

The Kenai Peninsula Food Systems Resilience

Impact from COVID and severe climactic events

Prepared by Courtney Long and Kaley Hohenshell: Iowa State University Extension and Outreach Food Systems Team

The snapshot is formatted to give an in-depth analysis of findings related to impacts of the climactic events and COVID-19 on the Kenai Peninsula, Alaska, specifically on the southeast portion of the peninsula, including Soldotna, Kenai, and Homer. Iowa State Extension and University of Alaska Fairbanks Cooperative Extension (UAF Cooperative Extension) have been working in partnership since 2018 starting with a Local Food Leader and Community Food Systems certification.

The research was conducted between 2020-2022. Participants included community advocates, farmers and food businesses, non-profits, colleges, and state organizations. Alaska Food Policy Council and Homer Soil and Water, supported the project through outreach for participation in surveys, interviews, and focus groups, resulting in 35 survey responses, nine interviews, and two focus groups (8 participants total), each with IRB¹ approval and informed consent.

Overall, this research has shown the need for community collaboration and networking, scaling up of farming, and infrastructure investment for the Kenai Peninsula food system. Discussion around care for the environment and habitat preservation was present in many discussions. While there is a desire to increase production, it is also important to continue to connect to subsistence and traditional ways of growing, harvesting, and preparing foods.

A special thanks to all the farmers, businesses, organizations, staff, and individuals that met and shared their stories. Thank you for your work and dedication to resilient food systems. We are humbled and grateful for your time.

In accordance with Federal law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, this institution is prohibited from discriminating on the basis of race, color, national origin, sex, age, disability, and reprisal or retaliation for prior civil rights activity. (Not all prohibited bases apply to all programs.) Program information may be made available in languages other than English. Persons with disabilities who require alternative means of communication for program information (e.g., Braille, large print, audiotape, and American Sign Language) should contact the responsible State or local Agency that administers the program or USDA's TARGET Center at 202-720-2600 (voice and TTY) or contact USDA through the Federal Relay Service at 800-877-8339. To file a program discrimination complaint, a complainant should complete a Form AD-3027, USDA Program Discrimination Complaint Form, which can be obtained online at <https://www.ocio.usda.gov/document/ad-3027>, from any USDA office, by calling 866-632-9992, or by writing a letter addressed to USDA. The letter must contain the complainant's name, address, telephone number, and a written description of the alleged discriminatory action in sufficient detail to inform the Assistant Secretary for Civil Rights (ASCR) about the nature and date of an alleged civil rights violation. The completed AD-3027 form or letter must be submitted to USDA by: (1) Mail: U.S. Department of Agriculture Office of the Assistant Secretary for Civil Rights, 1400 Independence Avenue, SW Washington, D.C. 20250-9410; or (2) Fax: 833-256-1665 or 202-690-7442; or (3) Email: program.intake@usda.gov. This institution is an equal opportunity provider. For the full non-discrimination statement or accommodation inquiries, go to www.extension.iastate.edu/diversity/ext

¹ Institutional Review Boards and Protection of Human Subjects- study Exempt



The Kenai Peninsula Suggested Priorities

Based on the snapshot, interviews, surveys and focus groups, action planning sessions were held to determine priority areas. The options below include the priority areas by level of need identified in action planning sessions. For notes and voting information from the action planning sessions, please see Appendix E. Many of the priorities are intersectional and build across and within other priority areas.

The first priority that will be acted on through funding from the Agricultural Marketing Resource Center will be for supporting both a local and statewide network that connects to priority 4 of establishing food system network discussions statewide, regionally, and locally. The project will include understanding best practices of local food councils or coalitions, and statewide networks. Following this understanding, facilitated sessions will occur in Homer to help initiate a new local food and farm council in conjunction with the new Ag Program at Kenai Peninsula College. The \$10,000 will be allocated to the Alaska Food Policy Council, which will then coordinate research and facilitation related to both local and statewide food system networks.

Additional support for evaluating the success of this initial project will be conducting by Iowa State University Extension Food Systems team.

Suggested Priorities

1. Enhance opportunities for gardens and farms to scale up or cooperate for wholesale distribution
 - 1.1. Address feasibility for scaling-up of farms and food businesses
 - 1.1.1. Increase access to efficient equipment and tools; wash pack station, on-farm processes and access to inputs more available
 - 1.1.2. Increase education around animal and animal nutrition needs
 - 1.2. Connect to schools and teach what growing opportunities exist
 - 1.2.1. FFA and 4H – increase capacity and show farming as an option in Alaska
 - 1.2.2. Connect generations and passing of knowledge
 - 1.2.3. Connect to Extension and the food preservation options available, options for different seasons and products for preservation
 - 1.3. Increase cooperation among farmers
 - 1.3.1. Peer-to-peer and mentor farmer support networks to share knowledge
 - 1.3.2. May also support to accessing farm labor
 - 1.4. Develop policies for land trusts or use of public land for production and land access
2. Improve and invest in resilient infrastructure for farming, processing, storage, and distribution
 - 2.1. Identify options for fruit and vegetable storage and processing capacity (bricks and mortar or mobile)
 - 2.1.1. Identify existing shared-kitchen spaces and policies for at home processing
 - 2.1.2. Identify cold storage availability or community-based cooperative models for storage
 - 2.1.2.1. Shared services for things like freeze-drying equipment that can be paid for as a service (similar to freeze drying services for fish)
 - 2.1.2.2. Communal kitchen specifically around home-based food preservation or start-up businesses
 - 2.1.2.3. Identify best practices for mobile processing and storage units
 - 2.1.3. Feasibility/economic impact study for a cooperative business model for storage and processing; what has the capacity of what can be grown, processed and stored, marketed and sold
 - 2.2. Develop meat processing business (bricks and mortar or mobile) both livestock and poultry
 - 2.2.1. Understand policies for on-farm processing and if there are options for selling wholesale
 - 2.2.2. Conduct market assessment for poultry processing facility (processing and storage)



- 2.3. Understand role of Government and State agencies to provide support for this type of investment, including policy, food safety regulations, etc.
 - 2.3.1. Have courses and “how-to” checklist to become an approved entity/ license/etc.
- 2.4. Identify areas where local products can be used for feed, seed and fertilizer or inputs
 - 2.4.1. Assess kelp as a fertilizer and local input that could be developed into business
 - 2.4.2. Community root sellers and spaces for communal storage
 - 2.4.3. Increase collaboration between the end user and the farmer
3. Provide technical support and education around food as medicine and traditional food ways
 - 3.1. Assess what already is available
 - 3.1.1. Develop trust and learn from Alaska Natives
 - 3.1.2. Connect to tribal food ways education- growing, harvesting, preparing
 - 3.1.2.1. How are “white guy” ag practices utilizing things like hoop houses for traditional foods – soil, culture, way of life
 - 3.1.2.2. Shifting from “how to make money,” to “how do I share”
 - 3.2. Develop gardens and agricultural programs in colleges and K-12 schools
 - 3.2.1. Connect with Kenai Peninsula College- Kachemak Bay Campus- Ag Program
 - 3.2.2. Tie programming to habitat and natural resources
 - 3.2.3. Teach hunting, fishing, foraging, and gathering practices as well as butchering and processing
 - 3.3. Work with chefs and farmers to show traditional practices for production, preserving, and cooking
 - 3.4. Increase small market gardens and provide technical support from land access, loans, techniques that work in certain regions (connects to #1); care for soil and resources; thinking through when folks have enough individual/family production to sell into different markets
4. Establish food system network discussions statewide, regionally, and locally
 - 4.1. Establish peer-to-peer networks, mentorship, and technical support options for farmers and food system and value-chain coordinators
 - 4.2. Host a state convention with collaborations between all state associations – broaden the Farm Bureau state conference
 - 4.3. Identify funding for coordination of the networks and participant stipends
 - 4.4. Understand various “levels” of working groups, affiliations, and statewide networks
5. Encourage food distributors and buyers to seek out local food purchasing (go hand in hand with the need for #1)
 - 5.1. Conduct a feasibility study and supply/demand analysis for wholesale distribution; may include needs for feasibility research on potential partner distribution networks and nodes for backhauling of products
 - 5.2. Provide incentives through state, borough, or local legislation for local food purchases
 - 5.3. Develop awareness campaign for local food purchases and what currently exists for local food markets
 - 5.3.1. May connect to existing grant with Homer Soil and Water for marketing
 - 5.3.2. Student to do video and other marketing
 - 5.4. Increase capacity and visibility of the local food hub
 - 5.4.1. Increase collaboration between distributors for local food aggregation and sales
 - 5.4.1.1. While the food hub is currently direct to consumer only, it could grow to wholesale and include cold storage and needed infrastructure elements, but would need interest from farmers

6. Identify best practices for disaster preparedness related to farmers, distributors, and networks for storm mitigation, including policies for pre and post storm
 - 6.1. Identify best practices for disaster mitigation including, pruning, harvesting, and storage during climactic events such as fire, flood, hail, and drought
 - 6.2. Create a plan for aggregation and safe distribution of food post disaster, specifically around food preservation, food safe storage, and food distribution
7. Develop disaster food management plan
 - 7.1. Research and identify amount of food currently available within the Kenai Peninsula
 - 7.2. Identify total number of farms and quantity of products (on average)
 - 7.3. Identify amount of food in storage within grocery, food bank, pantries, and retailers
 - 7.4. Incorporate food storage and access borough policy for disaster management (connects with #2)
 - 7.4.1. Approach churches, non-profits, etc. for ability to store food in their existing dry storage space

Community Overview:

This section reviews values and ways that community members participate and connect in community. Within the survey, questions on individual values and community participation were asked. Within interviews and focus groups, open ended questions were asked about their community, like “how would you describe your community to someone else,” “what are the best parts about your community,” “what are the worst aspects of your community.” Responses are reflected in the following pages.

The Kenai Peninsula Borough is located southeast of Anchorage. While the entire peninsula was invited to participate in the research, most was conducted in the areas of Kenai, Homer, and Soldotna.

In 2020, the Kenai Peninsula had a population of 58,799 (United States Census Bureau, 2020); in 2021 it was estimated to be 59,767 (United States Census Bureau, 2021). City specific populations are chosen based on participation in the research.

- Homer: estimated population of 5,719 in 2021 (United States Census Bureau, 2021)
- Kenai: estimated population of 7,590 in 2021 (United States Census Bureau, 2021)
- Sterling: 2020 population of 5,918 (United States Census Bureau, 2021)
- Soldotna: 2020 population of 4,705 (Data USA, 2019)

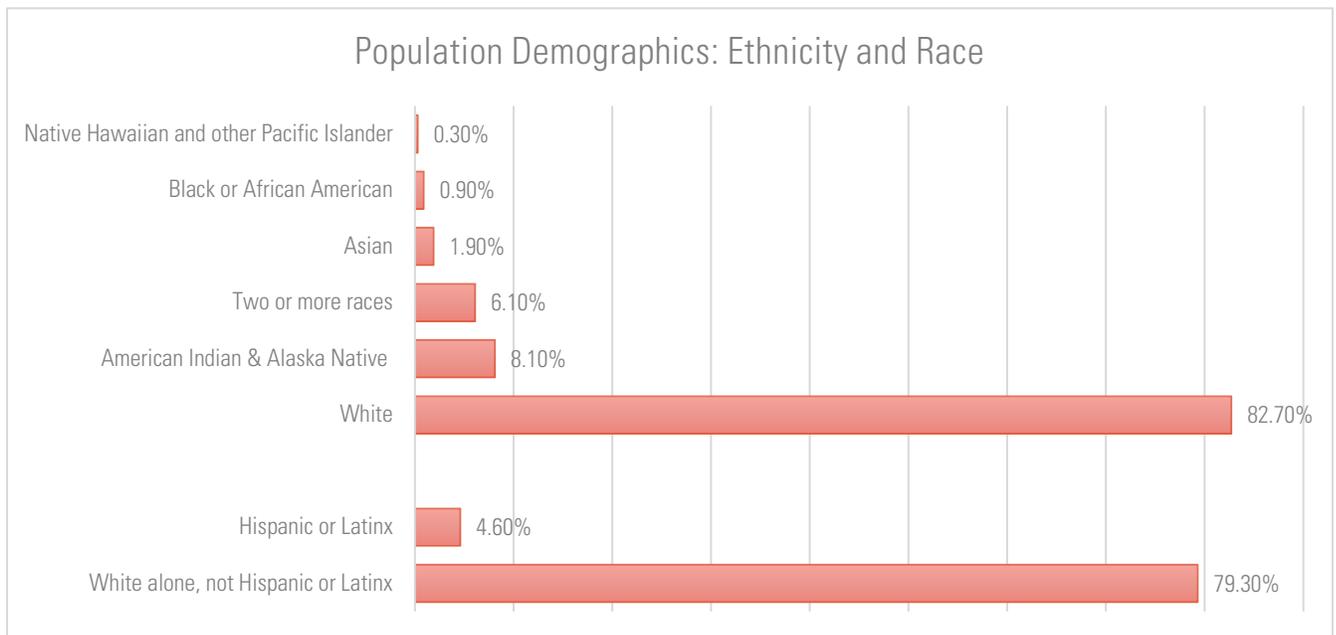


Figure 1: Population Demographics by Race (United States Census Bureau, 2021)

For information on the demographics of those that participated in the survey, see Appendix A.

Livability

Personal health status is shown to be impacted by where one lives, works, and plays. According to the AARP Livability index, [Kenai Peninsula](#) has an overall ranking of 55 (out of 100) for livability. This ranking is developed based on housing, neighborhood, transportation, environment, health, engagement, and opportunity.

Kenai Peninsula Borough Livability Index Overall Ranking 55

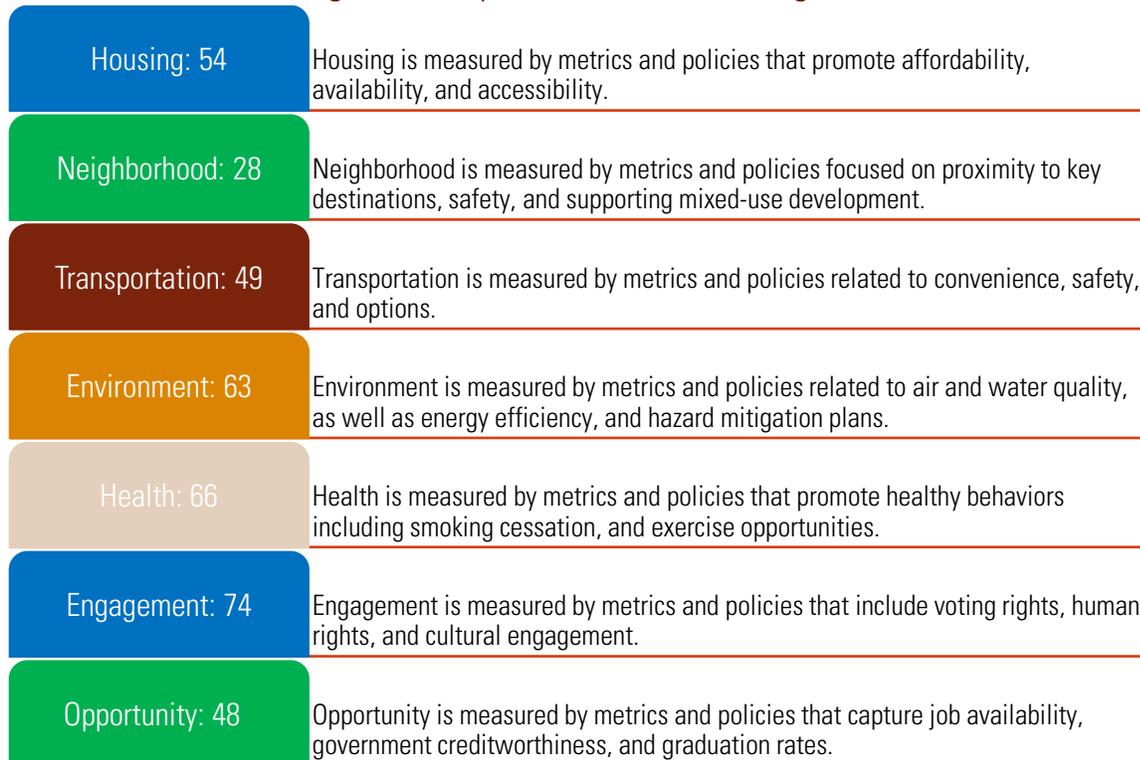


Figure 2: Livability Index Rankings; all definitions from AARP (AARP, 2022)

Neighborhood, which includes access to activities, grocery, and other amenities received the lowest score of 28. A few of the metrics for this section include access to amenities such as grocery stores and farmers markets (the county received a score of .2), access to jobs by auto within 45 minutes, activity density, and vacancy rates. Additionally, the AARP index looks at policies for age-friendly communities and policies for walkability and transportation, of which the Kenai Peninsula does not have. Opportunity was the second lowest score with 48. This attribute looks at income inequality, jobs per worker, high school graduation rate and age diversity. For the most part, Kenai is similar to the mean U.S. with the exception of a lower amount of job availability per person (AARP, 2022).

Values

Individuals who participated in the resilience survey were asked to select their top three societal values from a pre-created list. If they had additional values, they could add in options in “other.” Environment, Culture, and Education rank as the highest values, with 56% agreeing that Environment is a top value (See Figure 3).

In addition to these values, through focus groups and interviews, natural environment, community networks, and diversity came up as strong assets across the community. This connects to the survey findings as well. Regarding natural environment, interviewees expressed strengths around public land and aspiring farmers. One person shared, “we are blessed to have a lot of public and wild land on the peninsula,” a second mentioned, “[we] have the fastest growing farm area in the state,” and last, “[there is] tremendous growth in the number of farms and value-added producers that are popping up... it’s also beautiful here; I can’t think of another place to live.” However, while the natural beauty is a benefit, and the growing agricultural opportunities, a challenge in the natural and built

environment within Kenai is transportation and infrastructure. One individual mentioned, “[I] choose to be here and enjoy isolation, but there is only one way in and one way out,” and another person shared that, “you spend a lot of time driving (or boating and flying).”

Social networks were also seen to be a positive aspect of the Kenai Peninsula. One individual reflected on how “the community rocks when it comes to working together,” and another shared, “it’s one of the places that there is so much going on and largely accessible; people can find their community.” However, in the same vein of social connections and welcoming culture, others shared that “it’s hard to break into the community,” and that tribal culture is not always respected, including care for the environment and connections and relationships. While some believe that there is care and “value of indigenous people, and [their care] and value for the land,” not all are respecting their heritage and cultural values.

In Figure 3, it details that education is the third highest agreed upon value within the survey, with about 30% seeing this as a top value. Within interviews and focus groups, this also arose, and connected more to personal growth and education. One individual shared that, “there is a value of self-sufficiency and growing our own,” and another reported that “[we] have committed educators here, including athletics and school.” However, while there are educational resources, there are also concerns about individuals seeking higher degrees out of state and not returning. One interviewee shared, “[the] sad part is that about 80% go out of state to university and 80% do not return, [I’m] hopeful to hold more students [here] rather than losing them.”

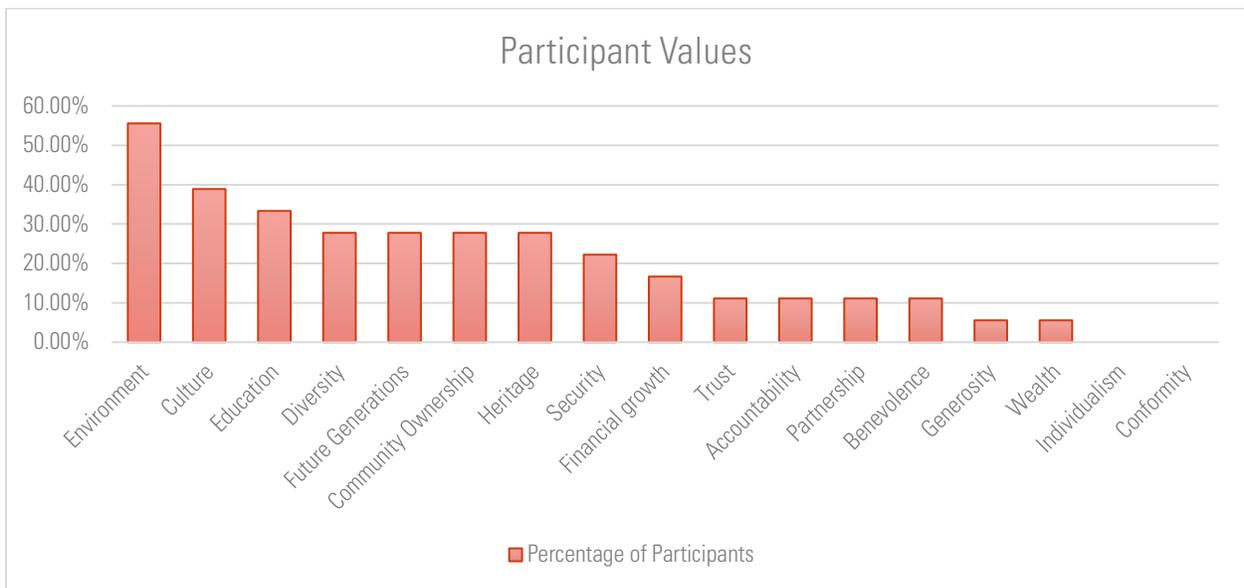


Figure 3: Participant Values (N=35)

In addition to the values shown in figure 3, one individual wrote in “honesty, fairness and individual rights” as values.

Participation

There are many ways to participate and support the local community. Individuals were asked to share how they supported their community from a pre-created list and could also type in “other” responses. All participants shared that they purchase from local businesses, and over 91% vote in local elections and build relationships with neighbors and community members. There was also a high degree of individuals, over 77%, who seek to understand the heritage and history of the community.



Figure 4: Community Participation (N=35)

In addition to the values shown in figure 2, individuals also shared that they “grow food for the community and give away plants,” “outdoor recreation, food gathering,” and “church leadership and chamber board.”

Business and Industry

While the first section of the report took a broad look at community engagement and values, the next portion focuses on business and industry specifically related to food systems. Within the community, it is estimated that there are 2,215 small businesses within the county, with an annual payroll of \$808,277,000 (U.S. Census Bureau, 2020). See Appendix C for full table of businesses.

Table 1: Businesses by number of employees in Kenai Peninsula Burrough (U.S. Census Bureau, 2020)

# of employees	# of Kenai Peninsula Burrough businesses
Less than 5	1,484
5-9	401
10-19	213
20-49	76
50-99	27
100-249	9
250-499	4
Total	2,215

Agriculture

There are 260 farms in the Kenai Peninsula and 31,508 acres of farmland. 73 farms participate in various government programs, with revenue of \$502,000. The median size of farms in the county is 10 acres (USDA National Agriculture Statistics Service, 2017). Tables 2-4 detail information on the number of farms by product type, farm value, and average number of acres. According to the USDA NASS statistics, almost 218 (84%) of those farms are making less than \$24,999 per year and 215 (83%) farms are less than 50 acres in size.

Table 2: Sales by Commodity (USDA NASS, 2017)

	Total # of Farms	Total Sales
Crops	176	\$2,711,000
Vegetables (including seeds and transplants)	70	\$440,000
Fruit and Tree Nuts	21	\$N/A
Berry	18	\$N/A
Horticulture	103	\$1,671,000
Field Crops, other, hay	39	\$N/A
Poultry, including eggs	55	\$64,000
Cattle, including calves	16	\$156,000
Milk	1	\$N/A
Hogs	12	\$N/A
Sheep and Goats	12	\$15,000
Equine	4	\$17,000
Aquaculture	15	\$2,245,000
Specialty Animals	25	\$N/A
Commodity Totals (included value added)	74	\$981,000

Table 3: Farms by Value (USDA NASS, 2017)

	# of Farms
Less than \$2,500	93
\$2,500 - 4,999	36
\$5,000 - \$9,999	42
\$10,000 - \$24,999	47
\$25,000 - \$49,999	22
\$50,000 - \$99,999	11
\$100,000 or more	9

Table 2: Number of Farms by Acres (USDA NASS, 2017)

Acres	# of Farms
1.0 -9.9 acres	128
10-49.9	87
50-179	30
180-499	9
500-999	1
1000 or more	5
Total # of Farms	260

According to the USDA, a farm is defined as “any place from which \$1,000 or more of agricultural products were produced and sold, or normally would have been sold during the census year” (2017, pp. Introduction, VIII). The definitions of terms used in Tables 2-4 can be found in the [2017 Census of Agriculture, Appendix B](#) (USDA, National Agricultural Statistics Service, 2017).

From interviews and focus groups, participants shared that the production and support agencies seem to be the largest strength of the region. There has been “rapid creation of small farms here, [tripling] local food for direct to consumer [markets] in the last five years,” one interviewee shared, and another mentioned, “small farms are up 73%.” During focus groups, individuals also discussed the strength of small-scale gardening and self-sufficiency and the need to protect the natural environment for subsistence fishing, foraging and hunting. For the most part, the farming discussed was around fruit and vegetable production. In some instances, farmers are looking to raise poultry, rabbits, or other livestock. However, feed, other inputs, and supplies for livestock can become expensive, especially with limited supplies and “being at the end of the road.”

Support businesses and organizations were also seen as a large strength in the region. There are numerous groups offering technical assistance, as well as options for peer-to-peer learning. Additionally, groups like the Alaska Food Policy Council, Kenai Local Food Connection, Homer Soil and Water, and others have worked together on various plans and research to fully understand needs of farmers and the broader food supply chain. The Kenai Peninsula college is “looking to have an agriculture program... with at least one of the farms that serves as an education program,” one interviewee shared, and additional groups like the Alaska Small Business Development Center has also “helped to support small businesses, including local food producers.” Another participant shared, “Alaska Natives are starting to jump into developing agriculture programs; [they] are working a lot on this.”

While small scale growers are on the incline, there is still a gap in selling to larger scale buyers. One interviewee shared that they hope “farmers [will learn] to focus on one crop to sell to markets,” which could encourage additional market avenues, or aggregation between farmers for wholesale markets. Scaling-up of agriculture is also challenging due to lack of access to equipment. One interviewee shared that “transportation for farm equipment is impossible and equipment is very expensive to get here.” Another person shared that “labor becomes an issue... there are short seasons and intense work for a brief time. [Some are looking into] labor like wwoofers² who are traveling, but they don’t have much experience.”

Additional constraints occur with processing and value-added products. “Almost all fish leave and are processed elsewhere, very few are able to be kept in the state,” one interviewee shared, and another mentioned, “there is almost no dairy because state regulations make it almost impossible.” Another mentioned that regarding livestock, “there are several with pigs, goats and small-scale diversified farms, [and a cattleman’s association], however, there is no processing available,” many have to “go to Palmer, which is a six-hour drive, for processing and the cows get stressed.”

While scaling production and processing are key constraints, another aspect to increasing production is fully understanding supply and demand and the ability to aggregate and transport foods to larger scale buyers beyond farmers markets or community-supported agriculture systems. There is currently a food hub within the region that supports direct to consumer distribution, and there is some interest from buyers to see this scale-up to wholesale markets. However, through discussions with producers, there is not yet interest or capacity to increase the supply-chain option through the food hub.

Food System

The intent of this research is to understand the interest and ability to have a resilient food system. Primarily, understanding the community’s interest in local and regional foods, and the willingness to participate and purchase from farm and food businesses that operate within a local or regional geography.

When asked about the importance of supporting local food and farm businesses, over 97% believed it was either extremely or very important.

Within the Kenai Peninsula, individuals are seeking out local whenever they can, however, there is not always available products at markets, especially in off-season. A unique aspect of the Kenai Peninsula is the reliance of subsistence gardening, fishing and hunting which may increase the locally purveyed food in individuals’ homes, including products that are donated through food banks and pantries.

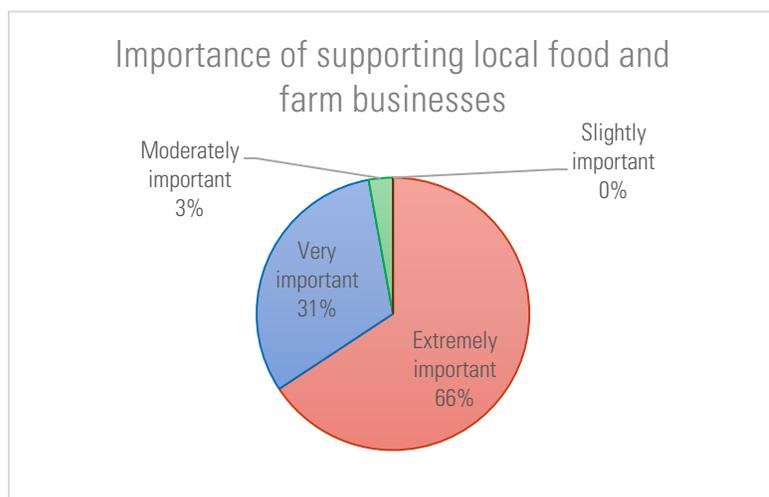


Figure 5: Extent of importance for supporting local food and farm businesses (N=35)

²“Wwoof is a worldwide effort to link visitors with organic farmers for education” (Wwoof, 2022)

When asked specifically about how important it was to support local farm and food businesses, 97 percent agreed that it was either extremely important or very important.

Shopping Patterns

Comparisons of Figure 6 (perspectives of the importance of supporting local food and farmers) and Figure 7 (local food purchasing locations) showcase where individuals are shopping, or growing or gathering, their own food. Overwhelmingly (almost 70% or more) have shared they are getting their food directly from farmers markets, local or independent grocery stores, personal gardens or farms, or hunting and fishing. While locally or independently managed grocery stores may not always have local products available, there is still a desire to shop with locally owned businesses, and anecdotally, it was understood that many stores try to source local when they can.

During action planning sessions, the group spoke about the breadth of direct-to-consumer markets that exist and the need to increase the opportunities to increase access to wholesale markets, as mentioned previously.

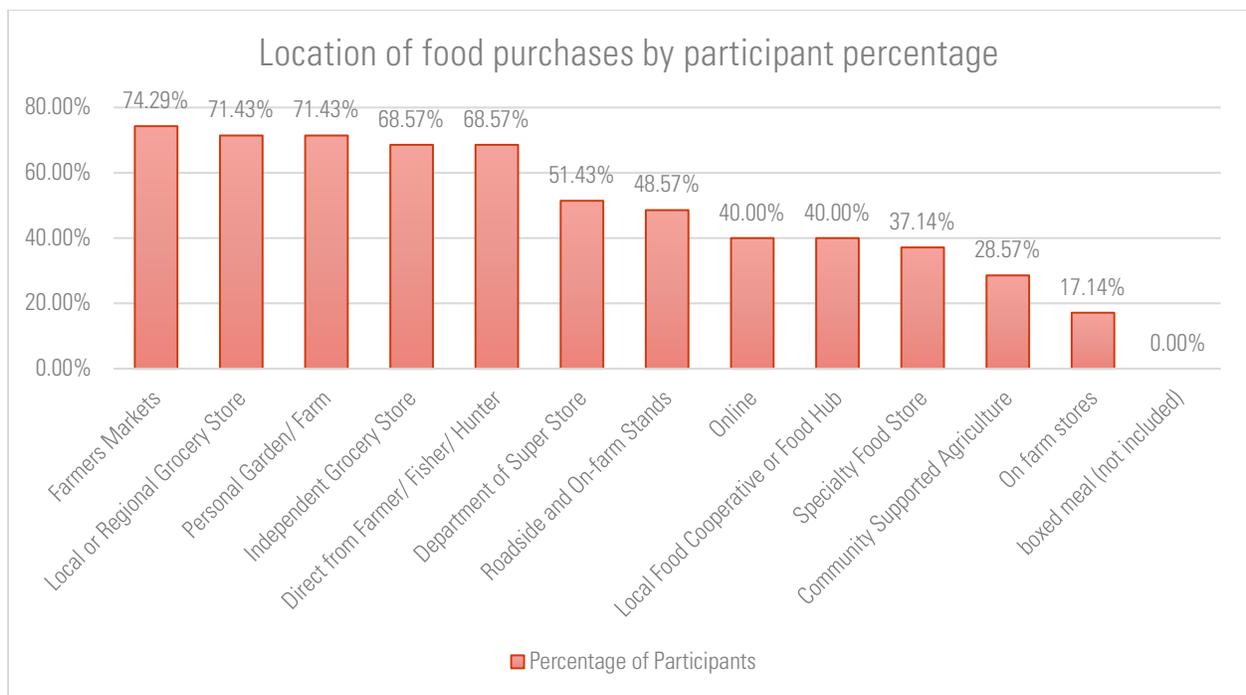


Figure 6: Location of food purchasing by participant percentage (N=35)

Attributes for food purchasing

To further understand purchasing habits, survey participants were asked about the level of importance for attributes for purchasing food. Based on average rankings (with extremely important equaling 5 and not at all important equaling 1), grown local (4.37) and freshness (4.29) were ranked highest; organic (3.34) and food safety practices (3.44) were ranked lowest (see Table 5 for all averages). Figure 8 details the percentage of individuals who ranked each attribute by level of ranking. In addition to the attribute options provided, “non-GMO,” “variety,” “Farming methods/humane animal farming practices,” “free from insects and insect damage,” “Humanely raised,” and “producers that support food banks and elimination of food waste” were included as “other.”

Table 3: Averages for importance of food purchasing attributes

	Grown Local	Affordability	Relationship with producer, seller, etc.	Location	Convenience	Organic	Fresh	Food Safety Practices
Average Scores	4.37	3.80	3.49	3.54	3.49	3.34	4.29	3.44

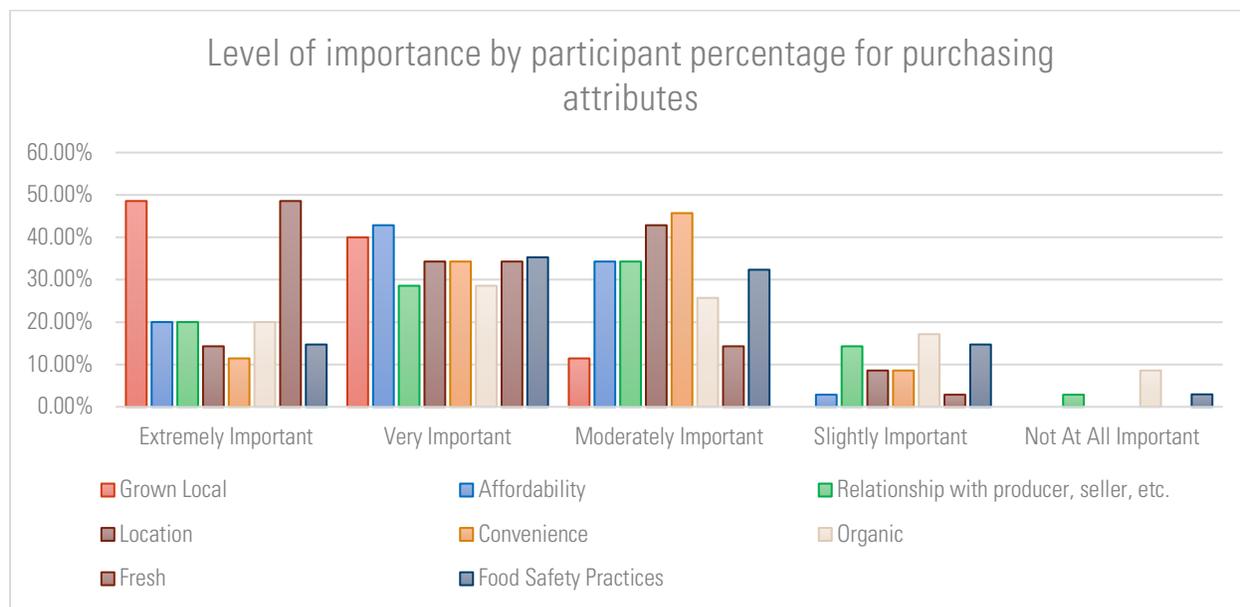


Figure 7: Importance of food attributes by percentage (N=34 for food safety); for full data spreadsheet on level of importance of attributes, see Appendix D

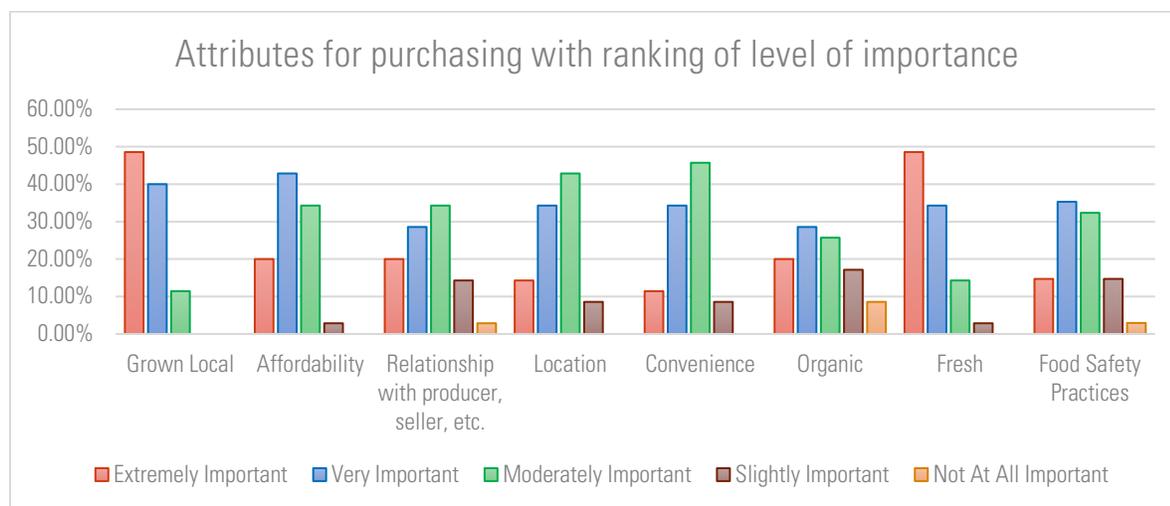


Figure 8: Importance of food attributes by level of importance (N=35 except for food safety practices, N=34)

All attributes received over a 3.3, showing that each are seen as moderately important, however grown local, and fresh were the two categories ranking about a 4, or very important. This is not surprising, as in focus groups and action planning sessions, participants alluded to the desire to source local, or grow your own, and also the desire, and sometimes challenging aspect to find fresh foods during certain times of the year.

Organic and food safety practices were ranked the lowest attributes for food purchasing decisions. This was considered to be because of the understanding of farmers practices and the small-scale nature of production in the Kenai Peninsula. Additionally, because of mainly direct-to-consumer sales. One participant shared the sentiment that there are not as rigid of restrictions on the types of food safety practices, or licenses and certifications, that are required.

A few participants mentioned their surprise at the lower ranking of convenience and affordability, because some individuals may not have the disposable income to purchase locally grown foods or fresh products during certain times of the year. However, when considering the overall importance, it seems fair to say that individuals are seeking out local and fresh first. Another participant mentioned that many food banks and pantries are also able to provide locally sourced fruits and vegetables, as well as fish and game. An interviewee also spoke to food access and local availability, "local food access is great in July and August...eggs come locally, lettuce, carrots, potatoes, etc."

Food purchasing decisions are also impacted by external causes, such as natural disasters and COVID-19. The following sections of this report will detail impacts for both cases.



Natural Disaster Impact

In addition to the primary research of focus groups, interviews and surveys, additional data for natural disasters has come from FEMA. However, FEMA only tracks nationally declared disasters, and from this research, it is understood there are many instances where climate change, and general climactic events, create additional havoc on farming and businesses with ever-evolving cycles and changes in weather, that are not tracked at the same level as extreme events.

Disasters impact all of community life, ranging from mild challenges for transportation and ease of access to devastating loss of infrastructure and life. The Kenai Peninsula has been involved in seven designated disaster areas since 2011 according to FEMA (FEMA, 2022). Table 7 details each of these disasters that have impacted the region.

The funding allotment is shown for the entire region of impact, as specific county level data is not available. Each line details the name of the disaster, date, type of assistance and total amount allotted. Within the assistance type column, only the assistance that was provided to the Kenai Peninsula is included. While federally proclaimed disasters do not showcase the full extent of extreme weather on the region, this is one way to understand impacts from disaster, such as infrastructure damage, debris, and damage to shelter and community areas. Types of disaster declarations include:

- DR: Major disaster declared
- FM: Fire Management
- EM: Emergency Declaration

Table 4: Natural Disaster Declarations (FEMA, 2022)

Disaster Declaration	Date	Assistance Type	Funding allotted (full region)
Alaska Severe Storm DR-4054-AK	Nov. 15, 2011 – Nov. 17, 2011	Public Assistance PA- A-B Emergency and PA C- G Permanent work	\$1,340,817
Alaska Severe Storm, Straight-line Winds, Flooding, and Landslides DR-4094-AK	Sep. 15, 2012 – Sep. 30, 2012	Public Assistance PA- A-B Emergency and PA C- G Permanent work	\$21,072,971
Alaska Flooding DR-4161-AK	Oct. 27, 2013 – Oct. 29, 2013	Public Assistance PA- A-B Emergency and PA C- G Permanent work	\$1,144,274
Alaska Card Street Fire FM-5085-AK	Jun. 15, 2015 and continuing	PA- B Emergency and PA H Permanent work	\$521,547
Alaska Severe Storm DR-4369-AK	Dec. 4, 2017	PA- A-B Emergency and PA C- G Permanent work	\$4,073,456
		Hazard Mitigation	\$74,075
Alaska Earthquake EM-3410-AK	Nov. 30, 2018	PA- B Emergency	\$N/A
Alaska Earthquake DR-4413-AK	Nov. 30, 2018	Individual Assistance	\$28,176,282 4356 Applications
		PA- A-B Emergency and PA C- G Permanent work	\$141,198,282
		Hazard Mitigation	3,105,479

Interview, focus group and survey participants were asked to reflect on their experiences of natural disasters. Of the 35 survey participants, 25 (71%) shared that they experienced a natural disaster, which included the Swan Lake Fire or other climactic events such as hail, flood, wind, tornado, and drought (see Figure 10). Additional “other” events that individuals experienced included two “snowstorms,” two “volcanic eruptions,” two “wet and cold summers,” “mud slides,” “other fires,” “avalanche,” and “heavy rains.”

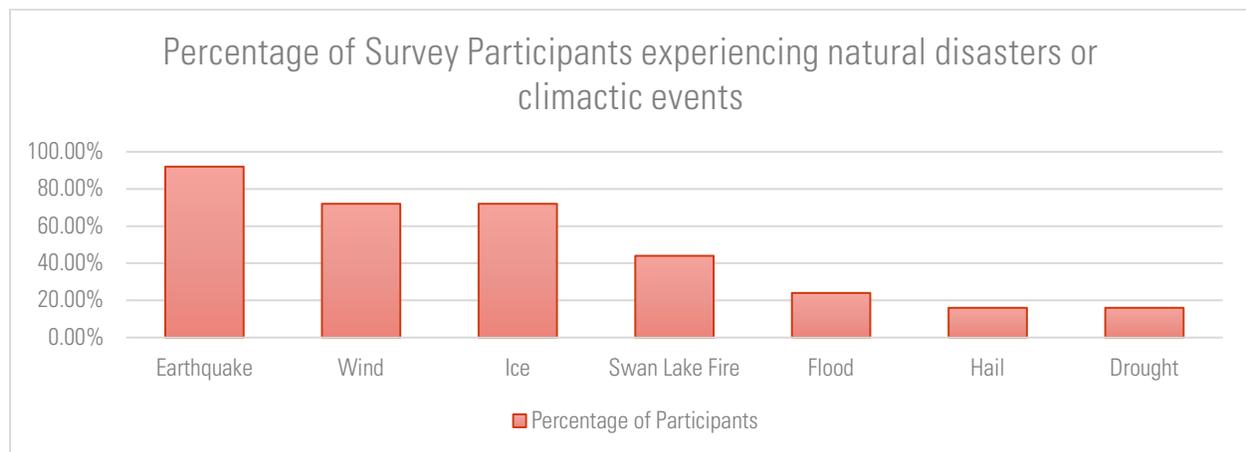


Figure 9: Percentage of Survey Participants experiencing natural disasters or climactic events (N=25)

Impact from Natural Disaster or Climactic Event

Of those who experienced a natural disaster, 24 (96%) experienced more than one event. Table 7 details the number of participants that experienced each type of event (left column) and the impacts they experienced. Figure 11 showcases the percentage of individuals that experienced each event and the impact it had.

Table 5: Total participant numbers based on impact from natural disasters and climactic events

	Increase in mental stress	Damaged home/land/ etc.	Increase in physical stress	Loss of communications	Increase in financial pressures	Diminished personal health	Damaged business/farm/ etc.	Loss of essential provisions (water/shelter/ etc.)	Diminished family health	Business closure
Hail (4)	0	1	0	0	1	0	2	0	0	0
Drought (4)	1	1	1	0	1	1	1	1	0	0
Flood (6)	3	1	0	0	0	0	0	3	0	0
Swan Lake Fire (11)	9	0	3	0	0	4	1	1	3	0
Wind (18)	5	9	2	10	2	0	5	2	0	0
Ice (18)	10	4	9	3	5	4	0	1	2	1
Earthquake (23)	5	3	2	2	1	0	0	0	0	0
Totals:	33	19	17	15	10	9	9	8	5	1

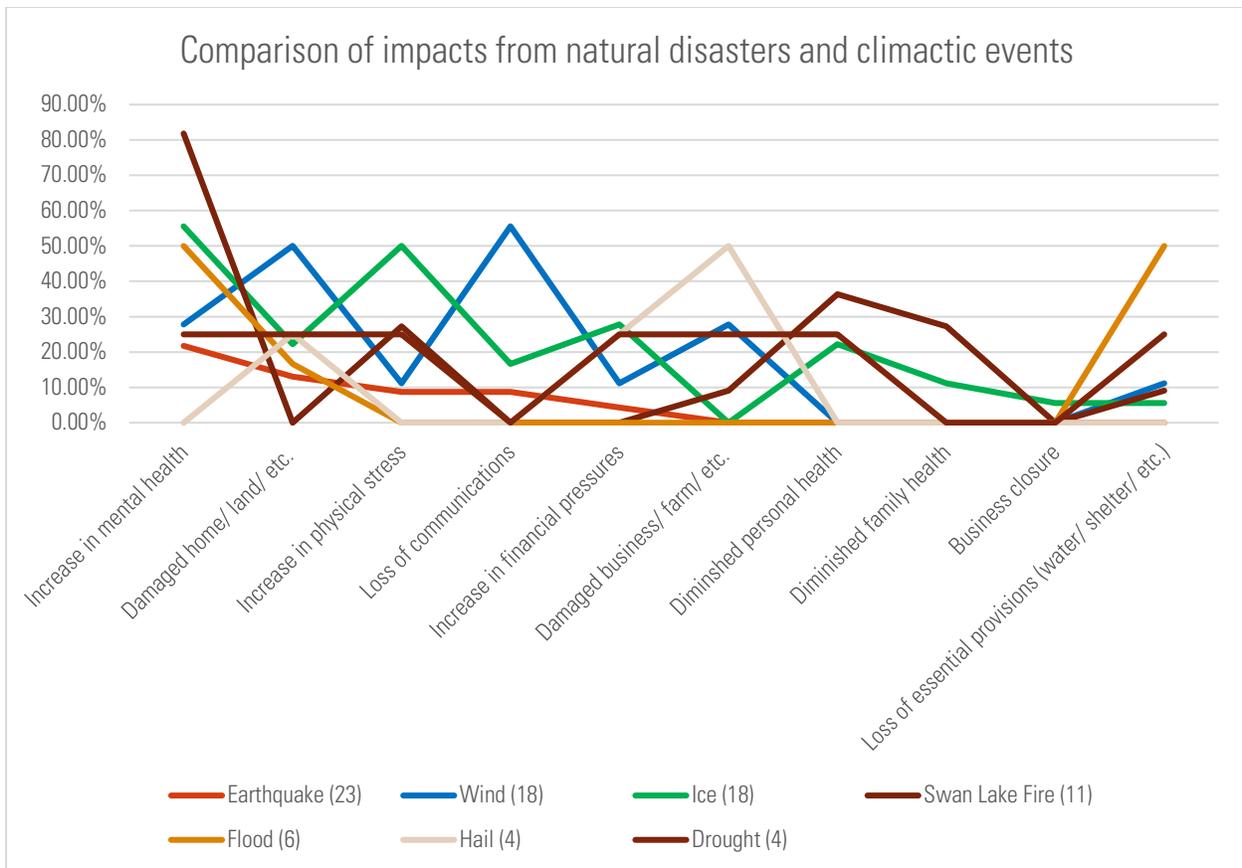


Figure 10: Comparison of impacts from natural disasters and climactic events based on percentage (total population numbers are expressed in the graph)

Other responses for impact are shared below based on disaster type:

- Flood: "Access to resources- road washed out;" "travel restriction;" "Couldn't get to town; didn't have running water (damaged on-site water system);" and "Highway closed, couldn't get to work"
- Swan Lake Fire: "Had some smoke drift into the neighborhood;" "Danger to friends and family traveling in area;" "difficulty in accessing needed services in Anchorage due to frequent road closures"
- Drought: "poor crop yields;" "fire, smoke, burning bans, extra work to keep gardens/lawn growing"
- Wind: "damage to forest;" "Trees uprooted. No property damage; beloved 28-year Larch and some spruce. Used for firewood;" "It can be very windy here, so you clean up your yard and batten down the hatches;" "The wind is hard on the plants, greenhouse and chickens"
- Earthquake: "Fortunately no damage. Just surprise" and "Yes we have earthquakes...a lot of earthquakes"
- Ice: "The ice is crazy! It is hard to equate. It is everywhere & you just hope you have a job that lets you skip if the ice is too severe"

Increase in mental stress, damage to home or property, and increase in physical stress were the most common impacts across all disasters. Ice storms and the Swan Lake fire created the most increase in mental stress, with individuals speaking towards constraints in travel, infrastructure challenges, and general worry. Windstorms caused the most damage to property, farms and businesses.

While the Swan Lake fire was asked about specifically in the survey, interview participants also shared that “fire issues are consistent and they aren’t going anywhere,” and another mentioned their feeling that “Alaska is drying out... three time faster than the lower 48. There is a peatland project because the land is drying; forest fires are here to stay.” The Swan Lake fire dramatically affected Cooper Landing, both in concern that the town may be taken by the fire, and also due to the season of the fire and the limited tourism. One participant shared, “Cooper Landing also got hit because of fishing, and then got hit again with COVID... there are businesses that can’t recover.” Fires within the Kenai Peninsula also impact ability for transportation and supply chain impacts, especially with one road in and out. One participant shared, “The Swan Lake fire closed things down and could see the impact on the shelves,” another shared that “some of the big issues were with fresh products but could get many of those locally because of the time of year...but some things didn’t get delivered because of the drive.”

Many individuals shared that while they did not experience the fire firsthand, there was an immense amount of community outreach and support, and concern for neighbors through this event. The Swan Lake fire also has long lasting impacts on mental and physical health with continual concern about fires and trauma from the event. Participants shared, “The mental impact that the fire had, [we] still see some struggle. This mental impact is what made the Kenai Peninsula Cares come together,” and “people are still really not over that, it was a huge traumatic event, and took out a lot of housing.”

In general, it’s clear to see that climate is changing and impacting the way of life, natural environment, and farming in the peninsula. Individuals shared that, “there was also a very dry year throughout the peninsula; we have aquifers that are about 10 years old [that are] constantly being refilled, and farmers [have had] dry well,” while more recently, individuals shared, “this year we’ve had so much snow, and have been dumped on even though had a warm fall... the norms are becoming more wobbily.”

Individuals were asked to share their perspectives on recovery on a scale of zero to ten (see Figure 11). On average, participants have mostly recovered from each event, ranging from 7.75 (drought) -10 (hail and flood) (with 0 being no recovery, and 10 being full recovery). Almost all individuals felt they were almost fully recovered from other severe weather events.

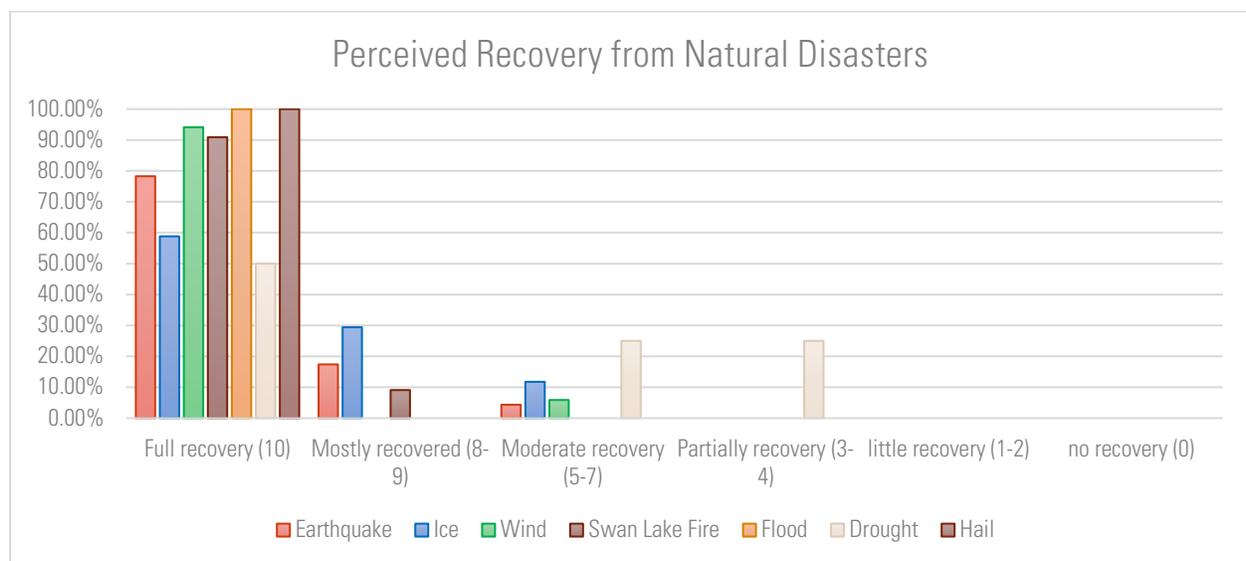


Figure 11: Extent of recovery for natural disasters; see Table 8 for number of individuals impacted; for full data spreadsheet on perceived recovery see Appendix E

Usefulness of Organization when responding to a Natural Disaster

Individuals were asked about usefulness for organizations in the Kenai Peninsula, based on a pre-made list from interviews. Organizations included in the survey were City Government, Borough Government, Alaska Department of Agriculture, Alaska Department of Education, Alaska Department of Public Health, Alaska Fish and Game, University of Alaska, University of Alaska Extension, Kenai Peninsula District Extension, Kenai Soil and Water, and Cook Inlet Keeper. Table 8 shows exact percentages; bolded numbers are the top three highest values per category and Figure 13 details the extent individuals felt that each organization was useful in responding to disaster on average, not specific each type of natural disaster.

Table 6: Average and Percentage usefulness of organizations in responding to natural disasters (N variable - see row "Total Number of Participants")

Organization Usefulness	City	Borough Government	Kenai Soil and Water	Cook InletKeeper	Kenai Peninsula District Extension	University of AK Extension	AK DPH	AK DOA	AK Dept. Fish and Game	AK DOE	University of AK
Total number of Participants	16	21	18	16	18	17	15	17	16	15	15
Average Usefulness	3.88	3.76	3.33	3.19	3.17	3.06	2.93	2.71	2.69	2.67	2.67
Extremely useful	31.25%	33.33%	16.67%	6.25%	5.56%	11.76%	6.67%	0.00%	0.00%	0.00%	0.00%
Somewhat useful	37.50%	33.33%	22.22%	25.00%	27.78%	23.53%	26.67%	11.76%	18.75%	13.33%	6.67%
Neither useful or useless	25.00%	19.05%	50.00%	56.25%	55.56%	41.18%	40.00%	64.71%	56.25%	60.00%	73.33%
Somewhat useless	0.00%	4.76%	0.00%	6.25%	0.00%	5.88%	6.67%	5.88%	0.00%	6.67%	0.00%
Extremely useless	6.25%	9.52%	11.11%	6.25%	11.11%	17.65%	20.00%	17.65%	25.00%	20.00%	20.00%

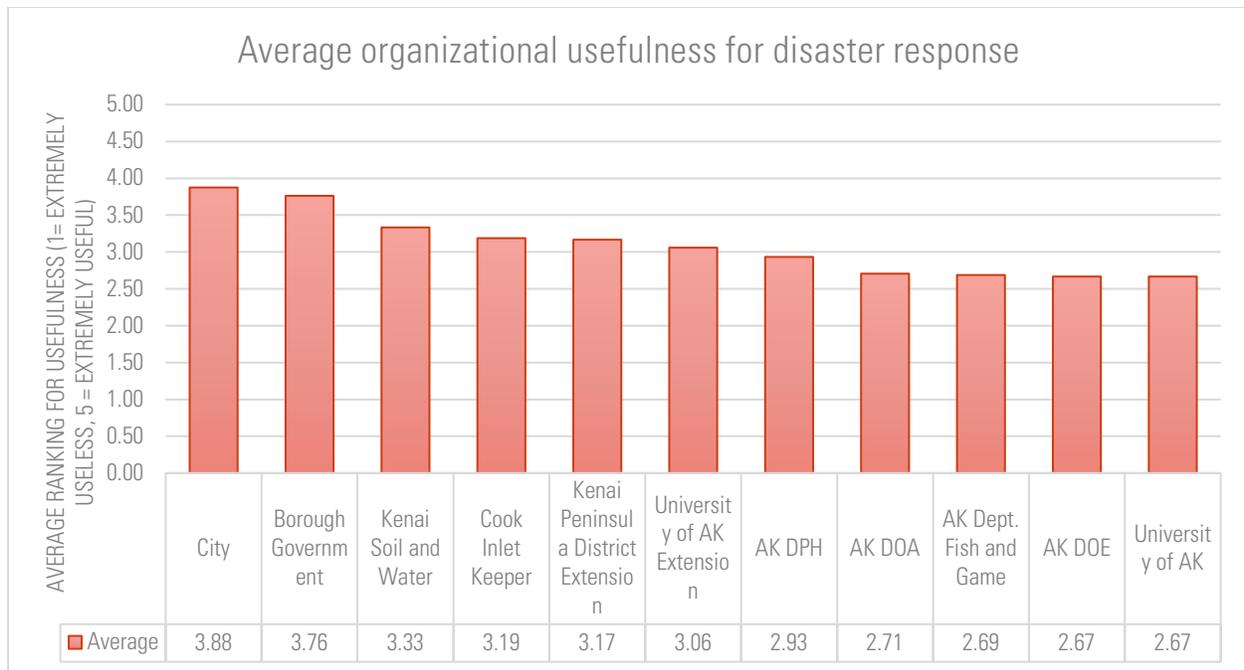


Figure 12: Average usefulness of organizations for responding to Natural Disasters; see Table 7 for total participant numbers

City Government, Borough Government, and Kenai Soil and Water were seen to be the most useful organizations, while University of Alaska, Alaska Department of Education, and Alaska Department of Fish and Game were seen to be the least useful. Additional categories were identified by providing “other” responses in surveys:

- Extremely useful: KBBI local public radio, Alaska Department of Transportation, Alaska Division of Forestry, USGS NVEWS
- Somewhat useful: Homer Electric Association
- KBBI Public Radio, Alaska Food Coalition, and local food connection (no identifier on level of usefulness)

When discussed within interviews and focus groups, one participant shared, “Emergency services worked hand in hand together; we started with [response to the] earthquake, then fire, and by the time we got to COVID we had been working so closely together. . . it was building us up to the ‘big one’ and we had so many partners.” Cook InletKeeper was seen as a stronghold for supporting the local food seen, and additional agencies were supporting environmental concerns, like Farmers Market and Food Policy Council as well as the Soil and Water Districts.

Future

To understand future needs for natural disaster response, interview, survey and focus groups were asked to consider the next steps necessary. Additionally, a review of FEMA’s National Risk Assessment for the Kenai Peninsula was taken into consideration. Figure 13 shows the expected annual loss due to natural disasters across the Kenai Peninsula. The Kenai Peninsula has a relatively moderate risk – 14.15 compared to 6.14 of the state of Alaska, and the national average of 10.60. The risk assessment considers expected annual loss, social vulnerability, and community resilience based on datasets from 18 natural hazards (Department of Homeland Security, 2022). The formula utilized to assess risk includes:

$$(Expected\ annual\ loss \times social\ vulnerability) \div community\ resilience = Risk\ Index$$

- Expected annual loss: “natural hazards component that represents the average economic loss in dollars resulting from natural hazards each year”
- Social vulnerability: consequence enhancing risk component and community risk factor that represents the susceptibility of social groups to the adverse impacts of natural hazards
- Community Resilience: consequence reduction risk component and community risk factor that represents the ability of a community to prepare for anticipated natural hazards, adapt to changing conditions, and withstand and recover rapidly from disruptions
- Risk Index: represents the potential for negative impacts resulting from natural hazards

Moderate areas of risk include flooding, tornadoes, and winter weather; according to the index, strong winds, wildfires, and drought are relatively low risks (FEMA, 2022); however, the Kenai Peninsula resilience research has shown impacts from these issues that are significant.

Composite Expected Annual Loss	\$16,527,737.68
Building Value	\$12,627,864.64
Population	0.51 fatalities
Population Equivalence	\$3,899,673.30
Agriculture Value	\$199.74

Figure 13: Expected Annual Loss Overview (FEMA, 2022)

Figure 14 details estimates for expected annual losses from storms based on FEMA calculations. In addition to these figures, to understand full economic impact of the storms, Table 9 utilizes the estimated losses from FEMA Risk Assessment and then incorporating them into the [Local Food Economic Impact](#) study to understand overall impact across the community.

Table 7: Economic Impact of Storms (FEMA, 2022)

Disaster	Risk Index Rating	Expected Annual Loss (from similar type of storm)	Economic Impact
Avalanche	59.73	\$1,208,088	\$1,711,001.64
Earthquake	13.92	\$12,609,145	\$17,858,192.25
Hail	2.59	\$3,223	\$4,564.70
Ice Storm	5.07	\$6,640	\$9,404.16
Riverine Flood	6.81	\$339,134	\$480,311.72
Tsunami	18.33	\$22,302	\$31,586.08
Volcanic Activity	55.27	\$2,289,130	\$3,242,069.44
Winter Weather	12.35	\$50,051	\$70,886.68

Avalanche and volcanic activity have the highest level of risk, followed by tsunami and earthquakes. However, Earthquakes have the highest expected annual loss, followed by volcanic activity. It is suggested to identify potential hazard mitigation steps for these specific events, and to also take into consideration smaller risk areas such as ice

storms, hail, flooding, and drought, as these were identified as weather impacting farms. Additional suggested items for next steps are shown below based on conversations with the community.

Natural Disaster Resilience Next Steps

Based on the full research scope, the following are suggested priorities and next steps. Additionally, partners were identified though focus groups for who would need to be a part of prevention and recovery.

- 1.1. Address feasibility for scaling-up of farms and food businesses
 - 1.1.1. Increase access to efficient equipment and tools; wash pack station, on-farm processes and access to inputs more available
 - 1.1.2. Increase education around animal and animal nutrition needs
 - 1.2. Increase cooperation among farmers
 - 1.2.1. Peer-to-peer and mentor farmer support networks to share knowledge
 - 1.2.2. May also support to accessing farm labor
 - 1.3. Develop policies for land trusts or use of public land for production and land access
2. Improve and invest in resilient infrastructure for farming, processing, storage, and distribution
 - 2.1. Identify options for fruit and vegetable storage and processing capacity (bricks and mortar or mobile)
 - 2.1.1. Identify existing shared-kitchen spaces and policies for at home processing
 - 2.1.2. Identify cold storage availability or community-based cooperative models for storage
 - 2.1.2.1. Shared services for things like freeze-drying equipment that can be paid for as a service (similar to freeze drying services for fish)
 - 2.1.2.2. Communal kitchen specific around home-based food preservation or start-up businesses
 - 2.1.2.3. Identify best practices for mobile processing and storage units
 - 2.1.3. Feasibility/economic impact study for a cooperative business model for storage and processing; what has the capacity of what can be grown, (processed and stored), marketed and sold
 - 2.2. Develop meat processing business (bricks and mortar or mobile)– both livestock and poultry
 - 2.2.1. Understand policies for on-farm processing and if there are options for selling wholesale
 - 2.2.2. Conduct market assessment for poultry processing facility (processing and storage)
 - 2.3. Understand role of Government and State agencies to provide support for this type of investment, including policy, food safety regulations, etc.
 - 2.3.1. Have courses and “how-to” checklist to become an approved entity/ license/etc.
 - 2.4. Identify areas where local products can be used for feed, seed and fertilizer or inputs
 - 2.4.1. Assess kelp as a fertilizer and local input that could be developed into business
 - 2.4.2. Community root sellers and spaces for communal storage
 - 2.4.3. Increase collaboration between the end user and the farmer
 3. Provide technical support and education around food as medicine and traditional food ways
 - 3.1. Assess what already is available
 - 3.1.1. Develop trust and learn from Alaska Natives
 - 3.1.2. Connect to tribal food ways education- growing, harvesting, preparing
 - 3.1.2.1. How are “white guy” ag practices utilizing things like hoop houses for traditional foods – soil, culture, way of life
 - 3.1.2.2. Shifting from “how to make money” to “how do I share”
 - 3.2. Develop gardens and agricultural programs in colleges and K-12 schools
 - 3.2.1. Connect with Kenai Peninsula College- Kachemak Bay Campus- Ag Program

- 3.2.2. Tie programming to habitat and natural resources
 - 3.2.3. Teach hunting, fishing, foraging, and gathering practices as well as butchering and processing
 - 3.3. Work with chefs and farmers to show traditional practices for production, preserving, and cooking
 - 3.4. Increase small market gardens and provide technical support from land access, loans, techniques that work in certain regions (connects to #1); care for soil and resources; thinking through when folks have enough individual/family production to sell into different markets
4. Identify best practices for disaster preparedness related to farmers, distributors, and networks for storm mitigation, including policies for pre and post storm
 - 4.1. Identify best practices for disaster mitigation including, pruning, harvesting, and storage during climactic events such as fire, flood, hail, and drought
 - 4.2. Create a plan for aggregation and safe distribution of food post disaster, specifically around food preservation, food safe storage, and food distribution
 5. Develop disaster food management plan
 - 5.1. Research and identify amount of food currently available within the Kenai Peninsula
 - 5.2. Identify total number of farms and quantity of products (on average)
 - 5.3. Identify amount of food in storage within grocery, food bank, pantries, and retailers
 - 5.4. Incorporate food storage and access borough policy for disaster management (connects to #2)
 - 5.4.1. Approach churches, non-profits, etc. and ability to store food in their existing dry storage space

COVID-19 Impact

Interview, focus group, and survey participants were asked to reflect on their experiences of COVID-19. All participants in the survey shared that they experienced some type of impact from COVID-19. Of those who experienced COVID-19, 25 (71%), also experienced at least one natural disaster that happened within the same time frame. Experiencing both COVID-19 and disasters influence mental and physical health, including general fatigue from exposure and worry, and stress related to financial and employment constraints that have occurred due to supply-chain and corporate closures. Table 10 details the funding allotment for the entire state of Alaska for COVID-19 response, which was deemed both a “major disaster declaration” and “emergency declaration.” Table 11 details the number of participants that experienced COVID-19 by type of impact and Figure 15 showcases the percentage of individuals that experienced each impact.

Table 8: COVID-19 Natural Disaster Declaration (FEMA, 2022)

Alaska COVID-19 Pandemic DR-4533-AK	Jan. 20, 2020; continuing	Individual and Households	\$1,616,647 326 applications approved
		Public Assistance (B)	\$124,998,954
Alaska COVID-19 EM-3446-AK	Jan. 20, 2020; continuing	Public Assistance (B)	NA

Table 9: Total participant numbers based on impact from COVID-19 (N=35)

	Increase in mental stress	Inability to see family/ friends/ social networks	Increase in physical stress	Increase in financial pressures	Diminished personal health	Diminished family health	Loss of job or unemployment	Business closure	Unable to pay rent/ mortgage/etc.
COVID-19	31	30	12	12	11	9	6	3	1

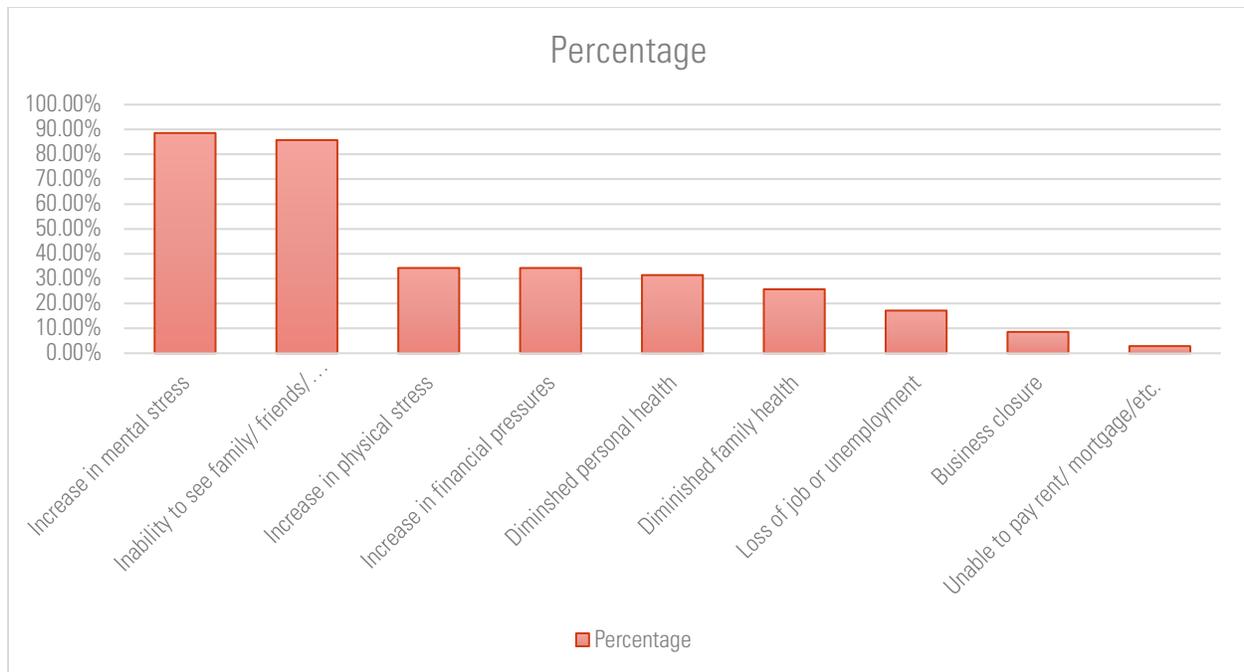


Figure 14: Comparison of impacts from natural disasters and climactic events based on percentage (N=35)

Participants mentioned mostly being impacted by increased mental stress and inability to see friends, with each showing over 85% experiencing these indicators. The quotes shared in “other” highlight well the stress, fatigue, and frustration that they experienced within their community during COVID-19: “disappointment in my larger social circle, acquaintances, etc. and their complete disregard for other Humans,” “Uncertainty about so many aspects of life especially planning for future,” “Difficulty finding staple food items (grocery stores were sold out of things like rice, beans, canned tomatoes, flour, etc.) This was more of a problem in spring of 2020 but continues to be a problem with certain less crucial items from time to time,” “Delay accessing community resources for needs,” “Discouraged by politics/lack of leadership (except for SPH KBBI and public health dept: worry,” “I was unable to return from a vacation in Peru for 2 weeks because of a sudden border closure,” “Our kids couldn't go to school,” “I enjoy attending and participating in community meetings. I was actually able to attend more because so many were offered via Zoom,” “Triggered my PTSD from the Iraq War. The division between Americans makes me feel like what I did was pointless, and the way people stare at you if you don't wear a mask makes me feel like I'm a guilty murderer instead of a brave soldier,” and “double the workload and less staff and volunteers to help.”

A smaller amount of survey participants, below 35% experienced physical stress, financial pressures of diminished personal or family health. When addressing these limited impacts with community members, many spoke to the isolated cases of COVID-19 in the region, and the amount of community support for residents.

Overall, individuals saw the impacts of COVID-19, and the ability to respond, in a mixed way. Some felt isolated, alone, and were fearful, and others reported very minimal impact and ability to go on with daily life. Many organizations also moved to new ways of doing through virtual meetings and educational options. One shared that they “moved all education online and opened up to the state and beyond, we were able to offer food preservation or gardening and other classes to people to others who had not been able to take classes and were able to offer a lot more,” and another mentioned that “people loved the virtual [options] because it was cheaper and more time

effective.” However, in many areas, the internet can be unreliable and makes it difficult for connection, and there are not the same opportunities for further networking and relationships development in virtual settings.

While it is difficult to know the extent of recovery that has been able to occur from COVID-19 since it is an ongoing pandemic, individuals were still asked to share their perceived level of recovery from COVID-19 based on the moment in time that they were participating in the research study. Figure 16 showcases the extent individuals feel they have recovered. Most people felt that they are moderately recovered, with a 6.2 on average out of 10. It is fair that people have mixed reviews on recovery as we are still continuously hearing about COVID-19 impacts and new scares. This is a time to take stock in the potential reality that this will be a long-term impact for our communities and the need to have practices in place to ensure safe and economically vibrant communities, amidst an ongoing pandemic.

Usefulness of Organization when responding to COVID-19

Individuals were asked about usefulness for organizations in the Kenai Peninsula, based on a pre-made list from interviews. Organizations included in the survey were City Government, Borough Government, Alaska Department of Agriculture, Alaska Department of Education, Alaska Department of Public Health, Alaska Fish and Game, University of Alaska, University of Alaska Extension, Kenai Peninsula District Extension, Kenai Soil and Water, and Cook Inlet Keeper. Table 12 shows exact percentages; bolded numbers are the top three highest values per category and Figure 17 details the extent individuals felt that each organization was useful in responding to COVID-19 on average.

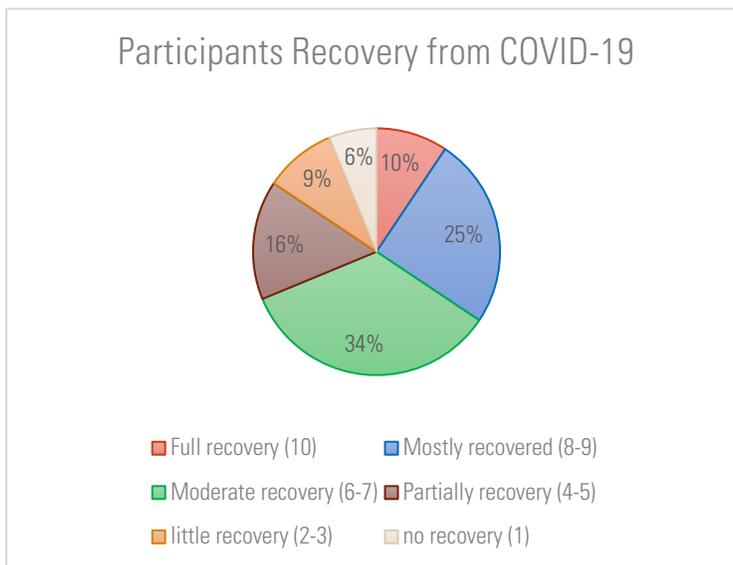


Figure 15: Perceived extent of recovery from COVID (N=32)

Table 10: Average and Percentage usefulness of organizations in responding to COVID-19 (N variable - see row "Total Number of Participants")

Organization Usefulness	AK DPH	City	University of AK	Cook InletKeeper	Kenai Soil and Water	University of AK Extension	AK DOA	AK Dept. Fish and Game	Kenai Peninsula Extension	AK DOE	Borough Government
Total Number of Participants	31	29	26	23	24	26	26	24	24	25	32
Average Usefulness	4.23	3.66	3.31	3.48	3.33	3.08	2.92	2.88	2.79	2.68	2.66
Extremely useful	61.29%	31.03%	23.08%	17.39%	20.83%	15.38%	7.69%	4.17%	4.17%	4.00%	6.25%
Somewhat useful	19.35%	27.59%	7.69%	21.74%	8.33%	7.69%	3.85%	4.17%	8.33%	8.00%	25.00%

Neither useful or useless	9.68%	24.14%	57.69%	56.52%	62.50%	61.54%	73.08%	79.17%	66.67%	52.00%	15.63%
Somewhat useless	0.00%	10.34%	0.00%	0.00%	0.00%	0.00%	3.85%	0.00%	4.17%	24.00%	34.38%
Extremely useless	9.68%	6.90%	11.54%	4.35%	8.33%	15.38%	11.54%	12.50%	16.67%	12.00%	18.75%

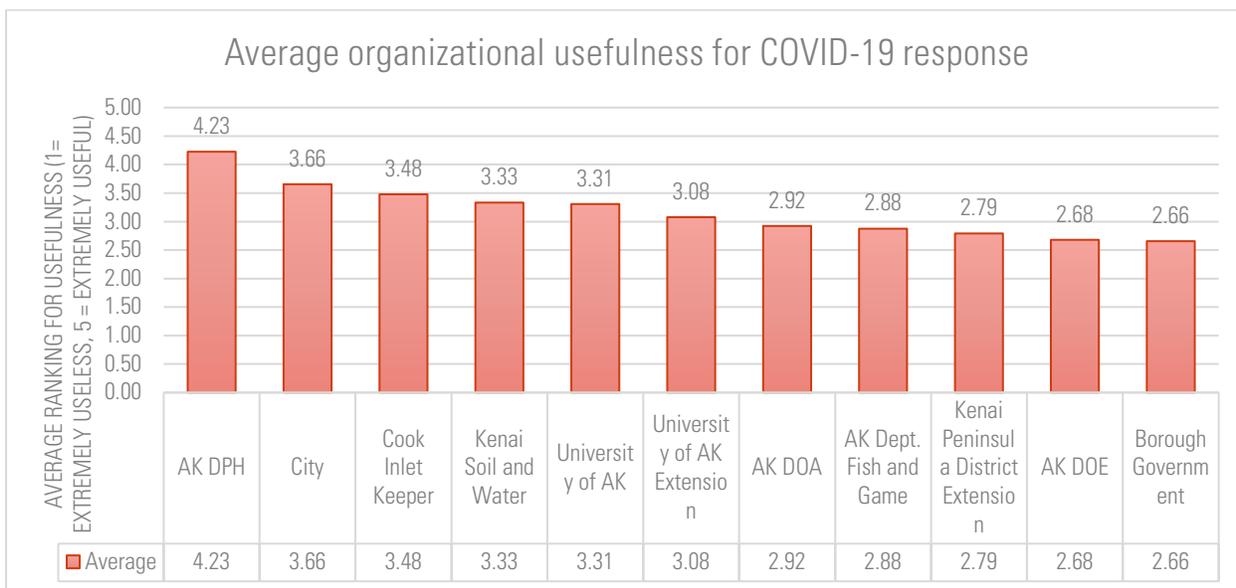


Figure 16: Average usefulness of organizations for responding to COVID-19; see Table 12 for participation numbers (N value)

The Alaska Department of Public Health (4.33) and City (3.66) were the highest ranked organizations for usefulness followed by Cook InletKeeper. One person shared, “[the] community is flooded with support and now in donor fatigue because everyone is dealing with something now,” another shared that “the city and state [offered] housing relief, and a lot of organizations got help through state, county, or federal [funding] that kept our economy going alright,” and “City of Soldotna and Kenai stepped up and supported through funds for food distribution, not just farm to family food box, but also grocery sacks full of shelf-stable options.” While some shared sentiment for being supported, others mentioned that they “didn’t have local support” or “it felt pretty isolated because didn’t have support from local government.”

Additional categories were identified by providing “other” responses in the survey:

- Extremely useful: KBBI AM 890, KPC, South Peninsula Hospital, Save U More, U.S. State Department, Natural Resources Conservation Service
- Extremely useless: AK state Covid Data Keeping, Kenai Peninsula Borough School District

Future

To understand future needs for COVID-19 survey, interviewees and focus group participants were asked to share their ideas for recovery. Within the survey, 22 (64%) of respondents shared additional thoughts. The community appears to be polarized when it comes to make mandates and vaccines, with several requesting stronger mandates, and others requesting no mandates. One participant shared this well, “As I do this survey we are still in the midst of the pandemic. The strategies required are very complex and resolving the polarization in communities around this public health issue seems insurmountable at this point.” Others requested more data and clarification of misinformation

being spread about COVID-19 and vaccinations. A few also suggested funding resources whether that be through, “direct payments,” or for things like a mini-grant program for agriculture. One participant shared that the “Division of Agriculture had a great food security micro grant program that was very timely in its release last spring, but they totally got overwhelmed by applications and dropped the ball and no announcements have been made yet on the grants. This shows that this is a very wanted program and they need more resources to fulfill the needs of Alaskans.”

Additional ideas for COVID-19 response related to food and agriculture included, “Utilize financial resources for homeowners/farmers to further establish food security in our regions/neighborhoods. Incentivize solar panels, battery banks, walk in coolers, fencing, and farming. Help us farmers to be able to focus on growing food instead of needing additional work because we can't store our food through the winter and/or we can't get our product from the country to the towns.” Further ideas on next steps are detailed below.

COVID-19 Resilience Next Steps

Based on the research scope, the following are suggested as next steps. These strategies also connect to that natural disaster priorities and areas of interest in the Department of Agriculture Territorial Plan.

1. Enhance opportunities for gardens and farms to scale up or cooperate for wholesale distribution
 - 1.1. Address feasibility for scaling-up of farms and food businesses
 - 1.1.1. Increase access to efficient equipment and tools; wash pack station, on-farm processes and access to inputs more available
 - 1.1.2. Increase education around animal and animal nutrition needs
 - 1.2. Connect to schools and teach what growing opportunities exist
 - 1.3. Increase cooperation among farmers
 - 1.3.1. Peer-to-peer and mentor farmer support networks to share knowledge
 - 1.3.2. May also support to accessing farm labor
 - 1.4. Develop policies for land trusts or use of public land for production and land access
2. Provide technical support and education around food as medicine and traditional food ways
 - 2.1. Assess what already is available
 - 2.1.1. Develop trust and learn from Alaska Natives
 - 2.1.2. Connect to tribal food ways education- growing, harvesting, preparing
 - 2.1.2.1. How are “white guy” ag practices utilizing things like hoop houses for traditional foods – soil, culture, way of life
 - 2.1.2.2. Shifting from “how to make money” to “how do I share”
 - 2.2. Develop gardens and agricultural programs in colleges and K-12 schools
 - 2.2.1. Connect with Kenai Peninsula College- Kachemak Bay Campus- Ag Program
 - 2.2.2. Tie programming to habitat and natural resources
 - 2.2.3. Teach hunting, fishing, foraging, and gathering practices as well as butchering and processing
 - 2.3. Work with chefs and farmers to show traditional practices for production, preserving, and cooking
 - 2.4. Increase small market gardens and provide technical support from land access, loans, techniques that work in certain regions (connects to #1); care for soil and resources; thinking through when folks have enough individual/family production to sell into different markets
3. Encourage food distributors and buyers to seek out local food purchasing (go hand in hand with the need for #1)
 - 3.1. Conduct a feasibility study and supply/demand analysis for wholesale distribution may include needs for feasibility research on potential partner distribution networks and nodes for backhauling of products

- 3.2. Provide incentives through state, borough, or local legislation for local food purchases
 - 3.3. Develop awareness campaign for local food purchases and what currently exists for local food markets
 - 3.3.1. May connect with existing grant with Homer Soil and Water for marketing
 - 3.3.2. Student to do video and other marketing
 - 3.4. Increase capacity and visibility of the local food hub
 - 3.4.1. Increase collaboration between distributors for local food aggregation and sales
 - 3.4.1.1. While the food hub is only direct to consumer currently, could grow to wholesale and include cold storage and needed infrastructure elements, but would need interest from farmers
4. Establish food system network discussions statewide, regionally, and locally
- 4.1. Establish peer to peer networks, mentorship, and technical support options for farmers and food system and value-chain coordinators
 - 4.2. Host a state convention with collaborations between all state associations – broaden the Farm Bureau state conference
 - 4.3. Identify funding for coordination of the networks and participant stipends
 - 4.4. Understand various “levels” of working groups, affiliations, and statewide networks
5. Develop disaster food management plan
- 5.1. Research and identify amount of food currently available within the Kenai Peninsula
 - 5.2. Identify total number of farms and quantity of products (on average)
 - 5.3. Identify amount of food in storage within grocery, food bank, pantries, and retailers
 - 5.4. Incorporate food storage and access borough policy for disaster management (connects to #2)
 - 5.4.1. Approach churches, non-profits, etc. and ability to store food in their existing dry storage space

Appendix A: Demographics and additional identifiers from survey participants

Zip Code

99556	4
99603	18
99604	1
99610	2
99611	3
99669	5
99672	2

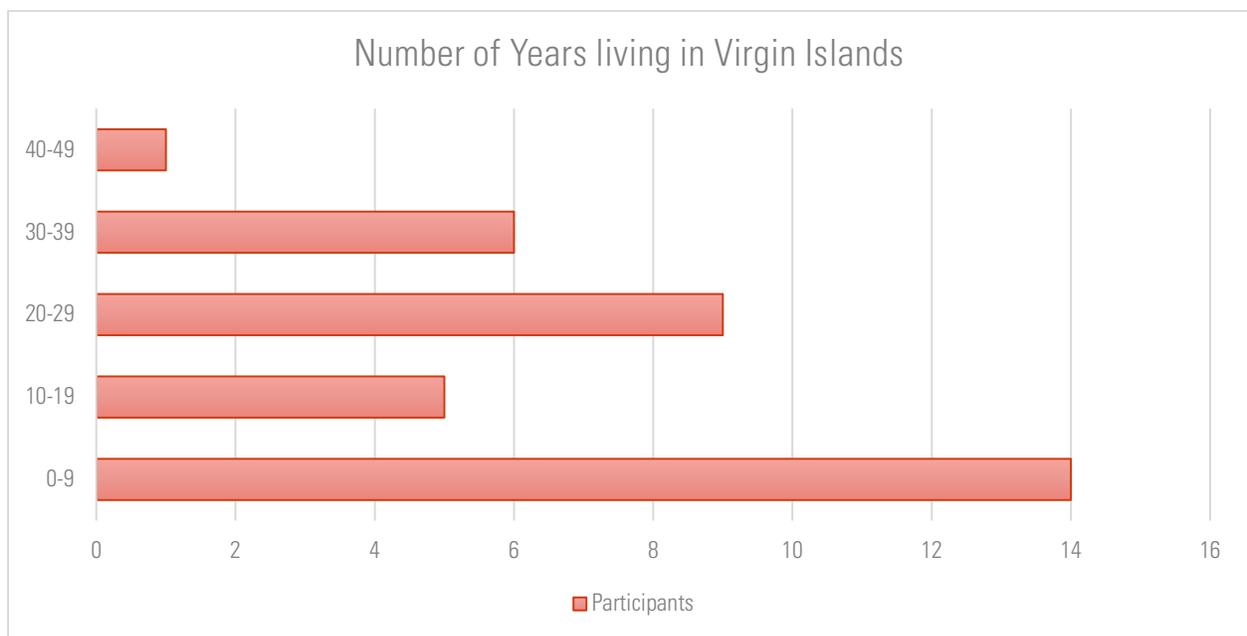


Figure 17: Number of Years in Virgin Islands (N=35)

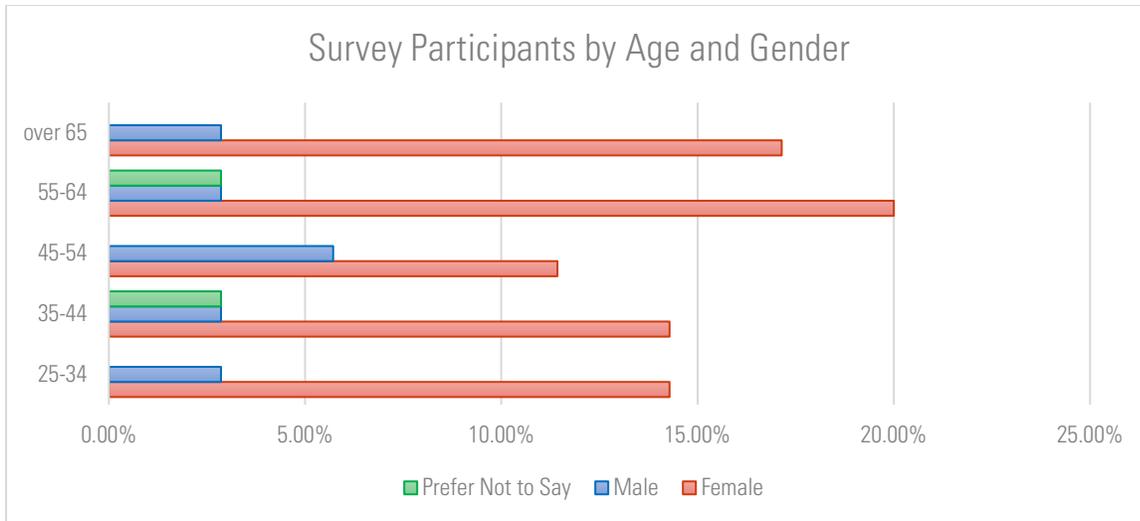


Figure 18: Survey Participants by Age and Gender (N=35)

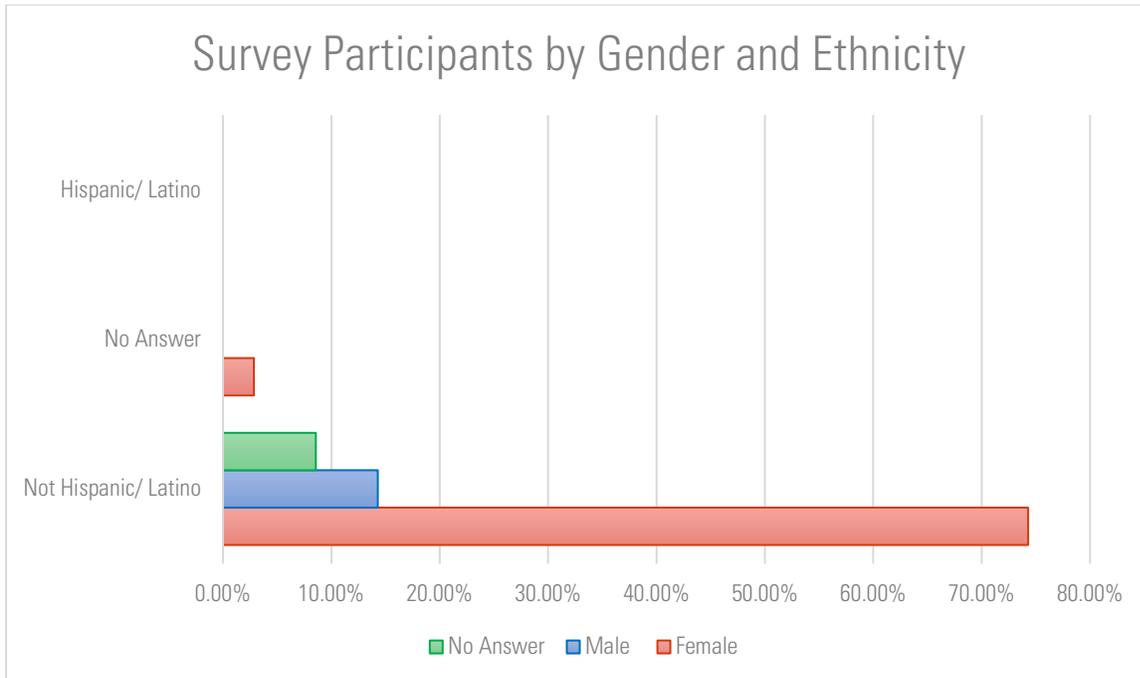


Figure 19: Survey Participants by Gender and Ethnicity (N=35)

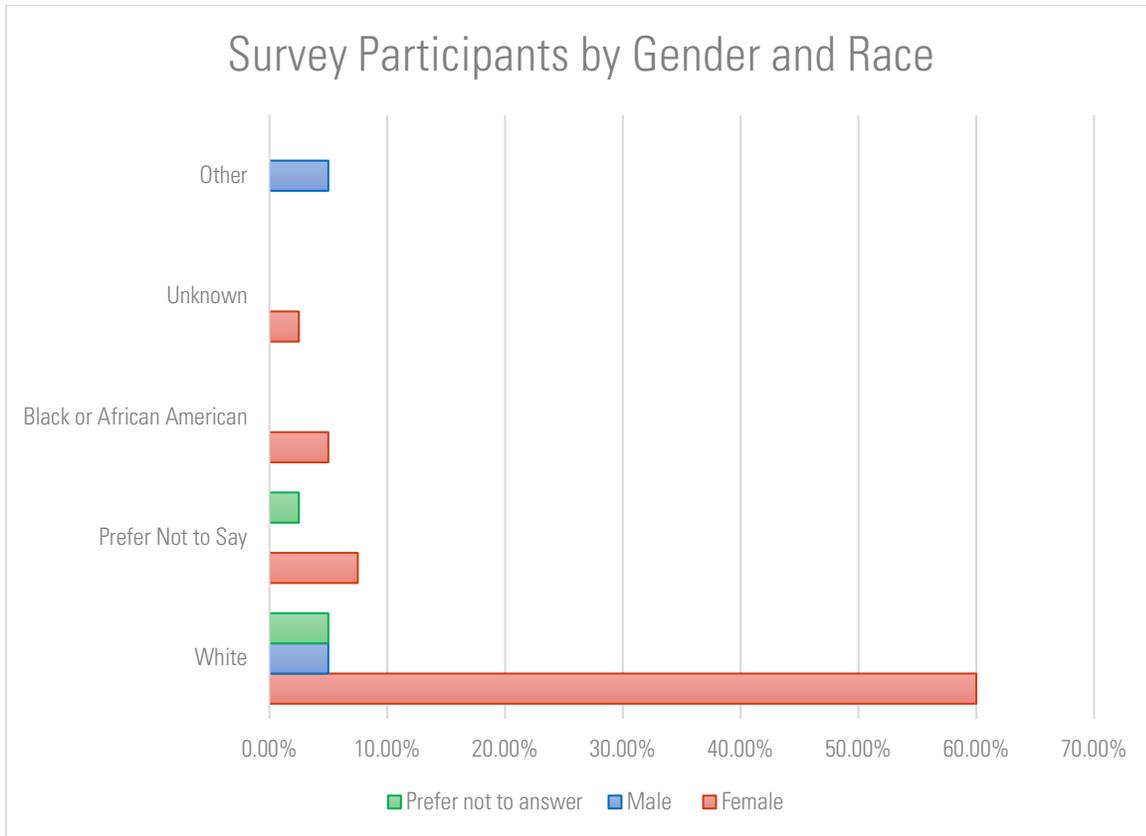


Figure 20: Survey Participants by Gender and Ethnicity (N=35; Participants could select all that apply)

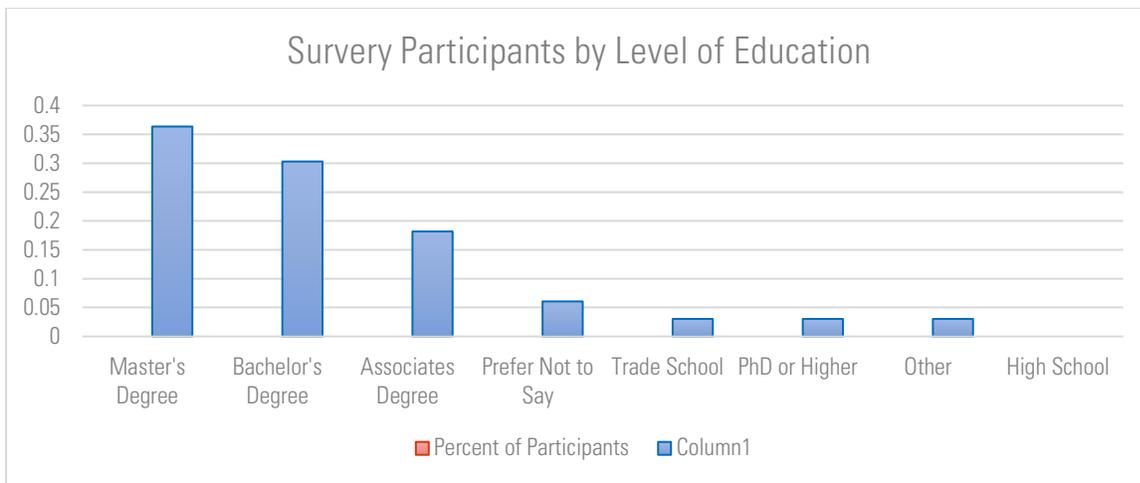


Figure 21: Survey Participants by Level of Education (N=35)

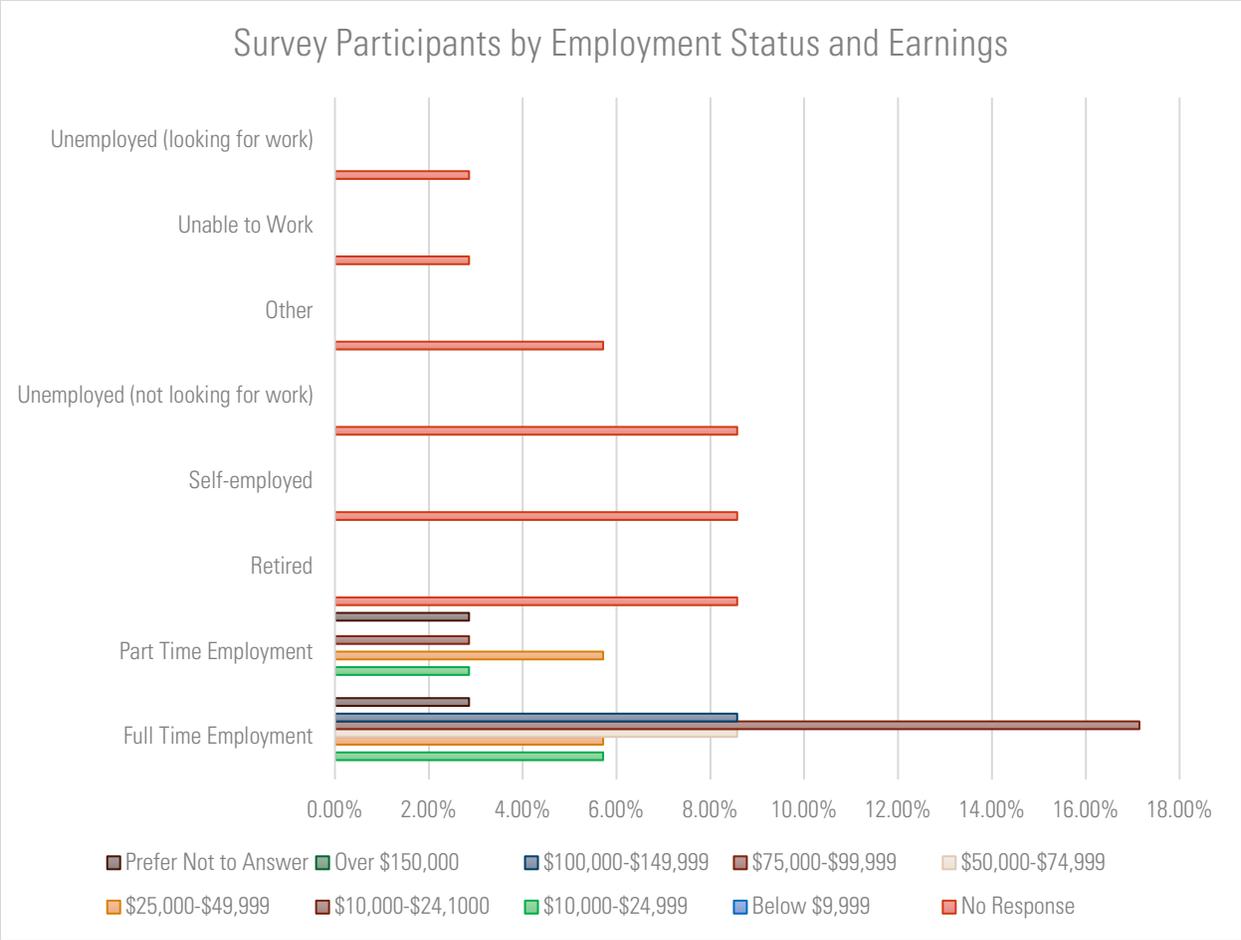


Figure 22: Survey Participants by Employment Status and Earnings (N=35)

Appendix B: Poverty Data

Table 11: Income and Poverty Thresholds for the United States

Size of family unit	Weighted average thresholds	Related children under 18 years								
		None	One	Two	Three	Four	Five	Six	Seven	Eight or more
One person (unrelated individual):	13,171									
Under age 65.....	13,465	13,465								
Aged 65 and older.....	12,413	12,413								
Two people:	16,733									
Householder under age 65.....	17,413	17,331	17,839							
Householder aged 65 and older.....	15,659	15,644	17,771							
Three people.....	20,591	20,244	20,832	20,852						
Four people.....	26,496	26,695	27,131	26,246	26,338					
Five people.....	31,417	32,193	32,661	31,661	30,887	30,414				
Six people.....	35,499	37,027	37,174	36,408	35,674	34,582	33,935			
Seven people.....	40,406	42,605	42,871	41,954	41,314	40,124	38,734	37,210		
Eight people.....	44,755	47,650	48,071	47,205	46,447	45,371	44,006	42,585	42,224	
Nine people or more.....	53,905	57,319	57,597	56,831	56,188	55,132	53,679	52,366	52,040	50,035

Source: U.S. Census Bureau.

Additionally, based on this poverty guideline, households can apply for assistance through the Supplemental Nutrition Assistance Program to receive monthly allotments to support their food purchases.

HOUSEHOLD SIZE	GROSS LIMIT	NET LIMIT	165% POVERTY	STANDARD DEDUCTION
1	\$1,841	\$1,416	\$2,337	\$330
2	\$2,480	\$1,908	\$3,148	\$330
3	\$3,119	\$2,400	\$3,959	\$330
4	\$3,759	\$2,891	\$4,770	\$330
5	\$4,398	\$3,383	\$5,582	\$330
6	\$5,037	\$3,875	\$6,393	\$330
7	\$5,676	\$4,366	\$7,204	\$330
8	\$6,315	\$4,858	\$8,015	\$330
Additional Member	+ \$640	+ \$492	+ \$812	+ \$330

Figure 23: SNAP Eligibility (Department of Human Services, 2022)



Appendix C: Business and Industry

Table 12: Business and Industry, The Kenai Peninsula, United States Census 2021

Establishments by employees	Number of businesses	Annual Payroll (\$1,000)	Number of employees
Less than 5	1,484		
5-9	401		
10-19	213		
20-49	76		
50-99	27		
100-249	9		
250-499	4		
Total	2,215	808,277	15,156
By category			
Agriculture, forestry, fishing, and hunting	115	7,640	87
Mining, quarrying, and oil and gas extraction	17	61,772	516
Utilities	10	23,908	185
Construction	277	65,291	1,010
Manufacturing	63	54,880	736
Wholesale Trade	60	18,744	318
Retail Trade	240	89,885	2,600
Transportation and Warehousing	166	85,740	1,053
Information	28	2,890	207
Finance and insurance	83	20,220	283
Real estate and rental and leasing	89	16,220	298
Professional, scientific, and technical services	141	31,989	581
Management of companies and enterprises	4	2,099	56
Administration and support and waste management and remediation services	85	25,991	365
Educational Services	30	4,018	195
Health Care and Social Assistance	266	214,962	3,967
Arts, Entertainment, and Recreation	71	5,221	192
Accommodation and Food Service	288	43,485	1,753
Other services (except public administration)	195	23,758	753

Appendix D: Food Purchasing, Levels of Importance

Table 13: Level of Importance for food purchasing criteria- Resilience (N=35)

	Grown Local	Affordability	Relationship with producer, seller, etc.	Location	Convenience	Organic	Fresh	Food Safety Practices
Average	4.37	3.80	3.49	3.54	3.49	3.34	4.29	3.44
Extremely Important	48.57%	20.00%	20.00%	14.29%	11.43%	20.00%	48.57%	14.71%
Very Important	40.00%	42.86%	28.57%	34.29%	34.29%	28.57%	34.29%	35.29%
Moderately Important	11.43%	34.29%	34.29%	42.86%	45.71%	25.71%	14.29%	32.35%
Slightly Important	0.00%	2.86%	14.29%	8.57%	8.57%	17.14%	2.86%	14.71%
Not At All Important	0.00%	0.00%	2.86%	0.00%	0.00%	8.57%	0.00%	2.94%

Appendix E: Action Planning Notes

Alaska Action Planning Notes: Kachemak Bay Campus Homer, AK

Action Planning Session 1: 2-4pm

Introductions: (3 attendees)

Sharing the data/presentation discussion

- Possibility of low financial stress during covid because of the federal programs that were helping with rent, utilities, etc.
- Low bandwidth for internet was a problem for tele-health, education, etc.
- DOE weren't making plans for virtual education specifically with special education, weren't making themselves available for support
- Habitat management is important—focus for salmon, moose populations with intense changes on habitat for development--need a coastal management plan--habitat under extreme pressure on land and sea
- Kenai Peninsula quickest growing in population—people from outside and inside AK coming to live because of wildlife population and resources available
- Expanded education in schools on local food system is needed

Priorities Discussion:

- Encourage: Increase local food distribution; encourage distributors and buyers to seek out local food purchasing; develop food policy for local food purchasing
- Marketing/Awareness: Increasing visibility of local food hub, encourage farmers to sell to food hub, increase awareness of what foods could be grown to be sold to food hub and have more food flowing through
- Homer Soil and Water has USDA grant that includes marketing for the food hub
- Feasibility for scaling up: currently don't have a wholesale arm of food hub but could expand into that
- Infrastructure needs: food hub could be a place for storage (cold storage specifically) and processing (commercial kitchen) and distribution, increase awareness of consumers to go there

Action Planning Session 2: 10am-12pm

Introductions: (2 attendees)

Sharing the data/presentation discussion

- Promoting more people growing gardens, and smaller scale infrastructure for processing at the home scale, more home-economics focused
- Small scale operations not really included, if there was more awareness of the smaller operations, we would have a better picture of what is available and being grown, there is also a lot of expertise within community members because of the homestead era of the location and culture, social justice aspect: if people don't have land they can lean into the gardening space, how to weave in hobby gardeners and farmers into the conversation
- Organization and support for small scale growers on what to grow and what crops store well or has available processing infrastructure available
- Inputs for farms that are needed are vulnerable because of location so what happens if we can't get those inputs (can we produce our own fertilizer with fish/kelp, etc.?), value added processing for waste
- Kelp industry as fertilizer and using this as a model for land-based agriculture as an option, need more collab between the end user and the farmer
- Composting with kelp and fish waste is an opportunity

Priorities Discussion:

Enhance: Enhance opportunities for gardens and farms to scale up or cooperate for wholesale distribution; including feasibility for wholesale distribution, processing, storage and land access (including home gardens)

- Increasing the capacity of what can be grown and stored and sold
- Utilize food hub more
- Two scales: subsistence and homesteading vs. farming as a business
- Need more on the ground help for understanding what TA assistance/infrastructure resources are available to farmers/gardeners and licensing that might be needed for existing businesses/orgs to provide these services

Provide: Provide and increase technical support and education around food as medicine and traditional food ways

- Traditional homestead practices; educational program-How food is grown/processed; what is different from local production and habitat [environmental systems: salmon, moose] compared to what is in the store
- More education in the school system of food/growing basics to increase interest and knowledge in local food
- FFA and 4H are programs that aren't fully utilized across the peninsula and specifically in Homer, looking at farming as a viable business
- Passing on of generational knowledge, localized knowledge
- Peer-to-peer and mentorship programs could be helpful to grow success of farms/gardens
- Two scales: subsistence and homesteading vs. farming as a business

Improve: Improve and invest in resilient infrastructure for farming, processing, storage (cold storage, dehydration, pickling, food preservation) and distribution

- Need to ask farmers: what do you have a hard time storing/selling and what would make it easier and what options would help you plan for what products to grow, figuring out supply and demand research, what commercial or community facilities are needed
- Meat/hunting: if you don't want to process yourself there are processing options, need more services available for produce processing
- Need workshops for preserving/processing procedures, communal kitchen with infrastructure/tools and guidance needed to process food
- Fairbanks has a program like this, someone in Anchorage bought a freeze-dryer and was offering freeze-dried capacity for gardeners in FB group
- Opportunity for wholesale buyers and distributors in the scaling-up piece
- Cooperative Extension could be the educators for food processing guidance

Action Planning Session 3: 5-7pm

Notes N/A: no attendees



Action Planning Session 4: 10am-12pm

Introductions: (2 attendees)

Priorities Discussion:

Provide: Provide and increase technical support and education around food as medicine and traditional food ways

- Traditional homestead practices; educational program-How food is grown/processed; what is different from local production and habitat [environmental systems: salmon, moose] compared to what is in the store
- Taking a look at what's already out there for existing education and resources
- Soldovia village tribe, Pratt, coastal studies, new ag program, Chef at the market program
- Provide technical support for farmers to create more farmers and get folks excited and to expand production
- Most folks are market gardeners and hit a capacity limit so they aren't able to scale-up
- How to get grants/loans, how to save soil
- Kenaitze tribe brining their food is medicine program down to Homer or other areas
- Because of climate change tribes are using more "white guy ag" like high tunnels but still putting their traditional spin
- Need people to realize that the focus doesn't need to be "white guy ag" and that food can be for sharing
- There are (5) community level shared-kitchen or processing sites but people are not using them
- There may need to be more education on processing processes for people to feel confident using the facilities

Establish: Establish and continue food system network discussions statewide, regionally and local, including peer-to-peer networks for farmers and food system practitioners

- Funding for facilitators and money for folks to participate
- Creating the actual plan for facilitating
- Farmer peer-to-peer network is also needed
- Make sure farming is viable, create a space for a farming culture to develop
- State association of districts, farm bureau, food policy council collaborate on the Farm Bureau Annual Conference in AK

Action Planning Session 4: 2-4pm

Introductions: (4 attendees)

Sharing the data/presentation discussion

- Continue to try to get SNAP accepted at the farmer's market
- Education: increase the amount of farm to program in schools
- Food storage: approach churches that have food pantries about stockpiling food (at least dry food or canned goods)

Priority Discussion:

Enhance: Enhance opportunities for gardens and farms to scale up or cooperate for wholesale distribution; including feasibility for wholesale distribution, processing, storage and land access (including home gardens)

- Specifically scaling up
 - Labor: finding labor (ex. For a farm to scale-up they might need more labor)
 - Supplies: need newer supplies to make time farming more sufficient
 - Cooperation: working together as a community for resilient infrastructure (ex. Community root cellar)



- One licensed slaughterhouse in the whole state so this would make scaling up for livestock/poultry (meat) difficult

Improve: Improve and invest in resilient infrastructure for farming, processing, storage (cold storage, dehydration, pickling, food preservation) and distribution

- Mobile food hub, mobile aggregator
- Homer just got a large cold-storage facility but it's only for peonies and bees

Comprehensive Priority Areas and Votes

Develop (0): Develop disaster food management plan, including research on food available, total number of farms and food storage

Enhance (7): Enhance opportunities for gardens and farms to scale up or cooperate for wholesale distribution; including feasibility for wholesale distribution, processing, storage and land access (including home gardens)

Encourage (2): Increase local food distribution; encourage distributors and buyers to seek out local food purchasing; develop food policy for local food purchasing

Identify (1): Identify best practices for disaster preparedness related to farmers and distributors and networks, etc. have on hand and develop strategies for storm mitigation, including policies for pre- and post-storm

Establish (2): Establish and continue food system network discussions statewide, regionally and local, including peer-to-peer networks for farmers and food system practitioners

Provide (4): Provide and increase technical support and education around food as medicine and traditional food ways (traditional homestead practices; educational program-How food is grown/processed; what is different from local production and habitat [environmental systems: salmon, moose] compared to what is in the store

Improve (6): Improve and invest in resilient infrastructure for farming, processing, storage (cold storage, dehydration, pickling, food preservation) and distribution

What's Missing:

Habitat management educational program (added to Provide)



References

- AARP. (2022). *AARP Livability Index*. Retrieved from Kenai Peninsula Livability Index: <https://livabilityindex.aarp.org/search/Kenai%20Peninsula%20Borough,%20Alaska,%20United%20States>
- AARP. (2022). *AARP Livability Index*. Retrieved from Kenai Peninsula Livability Index: <https://livabilityindex.aarp.org/search/Kenai%20Peninsula%20Borough,%20Alaska,%20United%20States>
- Data USA. (2019). *Data USA*. Retrieved from Soldotna, AK: <https://datausa.io/profile/geo/soldotna-ak>
- Department of Health and Human Services. (2019). *Annual Update of the HHS Poverty Guidelines*. Health and Human Services. Retrieved from <https://www.federalregister.gov/documents/2019/02/01/2019-00621/annual-update-of-the-hhs-poverty-guidelines>
- Department of Homeland Security. (2022). *National Risk Index*. Retrieved from Learn More: <https://hazards.fema.gov/nri/learn-more>
- Department of Human Services. (2022, October 1). *Supplemental Nutrition Assistance Program*. Retrieved from Alaska Department of Health Division of Public Assistance: http://dpaweb.hss.state.ak.us/e-forms/pdf/FSP-76_FFY2023.pdf
- FEMA. (2022). *FEMA*. Retrieved from Declared Disasters: https://www.fema.gov/disaster/declarations?field_dv2_state_territory_tribal_value=AK&field_year_value%5B%5D=2011&field_dv2_declaration_type_value=All&field_dv2_incident_type_target_id_selective=All
- FEMA. (2022). *FEMA*. Retrieved from Declared Disasters: https://www.fema.gov/disaster/declarations?field_dv2_state_territory_tribal_value=AK&field_year_value%5B%5D=2011&field_dv2_declaration_type_value=All&field_dv2_incident_type_target_id_selective=All
- FEMA. (2022). *National Risk Index*. Retrieved from National Risk Index County View Map: <https://hazards.fema.gov/nri/map>
- Food and Nutritional Service. (2018). *Child Nutrition Labels*. Retrieved from Food and Nutritional Service: <https://www.fns.usda.gov/pd/child-nutrition-tables>
- Foundation, H. J. (2017). *Overweight and Obesity Rates for Adults by Gender*. Retrieved from KFF: Filling the need for trusted information on national health issues: <https://www.kff.org/other/state-indicator/adult-overweightobesity-rate-by-gender/?currentTimeframe=0&sortModel=%7B%22colId%22:%22Location%22,%22sort%22:%22asc%22%7D>
- InTeGrate. (2018, January 11). *InTeGrate*. Retrieved from Introduction to Food Access, Food Security and Food Insecure Conditions: https://serc.carleton.edu/integrate/teaching_materials/food_supply/student_materials/1063
- Office of the Assistant Secretary for Planning and Evaluation. (2022). *HHS Poverty Guidelines for 2022*. Retrieved from ASPE HHS: <https://aspe.hhs.gov/topics/poverty-economic-mobility/poverty-guidelines>
- U.S. Census Bureau. (2020). *U.S. Census Bureau*. Retrieved from County Business Patterns, including Zip Code Business Pattern, by Legal Form of Organization and Employment Size Class: <https://data.census.gov/table?q=Kenai+Peninsula,+Alaska&t=Establishments>

- United States Census Bureau. (2020). *United States Census Bureau*. Retrieved from Kenai Peninsula Alaska Decennial Census: <https://data.census.gov/cedsci/all?q=Kenai%20Peninsula>
- United States Census Bureau. (2020). *United States Census Bureau*. Retrieved July 7, 2022, from Economic Surveys: County Business Patterns: <https://data.census.gov/table?q=kenai+peninsula&t=Establishments>
- United States Census Bureau. (2021). *U.S. Census Bureau*. Retrieved from Quick Facts: Kenai Peninsula Borough, Alaska: <https://www.census.gov/quickfacts/fact/table/kenaipeninsulaboroughalaska/PST045221>
- USDA National Agriculture Statistics Service. (2017). *NASS USDA*. Retrieved from Kenai Peninsula Alaska Quick Stats Table:
https://www.nass.usda.gov/Quick_Stats/CDQT/chapter/2/table/5/state/AK/county/122/year/2017
- USDA, National Agricultural Statistics Service. (2017). *2017 Census of Agriculture*. USDA, National Agricultural Statistics Service.
- WWOOF. (2022, December 3). *Worldwide on organic farms*. Retrieved from <https://wwwoofusa.org/en/>

