infrastructure priorities	Funding for climate assessments, relocation planning, and implementation Technical assistance in designing effective relocation strategies Community capacity for conducting assessments, planning efforts, and implementing relocation projects	Tribal Climate Resilience Annual Awards Program (4b) Indian Environmental General Assistance Program (4c) Climate Resilience in Alaskan Communities: Catalog of Federal Programs (4g) Climate Smart Communities Initiative (4h) Environmental Justice Thriving Communities Grantmaking Program (7c) Coordination with ACCAP (4f) Coordination with CIC
Support local climate outreach programs and education programs that build climate resilience technical capacity	Discussed in literature as an important component of building local climate resilience capacity	Include climate education in youth Culture Camps and other youth curriculums Support community climate education outreach and local workshops Support regional climate workshops to build climate networks for sharing adaptation strategies and resources Support educational opportunities that build community climate technical capacities such as assessment, planning and monitoring	Funding for local climate outreach and education Community capacity for designing and implementing locally contextual climate education and outreach efforts	National Tribal and Indigenous Climate Conference Scholarships (4a) Tribal Climate Resilience Annual Awards Program (4b) Indian Environmental General Assistance Program (4c) Climate Resilience in Alaskan Communities: Catalog of Federal Programs (4g) Coordination with ACCAP (4f) Coordination with CIC

Federal Aid Support

This section addresses the need stated in both resilience literature and by Chignik region community members to improve the speed and efficiency of federal fishery disaster relief aid.

Resilience Action Opportunity	Current Status	Potential Next Steps	Potential Support Components	Available Resources
Reform Fishery Disaster Relief Processes	The Fishery Resource Disasters Improvement Act (S.2923) passed in 2022 The FISHES Act (H.R. 5103) passed in 2025			
Advocate for community and subsistence priorities through regional organizations and the Lake and Peninsula Borough	Lake and Peninsula Borough have successfully advocated to change disaster relief allocations BBNA assists communities crafting testimonials and navigating laws and regulation	Monitor for information on public hearings and attend when possible Coordinate with community organizations in other regions affected by fishery disasters to create stronger advocacy for subsistence priorities	Staff and community capacity for administration, organization, and advocacy	Coordination with Lake and Peninsula Borough staff Coordination with BBNA

Potential Challenges

While each opportunity Chignik region communities pursue will face distinct challenges, discussions with community members highlighted that there are several challenges that all Chignik region communities face. These challenges, including institutional barriers, community coordination, economic vulnerability, community capacity limits, climate and environmental risk, and data and research gaps, limit the ability of communities to implement actions across a range of resilience areas. Many of these challenges are notable for being more systemically rooted, and while communities can still build resilience in the face of these challenges, many will likely require systemic changes that may be beyond the scope of individual communities to remediate.

External Institutional Challenges

Chignik region communities face several of the same institutional barriers that other Alaskan communities have described. One of the largest of these is the distrust that many community members expressed for external management agencies and the history of poor relations which have hindered effective collaboration. These issues are also limited by capacity issues at the agency level. Current funding and staffing issues make it difficult to support or expand community-prioritized projects and limit the ability to implement new research or recovery efforts. Additionally, Chignik region communities are subject to the same funding process institutional barriers described by other Alaskan communities, such as the necessity of funding resilience projects in a piecemeal fashion rather than systematically and the frequent limiting constraints placed upon funding.

Community Institutions and Coordination

While not addressed in many resilience interviews, a few of the community members we spoke with discussed concerns about how local institutional structures with varying responsibilities and constituencies across Chignik region communities may make comprehensive resilience planning challenging. These community members expressed dissatisfaction in local institutional processes and felt that institutional priorities did not always align with the resilience goals and needs of community members. One community member noted that this was also a critical barrier toward the effective implementation of larger-scale projects and collaborations with external partners and funders.

Economic Vulnerability

Economic dependence on salmon fisheries was one of the most significant vulnerabilities noted for Chignik region communities during the disasters and continues to be a vulnerability highlighted in subsequent interviews, especially given the continuing vulnerability of local salmon fisheries. Diversifying Chignik fishery portfolios is difficult due to the high costs of entering other fisheries (such as gear and quota investments), the lack of local processing support for locally abundant fisheries like cod or crab, and lack of funding and organizational support for CQE in some Chignik region communities. Additionally, most of the opportunities for diversifying into other industries discussed in resilience interviews focused on Chignik Bay, which is currently in the best position for

diversification due to infrastructure, with little discussion of alternative industry in other Chignik region communities. More focus may need to be placed on diversifying opportunities and incomes in communities outside of Chignik Bay in future resilience planning efforts.

Community Capacity Issues

Community capacity was identified as one of the largest challenges to resilience implementation in Chignik region communities. Large-scale adaptation infrastructure projects or investments in new industries require outside funding, and even smaller projects require communities to make tough decisions about prioritizing already limited spending. Outmigration from communities has been noted as limiting staff and workforce capacity, increasing administrative burdens, and eroding cultural continuity within Chignik region communities. Shortages of suitable housing and relatively modest non-fishing wages also make it difficult to retain residents or for those families or individuals to return once they have left. More effort may need to be spent in mapping these fundamental barriers to effective planning and developing strategies to overcome them as a first step toward building community resilience.

Climate and Environmental Risks

Shifting environmental conditions have been noted to impact local access to subsistence such as salmon, berries, shellfish, and other resources. This presents a potential food security risk that will likely be exacerbated in the case of future fishery disasters. Instability in salmon runs also make it difficult to attract long-term investors in Chignik fishing industries. Additionally, some of the community planning that has already been done (Chignik Bay Tribal Council 2023; 2022) has identified potential climate-related trends or events like erosion, flooding, and habitat degradation which may put Chignik region communities and infrastructure at risk. However, few of the follow-up resilience interviews conducted with community members highlighted climate risks as a key priority, and additional outreach, education, and planning efforts may need to be implemented to build climate resilience across Chignik region communities.

Data and Research Gaps

Resilience interviews with community members and organizational representatives have highlighted several key areas where more data is needed to effectively plan resilience efforts. Much of this focuses on collecting baseline environmental and biophysical data, as well as focused research on the salmon fishery and causes of the salmon declines.

Interviews also highlighted differences in community and agency research priorities, exacerbated by tensions in the relationship that may hinder communication and collaboration. However, in-depth subsistence surveys in the region have not been conducted since 2016 by ADFG, which limits the availability of information about the recent disasters and comparison to preexisting datasets. Sparse or infrequent data collections in the future will further limit the ability to understand how communities are recovering or how they are impacted by additional disasters. Additionally, as noted in both the literature review and in interviews, there was limited discussion of health and wellness

impacts in the community or discussion of strategies to improve community resilience in these areas. More targeted data collection and monitoring of health and wellness metrics across Chignik region communities should be considered to build more holistic resilience strategies.

Conclusions

The 2018 and 2020 fishery disasters not only affected Chignik regional subsistence users, but had wide-ranging negative impacts throughout the intertwined economic, social, and cultural fabric of Chignik region communities. The collapse of the sockeye fishery highlighted how integrated the sockeye fishery is into the well-being and identity of these communities. Cascading effects of the disasters limited the ability of community members to harvest subsistence resources, highlighted community dependence on commercial fishery revenue, threatened food security, and disrupted community subsistence practices, sharing networks, and cultural traditions. The disasters demonstrate how many aspects of life in Chignik region communities are connected to subsistence practices, such as how declines in commercial fishing limit the ability to efficiently engage in a range of subsistence practices and reduce financial resources needed to adapt to changes.

Effective preparation for future disasters will require action frameworks that consider community vulnerability and resilience holistically. Opportunities to diversify local fishing portfolios and economies, expand subsistence opportunities, provide technical support, build on previously successful programs, and increase the efficiency of disaster relief disbursement should be considered as individual components of broader resilience efforts centered around community-led identification of goals and needs. This section summarizes the major conclusions of this study.

Impacts to Harvesting, Sharing, and Use

Chignik region community members widely described significant negative impacts during the fishery disasters to subsistence harvesting, sharing, and use. Many individuals and households indicated they faced challenges obtaining sufficient sockeye salmon through traditional subsistence methods or established sharing networks. This is also reflected in estimated subsistence harvest data, which showed a 38% decline in sockeye harvests between 2018 and 2020 compared to the previous 10-year average. While many community members reported turning to other subsistence species, such as caribou, moose, other salmon species, shellfish and birds, people also felt they were limited by their availability, with over 75% of those interviewed stating they were not able to fish, hunt, and gather enough to meet their needs during the disaster years. Many community members described needing to purchase more store-bought food to make up for the lack of salmon. The disaster also altered sharing practices across the Chignik region communities. While sharing during the disaster years varied by household, many community members described needing to turn to alternative sharing networks, sharing less, or not being able to share at all. These impacts emphasize the role sockeye salmon plays in food security and culture for Chignik subsistence users and highlight the need for resilience measures to support them in the event of future disasters.

Economic Impacts

While all subsistence users may have experienced negative economic impacts due to the unavailability of salmon (through increased harvesting and food replacement costs), commercial

fishery participants who lost income and opportunities to successfully participate in subsistence pursuits experienced the most negative economic impacts. The collapse of the commercial sockeye salmon fishery during the disaster years led to an 80% reduction in total fishery earnings for resident fishermen compared to the previous 10 years. Negative employment impacts from the disasters were also widespread, including reduced availability of crew, inability to switch into other fisheries, and difficulties finding local non-fishery jobs, with the communities of Chignik Bay and Perryville experiencing the highest disaster unemployment rates.

Increased costs of living compounded the economic challenges. Residents reported higher expenses for subsistence gear and equipment, fuel, and travel, and more spent on shipping and purchasing store-bought food to supplement lost subsistence opportunities. The disaster also created broader economic impacts for the Chignik region, with the City of Chignik experiencing a 50% reduction in tax revenue from lost fishery landings and processing-related taxes. Many of these economic impacts were also exacerbated by the earlier closure of the region's last remaining shore-based processing facility, which increased financial instability and reduced fishing opportunities for Chignik fishermen through the disaster. These economic impacts highlight the severe economic toll of the disaster on Chignik region communities, the need to support the local fishing industry, and the importance of exploring other economic opportunities to help mitigate future disaster impacts.

Other Social, Cultural and Community Impacts

The fishery disasters had far-reaching social and cultural consequences that disrupted cultural practices and community dynamics in Chignik region communities. The region experienced an estimated 10.5% decrease in average population during the disaster, a decline that was particularly felt in Chignik Bay, leading to the closure of their school in 2022. The unavailability of salmon and changes to traditional subsistence practices also impacted communities. While many expressed concerns about limited opportunities for families and communities to process salmon together and pass cultural traditions and subsistence practices to younger generations, others felt the disaster created more opportunities to spend time with family. Broader social impacts of the disasters included significant challenges to mental health and well-being. Some interviewees described feelings of helplessness and uncertainty, particularly regarding the causes and long-term implications of the disasters. Despite these challenges, resilience and hope remained evident among community subsistence users. Several interviewees expressed a strong determination to stay in their communities and work through future challenges, citing deep cultural and familial ties to the region as central to their decision.

Individual and Community Responses to the Disasters

The 2018 and 2020 fishery disasters prompted a range of individual and community responses aimed at mitigating their impacts. Many subsistence users discussed needing to shift their subsistence practices to adjust to the decline in available salmon, such as harvesting new species, buying new or additional subsistence gear, and traveling to new locations to harvest. Many

subsistence users were able to benefit from food donation programs, especially the SDN, which played a critical role in filling gaps in food security during the disaster years. It also allowed subsistence users to maintain traditional processing practices and provided a food source similar to their local diet staple.

The federal fishery disaster aid relief efforts were another significant component of the response, though many interviewees expressed that they were too slow to prevent some of the most severe economic impacts. These delays led to severe economic consequences for some, including missed boat payments and the forced sale of vessels, emphasizing the need expressed by many to expedite this process. By contrast, COVID-19 relief measures like PPP loans, direct cash payments, and allocations to Tribes, were extremely timely to offset, at least in part, some of the negative economic impacts resulting from the disasters. Successful measures like these provide a potential pathway for future mitigation efforts.

Preparing for Future Disasters

Building resilience in Chignik region communities for subsistence users is a multi-faceted challenge that requires addressing systemic challenges, centering community priorities, and leveraging the resources already available to Chignik region communities with external resources, funding, and expertise. While the recent fishery disasters highlighted economic, food security, and capacity vulnerabilities, discussions show that Chignik region communities are embarking on myriad strategies that will enable them to prepare for and withstand any future disasters. Planning for the best ways to buoy commercial fishing industries is ongoing and communities have begun exploring other potential industries to promote local economic growth. Adaptation efforts are supported by planned infrastructure improvements, particularly in Chignik Bay, and subsistence users have highlighted potential pathways for expanding subsistence access and bolstering support for food security. Community discussions, interviews, and resilience literature also provide additional potential actions that Chignik region communities can pursue.

However, Chignik region communities are still encountering significant challenges in assessing resilience needs, planning, and implementing actions. Many of these limitations are commonly shared among rural Alaskan communities, such as shifting climate threats, gaps in critical data and research needed for planning, and the need to align institutional and community priorities. However, funding and constrained community capacity continue to be the most commonly discussed limiting factors across Chignik resilience efforts. Despite this, many subsistence users expressed determination and creativity in finding ways to overcome these challenges. While Chignik subsistence users are still recovering from the impacts of previous fishery disasters, and dealing with continuing uncertainty, this project highlights how these communities are actively building resilience and ideally provides additional considerations for ways they can continue to build resilience in the long term.

Methods

For this project, the primary data sources included past research and literature on subsistence harvest, sharing and use in the Chignik region, and for recent impacts as a result of the fishery disasters the analytic team relied on interviews with Chignik region community members as well as additional available data on commercial fishery harvests and participation, population and school enrollment changes, and other data as necessary. In this section, more information is provided about this approach.

Interviews and Community Visits

Initial Community Interviews

As discussed previously, interviews with community members were a primary source of information for this report. In September of 2023, two researchers traveled to Perryville, Chignik Lake, Chignik Lagoon, and Chignik Bay to conduct interviews.[22] In total, 30 interviews were conducted across the four communities. In the winter of 2023, 3 additional phone interviews were conducted with Ivanof Bay community members residing in Anchorage, for a total of 33 interviews. The number of people in each interview varied from 1 to 3 individuals in any one interview, for a total of 37 people interviewed. A table of the number of interviews and people interviewed by community can be found in Table 13.

Table 13. Number of Interviews and People Interviewed by Community

Community	Number of Interviews Conducted	Number of Individual People Interviewed
Perryville	9	9
Chignik Lake	6	7
Chignik Lagoon	8	11
Chignik Bay	7	10
Ivanof Bay*	3	3
Total	**33**	**37**

Note: Interviews conducted in Ivanof Bay were conducted over the phone. All other interviews were conducted in person.

For each community visited in person, the research team recruited one local resident to serve as a community navigator, who assisted by making introductions, providing contact information, and participating in interviews, if interested. Each community navigator was paid a flat fee of $500 for their services. In some communities, community navigators provided lists of names and telephone numbers for the research team to reach out to, while in others community navigators traveled with

[22] The researchers did not travel to Ivanof Bay, due to a lack of year-round residents and the absence of seasonal residents at that time.

the team to households and participated in interviews. Additional community members for interviews were identified from suggestions made by those interviewed (snowball sampling).

Interviews were semi-structured and utilized standard open-ended protocols. A copy of the interview protocol can be found in *Appendix A*. Before each interview, interviewees were provided with a brief summary of the project, a description of how the interview would go, including how long it would take, and information about the confidentiality of responses and voluntary nature of the project. In addition, interviewers also asked if it was possible for a recording to be made of the interview.

While interviews were largely unstructured conversations without a specific set of targeted questions, the interview protocol was structured so as to assist with the collection of information on specific topics of interest spanning subsistence impacts, economic impacts, population and residency impacts, other cultural and social impacts, community responses to the disasters, and actions taken or needed to increase adaptability. Each topic then had a set of potential sub-topics or prompts that were identified during research plan development and outreach.

Community Presentations and Discussions

During June of 2024, community presentations were provided to review draft report findings and solicit feedback. Chignik region communities were first notified about the project presentations via community contacts and guides. Physical and digital flyers outlining the project and information about the dates and locations of the presentations were distributed to Chignik Bay, Chignik Lagoon, Chignik Lake and Perryville in May ahead of the June presentations. The flyers also contained information on the Chignik Regional Resilience Symposium and included ways to view and participate online or via phone. This provided another opportunity for community members who were unable to attend the presentations in their communities to participate in project discussions. The presentation to Ivanof Bay residents was done virtually, with information about the presentation disseminated beforehand via community contacts.

Community presentations were broken down into several sections, beginning with a summary of findings, followed by a group discussion of the report itself, and concluding with a group discussion of ways Chignik region communities can prepare for similar disasters. Dates for the presentation can be found in Table 14.

Table 14. Chignik Region Community Presentations and Dates

Community Presentation	Date
Ivanof Bay (virtual)	May 5th, 2024
Perryville	June 3rd, 2024
Chignik Lake	June 4th, 2024
Chignik Lagoon*	June 5th, 2024
Chignik Bay	June 7th, 2024

Note: All presentations were delivered in the respective communities except for Ivanof Bay, which was conducted virtually. Chignik Lagoon is indicated with an "" since no community members attended the presentation, and no feedback was collected.*

Follow-up Resilience Interviews

In the fall and winter of 2024, follow-up resilience interviews were held to better understand opportunities and barriers to resilience actions. In total, 12 resilience interviews were conducted with Chignik region community members and organizational, institutional, and agency representatives between September and November 2024 (Table 15). Community members selected for the follow-up resilience interviews were participants in the initial community interviews who previously provided insights on community resilience topics. Organizational experts interviewed were identified through either recommendations by project partners, or through previous knowledge of their expertise in relevant topics and Chignik region communities. Participants who were unfamiliar with the project were given a project overview and a summary of initially identified potential resilience actions. Interviews were semi-structured and conducted as informal discussions through phone or video calls. These interviews focused on Chignik region community resilience needs, potential resilience actions, and barriers to implementation of resilience actions. Resilience actions highlighted for discussion were gathered from previous interviews, community discussions, and literature, and interview participants were encouraged to expand any other potential resilience opportunities available to Chignik region communities.

Table 15. Resilience Interview Participant Affiliations

Affiliation	Number of Individuals Interviewed
Chignik Region Community Member	6
ADFG (or former ADFG)	2
Lake and Peninsula Borough	2
Alaska Longline Fishermen's Association	1
City of Chignik	1
NOAA	1
Alaska Marine Conservation Council	1
CRAA	1

Note: The total number of individuals represented here exceeds 12, as some of the individuals interviewed have multiple affiliations and discussions may have included topics from across their range of affiliations.

Data Analysis

Fishery Data

The historical and recent data used to analyze the Chignik purse seine fishery (S01L) was provided by ADFG and the CFEC under an agreement of confidentiality. S01L confidential data were used to determine the compositions of salmon species relative to total catch for examined years, to determine trends in commercial earnings, permits and harvest in the S01L fishery over the examined years,

calculate pre- and post-disaster earnings for Chignik fishermen in the S01L fishery as well as average percent change between periods, and calculate average earnings per permit for Chignik fishermen pre- and post-disaster along with average percent change between periods. S01L confidential data were also used to estimate homepack taken by Chignik fishermen by calculating pre- and post-disaster averages of reported "personal use" catch, along with percent change between periods.

To ensure the confidentiality of all reported data, analysis was conducted using R and coded to ensure that any data point represented is an aggregate of at least four unique permits. Any data points containing information from three or fewer unique permits were excluded from the report and noted in the respective figure or table.

The data used for examining trends in S01L permit transfers were taken from publicly available annual reports published on the CFEC website (CFEC 2023). Analysis was conducted to determine pre- and post-disaster trends in emergency and permanent transfers in the fishery, as well as the percent change between periods.

Subsistence Harvest Data

Subsistence harvest data were collected from publicly available reports published by ADFG, as well as from data published by researchers studying subsistence use and patterns in the Chignik region. Historical salmon subsistence data in the CMA and salmon subsistence uses by Chignik region communities were provided by ADFG annual subsistence reports and analysis was done to determine historical averages, disaster year averages, and the changes in harvest percentages during those periods. Analysis of the composition of subsistence resource uses, salmon subsistence uses, and salmon subsistence catch methods was conducted in other published research and their data were recreated for this report (Fall 2006, Hutchinson-Scarbrough et al. 2020, Hutchinson-Scarbrough and Koster 2021).

It is important to note that the ADFG data presented are estimates of subsistence salmon harvests. Notes provided by ADFG with their data stated that in 2008, 2011, 2014, 2015, and 2016, ADFG conducted postseason household surveys to supplement harvest data collected through returned permits. Limited budgets prevented administering the surveys for 2009–2010, 2012–2013, and 2017-2020 likely resulting in an underestimate of subsistence harvests since not all subsistence fishing households obtained a permit. To compensate for this underestimate, the average annual harvest for postseason surveys was added to harvests to estimate the total subsistence harvest for 2009–2010, 2012–2013, and 2017-2020 (Brown et al. 2023).

Employment

Employment data for Chignik Bay, Chignik Lake, Chignik Lagoon, and Perryville were collected from publicly available American Community Survey (ACS) 5-year estimate data profiles published by the U.S. Census Bureau, Table DP03 (U.S. Census Bureau 2024). Analysis was conducted to determine

employment trends, pre- and post-disaster community unemployment rate averages, and percentage changes between these periods.

School Enrollment

Chignik school enrollment data were collected from publicly available annual enrollment reports published by the Alaska Department of Education and Early Development (DEED 2023). Analysis was conducted to track enrollment trends at the Chignik Bay School, Chignik Lake School, Chignik Lagoon School, Perryville School, and Ivanof Bay School. Enrollment averages for pre- and post-disaster periods and average percent changes between those periods were calculated, as well as analyzing when enrollments hit critically low thresholds, resulting in school closures.

Population

Population data for Chignik Bay, Chignik Lake, Chignik Lagoon, Perryville and Ivanof Bay were collected from publicly available 2022 census data published by ADOLWD (2023). Analysis was conducted to determine population trends, pre- and post-disaster period community population averages, and percentage changes during those periods.

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Appendix A: Interview Protocol

This section contains the interview protocol used during the first round of interviews with Chignik region community members and provided to interviewees in September of 2023.

Interview Protocol

Introduction to Project

Thank you for your time and willingness to be interviewed. Before we start, I want to go over what the study is about, how the interview will go, and how we will be using the information you provide.

Our study is titled "Impacts of Fishery Disasters on Chignik Subsistence Users". This study is being conducted by Northern Economics and Wislow Research in cooperation with the Chignik Intertribal Coalition. It is being supported by a grant from the Pacific States Marine Fisheries Commission that is funded by the National Oceanic and Atmospheric Administration and the Alaska Department of Fish and Game.

What the study is about

The purpose of the study is to understand impacts of the ongoing sockeye fishery disasters on subsistence in the Chignik region and document how individuals, households, and communities have coped with these impacts, as well as challenges they have encountered. An important goal is to identify strategies that may help residents to recover from the current fishery disasters and help minimize the impacts of possible future disasters. Our approach will include combining existing social and economic data and new information from interviews. The study is NOT about identifying the causes of the fishery disaster.

What we will ask you to do

The interview will be an open-ended conversation where you can share your experiences and perspectives. We may prompt you to expand on your input in several different topic areas, including impacts to subsistence and the local economy, changes in the local population, social and cultural impacts, community responses, and ways to strengthen the community's ability to adapt to potential future disasters. These topics will help us understand the range of local impacts and responses and how they connect to subsistence. The interview likely will take about an hour.

Audio/Video Recording

To help us collect accurate and thorough information, we would like to record the interview. This recording will not be shared outside of our research organizations. At the end of the study (July 2025) all recordings will be destroyed. Is it OK if we record the interview?

- ☐ Yes.
- ☐ No.

Privacy/Confidentiality/Data Security

We will do our best to keep the information provided to us in this research confidential to the extent permitted by law. It is possible, that other people may need to review the research records and may find out about your participation in this study. For example, the grant and funding agencies may check and copy records about this research.

To help ensure that no one will be able to identify you from the information you share with us, we will remove any personal information before files are shared with other researchers or used in draft reports. Despite these measures we cannot guarantee your anonymity.

Taking part is voluntary

Your participation and involvement in this research effort is entirely voluntary. You may choose not to participate before the interview begins, you can end the interview at any time, and you can skip any questions or topics for any reason. Are you OK with going ahead with the interview?

INTRODUCTION Name: Best Categorization: • commercial harvester, • subsistence user, • business owner, • government representative, • non-governmental representative, • community member Second Best Categorization: • commercial harvester, • subsistence user, • business owner, • government representative, • non-governmental representative, • community member Contact email for follow-up, updates on the research:	

Topic 1: IMPACTS TO SUBSISTENCE What have been the impacts to subsistence harvest, sharing, and use stemming from the 2018 sockeye fishery disaster? [personal/family impacts if applicable, otherwise community-level]	**PROMPTS** <u>Harvesting Changes</u> • Vessels not available • People not around • Other species or amounts harvested changed <u>Sharing Changes</u> • Different resources shared • Different people involved • Resources from different places <u>Use Changes</u> • Changes in subsistence and other foods balance • Changes in the subsistence resources consumed • Substitutes for salmon

Topic 2: ECONOMIC IMPACTS What have impacts been to employment and income? [personal/family impacts if applicable, otherwise community-level]	**PROMPTS** <u>Employment Changes</u> • Number of employers • Types of employment • Hours available • People looking for work • Job satisfaction <u>Income Changes</u> • Level of household income • Stability of household income <u>Impacts to local businesses</u> • Fishing related • Non-fishing related <u>Impacts to local government or tribes</u> • Fishing related • Non-fishing related

Topic 3: POPULATION AND RESIDENCY IMPACTS	**PROMPTS**
How has the population of the community changed?	<u>Local Residents</u> • Year rounders • Seasonal <u>Families</u> • School enrollment • Other childhood learning <u>Moving away</u> • Have people left • Where did they go • Others thinking about it <u>Seasonal workers</u> • Processors • Others

Topic 4: OTHER CULTURAL AND SOCIAL IMPACTS Have you seen/experienced other cultural or social impacts personally/in the community?	**PROMPTS** <u>Cultural</u> • Satisfaction with living in the community • Changes in salmon related cultural activities • Ability to maintain cultural traditions or practices <u>Generational</u> • Elders, adults, young adults, children • Teaching, transferring, or learning commercial or subsistence skills <u>Well-being</u> • Physical, mental, spiritual health • Quality of life • Social relationships • Trust in local, regional, or federal government.

Topic 5: COMMUNITY RESPONSES	**PROMPTS**
How did individuals and community members respond to a loss of employment and income opportunities related to the commercial sockeye fishery and sockeye resources?	<u>Found non-fishing income/employment</u> • In the community • Elsewhere • What were the options <u>Changed commercial fishing practices</u> • Fished other species • Fished in other areas • What are barriers to changing fishing practices <u>Left the community</u> • Long term • Seasonally • Temporarily

Topic 6: INCREASING ADAPTABILITY	**PROMPTS**
What actions are being taken or are needed for individuals and communities to better prepare for, withstand, or recover from future fishing disasters?	Perception of likelihood of future disasters Outlook for the community Actions being taken by individuals Actions being taken by communities Additional risks or pressures Other potential changes that would buffer or reduce the impacts of future disasters • New industries • Fishing policy changes

WRAPPING UP THE INTERVIEW **Next steps** *Once we finish conducting interviews, we will compile and analyze information into a report of our findings this fall and winter.* **Follow up** *We will be reaching out in the winter and next spring to request your review of our draft materials and potentially ask follow-up questions. For this purpose, we will be asking for your best contact information (email or phone number) As always, your participation is voluntary in any follow-up.* **If you have questions** *Please reach out to us if you have any questions at any time during the course of this study.* The primary point of contact for this study is *Melissa Errend*, a *researcher* at Northern Economics. You may contact *Melissa* at *melissa.errend@norecon.com* or at *907-264-5411*. *More information about our study and timeline are on our outreach flyer*	

Appendix B: Report Revisions and First Draft Report Feedback

Second Community Visits

In May 2024 a virtual presentation was given to Ivanof Bay residents and in June of 2024, in-person presentations were in Perryville, Chignik Lake, and Chignik Bay with the aim of eliciting feedback and validation on the findings of the report and discussing ideas on how Chignik region communities can better prepare for future disasters.[23] More details on the in-person community visits can be found in the *Methods* section. This section further discusses the feedback received during virtual and in-person community presentations and follow-on discussions.

Report Feedback

Following the presentation of initial findings, community members were encouraged to provide feedback. Attendees were prompted with example questions and the community was given space to discuss any aspects of the report. Overall feedback for the report from communities was positive. Community members said that the broadscale overview of the salmon disaster impacts was valuable, and that having them detailed and compiled in a single source would be useful. While no other single comment was shared between the 3 communities where in-person presentations took place, one comment was reiterated multiple times during the visit to Chignik Bay. Some community members felt that the definition of subsistence used during the presentation felt narrow. Some of the audience felt it did not encompass enough of the cultural and well-being aspects of subsistence for their communities. However, through additional discussion with community members involved with the project, this was likely a product of how information was presented in the live meeting rather than a factor of how it was examined in the written report.

Changes to the Report from Comments

- In the section *Recent Historical Subsistence Harvesting, Sharing, and Use in Chignik*, clarified how subsistence was defined for this project and expanded upon the social, cultural, and traditional aspects of subsistence practices that were considered when discussing the impacts of the fishery disasters with subsistence users

- Expanded the *Employment Impacts* section by including data and figures on Chignik region community unemployment before and during the disaster years

Future Work Considerations

These are report feedback comments which are likely beyond the current scope of this project. However, the following comments could be examined further in follow-up work:

[23] An in-person presentation was also scheduled for Chignik Lagoon in June 2024, but no community residents attended.

- Examine Chignik region community testimonials and proposals to the Board of Fish to determine how they have been implemented as a measure of how community feedback is incorporated into management actions
- Examine how housing barriers may have prevented Chignik region community members from returning to their communities after the disasters
- Further examine the communal, cultural, and socioeconomic ties that led people to choose to stay in their communities through the disasters
- Examine population data for community members who left and were/are unable to return and include quantifiable employment data for communities through the disaster

Community Presentation Discussions

One of the aims for the community presentations was to foster open discussions about how Chignik region communities can bolster resilience against similar disasters. Cataloguing and building upon the ideas and recommendations garnered from these discussions was a key component of this phase of the project. Discussions were started by first presenting the ideas heard during initial community interviews and asking communities to highlight ideas which should be prioritized and identifying which seemed less feasible. A list of the ideas presented during discussions can be found in section *Presented Community Resilience Ideas and Feedback*.

While none of the ideas gathered were highlighted as infeasible or not helpful for bolstering resilience, several of the ideas were highlighted as priorities. The following ideas from the presented list were mentioned in 2 of the 4 community discussions:

- *Technical assistance:* Perryville and Chignik Lake community members both mentioned the need for technical assistance in applying for aid and community/project grants. Both communities mentioned that applying for aid felt like an opaque process during the disaster, that qualifications were unclear, and that local organizations did not provide their communities with adequate support. Communities stated they need support in navigating these processes and in identifying opportunities.
- *Increase Local Processing Capacity:* Perryville community members discussed increasing the capacity of their CQE to ship out local catch by facilitating deals with local airlines for better freight rates or exploring alternatives like freezing and sea freight. Ivanof Bay community members discussed partnering with other local tribes to invest in a locally owned shore-based freezing facility.
- *Hunting Permits/Hospitality:* While these are technically distinct ideas brough up by Perryville and Chignik Bay respectively, they touch upon a similar theme, which is finding ways to attract more money into the communities through visitors. A Perryville community

member discussed expanding the moose hunting season and permits to attract hunters while Chignik Bay members discussed finding ways to expand upon local visitor opportunities.

- *Online jobs and job diversification:* Community members of Chignik Bay and Chignik Lake mentioned that some members had found alternative jobs through TikTok or online platforms. It was suggested that tech-savvy community members could provide training for other members of the community and information for other avenues of job diversification.

Additionally, Chignik Lake residents discussed the need for continuing programs hosted by local corporations and organizations that provided supplementary aid for living costs (i.e., fuel, food, and utilities) during the disasters. Community members stated that these types of costs continued to increase post-disaster, and while this action was discussed as a community-specific need, it is likely other Chignik region communities would find this helpful given their similar economic pressures.

Additional Ideas from Communities

Community members from Chignik Bay, Chignik Lake, Perryville and Ivanof Bay also provided a variety of additional avenues for bolstering community resilience in the face of similar disasters. While many of these ideas were specific to their communities, a few of them were echoed in several communities. The most commonly discussed idea across 3 of the 4 community discussions concerned ways Chignik region communities can increase and get more involved in local fishery research:

- *Funding for Research:* In Perryville, Chignik Bay, and Ivanof Bay, community members discussed either acquiring or diverting funding (from disaster relief or through NOAA projects) for targeted fishery research in the Chignik region. In Chignik Bay, community members highlighted research into Chinook exclusion technology for fishing gear, more targeted research into sockeye fisheries, and analyses of current data gaps were raised as potential research subjects as priorities. In Ivanof Bay, community members highlighted stock research for management and how local communities can get more involved in the research process.

The following additional ideas were mentioned in 2 out of 4 community discussions:

- *Increase Relief Fund Distribution Efficiency:* Chignik Bay and Ivanof Bay community members discussed conducting an analysis to see if there is quantifiable data that can be used to determine where in the process the disaster relief fund failed and if relief fund distribution can be decreased to 12-18 months to decrease reliance on high interest bank loans during the disaster.

- *Increase Awareness of Disaster Impacts:* Chignik Lake community members highlighted finding ways to spread awareness of the report and get it into the hands of people/organizations who can use it to support community action, particularly at policy or federal levels. Ivanof Bay community members asked if there was a way to put a quantifiable

number on individual economic impacts for Chignik region community members during the disaster that can be shown to Congress.

The following ideas for increasing community resilience were brought up in individual communities:

Chignik Lake

- Increase outreach and communication between management agencies and local communities, particularly if there are indications of a similar disaster.

Perryville

- Find funding to support local vessel maintenance operations and infrastructure, particularly a new boat ramp, to avoid the high costs of conducting maintenance or putting vessels up in Homer.

Chignik Bay

- Explore opportunities for corporations or Native allottees to subdivide or sell land to assist families who left during the disaster and cannot afford to re-purchase homes/land.
- Create a culture camp to help teach and pass subsistence traditions and processing techniques to the next generation.
- Work to define disasters beyond sockeye abundance shortfalls, specifically looking at avoiding sockeye closures due to chinook closures.

Ivanof Bay

- Increase indigenous representation on the Board of Fish and increase the use of indigenous and historical knowledge in the management decision-making process.
- Eliminate the need for hunting permits for Tribal members entirely and prioritize tribal preference on subsistence harvest (see recent litigation on behalf of Lummi Tribe in Washington for reference).

Appendix C: Insights from the Resilience Literature

Challenges for Building Resilience

This section of the literature review discusses some of the challenges and barriers the Chignik region communities and other similar rural Alaskan communities face implementing adaptive strategies to build resilience. These challenges are divided into 5 main categories: institutional barriers, economic barriers, climate and environmental barriers, community capacity and logistical barriers, and data and research barriers. However, many of these barriers are related and are experienced simultaneously by communities, compounding the difficulties Chignik and other similar communities face in responding to these challenges.

Institutional Barriers

Many of the challenges described in the literature stem from policies, institutional structures, limited capacities, and partnership mismatches that rural Alaskan communities must necessarily contend with to obtain assistance dealing with large-scale climate and fishery issues. While communities work with an increasing number of institutions to promote resilience efforts, including universities, non-governmental organizations, and corporations (Hasert et al. 2024), federal and state agencies working with Native communities were discussed as presenting unique structural challenges, such as:

- Agency responses are often not sufficient or timely enough to match the urgency of community needs and agencies often lack the necessary framework to address specific adaptation efforts (Meeker and Kettle 2017).
- Partnerships are hindered by a lack of understanding of the Tribal consultation process, lack of institutional support for community collaboration (such as directed efforts to build rapport and funding for in-person meetings), and a high turnover rate in community-facing staff with limited knowledge transfer (Meeker and Kettle 2017; Hasert et al. 2024; Taylor, Poleacovschi, and Perez 2020).
- Management of community programs are done in isolation, forcing individual programs to compete with one another for approval and funding (Meeker and Kettle 2017).
- The approval process for funding can force communities to tailor projects in ways that do not fully match community needs and cost-benefit analyses often disfavor projects benefitting smaller populations, discount non-monetary benefits like subsistence access, and undervalue long-term savings of effective mitigation projects (Meeker and Kettle 2017; Kelly and Holen 2024).

These issues are compounded by a lack of Tribal representation in agency decision-making processes (Meeker and Kettle 2017) and can result in additional policy barriers, such as outdated management

policies that don't account for the rapid climate impacts communities are experiencing (Brown et al. 2021; Meeker and Kettle 2017; Aktürk 2022). Additionally, regulatory changes can reduce access to resources and place subsistence communities in competition with other sectors, like commercial and sport sectors, further limiting their ability to adapt (Herman-Mercer et al. 2019).

Economic Barriers

While speaking with communities, much of the literature discussed funding and socioeconomic conditions in rural Alaskan communities as a primary barrier toward implementing resilience strategies. Implementing adaptive strategies in these communities can be prohibitively expensive (Brown et al. 2021). Extreme weather, remoteness and small populations make fuel, housing and transportation are expensive for these communities. Competing priorities and immediate needs make it difficult to allocate resources to long-term resilience projects, and even short-term measures are costly as they require planning, assessments, monitoring, and a staff to implement them (Fuller 2022; Meeker and Kettle 2017). Large scale projects often require outside funding, yet these efforts present their own challenges, such as:

- Funding opportunities are often inflexible in terms of scope, length, and approval requirements, creating mismatches that can make it difficult to find funding for projects that address complex community needs (Hasert et al. 2024).
- Funding sources are often siloed between agencies and specific types of infrastructure, agricultural and fishery issues, making it difficult for communities to address multiple, overlapping concerns holistically. Communities often must pursue funding opportunistically and piecemeal, significantly increasing administrative costs and workloads (Hasert et al. 2024; Oaster 2024).
- Rural Alaskan communities often compete for funding with communities in rest of the US, where infrastructure, technology and project implementation costs are often lower (Taylor, Poleacovschi, and Perez 2020).
- Funding conditions like requiring a matching contribution from applicant communities disadvantages under-resourced communities and can lock some communities out of the process entirely (Hasert et al. 2024).

Climate and Environmental Barriers

Changing climate and environmental factors were identified as a large barrier for many rural Alaskan communities, particularly as a factor limiting access to critical subsistence. Reviews, workshops, and interviews held with coastal Alaskan communities showed that many communities are already experiencing the impacts of climate change on their access to subsistence, and that increasing climate effects are likely to further hinder access and necessitate adaptation (Brinkman et al. 2016; Carey 2009; Brown et al. 2021; Holen 2016; Schmidt and Berman 2018; Kelly and Holen 2024). Some of the most highlighted challenges include:

- Climate-induced changes, such as changes in snowfall, precipitation, incomplete freezing of lakes, and changes in vegetative overgrowth, can hinder movement through the environment and reduce access to traditional subsistence resources (Herman-Mercer et al. 2019; Carey 2009; Holen 2016).

- Environmental changes can impact the health of ecosystems and the abundance of subsistence resources. Community-highlighted examples include changes in water pH which impact local shellfish distributions and changes in water temperature which impact salmon quality and spawning (Holen 2016; 2023; CRCC 2016; Szymkowiak, Steinkruger, and Furman 2023; Brinkman et al. 2016; 2022).

- Climate-induced ecological shifts can cause mismatches in management policies and harvesting efforts, such as shifts in ranges for birds and caribou, variability in seasonal berry production, and changes in salmon run timing (Holen 2016; Schmidt and Berman 2018; CRCC 2016).

- Community health hazards such as increases of toxins, parasites, and disease in subsistence resources (CRCC 2016; 2022).

Additionally, the environment can present more direct threats to Alaskan communities. The risk of floods and avalanches has increased with climate effects and threatens the lives, industry, and infrastructure in vulnerable communities (Kelly and Holen 2024; Holen 2023; Chignik Bay Tribal Council 2023). Climate impacts like erosion and thawing permafrost threaten the integrity of current infrastructure and makes adaptive planning for future infrastructure a challenge, as well as threatening habitats critical for local ecosystems (Hasert et al. 2024; Taylor, Poleacovschi, and Perez 2020; Zimmermann et al. 2018). The Chignik Bay Climate Resiliency Plan (Chignik Bay Tribal Council 2023) identifies several climate hazards that present potential threats to the community which may be exacerbated by continuing climate impacts including: avalanches, erosion, floods, landslides, precipitation, and wildfires. The plan also identified fishery collapse as a climate hazard.

Community Capacity and Logistical Barriers

Adapting to the range of challenges presented above has also created additional social and logistical burdens for the communities working to overcome these barriers. Much of this stems from the limited resources, funds, and personnel that communities can dedicate toward overcoming challenges, which creates additional stresses on the capacity of already taxed communities. Climate change has also affected traditional subsistence and cultural practices, which has created negative impacts on the well-being of many of these communities (Meeker and Kettle 2017; Holen 2016; Kelly and Holen 2024). How these challenges have been discussed by literature and Alaskan communities is outlined below:

- Many communities have insufficient access to technical expertise and technology to effectively plan, conduct assessments, or implement adaptive strategies. The necessity of

outsourcing for these needs creates additional financial and logistical barriers (Meeker and Kettle 2017).

- Tribal governments and community organizations are often understaffed. The ability to add responsibilities, like planning and managing resilience projects, is limited by the capacity of staffs who are often already overburdened with administrative duties (Meeker and Kettle 2017; Oaster 2024; Hasert et al. 2024).

- There is insufficient access to educational opportunities, both for bolstering community technical capacities and for education on climate impacts and adaption strategies (Meeker and Kettle 2017; Aktürk 2022).

- Outmigration from rural Alaskan communities due to lack of education, work, and affordable housing opportunities exacerbate community capacity issues. Outmigration, particularly among youths, has also compounded that feeling that culture and traditions are not being passed to next generations (Hasert et al. 2024; Fuller 2022; Meeker and Kettle 2017).

- Current community adaptive and resilience efforts often do not adequately account for physical and mental health concerns (Meeker and Kettle 2017; Kelly and Holen 2024).

Research and Data Barriers

Effective resilience efforts hinge upon the availability of accurate data and the ability to plan for future impacts. Understanding how communities are experiencing these climate and resource impacts presents a challenge for adaptation, as published scientific results may not reflect current conditions and climate projections may change mid-planning (Kelly and Holen 2024; CRCC 2016). Additionally, many of the challenges discussed above, such as funding, institutional barriers, low capacity, and the logistical costs of conducting research in rural Alaska, further exacerbate these gaps. Some of the data challenges discussed by communities and in the literature are outlined below:

- Communities need better baseline data to inform decision-making and adaptive planning including increased harvest reporting, environmental biophysical data, and local socioeconomic data (Brown et al. 2021; Aktürk 2022).

- Lack of inclusion in aligning research priorities with community needs and failure to meaningfully incorporate traditional knowledge as a valid source of data (Aktürk 2022; Meeker and Kettle 2017).

- Data sharing barriers between agencies which creates a disconnect between management bodies, policymakers, and communities (Holen 2023).

The Chignik Bay Climate Resilience Action Plan (Chignik Bay Tribal Council 2023) also identified locally specific data needs including: research into the cause of low salmon runs, more accurate weather data, bathymetry of the river, lakes, and bay, water level monitoring, centralized historical

flood database, a sediment transport model, updated land ownership maps, updated aerial imagery, and a study on the feasibility of an inner transit system.

Resilience Actions

This section of the literature review discusses some of the actions rural Alaskan communities are already taking to adapt and potential strategies to further build resilience. These actions and recommendations were generated in various ways, including community workshops and interviews, community-led assessments, institutional taskforces, and peer-reviewed research. Resilience and adaptation are highly contextual to the threats, goals, asocial frameworks of individual communities, and not all these actions may be viable, necessary, or even desirable, for Chignik region communities. However, they do provide options for consideration and inspiration. These actions discussed below are broken into 6 categories of resilience: subsistence, climate adaptation, community capacity, management and policy, community aid and funding, and research.

Subsistence

Maintaining access to subsistence was highlighted as one of the key concerns for Alaskan communities for its critical importance to food security, social and cultural value, and as key component of community well-being. In response to the challenges of changing distribution and abundance of subsistence resources noted above, many communities are already adapting by finding new areas to hunt, shifting harvest seasons, substituting less abundant harvest species with other species, and employing new modes of travel to reach subsistence areas (Brown et al. 2021; Brinkman et al. 2016; Carey 2009; Herman-Mercer et al. 2019; Holen 2016; CRCC 2016). Some of the additional potential actions discussed by the literature and by communities to bolster subsistence access and food security include:

- Developing community gardens and greenhouses to ensure access to berries and other produce (Chapin et al. 2016; 2022; Holen 2016).
- Implementing local reindeer herding and examining potential grants to support reindeer meat processing (Holen 2016; Lusk 2023).
- Improving techniques for processing and storing food to help develop longer-term subsistence caches during more abundant seasons, support knowledge sharing through region harvest and storage workshops, and provide training for individuals to fix subsistence gear and equipment (Brown et al. 2021; Carey 2009; Holen 2016).
- Assess the viability of implementing aquaculture and mariculture projects in coastal communities. Community discussions have highlighted that Ivanof Bay may be able to support oyster farms and processing (2022; Fuller 2022).
- Increase access to local testing of subsistence harvest bivalves for potentially hazardous levels of PSP (2022; Alaska Food Security and Independence Task Force 2023).

- Invest in education programs aimed at increasing harvest effort, especially in younger generations, and use technology to assist in the communication and transmission of traditional knowledge (Alaska Food Security and Independence Task Force 2023; CRCC 2016).

Additionally, the literature examined potential policy and management options for addressing food security and subsistence access challenges, such as:

- Exploring ways to legally use commercial bycatch, such as using tax credit programs to support bycatch use and distribution and incentivizing large commercial operators to support subsistence activities through donation campaigns (Alaska Food Security and Independence Task Force 2023).

- Adapt management policy to extend local hunting seasons, increase bag limits, and change resource access to accommodate shifting climate patterns and harvest needs (Brown et al. 2021).

- Work with federal entities to change Marine Mammal Protection Act harvest restrictions from current blood quantum requirements to proof of membership in a federally recognized Tribe (Alaska Food Security and Independence Task Force 2023).

- Adapt USDA food security program priorities to better fit Alaskan community needs, such as supporting wild-harvest and non-economically driven activities as equal priorities, using relevant food system indicators and evaluation metrics for Tribes in Alaska, promoting food justice and food sovereignty, and funding the Federally Recognized Tribes Extension Program with mandatory, non-competitive funds (Rader and Gannon 2024).

Climate

Discussions with rural Alaskan communities have shown that climate impacts are felt beyond just changes to their immediate environments, and can affect their economies, infrastructure, health, culture, and general well-being (Hasert et al. 2024). Adapting to climate threats necessitates a multi-faceted approach to address climate change along each of these fronts, including mitigating impacts on future fishery disasters like the one experienced by Chignik region communities. The literature examined for this review discusses adaptations and resilience strategies to address the direct, physical impacts of climate change Alaskan communities are experiencing, some of which are highlighted here:

- Implement regional climate observation networks to collect and track critical environmental data, such as water temperature and pH, to bolster climate assessment, monitoring, modeling, and resilience planning efforts (Brown et al. 2021; Holen 2016).

- Design erosion and flood protection strategies that fit community needs such as armoring shorelines, elevating infrastructure, documenting flood history to assess future risks, and implementing erosion monitoring programs (Chapin et al. 2016; Holen 2016).
- Reduce brush overgrowth around communities to reduce the risk of wildfires.
- Where possible, reduce non-climate related habitat stressors such as: improving stream-side vegetation for shade, maintaining groundwater connections maintaining wetlands for water storage, and protecting fish passage to thermal refugia (Holen 2016).
- If community infrastructure cannot be protected in place, relocate critical infrastructure out of flood and avalanche paths. If necessary, consider seasonal, phased, or full relocation of communities to more environmentally protected locations (Chapin et al. 2016; Holen 2016).

Community Capacity

This section discusses potential actions that can be taken at a community level to adapt to threats and build long-term resilience. Many of the of the ideas outlined here focus on creating flexibility and diversity in community resources, which is key to building adaptive capacity (Scaggs, Gerkey, and McLaughlin 2021; Martin 2015). Others focus on closing gaps in community technical capacities and protecting access to the resources communities currently depend on. Some of the actions most highlighted by communities and in the literature are outlined below:

- Supplement wild food harvests and fishing incomes with wage employment where available and examine the viability of new supplementary industries in the community. For example, seasonal mariculture can provide jobs between fishing seasons, and promoting local and regional job fairs can help align job seekers with openings (Carey 2009; Fuller 2022).
- Bolster local training opportunities that build technical capacities, particularly that help youths build skills in research, monitoring, and getting involved with management agencies. Federal funding can support local technical capacity building such as on-the-job training programs, workshops, and climate adaptation workforce development programs, and can help retain technical capacity in communities (Holen 2016; Hasert et al. 2024).
- Implement culture camps that can train youths in environmental education and stewardship, build skills necessary for food sovereignty and security, and assist with the transmission of culture and traditional practices (Chapin et al. 2016; Holen 2016).
- Create more "inviting" communities that can attract more tourism and retain current residents through investments in walking paths, communal areas, and centers that can showcase local food and culture (Fuller 2022).
- Invest in renewable and efficient energies, such as wind turbines or solar power, to make community activities more sustainable (Chapin et al. 2016; Holen 2023).

- Support new communication strategies and knowledge sharing opportunities, like regional workshops focusing on subsistence strategies, climate adaptation strategies, regional monitoring, and data-sharing networks (Holen 2016; Brown et al. 2021).

Some Chignik-specific community resilience efforts have already begun, and others are being examined. The Chignik Intertribal Coalition Preliminary Climate Risk Assessment has identified critical infrastructure in each of the Chignik region communities, such as docks, bridges, landings, and the ferry service, and discussed actions to protect them. Additionally, the Chignik Bay Climate Resiliency Action Plan (Chignik Bay Tribal Council 2023) has outlined their community priorities, including: improving emergency response preparedness, incentivizing more people and families to stay in the community, providing better support systems for older members of community to stay, preserving the subsistence cultural way of life (and the fishery specifically), and improving the economy by diversifying resources and providing more jobs to locals in the community.

Management

Alaskan communities are situated in complex relationships with institutions and agencies and must navigate political and regulatory frameworks to obtain funding and technical support for resilience activities. As described in the section *Institutional Barriers* above, this relationship can often be fraught. However, top-down actions on behalf of management can help give communities more flexibility in how they respond to challenges. The actions highlighted below are potential ways management can be adapted to support community-led resilience efforts:

- Support and prioritize co-management and knowledge partnerships with communities, particularly in the development of policy. Ensuring that the communities with the highest stakes in the system have the most representation helps build flexibility into management decisions (Martin 2015; Holen 2016; Brown et al. 2021).

- Examine ways to protect and support rural Alaskan fishing rights, such as community use rights, youth permits and quota, fishery trusts and permit banks, set-asides for rural regions, and special provisions for small-scale and Indigenous fishermen (Donkersloot, Coleman, et al. 2020).

- Emphasize ecosystem-based salmon management practices that emphasize multi-species management (Sakati 2023).

- Adopt adaptable management practices, such as placing limits on total amount harvested rather than daily bag limits to support subsistence users and allowing the dates of hunting seasons to be changed to match local conditions (Meeker and Kettle 2017; Brown et al. 2021).

- Protect against habitat degradation impacting salmon allowing management to issue dynamic habitat control regulations and require studies reviewing major development and natural resource projects' impacts on salmon (Sakati 2023).

Community Aid and Funding

In the face of continuing climate and fishery threats to rural Alaskan communities, limited funding and resources remains a significant barrier to adaptation. As discussed above in the first phase of this project, one of the primary impacts of the salmon fishery disaster was depriving Chignik region communities of income and access to subsistence, further reducing their capacity. This is where support networks and funding sources that can help mitigate these impacts become important, allowing communities to allocate more resources to recovery, mitigation, and adaptive actions. Some of the actions below describe potential ways that aid and funding can more effectively meet the needs of affected communities:

- Ensure federal disaster relief centers on local voices in deciding how funds are used and dispersed, and build in mechanisms to assist communities in diversifying economies and building economic buffers (Sakati 2023).
- Ensure aid funding better targets subsistence loss rather than just focusing on commercial fishing damages (Sakati 2023).
- Invest in infrastructure that supports food logistics and shortens supply chains, as well as creating additional storage and freezer hubs to improve food donation distribution (Alaska Food Security and Independence Task Force 2023).
- Rework the federal funding model for Tribal adaptation to better fit the scale of resilience actions required and align with Tribal priorities through the provision of long-term and flexible funding sources (Hasert et al. 2024).
- Provide funding for a local coordinator whose role is to connect local stakeholders with funding bodies, agencies, and institutions, organize meetings, promote community engagement, and help navigate the administrative workload (Taylor, Poleacovschi, and Perez 2020).
- Create a frequently updated and openly accessible directory to help communities navigate compliance requirements and understand which agencies are responsible for what aspects of resilience planning. The resource should help communities better understand the larger picture of how agencies interact and should help point to where communities should turn for implementation, operation, regulations, grant funding, partners for different topics, etc. (Holen 2016; Taylor, Poleacovschi, and Perez 2020; Hasert et al. 2024).

Research

Closing data gaps is a critical part of effective resilience planning. As discussed above in the section *Research and Data Barriers*, some Chignik region communities have already identified areas that should be addressed with further research to better plan adaptive actions. The potential research

avenues presented here address both topics that may be important for coastal Alaskan communities and recommendations for research should be approached to most benefit those communities:

- Establish community-level baseline environmental and biophysical data and monitoring programs to assist with planning and local climate modeling, such as harvest surveys, vector-borne diseases and contaminants, ice extent and permafrost, water quality, water pH, coastal and riverine erosion, invasive species, air quality data, and soil temperature (Holen 2016; Meeker and Kettle 2017).

- Conduct additional research on the impact of climate change on local stocks, with a focus on ensuring adequate stock assessments and how impacts can be mitigated through habitat enhancement, technology, or management (Meeker and Kettle 2017; Alaska Food Security and Independence Task Force 2023).

- Prioritize more research on local food security topics such as: examining the carrying capacity of Alaskan lands and ensuring the follow the best ecological and management practices, further research on ocean acidification and projected impacts on local shellfish, and the potential impacts of Sockeye salmon hatcheries in Southeast Alaska (Alaska Food Security and Independence Task Force 2023).

- Collaborate with communities to integrate traditional and local knowledge into local data collection to create holistic, place-based pictures of climate impacts and help identify potential data gaps (Ignatowski and Rosales 2013; Aktürk 2022).

- Ensure that data are accessible to communities by regularly reporting research back to community partners, presenting findings at community meetings or local conferences, ensuring data is accessible online and not gatekept behind paywalls, and that the proprietary nature of traditional and local knowledge is protected through community consent and written agreements. These efforts also help to ensure that research efforts are not duplicated, fatiguing local communities (Meeker and Kettle 2017; Hasert et al. 2024; Holen 2016).

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Appendix D: Resilience Resources

The resources presented here were gathered through community discussions, resilience interviews, or relevant research. Though not comprehensive, these resources may help Chignik and other communities support some of the resilience actions discussed in this report.

1. Commercial Fishing Resources

a. **Joint Legislative Task Force Evaluating Alaska's Seafood Industry** *(Senate)*- Legislative task force pursuing policy recommendations on how the state could help the commercial fishing sector and impacted communities across Alaska, with recommendations due Jan. 2025

b. **H.R.4940 - Fishing Industry Credit Enhancement Act of 2023-** A legislative step toward providing fishing businesses with access to the same loans as agriculture businesses through the FarmCredit System (has been introduced, but has not yet passed as of January 2024)

c. **CQE Loans Program** *(State of Alaska)*- Program designed to provide long-term, low interest loans to Community Quota Entities for the purchase of halibut and sable fish quota shares: *https://www.commerce.alaska.gov/web/inv/LoanPrograms/CommunityQuotaEntity.aspx*

d. **Crew Training Program** *(ALFA)*- This crew training program provides an opportunity to attract younger entrants into an industry: *https://www.alfafish.org/crewtraining*

e. **Local Fish Fund** *(ASFT)*- The Local Fish Fund is designed to improve local retention of economic benefits from Alaska fisheries by facilitating transactions between established fishermen, emerging fishermen, and socially responsible investors: *https://thealaskatrust.org/local-fish-fund*

f. **USDA Seafood Funding Guide** (*ASFT)*: This USDA Seafood Funding provides information to fishermen and seafood businesses about the many USDA programs and resources available to the seafood industry and how to successfully access and engage in those programs: *https://drive.google.com/file/d/10ZSIetAHHHkFhemhVgpMmE9i9LBDktfe/view*

g. **Saltonstall-Kennedy Grant Competition**- The Saltonstall-Kennedy Program administers a yearly grant competition which annually funds projects that lead to the promotion, development and marketing of U.S. fisheries.: *https://www.fisheries.noaa.gov/grant/saltonstall-kennedy-grant-competition*

h. **Seafood Processing and Technology** *(Sea Grant)*- Offers classes and workshops on seafood safety, quality control, product development, business and marketing operations, leadership training, and other areas that support of Alaska's seafood processing businesses: *https://alaskaseagrant.org/our-work/seafood-processing/*

i. **Young Fishermen's Career Development Program** *(Sea Grant)*- Projects that aim to enhance educational programs, training, workshops, and technical assistance for young fishers: *https://seagrant.noaa.gov/how-we-work/topics/youngfishermen/*

2. Mariculture and Aquaculture Resources

a. **Alaska Mariculture Cluster Grants and Revolving Loan Fund**- Grant coalition aiming to catalyze a viable and sustainable mariculture industry in Alaska, supporting the production of shellfish and seaweed, for the long-term benefit of the state's economy, environment, and communities: *https://alaskamaricultureclustер.org/*

b. **Alaska Mariculture Research and Training Center**- Organization helping to build partnerships and leverage resources to facilitate and coordinate training, research and dissemination in support of community development and improved mariculture management: *https://amrtc.org/*

c. **Alaska Mariculture Alliance**- Organization providing research, training, and grant opportunities in support of Alaskan community mariculture: *https://alaskamariculture.org/*

d. **Mariculture and Seaweed Farming resources** *(ALFA)*- A resource page for Alaskan mariculture and aquaculture research, training, and other resources: *https://www.alfafish.org/seaweed-farming-1*

e. **FY2025 National Aquaculture Initiative** *(Sea Grant)*- Program designed to strengthen U.S. coastal, marine, and Great Lakes aquaculture through business support: *https://grants.gov/search-results-detail/356751*

3. Community Infrastructure and Energy

a. **Community Facilities Technical Assistance and Training Grant** *(USDA)*- Grant program designed to assist communities identify and plan for community facility needs that exist in their area: *https://www.rd.usda.gov/programs-services/community-facilities/community-facilities-technical-assistance-and-training-grant*

b. **Energy Transitions Initiative Partnership Project** *(NREL)*- Program designed to help communities access and advance resilient, affordable, sustainable, and clean energy resources: *https://www.energy.gov/eere/energy-transitions-initiative-partnership-project*

c. **Community Assistance Program** *(State of Alaska)*- CAP provides communities with funds vital to the delivery of basic public services. CAP funds can be used for any public purpose

that have been determined as a priority of the funding recipient: *https://www.commerce.alaska.gov/web/dcra/GrantsSection/CommunityRevenueSharing*

d. **Denali Commission Funding Opportunity Announcements**- Work Plan and Infrastructure Investment and Jobs Act Program Grants that may present similar funding opportunities in coming years: *https://denali.gov/funding-requests/*

e. **Community Facilities Direct Loan and Grant Program in Alaska**- This program provides affordable funding to develop essential community facilities in rural areas: *https://www.rd.usda.gov/programs-services/community-facilities/community-facilities-direct-loan-grant-program-4*

4. Climate Resources

a. **National Tribal and Indigenous Climate Conference Scholarships** *(NTICC)***-** The conference offers a limited number of scholarships to attend NTICC in-person: *https://sites.google.com/view/nticc2024/registration/travel-scholarships*

b. **Tribal Climate Resilience Annual Awards Program** *(Bureau of Indian Affairs)*- The Branch of Tribal Climate Resilience (TCR) provides financial support to address current and future climate change impacts on Tribal Treaty and Trust resources, economies, regenerative agriculture and food sovereignty, conservation practices, infrastructure, and human health and safety: *https://www.bia.gov/service/tcr-annual-awards-program*

c. **Indian Environmental General Assistance Program (IGAP)** *(EPA)*- Program that provides General Assistance Program (GAP) grants to federally recognized tribes for the planning, development, and establishment of environmental protection programs: *https://www.epa.gov/tribal-lands/indian-environmental-general-assistance-program-gap*

d. **Adapt Alaska**- Provides resources and planning tools for helping Alaskan communities adapt to climate change: *https://adaptalaska.org/*

e. **Alaska Climate Adaptation Science Center**- Organization that produces data and tools that help to inform natural and cultural resource management decisions: *https://akcasc.org/*

f. **Alaska Center for Climate Assessment and Policy**- Organization that provides resources, tools for planning, training, and some small grants to help communities build climate resilience: *https://uaf-accap.org/*

g. **Climate Resilience in Alaskan Communities: Catalog of Federal Programs**- A catalog of Federal programs that could be useful for Alaskan coastal communities seeking to address

erosion, flooding, and other resilience challenges: *https://www.denali.gov/wp-content/uploads/2018/03/Catalog_of_Federal_Resilience_Programs_for_Alaskan_Communities.pdf*

h. **Climate Smart Communities Initiative**- Organization that provides grants to climate adaptation and resilience professionals to create or advance a climate resilience plan or project in collaboration with a community that is on the front lines of the climate crisis: *https://climatesmartcommunity.org/funding/*

5. Subsistence Resources

a. **Indigenous Animals Grant** *(USDA)*: The Indigenous Animals Harvesting and Meat Processing Grant Program (IAG) is designed to support the priorities of Tribal Nations in meeting the needs of traditional harvesting methods and indigenous animals: *https://www.usda.gov/iag*

b. **The Alaska Supplemental Nutrition Assistance Program**- Program with benefits that support both gardening as well as purchasing supplies for subsistence hunting and fishing (only in Alaska): *https://health.alaska.gov/dpa/Pages/SNAP/default.aspx*

c. **Proxy Hunting** *(ADFG)*- Some Alaska residents may be eligible to have another Alaska resident hunt or fish for them: *https://www.adfg.alaska.gov/index.cfm?adfg=huntlicense.proxy*

6. Food Security Resources

a. **Food Security Grant Program** *(State of Alaska)*- Program intended to improve food security in Alaska with $1,500,000.00 in funds available to eligible Food Banks and Food Pantries across Alaska: *https://www.commerce.alaska.gov/web/dcra/GrantsSection/FoodSecurityGrantProgram.aspx*

b. **Microgrants for Food Security** *(Alaska Department of Natural Resources, Department of Agriculture)*- Grants designed to increase the quantity and quality of locally grown food through small- scale gardening, herding, and livestock operations in food insecure communities in areas of the State that have significant levels of food insecurity and import significant quantity of foods: *https://dnr.alaska.gov/ag/ag_grants/microgrants_for_food_security.htm*

c. **Native American Agricultural Fund** *(NAAF)*- Organization that provides grants to eligible organizations for business assistance, agricultural education, technical support, and advocacy services to support Native farmers and ranchers: *https://nativeamericanagriculturefund.org/about/*

d. **Calypso Farm and Ecology Center**- Organization that provides workshops, trainings and youth programs with a focus on indigenous agriculture: *https://calypsofarm.org/indigenous-agriculture/*

e. **Local Food Purchase Assistance Cooperative Agreement Program** *(USDA)*- Program that uses non-competitive cooperative agreements to provide funding for state, tribal and territorial governments to purchase foods produced within the state or within 400 miles of the delivery destination to help support local, regional and underserved producers: *https://www.ams.usda.gov/selling-food-to-usda/lfpacap*

f. **Community Food Projects Competitive Grant Program** *(USDA)*- Grant program designed to help communities meet both short and long term food insecurity goals: *https://akfederalfunding.org/grant-opportunity/community-food-projects-competitive-grant-program/*

g. **USDA Resource Guide for American Indians & Alaskan Natives**- This guide provides readers with a comprehensive summary of USDA Programs, including resources focused on assisting American Indians and Alaskan Natives: *https://www.usda.gov/sites/default/files/documents/usda-resource-guide-american-indians-alaska-natives.pdf*

h. **Value-Added Producer Grants-** The Value-Added Producer Grant (VAPG) program helps agricultural producers enter value-added activities to generate new products, create and expand marketing opportunities, and increase producer income. Beginning farmers, socially disadvantaged famers, and other groups may receive priority: *https://www.rd.usda.gov/programs-services/business-programs/value-added-producer-grants*

7. Additional Financial Aid and Grant Resources

a. **H.R.5103 FISHES Act-** Requires the Office of Management and Budget (OMB) to approve or deny a spend plan within 30 days of its receipt from NOAA (signed into law January 2025)

b. **Rural Economic Development Loan & Grant Programs** *(USDA)*: Program that provides funding for rural projects through local utility organizations. USDA provides zero-interest loans to local utilities which they, in turn, pass through to local businesses for projects that will create and retain employment in rural areas: *https://www.rd.usda.gov/programs-services/business-programs/rural-economic-development-loan-grant-programs*

c. **Environmental Justice Thriving Communities Grantmaking Program**- Provides grants over the next three years to chronically underinvested Alaskan communities that have been negatively impacted by environmental changes: *https://akfederalfunding.org/grant-opportunity/environmental-justice-thriving-communities-grantmaking-program/*

d. **Pacific Coastal Salmon Recovery Fund**- A federal funding grant program that supplements state and tribal programs for salmon recovery by allocating federal funding to projects that provide demonstrable and measurable benefits to Pacific anadromous salmonid populations: *https://www.fisheries.noaa.gov/grant/apply-pacific-coastal-salmon-recovery-fund*

e. **Alaska Sea Grant Biennial Research Call** (*Sea Grant)*- As part of the mission to enhance the sustainable use and conservation of Alaska's marine, coastal and watershed resources through research, education and extension, Alaska Sea Grant supports multiple formal, peer-reviewed research projects on a two-year cycle: *https://alaskaseagrant.org/research/funding/*

f. **Economic Adjustment Assistance** (*EDA)*- The EAA program is EDA's most flexible program that provides funding for a wide range of investments in rural community development: *https://www.eda.gov/funding/programs/american-rescue-plan/economic-adjustment-assistance/*

g. **Bycatch Reduction Engineering Program** *(NOAA)*- The Bycatch Reduction Engineering Program (BREP) provides funding to those looking for creative solutions to fishery bycatch challenges: *https://www.fisheries.noaa.gov/national/bycatch/bycatch-reduction-engineering-program*

h. **Youth Development & Culture Grants** *(RurAL CAP)*- Program that awards eligible organizations with the opportunity to design, develop, and implement projects that empower rural Alaskans to support positive youth development, leadership skills, and cultural connection: *https://ruralcap.org/client-services/health-well-being/youth-development-culture-grants/*

i. **Bristol Bay Native Corporation Caliaq Program** *(BBNC)*- A regional internship and apprenticeship framework for local Alaska Native students: *https://bbna.com/2023/03/27/project-bristol-bay-native-corporation-caliaq-program/*

j. **Regional Resilience Innovation Incubator (R2I2)** *(NSF)*- A federal grant program designed to support projects that address specific regional climate challenges and develop and demonstrate solutions to those challenges. As of January 10th, 2025 applications for 2025 funding have closed, but similar funding may be available in the future: *https://new.nsf.gov/funding/opportunities/r2i2-regional-resilience-innovation-incubator/nsf24-595/solicitation#pgm_intr_txt*