



EVALUATION REPORT: BRAIDED Food Security Project September 2025

**Civic Innovation Challenge (CIVIC) Grant
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Photo on cover: Exterior view of the Bering Sea Research Center, April 2024

Executive Summary

The BRAIDED Food Security Project (Building Research Aligned with Indigenous Determination, Equity, and Decision-Making) was launched in 2023 through a USDA Civic Innovation Challenge (CIVIC) grant to strengthen food safety monitoring and resilience in St. Paul Island, Alaska—a rural, predominantly Alaska Native community facing acute food security challenges. Traditional foods are central to cultural identity, nutrition, and well-being in St. Paul, yet global contaminants, climate change, and shifting ecosystems present new risks. Responding to community-identified needs, this project established a Tribally-led research partnership between the Tribal government of the Aleut Community of St. Paul Island (ACSPI) and an academic research team to braid Indigenous knowledge with Western science, reduce delays in food safety testing, and foster Indigenous food data sovereignty.

Project Goals

The project sought to:

- Establish a community-based, Bering Sea Research Center (BSRC).
- Provide skill building and workforce development.
- Implement sampling and analysis of traditional foods.
- Create a digital dashboard with data equity, access, and privacy.

Project Implementation

The project implemented its four core components with a high degree of fidelity while adapting to local realities. The BSRC was installed and equipped in April 2024, paired with a series of community rollout events that engaged residents and Elders. The One Health course, offered through Iḷisaḡvik College during June and July 2024, blended Western scientific concepts with Indigenous knowledge and saw participation by diverse community members. Through the end of the grant term, nearly 100 samples were collected and analyzed locally, demonstrating the feasibility of on-island contaminant monitoring. Data were uploaded into the ISN, affirming Tribal ownership and timely access.

Project Outcomes

As a result of project implementation, the following community- and individual-level outcomes were observed.

- **Reduced Delays:** Food sample analysis timelines shortened from months to weeks, enhancing community decision-making.
- **Increased Capacity:** Tribal government staff gained skills to independently operate lab equipment and manage workflows; community members reported improved scientific understanding and confidence in using scientific methods to assess the health of harvested foods.

- **Resident Engagement:** Almost 100 samples were community-contributed; residents of all ages participated actively in data collection and outreach events.
- **Confidence in Traditional Foods:** Awareness of contaminants grew, and information was communicated in ways that respected subsistence practices.
- **Trust in Partnerships:** Trust strengthened through Tribally-led ownership, local-first data sharing, and visible collaboration between university and Tribal partners.

Sustainability Assessment

As grant funding concludes in fall 2025, the sustainability assessment of this project shows clear strengths in partnerships and program adaptation, with growing capacity in strategic planning and organizational capacity through redundancy training, ISN workflow integration, and stronger role clarity between the BSRC and the Tribe's Ecosystem Conservation Office. Key risks remain in funding stability, as reliance on short-term grants and the absence of long-term stable funding continue to threaten technician support and long-term monitoring. Communications and evaluation are effective in building trust and visibility, including through external recognition such as the NOAA Arctic Report Card, but are not yet fully embedded in sustainability planning. Looking ahead, increased Council contributions, expanded monitoring readiness (e.g., harmful algal blooms and microplastics), and the potential to replicate the model across other Bering Sea and Arctic communities present significant opportunities to extend impact.

Limitations

Evaluation findings are shaped by the small, context-specific population of St. Paul; a short project timeline; reliance on self-reported data; and evolving organizational structures. While results are not statistically generalizable, the project model offers valuable insights for other rural and Indigenous contexts.

Conclusion

The BRAIDED project successfully demonstrated the feasibility and value of Tribally-led, community-centered food safety monitoring. It built trust, improved confidence and skills in scientific methods, and strengthened Tribal-university partnerships. While challenges remain in funding, redundancy, and scope expansion, the project provides a replicable model for Indigenous communities across the Arctic and beyond seeking to build resilience through local infrastructure, distributed capacity, and data sovereignty.

Background

Rural coastal Alaskan communities face growing threats to food security (ICCA, 2020). Traditional foods, central to culture and well-being, are increasingly endangered by environmental contaminants that concentrate in Arctic ecosystems (AMAP, 2018, 2021). Community members and Elders have raised concerns about mercury, radioactive elements, harmful algal blooms, and pesticides. Even when risks are low, fear of contamination can discourage consumption of traditional foods, leading to stress, disconnection from place and heritage, and reduced community resilience. Elders and residents consistently advocate for Indigenous communities to play a leading role in shaping solutions (ICCA, 2020).

Citizen-science programs have been widely used to monitor food safety in rural and isolated communities (Shirk et al., 2012; Dickinson et al., 2012; Haklay, 2012; McDuffie et al., 2019). These programs often generate knowledge and behavior change among participants (Dickinson et al., 2012, Aristeidou et al., 2020). However, they typically privilege western science over Indigenous knowledge (Haklay, 2012), and results are frequently processed off-site and communicated poorly to affected communities (Harris, 2015). In Alaska, residents have voiced skepticism toward research suggesting traditional foods remain safe, citing lack of trust in citizen-science findings (Sahota, 2010; Dirks et al., 2019).

Recent reports, including the Inuit Circumpolar Council of Alaska's *Food Sovereignty and Self-Governance* (2020), have underscored the urgent need for Indigenous leadership in contaminant research and Arctic marine resource management. Programs are beginning to shift from contributory models to equitable partnerships where communities help define problems, collect and analyze data, and interpret results (Huntington, 2008; Johnson et al., 2015; Henri et al., 2022). These approaches show promise for risk management and long-term resilience, though little research has assessed their impacts on decision-making.

A research team collaborated with the Tribal government of the Aleut Community of St. Paul Island (ACSPI) to create an equitable community-university partnership advancing food safety and sovereignty. Guided by self-identified needs, the project established a Tribally-led, community-centered research laboratory where local residents analyze tissue samples from traditionally harvested animals in real time. This model reduces delays, increases trust, and strengthens Tribal decision-making by ensuring that food safety data are generated and interpreted locally. Results are integrated into a community-owned digital dashboard, enabling the Tribe's ready access to information and supporting community resilience.

The project's goals extend beyond data collection. By braiding Indigenous and western knowledge, it enhances cultural continuity while expanding entry points into scientific practice. The initiative invested in physical infrastructure, workforce training, and data systems to support Tribally-led monitoring. In turn, it promoted diverse voices, skill transfer, and shared learning, moving away from the historic gatekeeping associated with academic researchers. Ultimately, this model strengthens self-efficacy, positions residents as equitable scientific partners, and builds trust in Tribal-university collaboration. By grounding food safety monitoring in Indigenous leadership and community-owned systems, the approach offers a replicable model for Arctic and other rural Indigenous communities.

Study Design

Purpose of Study

The purpose of this evaluation study was to examine the implementation and outcomes of the BRAIDED Food Security project on St. Paul Island, Alaska. Specifically, the study sought to understand how the project was implemented and the degree to which intended outcomes were achieved. By assessing outcomes such as increased capacity for managing traditional food sample analysis and engagement of community members in the collection of food samples, this evaluation sought to illuminate the project's contributions to Alaska Native resilience in the face of environmental change.

In addition to measuring local impact, the study explored the scalability of this model to other rural and Indigenous communities across the circumpolar Arctic and beyond. This report identifies key conditions, infrastructure investments, and collaborative processes necessary to replicate and adapt the approach in regions where food insecurity is exacerbated by geographic isolation and environmental threats. Ultimately, the evaluation aimed to inform future efforts in equitable research design, Indigenous data sovereignty, and community-led resilience strategies.

Evaluation Approach

Evaluation strategies focused on collection of data designed to address the accomplishments of the project goals and respond to the evaluation questions presented below. A mixed methods descriptive study utilized a pre-/post design to collect survey data from Tribal members who opted to participate in a training program and to collect perceptions of the project.¹ Random assignment was not applied due to the small population size. Interviews with project team members, ACSPI staff, graduate students, and Tribal members near the end of the project explored in depth the near-term outcomes of the project. Descriptive data that documented food sampling by Tribal members was collected through an agreement with ACSPI.

Implementation study: The purpose of the implementation study was to describe in measurable language the degree to which activities were carried out as planned. The guiding evaluation questions for a fidelity study are:

- *To what extent was the project implemented as designed?*
- *To what extent has the project achieved its intended outputs/objectives?*

For this study, the evaluator compared the project activities as originally described in the funding application and actual implementation as documented in project documentation, including project team meetings, project reports, and other sources, as well as the evaluator's observations.

¹ The post community perceptions survey did not yield sufficient responses for analysis. This was largely due to a lapse in an airline contract to service St. Paul, which prohibited the evaluator from administering the survey on-site.

Formative Evaluation study: The purpose of the formative evaluation was to provide information to project staff to inform improvements to program implementation. The formative evaluation study built upon data collected in the fidelity study, using a mixed methods approach to collect information that identified the extent to which the project achieved its intended outputs/annual objectives. The formative evaluation study also described factors that positively or negatively affected implementation, as well as implementation successes and challenges. This study used stakeholder interviews and surveys to collect formative data on program implementation. The guiding research questions were:

- *What were stakeholders' opinions about the project?*
- *What successes has the project achieved? Which component of the project is considered to be most closely associated with this success?*
- *What challenges has the project faced and what actions were taken in response? Which component of the project is considered to be most closely associated with this challenge?*
- *What factors (internal or external) have affected project implementation? What were the impacts of these factors on implementation?*
- *What steps have been taken by the team that demonstrate a commitment to sustainability or institutionalization of grant-funded personnel, programs, and services?*

Summative Evaluation study. The purpose of the summative evaluation was to assess the degree to which the project met its intended outcomes. Outcomes were assessed using mixed methods, including stakeholder interviews, surveys, and evaluator's observations. The guiding research question was:

- *To what extent has the project met its intended outcomes?*

Consent Procedures

This evaluation study involved a cross-section of project stakeholders including project staff and community members. This section provides details on the criteria for selecting and processes for involving participants in non-routine data collection, including focus groups. All data collection efforts were preceded with informed consent, providing information about the evaluation study, assuring confidentiality of information shared, and confirming the voluntary nature of the study. All Tribal members who participated in the evaluation study were compensated with a gift card. This study was conducted under the oversight of the University of Alaska Anchorage Institutional Review Board.

At the beginning of the project, the evaluator, with the assistance of ACSPI staff and project team members, administered an in-person intercept survey to Tribal members to collect community perceptions of the proposed project. A paper consent form was administered prior to a paper survey. All survey data was de-identified prior to analysis.

Prior to the training program, the primary investigator, with the assistance of the Tribal government's community program coordinator, administered a paper consent form and pre-survey to training program

attendees. The post-survey was administered to attendees at the conclusion of the program. All survey data was de-identified prior to analysis.

No earlier than two months from the end of the project term, the evaluator sent an email to a representative sample of stakeholders, including project team members, ACSPI staff, graduate students, and Tribal members and asked them to participate in an interview. Consent was collected at the start of each interview. Interviews were conducted via Microsoft Teams. All transcript data was de-identified prior to analysis.

ACSPI staff provided access to information about data and documentation related to food sampling that is stored in its Indigenous Sentinels Network and other project folders. No food sampling data was shared with the evaluator.

Data Security

Consent forms and de-identified data were stored in password-protected Excel files in a secured Dropbox or Google Drive folder and will be retained for at least three years after the Institutional Review Board (IRB) formally closes the project and after the completion of this report. After the three-year period is finished, any files containing project data will be deleted from Dropbox and Google Drive and all computers linked to these platforms.

As part of its normal practice, Shaffer Evaluation Group (SEG) uses policies and procedures for data handling that are consistent with the Family Educational Rights and Privacy Act (FERPA) and other Federal and State confidentiality and privacy provisions to protect personally identifiable information (PII) from further disclosure (except back to the disclosing entity) and unauthorized use. SEG staff are trained in FERPA and how to protect PII.

Findings

Project Implementation

To what extent was the project implemented as it was designed? To what extent has the project achieved its intended outputs/objectives?

The BRAIDED Food Security Project was implemented with a high degree of fidelity to its original design, as outlined in the January 2023 CIVIC proposal, while also adapting to emergent community concerns and logistical realities. The proposal envisioned a Tribally-led pilot project on St. Paul Island with four primary components: (1) establish the Bering Sea Research Center (BSRC) as a functional laboratory for local contaminant analysis, (2) provide skill-building and workforce development through a One Health training course, (3) implement a traditional food collection and mercury analysis program led by community staff, and (4) create a digital dashboard within the Indigenous Sentinels Network (ISN) to ensure timely dissemination of results under conditions of Indigenous Data Sovereignty. Collectively, these activities aimed to transform food monitoring from a distant, externally controlled process into a community-centered system that advanced both scientific rigor and cultural continuity.

Implementation of Core Components

All four core design elements were successfully launched. First, the BSRC was established as a Tribally-owned laboratory space, equipped with specialized instrumentation for mercury analysis. The laboratory was installed in April 2024 in a previously vacant industrial building and was fully outfitted for traditional food testing and local contaminant testing and included a range of other equipment and supplies supporting this function (e.g., freeze dryer, microscope). The proposal had identified a Nippon MA-3 Solo direct mercury analyzer as critical infrastructure, and this instrument was installed and put into operation, for the first time allowing community members to analyze traditional food samples locally rather than shipping them to distant universities or federal labs. While the grant supported the acquisition of equipment, the Tribal Council provided matching funds for the lab benches. The laboratory was staffed by a community program coordinator hired locally by ACSPI and trained by the project team. This outcome of the establishment of a functional laboratory represents a direct realization of the proposal's vision of closing the loop between harvest, analysis, and decision-making on the island.



Fig. 1. View inside the Bering Sea Research Center, St. Paul, 2025.

The entire project team visited the island at the time of the laboratory installation, which also marked the formal launch of the BSRC on St. Paul Island. The arrival of the equipment was paired with a series of community-focused events designed to introduce residents to the new laboratory and its purpose. A public meeting was held to walk community members through the process of sample collection, analysis, and data reporting, reinforcing the Tribe's ownership of both the facility and the results. Project staff also made a dedicated presentation to the island's senior residents, offering an opportunity for Elders to ask questions, share perspectives, and see the technology in use. Finally, an open house event was also held at the BSRC, where residents could see and learn about the research laboratory and hear about plans for this Tribally-owned center. These events marked the first time many residents could witness food safety science taking place on the island itself, strengthening transparency and trust. The combination of technical installation and community engagement underscored the project's commitment to embedding research infrastructure within cultural and social life, rather than treating it as a stand-alone scientific exercise.

Second, the project carried out its planned One Health short course in June-July 2024, offering college credit through Iḷisaḡvik College. The "Topics in Modern Science: Braided Insights on One Health" course



Fig. 2. Attendees of the Braided Insights on One Health course, St. Paul, July 2024.

was attended by the community program coordinator and additional community members, including youth and Elders. Training activities blended Western scientific methods—bio-sampling, laboratory / analysis protocols, QA/QC procedures, and the principles of bioaccumulation and biomagnification in the context of environmental contaminants—with Indigenous knowledge of harvesting practices and traditional food systems. Findings from a pre-post survey of participants are

presented later in this report. Following the training, the community program coordinator also informally mentored other Tribal members, including those who did not participate in the course, ensuring skills transfer within the St. Paul community.

Development of the course was informed by a survey of thirty St. Paul community members to gain their perceptions of the BRAIDED project. The survey found that overall community members had positive perceptions of the project. The most stated concern was that some community members may not be willing to participate in the initiative or have their traditional foods tested, while some respondents expressed concern about the availability of resources for those interested in taking their harvested samples to the BSRC for testing. Some community members expressed concern about wildlife—ranging from sea life to birds—in terms of variety, the seasonal nature of food, and interests in stopping the decline in all wildlife. Tribal sovereignty and independence in research and data collection were raised as points of concern. Survey findings were shared with team members to inform project implementation and the course.

Third, the traditional food monitoring program was initiated. Community members contributed samples of harvested animals—including land and marine mammals, seabirds, and fish—which were prepared and analyzed for mercury contamination locally at the BSRC. By the conclusion of the pilot year, nearly 100 biological samples had been gathered of a wide variety of wild foods, including northern fur seal, halibut, cod, crab, reindeer, and seabird eggs. While this number fell short of the project’s aspirational goal of 200 samples during the pilot, it nonetheless demonstrated that the technical systems and community engagement structures were in place. The shortfall reflected pragmatic adaptations to local conditions, including harvest variability, the pace of community trust-building, and the importance of not stigmatizing traditional foods by collecting samples too aggressively. This adjustment reflects fidelity to the project’s guiding principle of cultural responsiveness.

Fourth, the project deposited data in the Indigenous Sentinels Network (ISN). Data generated from this project are stored, archived, and accessible within an app- and web-based, data dashboard within the Indigenous Sentinels Network (ISN) program. The creation of a project-specific database and dashboard ensures that approved and registered users (i.e., the project team and community administrators) can access contaminant data for transparent and community-led decision-making. Any sensitive or confidential information, including the identity of individuals who provided samples, is not publicly available to safeguard privacy using existing standard operating procedures and protocols. This directly achieved the proposal’s goal of reducing delays between sampling and decision-making while ensuring data ownership remains firmly in Tribal hands.

While original project plans had called for a public-facing dashboard to share results with the community, the project team pivoted and instead focused on communication and community engagement modalities preferred by the community, including flyers, reports, presentations to Tribal Council, and a Facebook page. The project’s Facebook page, which has 130 followers, became a primary public repository for project-related news and information. A taskforce of project team members is working to develop a communication plan for sharing project data and information.

Project Outcomes

To what extent has the project met its intended outcomes?

The BRAIDED Food Security Project was successful in achieving or partially achieving its intended outcomes. It built trust, improved confidence and skills in scientific methods, and strengthened Tribal-university partnerships, among other outcomes. Each outcome is discussed in this section.

Outcome 1: Reduced delays between data collection and information dissemination to the community.

The project has **significantly reduced delays** between data collection and information dissemination, transforming community expectations of how quickly results are available. Before BRAIDED, hunters often waited months for feedback from distant labs. One Tribal member explained that after submitting a seal sample, a Tribal member “*wouldn’t be able to get any information for a month.*” Now, with the BSRC operating on-island, residents see results uploaded to the Indigenous Sentinels Network (ISN) dashboard within weeks instead of disappearing into what one Tribal leader called a “black box” of external science.

Community stakeholders highlighted how this shift empowered local decision-making. One ACSPI staff member noted that ensuring “*the tribe owned the database*” meant information reached Tribal Council and residents before outside researchers. The Research Center had “*flipped the model*” by moving analysis from university labs to the island. Further, by staff sharing results face-to-face during community events, it helped to “*demythify science and build trust.*” One stakeholder noted that in-person

communication worked far better than charts or flyers: “*Fancy charts and graphs... are not the approach to take. In-person dialogue is best.*” Elders’ lunches, harvest events, and open houses became trusted venues where residents could ask questions, see results, and connect information to lived experience.

Indicator 1.1: Reduced time between data collection and information dissemination was documented; initial samples analyzed locally were uploaded to the ISN dashboard within one to two weeks of collection, compared to the previous baseline of 3–6 months.

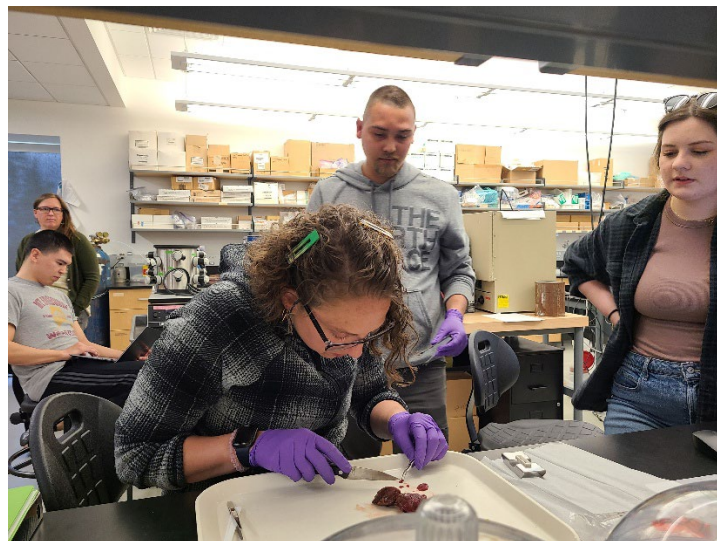


Fig. 3. Demonstration by Veronica Padula of food sample preparation at the Braided Insights on One Health course, St. Paul, July 2024.

A closer look at the April 2024 laboratory installation and community rollout

What happened. In April 2024, the project team completed on-island basic installation of the laboratory for traditional food sample testing at the Bering Sea Research Center (BSRC). The team paired the technical work with a public community meeting that walked through the full monitoring cycle (how samples are collected, handled, analyzed, and then shared back to the community), and it hosted a dedicated presentation for seniors. Elders and long-time harvesters were invited to handle sample jars, see the analyzer set-up, and ask detailed questions about contamination and testing of traditional foods. The events closed with sign-ups for sampling support and a demonstration of how results would flow into the Tribe-controlled dashboard, underscoring that information would be shared locally first.

Why this approach mattered for trust. The decision to center face-to-face dialogue reflected a core lesson of community-engaged research: people build trust through

conversation, continuity, and culturally respectful settings. Guidance from the CDC/ATSDR *Principles of Community Engagement* (Clinical and Translational Science Awards Consortium, et al., 2011) highlights exactly these ingredients—early and ongoing dialogue; local advisory voices; respect for customs; and



returning results in accessible, bidirectional formats—all of which were intentionally baked into the April events. By inviting Elders and other Tribal members to question, challenge, and help interpret findings in context, the team operationalized “*trust-building through participation*,” a practice associated with sustained partnerships.

Fig. 5. Primary investigator Amy Bishop discussing project with Elders at Senior Center, St. Paul, April 2024.



Fig. 4. Project team member Lorrie Rea discussing project with Elder at community meeting, St. Paul, April 2024.

How data governance was framed.

The installation week also served as a live tutorial on Indigenous data sovereignty. Project team members showed how results would be stored and displayed under Tribal control via the Indigenous Sentinels Network (ISN) dashboard, and they described local review before any external sharing. This squarely aligns with the CARE Principles for Indigenous Data Governance (Collective Benefit, Authority to Control, Responsibility, Ethics) and complements FAIR by centering people and purpose in data use (Research Data Alliance International Indigenous Data Sovereignty Interest Group, 2019).

Using the lab events to demonstrate these commitments (and not just state them) helped translate abstract governance principles into practice the community could see.



Fig. 6. Project team members Veronica Padula and Amy Bishop interviewed on St. Paul radio station about project, April 2024

Practice insights from April 2024. Three operational takeaways emerged. First, pairing a *technical milestone* (laboratory installation) with *relational milestones* (community meeting, Elders' presentation) accelerates trust and improves comprehension of complex methods—an approach consistent with the community-based participatory research literature that trust-building catalyzes ripple effects such as



Fig. 7. Open house event at Bering Sea Research Center, St. Paul, April 2024.

sustained participation and better questions. Second, letting residents see exactly how data becomes knowledge (from food sample to dashboard) made sovereignty tangible and reinforced accountability to the community. Third, convening a seniors-only session demonstrated the project's team respect for Elders while surfacing culturally specific questions (e.g., organ meats, preparation methods) and ensuring that those most affected by messaging helped co-shape it—reducing risk of stigma and aligning with culturally responsive research practices (Carroll, et al., 2020).

Outcome 2: Increased capacity building related to laboratory analyses of traditional foods within the community.

This outcome has been **achieved with strong evidence**. The proposal envisioned a fully functional laboratory on St. Paul Island capable of analyzing mercury in traditional food samples, and this was realized through the creation of the Bering Sea Research Center (BSRC). Multiple community members described the lab as a “*huge success*,” both visually and symbolically. One ACSPI staff member noted that “*establishing and outfitting that building with a functioning lab bench and equipment*” represented a significant milestone. Beyond the equipment itself, protocols and workflows were developed for bio-sampling, labeling, storing, and processing specimens. While these systems are still being refined, they provide the foundation for sustained monitoring.

The project invested heavily in developing a skilled workforce to manage and operate the BSRC. The Tribe’s community program coordinator, who was trained by project team members, is also the lead community technician; he expressed strong confidence in his ability to test and analyze food samples and manage workflows. He was described by a project team member as an “*anchor*” for the project, someone who could run tests independently and communicate results with confidence.

During interviews with ACSPI staff and project team members, however, there were repeated concerns with an over-reliance on a single staff person, unrealistic expectations for his workload, and the need for staff redundancy. Addressing this concern led to the training of other staff to ensure redundancy. There is also recognition that the BSRC will need staff with more advanced science qualifications in the longer term.

Community members who participated in the One Health course and outreach activities also demonstrated measurable gains in scientific understanding of key course concepts and confidence in using scientific methods. One community member reflected that his confidence in conducting bio-sampling and interpreting results grew, sharing that seeing contaminants that are “*invisible to the eye*” made science feel directly relevant to his subsistence lifestyle.

Indicator 2.1: ACSPI staff demonstrated efficacy with processing and analyzing traditional food samples and managing the lab station independently by the end of the pilot year.

Indicator 2.2: Course participants reported improved understanding of mercury pathways, One Health concepts, and local food safety issues through a pre-post survey. *See Fig. 8.*

Indicator 2.3: Instructor observations confirmed improved skills in bio-sampling and analysis of subsistence foods. Since the course, St. Paul Tribal members successfully collected and processed nearly 100 biological samples since the BSRC opened.

Indicator 2.4: Course participants demonstrated improved confidence in using scientific methods to assess the health of harvested fish or wild animals and uploading and accessing data on the ISN. *See Fig. 9.*

Fig. 8. Indicator 2.2: Course participants' knowledge/understanding of key course concepts, pre-post (n=6 (Pre), n=10 (Post); Scale 1-4, with 1=I don't know anything about this topic to 4=I could teach others about this topic)

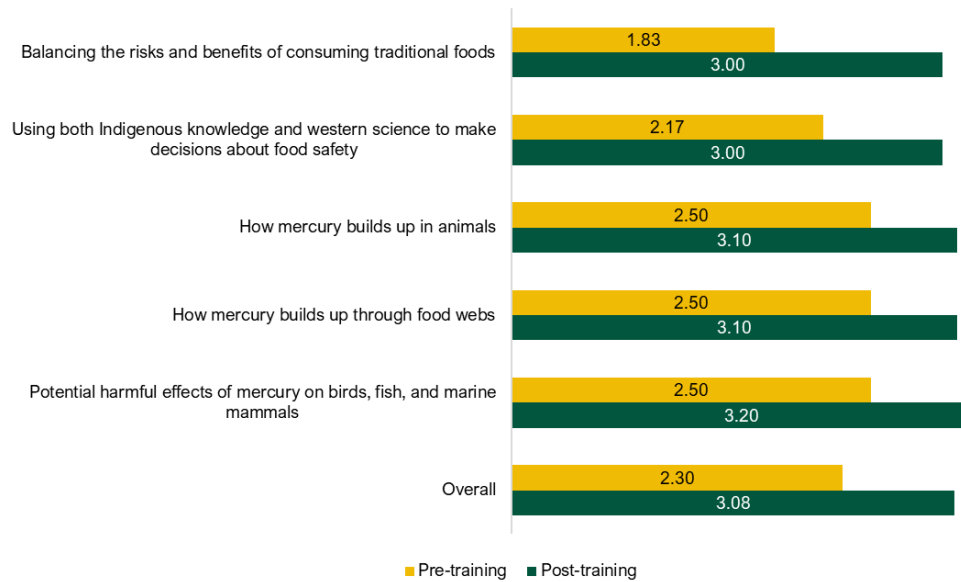
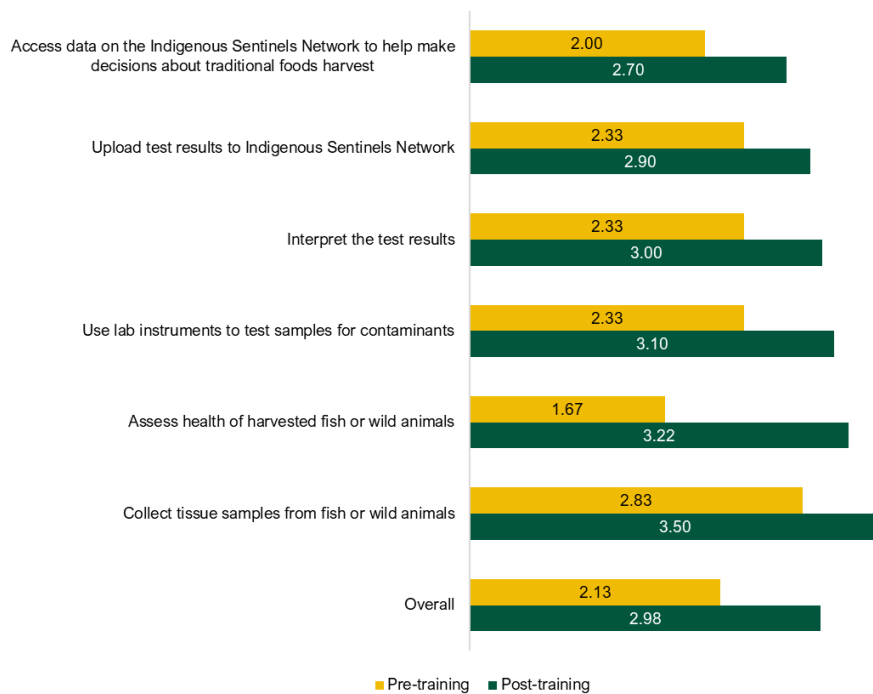


Fig. 9. Indicator 2.4: Course participants' confidence in their ability to perform activities related to key course concepts, pre-post (n=6 (Pre), n=10 (Post); Scale 1-4, with 1=Not at all confident to 4=Very confident)



Outcome 3: Increased resident access to, and engagement with, contaminant data.

There is **strong evidence** that resident access to, and engagement with, contaminant data increased during the pilot year. One ACSPI staff member described their role as getting “*Excel sheets from the mercury analyzer uploaded into the [ISN],*” reinforcing the Tribe’s commitment to data storage and security. While a public-facing dashboard was not produced, the project team in collaboration with the ACSPI staff remained committed to sharing information about findings. This transparency, according to ACSPI staff member, allowed the project to “*move from just reporting numbers to having thoughtful conversations about what they mean.*”

Community members valued open houses and live demonstrations that made the science tangible. One Tribal member expressed excitement during an interview at the possibility of “*going down to the lab at the next open house*” to see testing firsthand.



Indicator 3.1: Increased number of residents active in subsistence foods data collection & analysis.

Indicator 3.2: Residents demonstrated increased engagement with Western science data, reflected in high levels of course participation, positive feedback, and continued volunteerism in monitoring efforts.

During the pilot year, project staff reported that approximately 100 samples were brought to the BSRC for analysis.² The 72 samples provided in the inventory record include a range of algae, plant, marine, and animal samples; see figure 10 below.

Fig. 10. Range of animal, marine, and plants in sample inventory

Algae	Animal	Marine	Plant
Kelp	Common Murre	Golden King Crab	Beachgrass
	Reindeer	Kelp Greenling	
		Limpet	
		Northern Fur Seal	
		Octopus	
		Pacific Cod	
		Pacific Halibut	
		Pacific Ocean Perch	

² The sample inventory record provided to evaluator in September 2025 document that 72 samples had been tested, with an additional 32 samples reported as not yet entered into the inventory.

Residents were not passive recipients of data but active contributors and interpreters. One Tribal member, who was also a hunter, shared during an interview that he submitted tissue samples, while younger residents he knew engaged in training and outreach activities. The Tribal member stressed the importance of involving “*younger hunters*” to sustain the effort. A participating graduate student also highlighted the importance of intergenerational engagement, noting that Elders’ lunches were powerful spaces to introduce data and gather feedback. A project team member noted that Elders were quick to inquire, “*Are those levels dangerous? Could you test liver, since I eat liver?*” suggesting a deep level of interest and engagement with the data.

Outcome 4: Increased confidence in the safety of consuming traditional foods.

There is **moderate evidence** that the project increased awareness of contaminants without undermining confidence in traditional foods. One interviewed Tribal member noted that he hadn’t changed his diet but was now “*more aware of how mercury gets into animals and even plants.*” Residents appreciated that information was framed in ways that respected subsistence practices. A project team member explained that the project deliberately avoided rigid limits, instead focusing on “*balanced eating and cultural continuity of being at harvest with your family.*” An ACSPI staff member reported that Elders asked probing questions about interactions between contaminants and nutrients, such as whether selenium could offset mercury risk. This curiosity indicated both trust in the science and a desire to integrate findings into cultural frameworks of food knowledge. While there were no reports of residents changing their consumption patterns, some reported adjusted harvesting practices or preparation methods based on early results.

Indicator 4.1: Residents demonstrated increased awareness of data-informed subsistence food safety issues monitoring data.


Indicator 4.2: Residents' subsistence food practices somewhat influenced by food safety.

Outcome 5: Improved trust in research outcomes and in civic and university research partnerships.

While outcome 5 is a longer-term outcome, there was **demonstrable progress**. In interviews with the evaluator, Tribal members and ACSPI staff repeatedly emphasized that this project was different because it was Tribally led and locally controlled. As shared by one staff member, “*this is the first time the data belongs to us.*” Trust was strengthened in part because results were shared locally first: “*Local communication first, not publications first for academics.*” This reversal of typical research priorities ensured accountability to the community and boosted trust.

Trust also grew in relationships with external partners. One project team member stressed that having co-leads from both the university and the Tribe “*equally at the table*” demonstrated genuine partnership. Tribal members noted that the project helped normalize collaboration, with one member affirming his confidence in both the local ECO department and the university partners who worked visibly on the island.

The Tribal government was a partner in this project from the outset, contributing staff time and use of the ISN. During the project term, the most visible and long-term investment by the Tribal government was in establishing the Bering Sea Research Center as a supported institution in St. Paul. While the grant supported the acquisition of equipment, the Tribal Council provided matching funds for the lab benches.



Indicator 5.1: Some evidence of improved trust of external research partners

Indicator 5.2: No observed increases in research partnerships between ACSPI and external researchers

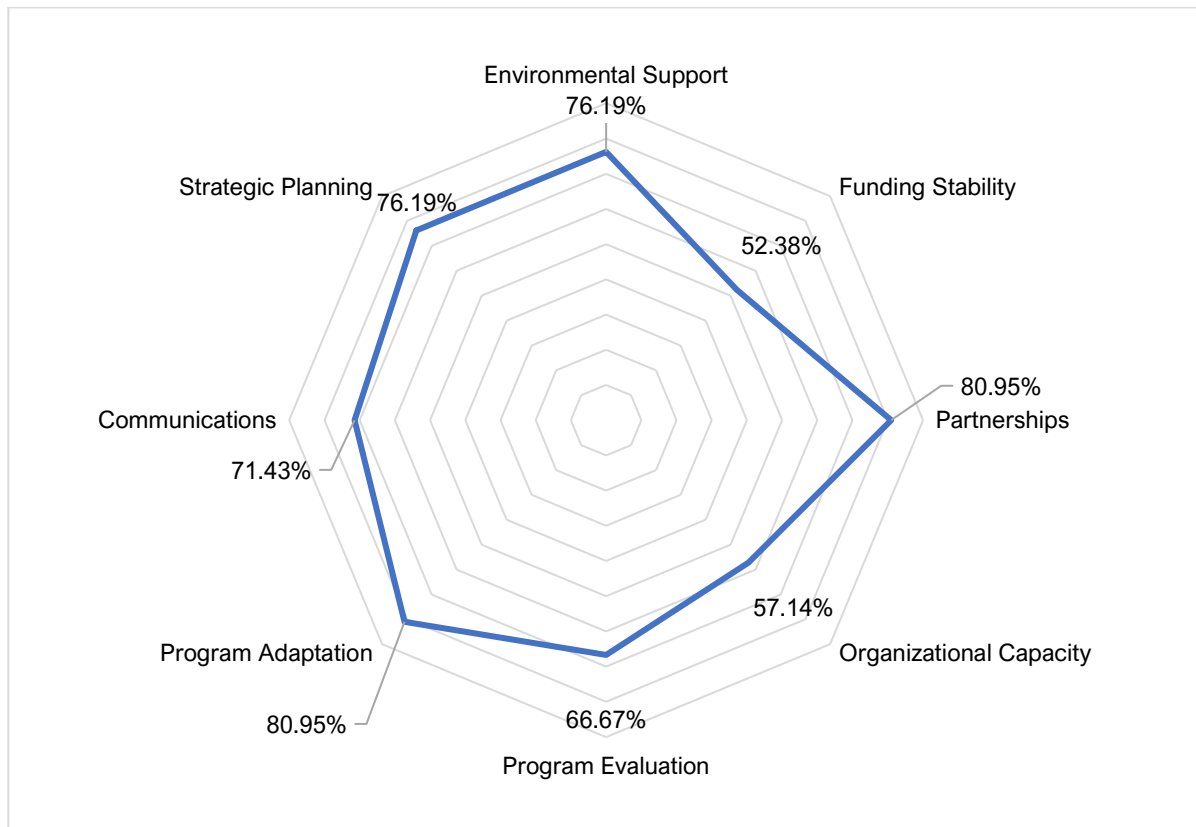
Indicator 5.3: Tribal government invested in the Bering Sea Research Center, including matching funds for lab benches.

Sustainability

Sustainability is a central concern as the project closes in fall 2025. The evaluator’s sustainability assessment of the BRAIDED Food Security project is based on the Program Sustainability Assessment Tool developed by Washington University (St Louis, MO); this tool is designed to assess a program’s current capacity for sustainability across a range of specific organizational and contextual factors. In the assessment conducted by the evaluator using available documentation, there is weak to moderate evidence that the activities initiated with CIVIC funding will be sustained in the longer term. Strengths were noted in **Partnerships** (80.95%) and **Program Adaptation** (80.95%), while weaknesses were evident in **Funding Stability** (52.38%) and **Organizational Capacity** (57.14%). Key risks include reliance on grant funding and organizational change within the ACSPI. Opportunities exist to leverage external recognition (e.g., NOAA Report Card participation), replicate the model in other Bering Sea communities, and expand testing to include new contaminants such as harmful algal blooms and microplastics.

The chart below provides a summary score for each domain, and domain summaries provide key pieces of evidence supporting the score. A detailed sustainability assessment is provided in Appendix A. The project team is encouraged to review the sustainability assessment findings and use results to support sustainability action planning for the initiative.

Fig. 11. Sustainability assessment by domains



Environmental Support (avg. 5.3/7)

The project benefits from strong Tribal champions, including the Council and ECO leadership, and consistent Elder engagement. These actors provide credibility and legitimacy, reinforced by external recognition such as invitations to contribute to the NOAA Arctic Report Card. Support improved across the grant term, with matched Council funding commitments signaling institutional buy-in. While local support is high, resource mobilization remains somewhat constrained by shifts in the federal funding climate.

Funding Stability (avg. 3.7/7)

Although funding stability is still a challenge, improvements are evident. In addition to federal grants, the project has secured more diverse and flexible awards, reducing overreliance on a single stream. Nonetheless, grant funding is insecure in the long term, leaving technician time and long-term monitoring vulnerable. Uncertainty tied to federal budgets and political priorities continues to pose risks.

Partnerships (avg. 5.7/7)

Partnerships remain one of the strongest domains. The project sustains regular communication with the Tribal Council and Elders, while engaging community members of all ages in decision-making and monitoring activities. University partners continue to provide co-leadership, and their participation in community presentations, open houses, and Elders' lunches reinforce collaboration and trust.

Organizational Capacity (avg. 4.0/7)

Organizational capacity has improved, though it remains an area for growth. Integration of the BSRC with ECO is advancing, and systems such as the ISN workflow are increasingly embedded. The hiring and training of an additional technician to build redundancy will reduce the bottleneck created by reliance on a single technician. The program will benefit from continued investment in role clarity and systems development.

Program Evaluation (avg. 4.7/7)

Evaluation remains a moderate strength. The program consistently shares interim outcomes locally first, building trust and accountability. Feedback loops from community meetings have directly shaped workflows and outreach strategies. External recognition, including NOAA case study features, is growing. However, evaluation findings are not yet fully integrated into long-term sustainability planning.

Program Adaptation (avg. 5.7/7)

Adaptability is a hallmark of the project. Rapid pivots have strengthened workflows for sample collection and training, while readiness to expand beyond mercury monitoring (e.g., harmful algal blooms, microplastics) demonstrates responsiveness to both community concerns and evolving scientific knowledge.

Communications (avg. 5.0/7)

Communications remain effective through trusted, in-person strategies such as Elders' lunches and open houses. Community awareness of contaminants and monitoring efforts is high, though mass communication strategies (flyers, Facebook, radio) are still inconsistent. The main challenge continues to be balancing nuanced messaging with broad outreach.

Strategic Planning (avg. 5.3/7)

Technician redundancy is being planned and informal sustainability planning has occurred, with clearer steps toward future monitoring. While a fully formalized sustainability plan is not yet in place, planning is more intentional, and the division of responsibilities between BSRC and ECO is beginning to solidify. This provides a stronger foundation for long-term sustainability.

Conclusion & Lessons Learned

The BRAIDED project fully implemented its planned activities and met or made strong progress toward all five intended outcomes. By the end of the project term, Tribal members experienced faster access to data, gained physical and human capacity for laboratory analysis, engaged directly with results, grew more confident in food safety, and developed stronger trust in research and partnerships. While sustainability challenges remain—particularly funding, staffing redundancy, and expanding testing beyond mercury—community voices confirmed that the project created lasting change. As one resident summarized, *“This is the first time science feels like it’s for us, not about us.”*

Lessons from this project highlight that building Indigenous-led science initiatives is not only about investing in scientific equipment and training. It is about designing distributed capacity, community engagement and trust-building, sovereign data systems, and scientific communication processes, while ensuring sustainability of funding and relevance. These insights are valuable not only for St. Paul Island but also for other rural and Indigenous communities seeking to build local research infrastructure that honors sovereignty, fosters trust, and responds to community-defined priorities. Based on stakeholder interviews at the project’s end, a discussion of lessons learned are presented below.

Lesson 1: Local Infrastructure is More than a Building

Establishing the Bering Sea Research Center (BSRC) taught the project team that infrastructure alone does not guarantee outcomes. While the facility was outfitted with state-of-the-art laboratory equipment, it was the symbolic and relational value of the building that most resonated with the community. One ACSPI staff member explained that the physical lab was *“a huge success, especially in the eyes of the community,”* because it visibly anchored science in the community’s control. Another staff member added that the BSRC was the *“linchpin”* in gaining Tribal Council’s matched investment. In remote and Indigenous settings, infrastructure is as much about trust and sovereignty as it is about technical function.

Implication: Future projects should treat facilities as community hubs that embody sovereignty and invite participation, not just as technical spaces.

Lesson 2: Clear Roles & Responsibilities Required for New Infrastructure

While establishing the BSRC provided a tangible achievement, interviews with project team members and ACSPI staff revealed that its integration into Tribal government created some confusion. Staff were uncertain how the new center fit with the longer-standing Ecosystem Conservation Office (ECO), and how technicians should prioritize time between multiple grants. One stakeholder noted that there was *“a big disconnect... because I don’t really feel like the work has gotten done how it was anticipated”* when oversight and roles were unclear.

Implication: Future projects must couple infrastructure with explicit governance structures. Early agreements should clarify which department is responsible for allocation of staff time, budgets, communications, and reporting to avoid ambiguity that strains professional relationships.

Lesson 3: Capacity Building Must be Distributed, Not Concentrated

Another key lesson was that investing in one or two “*anchor*” individuals can create momentum but also creates fragility. The community program coordinator’s role as the lead technician highlighted both the benefits and risks of this model. He became highly skilled, but over-reliance on him created burnout and a “*single point of failure*.” One staff member candidly shared: “*We hyper-focused on [community program coordinator], and it didn’t do us any favors because he felt there was too much weight on his shoulders.*” A project team member echoed this concern, stating “*having only one person creates a fragile point in the system.*” One project team member observed that more community members should have been trained from the outset.

Implication: Capacity-building models in small communities must intentionally build redundancy. Budgeting for multiple staff and embedding train the trainer approaches ensure continuity even when individuals leave or shift roles.

Lesson 4: Communication Works Best When It Is Conversational

The project demonstrated that communication methods rooted in conversation are more effective than mass outreach. Residents consistently preferred Elders’ lunches, open houses, and community harvest events as opportunities to learn about the BSRC rather than through flyers or digital updates. These spaces allowed for nuanced dialogue, enabling participants to ask questions, voice concerns, and contextualize data. One Tribal member noted that lab tours and informal exchanges sparked curiosity: “*I was surprised to hear mercury in different animals... it’s kind of amazing how it gets into plants too.*”

Implication: In-person, dialogic communication is essential for building understanding in small communities. Tools like dashboards and flyers can supplement, but they cannot replace face-to-face conversation.

Lesson 5: Data Sovereignty Strengthens Trust

The use of the Indigenous Sentinels Network (ISN) reinforced the importance of Indigenous data sovereignty. Uploading results to a Tribally owned platform ensured that information flowed to the community first, reversing the historical pattern of external researchers publishing before local results were shared. One ACSPI staff person emphasized that “*uploading results securely onto the dashboard was a turning point for conversations on the island.*” Another staff person summed it up simply: “*This time, the data belongs to us.*”

Implication: Local ownership of data is not a technical detail but a trust-building mechanism. Future projects should prioritize platforms and processes that keep communities in control of how information is stored and shared.

Lesson 6: Sustainability Requires Both Funding and Relevance

Project team and ACSPI staff members consistently raised concerns during interviews about how the work would continue after the pilot. While the BSRC lowered costs by enabling local analysis, project team members noted that long-term sustainability depends on funding cycles and whether the community continues to view mercury as a pressing concern. One project team member cautioned that *“progress made could be stalled because future funding is uncertain.”* Sustainability also depends on flexibility: if mercury levels remain stable, the community may want to focus on emerging concerns such as algal blooms.

Implication: Sustainable monitoring requires both reliable funding and responsiveness to evolving community priorities. Projects must be designed to adapt to shifting concerns while maintaining core capacity.

Lesson 7: Community Engagement Requires Logistical Flexibility

Logistical hurdles repeatedly surfaced throughout the project term. Flights were canceled, shipping delays slowed equipment delivery, and the project’s one-year timeframe limited flexibility. Community members also found it difficult to remember to set aside samples during busy harvest periods. As one project team member noted, *“people want it to be really simple... but it was a challenge just to get some samples sometimes.”*

Implication: Engagement strategies must fit community rhythms. Solutions like freezer drop-off boxes and shorter training sessions could improve participation. Timelines should anticipate remote logistics and seasonal cycles.

Lesson 8: Food Security Challenges are Larger than Contaminants Alone

Several project team members and ACSPI staff reflected that contaminants are only one dimension of a much broader food security puzzle. An ACSPI staff member described watching 10,000 pounds of food sit at cargo while store shelves were empty—evidence that supply chain disruptions may affect residents more immediately than mercury.

Implication: While contaminant monitoring is valuable, projects should situate it within the broader landscape of food security. Linking lab results to discussions of access, affordability, and sovereignty can increase relevance and community buy-in.

Recommendations for Scaling the Tribally-Led Food Security Model

Building from the St. Paul Island initiative, scaling this Tribally-led, community-centered model to other rural and Indigenous communities in the circumpolar Arctic and beyond requires attention to specific conditions, infrastructure, and collaborative processes. The recommendations below integrate lessons from this project with established best practices in community-based monitoring, Indigenous research, and knowledge co-production.

Key Conditions for Readiness

Successful replication depends on explicit Tribal leadership and consent to ensure ethical research in addition to community ownership and governance (Smith, 2012; ICCA, 2020). Clear, locally defined goals—such as balancing the health benefits of traditional foods with contaminant risk—provide purpose and legitimacy (Paul et al., 2018). Trusted partnerships with universities or public health laboratories are necessary but should remain supportive rather than directive (Johnson et al., 2015). Readiness also requires identification of community members willing to serve as technicians, coordinators, and data stewards. Finally, multi-year funding commitments are critical for sustaining personnel, consumables, and equipment.

Core Infrastructure Investments

Physical investments include community-located laboratories equipped with analyzers and sample-handling capacity to enable timely, on-site testing. Digital infrastructure should be community-owned and present results in accessible and low-bandwidth formats. Human infrastructure requires funding for resident positions, ongoing training in lab safety and QA/QC, and agreements for remote technical support.

Collaborative Processes: Braiding Knowledge Systems

Scaling should emphasize co-design governance, including steering groups of Tribal members to guide priorities and protocols (Norström et al., 2020). Food safety assessments should integrate Indigenous ecological knowledge, such as harvest calendars and local indicators, alongside laboratory results. Data sovereignty frameworks such as OCAP® principles (First Nations Information Governance Centre, 2014) should guide all data use and sharing.

Implementation Phases

A phased approach is recommended: (1) readiness assessment and co-design; (2) infrastructure development and training; (3) pilot testing with iterative feedback; (4) operational refinement and expansion; and (5) networking with other Tribally-led programs to share practices and resources. Adaptive approaches are well established in environmental monitoring literature (Danielsen et al., 2014).

Evaluation and Learning

Evaluation should focus on decision-use outcomes: timeliness of Tribal decision-making, community confidence in traditional foods, self-efficacy of residents in scientific roles, and trust in partnerships. Mixed-methods evaluation combining quantitative indicators with Elder and harvester perspectives is recommended (Meadow et al., 2015; Johnson et al., 2015).

Funding and Sustainability

Sustainability requires diversified and reliable funding streams. Short-term project grants risk collapse, whereas blended funding strategies, such as braiding together Tribal funds, public health agency grants, and philanthropic support, align with best practices for maintaining long-term community-based research.

Adaptation to Context

Scalability depends on tailoring contaminant panels, communication formats, and operational workflows to each community's cultural and geographic context. As noted earlier, a place-based readiness assessment and co-design should be the first implementation phase.

In sum, scaling requires more than replicating laboratory infrastructure: it demands careful alignment of governance, training, funding, and cultural protocols. By centering Tribal leadership, braiding Indigenous and western knowledge, and investing in sustainable infrastructure, this model can strengthen resilience and food sovereignty across the Arctic and other isolated Indigenous communities.

Limitations

This evaluation study provides important insights into the implementation and outcomes of the BRAIDED Food Security project, yet several limitations should be considered when interpreting findings.

Small and Context-Specific Population. The study was conducted in a single rural, predominantly Alaska Native community (St. Paul Island) with a small population. Random assignment was not feasible, and participation in surveys, training, and interviews was voluntary. As a result, findings may not be statistically generalizable to other Arctic communities, although they provide valuable lessons for contexts with similar demographic and geographic characteristics.

Short Timeframe. The project was implemented on an accelerated one-year timeline, later extended, which limited opportunities for longitudinal data collection. While pre-/post survey and interview data provide near-term evidence of capacity building, ownership of data, and changes in trust, longer-term impacts on community decision-making and resilience could not be fully assessed within the evaluation period.

Reliance on Self-Reported Data. Much of the evaluation data came from participant surveys, interviews, and focus groups. While this provided critical insights into perceptions, trust, and engagement, such data are subject to recall bias, social desirability bias, and the influence of local dynamics. Observed changes in confidence or trust may not directly translate into long-term behavioral change.

External Validity. The lessons learned are highly applicable to other rural and Indigenous contexts, but transferability requires adaptation to different cultural, ecological, and governance settings. The model demonstrates promise, but replication elsewhere will depend on infrastructure investments, local priorities, and Indigenous governance structures.

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Appendix A

Sustainability Analysis

Project Name:	BRAIDED Food Safety Project (St. Paul Island, AK)	AVERAGE SCORE	4.91667		
Analysis Year:	2025	TOTAL % SCORE	70.24%		
Environmental Support	Rating	Basis for Rating	Domain Total	Domain Average	Domain %
1. Champions exist who strongly support the program	5	Active Tribal champions; Council matched funds for lab benches; elders engaged in meetings.	16	5.3	76.19%
2. The program has strong champions with the ability to garner resources	6	Champions (ACSPI, ECO, UAA) can mobilize support.			
3. The program has leadership support from outside of the organization	5	Project has received external recognition (NOAA interest/Arctic Report Card invite).			
Funding Stability	Rating	Basis for Rating	Domain Total	Domain Average	Domain %
1. The program is funded through a variety of sources	6	Funding largely grant-based but diversified, including NOAA co-management and ADAC funding.	11	3.7	52.38%
2. The program has a combination of stable and flexible funding	3	Some flexible awards, but stability uncertain post-pilot; technician time at risk.			
3. The program has sustained funding	2	No committed multi-year funds; sustainability questioned without the motivation of "alarming findings" about food quality			
Partnerships	Rating	Basis for Rating	Domain Total	Domain Average	Domain %
1. The program communicates with community leaders	6	Regular communication with Tribal Council, participation in elders' lunches and community meetings, social and traditional media presence	17	5.7	80.95%

2. Community leaders are involved with the program	6	Council/elders involved in discussions and review before external dissemination.			
3. The community is engaged in the development of program goals	5	Community helped shape project priorities; there is evidence of intergenerational involvement			
Organizational Capacity	Rating	Basis for Rating	Domain Total	Domain Average	Domain %
1. The program is well integrated into the operations of the organization	5	Integration of BSRC with ECO was emerging during last months of project. Departmental roles more clearly defined.	12	4.0	57.14%
2. Organizational systems are in place to support the various program needs	3	Systems exist (ISN workflow) but sample drop-off/process needs streamlining			
3. The program has adequate staff to complete the program's goals	4	Limited staff and an over-reliance on one technician; another technician was recently hired to support redundancy.			
Program Evaluation	Rating	Basis for Rating	Domain Total	Domain Average	Domain %
1. The program reports short term and intermediate outcomes	5	Short-term outcomes reported locally first; interim results shared with community.	14	4.7	66.67%
2. Evaluation results inform program planning and implementation	5	Feedback loops from meetings adapted outreach/sampling; pivots made within pilot year.			
3. Program evaluation results are used to demonstrate successes to funders and other key stakeholders	4	Results used to demonstrate value; external communications are emerging (NOAA Report Card case study).			
Program Adaptation	Rating	Basis for Rating	Domain Total	Domain Average	Domain %
1. The program adapts strategies as needed	6	Evidence of rapid pivots to refine workflows (drop-offs, training) and adjust to harvest schedules.	17	5.7	80.95%
2. The program adapts to new science	6	Monitoring scope discussed beyond Hg; readiness signaled.			
3. The program proactively adapts to changes in the environment	5	Proactive discussions on expanding analyses/equipment, within logistical constraints.			

Communications	Rating	Basis for Rating	Domain Total	Domain Average	Domain %
1. Program staff communicate the need for the program to the public	5	Clear messaging at elders' lunches/open houses; community-first dissemination via ISN.	15	5.0	71.43%
2. The program increases community awareness of the issue	6	Awareness increased through in-person forums; Facebook/store flyers			
3. The program demonstrates its value to the public	4	Demonstrated value locally; broader, consistent mass communications still developing			
Strategic Planning	Rating	Basis for Rating	Domain Total	Domain Average	Domain %
1. The program plans for future resource needs	6	Team has planned for technician redundancy and future needs and secured additional funding streams.	16	5.3	76.19%
2. The program has a sustainability plan	5	Informal sustainability planning has taken place; reliance on grant renewals and ad hoc matches.			
3. The program clearly outlines roles and responsibilities for all stakeholders	5	Role clarity between BSRC/ECO is quickly evolving as a result of this project; responsibilities and escalation paths maturing.			