



**Exxon Valdez Oil Spill Trustee Council**  
**Long-Term Research and Monitoring, Mariculture, Education and Outreach**  
**Annual Project Reporting Form**

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*For Instructions for each section below, see Reporting Policy, II (B); the Reporting Policy can be found on the website, <https://evostc.state.ak.us/policies-procedures/reporting-procedures/>*

**Project Number:** 23220300

**Project Title:** Prince William Sound Kelp Mariculture Development for Habitat Restoration and Local Economy

**Principal Investigator(s):** Willow Hetrick-Price, Executive Director, Chugach Regional Resources Commission

**Reporting Period:** February 1, 2023– January 31, 2024

**Submission Date (Due March 1 immediately following the reporting period):** February 29, 2024

**Project Website:** <https://www.alutiiqprideak.org/kelp-farming>

Please check all the boxes that apply to the current reporting period.

**Project progress is on schedule.**

**Project progress is delayed.**

**Budget reallocation request.**

**Personnel changes.**

Although not technically included as personnel on this project, Dr. Schery Umanzor had originally been collaborating with Native Conservancy and advising on data collection, water sampling and tissue analysis, but will no longer be assisting with these project objectives due to time constraints and a shifting of focus to other projects. Alutiiq Pride Marine Institute's (APMI) Science Director, Dr. Maile Branson, will now be overseeing experimental design, data collection and sampling protocols, and data analysis.

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### **1. Summary of Work Performed:**

This report marks the completion of the first full year of this project which coincides with several other mariculture initiatives going on throughout the state, notably the Build Back Better Regional Challenge grant, administered by the Alaska Mariculture Cluster through funding from



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the Economic Development Administration. With support for a staff position (Mariculture Liaison, discussed in the FY22 report) from the EVOSTC through this project, CRRC and APMI have been able to capitalize on additional funding opportunities and leverage EVOSTC money to plan for the future after the funding sunsets. It is important to the organization to show the EVOSTC that there is a diversified revenue stream to stretch the impact of the EVOSTC investment in the organization. The next few paragraphs discuss the leveraged success briefly, but the team would be happy to discuss further if there are additional questions.

The first RFP issued under the Build Back Better (BBB) program solicited proposals from regional institutions to establish “mariculture liaison” positions at their organizations to facilitate the dissemination of information about the BBB program to Alaska’s coastal communities. Liaisons have been established in each of Alaska’s coastal regions—Kenai Peninsula, Prince William Sound, Southeast, Southwest, and Kodiak. As a result of this project and CRRC’s ongoing involvement and leadership in the mariculture industry throughout both the state and the regional areas, CRRC was awarded funding for two separate liaison positions, in the Kenai Peninsula and the Prince William Sound. As a result, CRRC has been able to remain involved in mariculture projects going on throughout the state and region under BBB funding and facilitate collaboration and synergy amongst ongoing mariculture projects, including this EVOSTC project. A discussion of currently awarded and pending projects under this funding program related to kelp mariculture has been included in the Coordination and Collaboration Section of this report, under the Native and Local Communities subheading (Section 3).

The BBB program has initiated numerous funding opportunities for both the public and private sector, in addition to providing funding for research and development, marketing, workforce development, and green energy initiatives to entities throughout the state, including the Alaska Department of Fish and Game (ADF&G), Alaska Department of Environmental Conservation, Alaska Fisheries Development Foundation, and the University of Alaska system. These additional funding opportunities have drastically increased the rate of change in Alaska’s kelp mariculture industry, due to additional funding opportunities for research and commercial projects. CRRC has found that the landscape for kelp mariculture priorities in Alaska has shifted considerably from the time that CRRC submitted its original, funded proposal for this project.

At the time CRRC submitted its original proposal, hatchery operations were perceived to be the biggest limitations to growth in the kelp mariculture industry. In 2021, when this proposal was submitted, there were three licensed kelp hatcheries in the state, including APMI’s facility in Seward, and a hatchery in Ketchikan and Kodiak. At the time of this writing, 13 hatchery facilities have been newly permitted, a 333% increase for the industry. CRRC and Native Conservancy (NC) trained and assisted in the development of four of these hatcheries. CRRC and Native Conservancy have already completed each of the deliverables outlined under Objective 1 of this project, focusing on developments for hatchery and nursery techniques. To



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continue forward progress under this project, CRRC will be shifting focus to direct seeding techniques and gametophyte banking, strategies that will help the industry to scale in the future.

However, it's important to note that with the proliferation of licensed kelp hatcheries in the state, access to seed string is no longer the limiting factor it was in 2021. Recent aquatic farming operations numbers shared by ADF&G at Alaska's Annual Mariculture conference forecast a reduction in kelp mariculture activity across the state. At the end of 2022, 10 farms had inventory for the 2022-2023 growing season; at the end of 2023, only eight farms reported an outplanted seed string inventory. Seeded line distribution from hatcheries to farms in 2023 was 27% less than the previous year and harvested poundage in 2023 was down by 56%. These operational statistics illustrate the impacts of the tenuous marketability and economics surrounding Alaska's commercial kelp industry. Harvesting, processing, marketing, and transportation of harvested biomass have proven to be extremely significant limiting factors to the growth of the industry and introduction of new participants. Veteran farmers have been scaling back operations due to a combination of a lack of markets and an inability to get kelp biomass harvested, stabilized, and transported to end users in a cost-effective and timely manner. As a result, in the interest of remaining true to the underlying goal of this project to lay the necessary groundwork for networks of Native-owned ocean farms, kelp seed nurseries, processing hubs and value-added kelp businesses to build a sustainable and profitable mariculture industry, CRRC has slightly shifted some of its focus to solving harvesting, processing, and marketing issues currently impacting the industry.

In April 2023, CRRC applied for permits to convert kelp test farm sites supported with this funding to three commercial, community-based kelp farms near Alaska Native communities in the Spill Area. Commercial farm permits were filed during last year's permit application period (January 1-April 30, 2023) to convert research sites at Latouche and Tatitlek into commercial sites, and to add a commercial site near Passage Island in Lower Cook Inlet. Research as outlined in the application to the EVOSTC will not stop; however, these commercial sites will allow CRRC to explore additional processing and marketing opportunities for kelp products, a feature that was not permitted with kelp test sites. Kelp grown on research sites, as CRRC and NC have been operating for this project, is not permitted to enter commerce in any way and can only be used for research purposes. Costs for operating and monitoring a research site are almost identical to those of operating a commercial site, but commercial sites increase CRRC and NC's ability to explore potential marketing and processing opportunities. Moreover, these sites can provide space that tribal members can lease or use to explore kelp farming interest and access to funding opportunities under the BBB program, lowering the barrier to access for new participants to the commercial kelp industry.

All commercial sites have been approved and permitted by Alaska Department of Natural Resources and ADF&G; the site at Passage Island has been fully permitted and sites at Latouche



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and Tatitlek are in the final process of receiving final permits from the Army Corps of Engineers. All sites are expected to be operational and available for use by the fall 2024 growing season.

In this project's first year, issues with data collection and sampling protocols were identified and have been addressed through the design and implementation of a new data collection protocol. Changes to data collection practices include requiring samplers to take multiple collections of both water samples and tissue samples, to avoid losing material for lab analysis in the event of either lab errors, shipping errors, storage errors, or other incidents that could compromise the integrity of the sample and the ability of the contracted lab to perform the required analyses.

A sampling protocol with explicit, step-by-step instructions on sample collection for water samples will be issued to all samplers collecting water quality data; samplers will be required to return forms with signatures to APMI's EVOSTC Mariculture Liaison to ensure that sampling protocols have been read and understood. Water samples for water quality analysis will be collected from field collectors quarterly, compiled at APMI's facility in Seward, then sent out for water quality analysis. APMI's lab facility is in the process of developing the ability to run water quality sample analysis in-house and anticipates being able to test these samples as they arrive from field collectors for the 2024-2025 growing season. In the interim, water quality samples will continue to be sent to Alaska Water Labs for testing.

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**Deliverables:**

Objective 1: Scale the infrastructure to increase the production capacity of the Alutiiq Pride Marine Institute (APMI) and Community Kelp Seed Nurseries (CKSN) to meet projected kelp seed string demands of the region.

**Deliverables:** CRRC projected two deliverables to be completed during this reporting period:

- The APMI seed nursery is scaled to 7500 square feet.
  - Completed. This deliverable was proposed to be completed in FY23 but was completed early, through funding with U. S. Economic Development Administration (EDA) Award No. 07-79-07702 in FY22.
- Field data collected and made available to the public.
  - Completed—data collected from the first growing season of this project, October 2022-June 2023, has been collected, synthesized, and uploaded into the Axiom database in compliance with the EVOSTC data management plan.
    - During FY22, CRRC redesigned and relaunched its website to render it more user friendly and easier for tribal members to navigate and find information about relevant programs. Data collected from the 2022-2023 growing season is still in the process of being integrated into the



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organization's webpage within its mariculture section and is anticipated to be completed by the end of Q2 of FY24.

**Milestones/Tasks Projected to be achieved in FY23:**

- Produce seedline—APMI Kelp Hatchery Production Statistics in FY23:
  - 17,800 linear feet of seed string was grown for research purposes at APMI's hatchery facility during the fall 2023 growing season:
    - 8,000 linear feet of seed string was grown for research sites at Fox Farm Bay and Latouche Passage. Species include bull kelp, ribbon kelp, sugar kelp, and three-ribbed kelp, a new species added based on previous years' farming experience indicating that the species grew opportunistically through setting naturally on seed lines at APMI test site locations.
    - 9,800 linear feet of seed string was grown for research purposes within APMI, but not outplanted on research sites. Seed string was grown in flow-through tanks, as opposed to standard 20-gallon aquaria, to monitor efficiency of flow-through system. Flow-through systems within hatcheries obviate the need for weekly tank changes of aquaria, by allowing for a constant flow a seawater in and out of the tank. It also requires fewer materials to grow large quantities of seed string, increasing the ability for hatcheries to scale to meet industry demand. Flow-through tanks were effective and did allow for some cultivation of sugar kelp spores, but contamination could not be wholly contained. Roughly 4,800 feet of seed string was moved from the flow-through tank to individual aquaria to assess measures to counteract contamination issues encountered by hatchery staff throughout growing season.
  - 66,900 linear feet of seed string was grown for commercial purposes during the fall 2023 growing season:
    - 2,900 feet of seed string was grown for commercial farmers in Kachemak Bay. A portion of this kelp harvest will be used for preliminary processing testing funded through the BBB program under the Joint Innovation Project. More information about this project can be found in Section 3 of this report, Coordination and Collaboration, Native and Local Communities.
    - 9,000 feet of seed string was grown for a commercial farmer in Juneau.
    - 10,000 feet of seed string was grown for a first-year commercial kelp farmer in Cordova.
    - 40,000 feet of seed string was grown for commercial farmers in Kodiak.
      - Of this quantity, 12,000 feet of seed string was grown for a first-year commercial farmer.
    - 5,000 feet of seed string was grown and outplanted for CRRC on a commercial farm site located in Resurrection Bay, south of Seward. Seed string supports a processing feasibility study CRRC was awarded by the



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BBB program in January 2024, that will unlock an economic assessment on harvesting, stabilizing, and transportation costs for bulk amounts of kelp. More information about this feasibility study can be found in Section 3 of this report, Coordination and Collaboration, Native and Local Communities.

- APMI-grown seed string was also deployed at added dropper line locations, including Eshamy Bay, Copper Bay on Elrington Island, and Passage Island in Lower Cook Inlet.
- APMI hatchery was fully scaled to 45 operation tanks for the fall 2023 growing season.
- APMI's hatchery's Basic Management Plan was amended on 1/31/2024 to permit for the cultivation of new species, including split kelp, five-ribbed kelp, and giant kelp. Mapping efforts have identified beds of five-ribbed kelp and split kelp near APMI's test sites in the Southwestern part of Prince William Sound and exploratory trips to Montague Island have been made to identify giant kelp beds that have been anecdotally observed in the area by local fishermen.
- Produce seedline—CKSN Kelp Hatchery Production Statistics in FY23:
  - CKSN produced 22,400 ft of sugar kelp seed string, 22,400 ft of ribbon kelp seed string, and 22,400 ft of bull kelp seed string
    - 1,500 ft was outplanted at research sites in Simpson Bay, Sheep Bay, Port Gravina, Tatitlek Narrows and Boulder Bay (1000 ft of ribbon kelp and 500 ft of sugar kelp).
    - 16,000 ft of bull kelp seed string was outplanted at Port Etches Farms for commercial testing
    - 1,000 ft of ribbon kelp and 500 ft of sugar kelp was outplanted at Blue Green Enterprises farm in Simpson Bay for commercial testing.
  - Several improvements were made to the cultivation systems to allow for better efficiency and quality of production:
    - New spool holders were made to allow for 16 spools per tank instead of 9. This increased production by 44% without adding additional labor, and equipment. NC was able to double production from the previous year, using half the space, and with enough room to double production again next year, if needed.
    - NC staff installed new LED full-spectrum light strips with dimmers. This removed the need for light screens, provided much more accurate and customizable light levels, and drastically reduced heat output.
    - NC drastically improved their seawater holding filtration system, installing exterior particle and UV filters that freshly collected water runs through before landing in the sterilized seawater holding tanks. From there, seawater is pulled on demand through another set of filters to be used in the aquaria. The entire seawater system was fully drained and



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- sterilized twice during the nursery season and resulted in virtually no contamination throughout the 2023-2024 growing season.
- NC continued to elaborate on initial trials from previous years on secondary and third spore releases:
  - The value of this is to eliminate the need for multiple or large sorus collections and shipment, and to achieve higher densities of spores/mL when needed.
  - Sugar kelp continues to be the most effective at multiple releases and bull kelp also continued to release over time but often with non-moving spores.
  - NC was able to do tank inoculations for all spools, eliminating the time- and material-consuming inoculation tubes.
  - NC developed a secondary mobile nursery for the Native Village of Kake in Southeast Alaska. Using knowledge and experience from three years of operating the CKSN, NC was able to improve nursery design and implementation for this secondary trial. NC purchased a 40-foot, fully insulated refrigerated conex unit that is much more efficient at holding temperature.
    - NC designed and purchased all materials for a flow through system, which will eliminate the need for tank changes and significantly reduce labor requirements for operation. All the materials have been purchased and are ready to be installed and then shipped to the village in time for the 2024-2025 growing season.
- Collect seed:
  - APMI staff collected sorus tissue for four different kelp species: *Saccharina latissima*, *Nereocystis luetkeana*, *Alaria marginata*, and *Cymathere triplicata*.
    - Sorus tissue for *Saccharina latissima*, *Cymathere triplicata*, and *Alaria marginata* was collected in Fox Farm Bay for test sites and transported back to APMI for preparation and spore release.
    - Sorus tissue for *Nereocystis luetkeana* was collected in Latouche Passage for test sites and transported back to APMI for preparation and spore release.
    - Sorus tissue for *Saccharina latissima*, and *Alaria marginata* was collected at Windy Bay for test sites and transported back to the CKSN for preparation and spore release.
    - Sorus tissue for *Nereocystis luetkeana* was collected in Port Etches for commercial site at Port Etches.
- Monitor wild kelp beds:
  - Wild kelp beds have been monitored opportunistically by CRRC's farm managers; information on location of kelp beds and timing of presence of sorus tissue has been shared with indigenous and local kelp farmers. A map of



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identified kelp beds, species, and timing of the presence of sorus tissue is in the process of being developed.

- Outreach has been made to Dr. Michael Stekoll, Professor Emeritus at UAF's College of Fisheries and Ocean Sciences in Juneau, to establish a kelp bed monitoring protocol. This milestone overlaps with the mapping component of EVOSTC project 23220301 "Social, cultural and economic assessment of kelp mariculture opportunities for coastal villages within the EVOS spill zone," and efforts to coordinate mapping projects between the two groups are underway.

Objective 2: Develop effective, affordable, and sustainable practices for Native kelp farming through specific array designs, deployment methods, and seed cultivation strategies that will lead to the long-term restoration of oil-spill impacted areas of PWS.

**Deliverables:**

- Annual test site data: Completed, please see data uploaded into the EVOSTC-approved data management portal, as well as attachments to this report. CRRC has begun coordinating with APMI's Science Director Dr. Maile Branson to establish new data collection and sampling protocols, to maintain scientific integrity of data collected through this project.

**Milestones/Tasks projected to be completed in FY23:**

- Expand and deploy grow lines:
  - Completed. CRRC added two new grow lines to its farm sites in Fox Farm and Latouche, totaling five new grow lines. Diagrams of CRRC's test site configurations are attached in Appendix D. Additional grow lines allow for the cultivation of three-ribbed kelp, a new kelp species that grows prolifically in the areas of APMI's test sites, and a blank line with no seed string outplanted to allow for natural setting kelp to grow without competing against hatchery-cultivated seed string. Blank lines will allow for APMI staff to note new species of opportunity growing in the area.
  - In April 2023, CRRC submitted commercial farm applications for three aquatic farm sites, including Latouche Passage, Tatitlek Narrows and Boulder Bay, in Prince William Sound, and Passage Island in Lower Cook Inlet. As discussed in greater detail in the "Project Summary" section of this report, these commercial test sites will allow CRRC to continue its broader goals of establishing a strong regenerative economy throughout coastal Southcentral Alaska. Diagrams of CRRC's commercial test site configurations are attached in Appendix E.
  - An updated map of commercial sites, research sites, and dropper lines has been attached to this report in Appendix H.
- Harvest and analyze kelp at test sites:



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- Partially completed. Harvest data was collected at each of the test site locations; please see the report attached in Appendix A for harvest data. Data has also been uploaded to the Axiom database in compliance with the EVOS data management plan.
  - Kelp tissue analysis was completed at Sheep Bay and Simpson Bay. Due to extensive lab errors, all kelp tissue samples were not able to undergo desired testing and processing. Analysis of kelp tissue samples that were able to be processed have been uploaded to the Axiom database in compliance with the EVOSTC data management plan. This error has informed the sampling protocol for future years, and additional, reserve samples have now been built into the experimental design and sampling collection protocol which can be found in Appendix C.
- Site monitoring and data collection:
  - Completed. Please see the data attached to this report in Appendix A. Data has also been uploaded to the Axiom database in compliance with the EVOSTC data management plan.

**Milestones/Tasks rolled over from FY22:** As discussed in the FY22 Annual report, two milestones projected to be completed in FY22 were not completed at the time of last year’s annual report, due to the late awarding of funds and signed contracts for this project. Both tasks were rolled over to be completed in FY23 and are discussed below:

- Launch a bull kelp-only test site: Completed. NC is currently operating a bull kelp only site located at Port Etches in Southwestern Prince William Sound. This site was selected based on previous years’ farming experience indicating that site locations with high rates of current are particularly well suited for the commercial cultivation of bull kelp. It should be noted that this site is not a test site but is permitted as a commercial site that NC is leasing from a commercial farmer. As discussed in the project summary overview, commercial sites allow for greater exploration of processing and marketing opportunities, which will be an essential hurdle to overcome to achieve the project’s overarching objective to establish a conservation-based mariculture industry led by indigenous farmers.
- Test two new anchor types: 600-pound danforths and 400-pound dormors: Not completed—this objective has been shifted to be accomplished by FY26. As discussed in the project summary overview, CRRC and NC are both extensively involved in the BBB Regional Challenge program, which has provided many opportunities for collaboration on the advancement of mariculture-related projects throughout the state. In spring 2023, under the BBB program, the Alaska Fisheries Development Foundation (AFDF) issued an RFP for Joint Innovation Projects (JIP), highlighting several key areas of focus for advancements within the mariculture industry, among them focusing on developments for anchoring and mooring systems for aquatic farms. Recipients of these projects were announced in summer 2023; two projects are currently in progress and focusing on



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testing the efficacy of new anchoring and mooring systems. One project has a specific focus on moorage techniques for bull kelp cultivation, and one focuses on assessing the performance of helical anchoring systems. A summary of these projects is attached to this report in Appendix F. CRRC received three JIP awards, two as the direct lead and the third as a subawardee, and thus, as part of the JIP cohort for the 2023-2024 round of funding, elected to avoid duplicating efforts and use the findings from these preliminary projects to inform potential farm-design changes in future years. These changes will be particularly useful to employ at-scale, as CRRC and NC have found no anchoring and mooring issues with its current farm design, at the scale required to operate test sites. As farming operations scale up, CRRC believes new equipment for mooring and anchoring will be essential to improve stability of farm sites. This delay will allow CRRC to build off contemporary mariculture research projects and use equipment funding for this project more strategically.

Objective 3: Conduct a comprehensive landscape analysis by deploying research kelp sites and kelp dropper lines to develop commercial farm capacity rating per region. Collect, analyze, and share data related to water quality, kelp tissue composition, sea life and other factors that may indicate the viability of a site for commercial kelp farms.

**Deliverables:**

- Annual test site data: Completed, please see data uploaded into the EVOSTC-approved data management portal, as well as attachments to this report. CRRC has begun coordinating with APMI's Science Director Dr. Maile Branson to establish new data collection and sampling protocols, to maintain scientific integrity of data collected through this project. Please see Appendix C for a copy of the scientific monitoring protocol.

**Milestones/Tasks projected to be completed in FY23:**

- Single-seeded dropper lines to be deployed in identified sites:
  - Completed. Single-seeded dropper lines have been deployed at sites identified near Eshamy Bay, and Copper Bay on Elrington Island.
    - Additional dropper lines have already been permitted in South Bay (Perry Island), Squaw Bay (Esther Island), and Wells Bay. Coordination efforts have already begun to use oyster farmers in South Bay and Squaw Bay for monitoring and data collection on dropper lines.
- Water quality and tissue sample data recorded at all sites throughout grow-out season:
  - Partially completed. Harvest data was collected at each of the test site locations; please see the report attached in Appendix A for harvest data. Data has also been uploaded to the Axiom database in compliance with the EVOSTC data management plan.



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- Kelp tissue analysis was completed at Sheep Bay, Simpson Bay, and Tatitlek. Due to extensive lab errors, all kelp tissue samples were not able to undergo desired testing and processing. Analysis of kelp tissue samples that were able to be processed have been uploaded to the Axiom database in compliance with the EVOS data management plan. This error has informed the sampling protocol for future years, and additional, reserve samples have now been built into the experimental design and sampling collection protocol which can be found in Appendix C.
  - Site monitoring and data collection:
    - Completed. Please see the data attached to this report in Appendix A. Data has also been uploaded to the Axiom database in compliance with the EVOS data management plan.
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## **2. Products:**

### Peer-reviewed publications:

None.

### Reports:

None.

### Popular articles:

Adventures in West Coast Kelp Farming. Tim Lydon. 19 Jan 2024. The Tyee.  
<https://thetyee.ca/WhatWorks/2024/01/19/West-Coast-Kelp-Farming/>

### Conferences and workshops:

CRRC's Mariculture Liaison presented on this project at the Native American Fish and Wildlife Service Conference located in Anchorage, Alaska in April 2023.

### Public presentations:

1. CRRC's mariculture liaison held an informational meeting at the Gateway Hotel, in Seward, Alaska, in collaboration with Stony Creek Brew House, a local brewery, on December 20, 2023. Presentation focused on ongoing mariculture projects and opportunities throughout the Chugach Region and highlighted CRRC's findings from this



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EVOSTC project. Approximately 16 Seward residents attended. Flier for presentation is attached in Appendix G.

*Data and/or information products developed during the reporting period:*

Data from the 2022-2023 growing season has been attached to this report in Appendix A; it has also been uploaded to the Axiom database in compliance with the EVOSTC data management plan. Last year's growing season marked the first full year of data collection for this project. As a result, project staff can provide little analysis and interpretation of results, without other data points for kelp tissue quality and water quality to point to. A more robust discussion and interpretation of data collected will be included in the FY24 Annual Report.

Data collected from the 2023 harvest do show that no significant levels of hydrocarbons or heavy metal contaminants were detected in the kelp tissue analyzed, a positive finding that opens the door for greater marketing opportunities for kelp produced. It should also be noted that although these results are preliminary, no statistical variation in analyzed water samples was detected across the various test sites.

*Data sets and associated metadata:*

Data sets have been attached to this report in Appendix A, as PDFs, for ease of viewing and consistency throughout reporting template.

*Additional Products not listed above:*

KBBI AM 890 Newscast, featuring our Science Director, Maile Branson, and our Mariculture Liaison, Briana Murphy discussing Aquaculture Opportunity Areas (AOAs). Listen here: <https://www.kbbi.org/.../202.../wednesday-morning-12-06-2023>

October 24, 2023, Facebook post highlighting the outplanting of kelp farm test sites at Latouche Island and Fox Farm.

October 30, 2023, Facebook post highlighting the kelp harvesting and hatchery process at APMI.

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**3. Coordination and Collaboration:**

*The Alaska SeaLife Center or Prince William Sound Science Center*



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Efforts have been made to connect with the Alaska SeaLife Center, particularly to enlist their dive team to assist APMI with kelp mapping efforts. Although no response has been received as of yet, APMI continues to establish coordination efforts.

The fall 2023 growing season marked the first year of operation for the Prince William Sound Science Center's kelp seed nursery (permitted in July 2023). In the 2022-2023 growing season, as noted in the FY22 Report for this project, APMI hosted Dr. Alysha Cypher from PWSSC to provide an opportunity to oversee seed string cultivation methods; in the 2023-2024 growing season, APMI's hatchery production manager Michael Mahmood coordinated with Dr. Cypher to assist with troubleshooting and information sharing on seed string progress throughout the growing season.

*EVOSTC Long-Term Research and Monitoring Projects*

None.

*EVOSTC Mariculture Projects*

CRRC's 22<sup>nd</sup> Annual Subsistence Gathering is funded in part by the Alaska Conservation Foundation, PI of Project 23220301. The mariculture liaison assisted in coordination of scheduling presentations by the EVOSTC ACF team and the Healthy Land and Sea Planning (HLSP) team for the day of the Gathering, as well as a follow-up day focused on the HLSP agenda to allow Tribal members time to talk to learn more about the project and its overarching goals. Following CRRC's 22<sup>nd</sup> Annual Gathering and the follow-up HLSP meeting day, Program Coordinator David Guilfoyle will move forward to commence field work and implementation of HLSP methodology. The HLSP process identifies key requirements for the development of mariculture and food security initiatives and focuses on immediate threats and gaps. This process juxtaposes community values with what Tribal members experience and observe as the main threats to their community.

This project is of particular importance at this point in time and to CRRC tribal members due to the extensive number of mariculture projects, opportunities, and developments occurring throughout the state. As briefly discussed in the "Trustees or Management Agencies" section of this report, NOAA has identified Alaska as an Aquaculture Opportunity Area (AOA) and has solicited community input on areas to explore as AOAs, as well as regions that are not suitable for aquaculture developments. NOAA has sought "Tribal engagement" throughout this process and CRRC has consistently advocated for the agency to put forth a clearer definition of what is meant by that term and to develop methods for outreach and engagement that do not put the onus of participation or action on tribal members. The HLSP model provides a clear path forward for Tribes to develop a plan for natural resource management that can be easily shared with regulatory agencies or private organizations when tribal input is requested.



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CRRC's Kenai Peninsula Mariculture Liaison traveled to Kodiak in December 2023 and presented a summary of work completed on this project to the EVOSTC project 23220301 team (kelp socio-economic studies, led by Alaska Conservation Foundation).

APMI's Mariculture Director, Jeff Hetrick, traveled to Cordova in January 2024 to provide an update on this project to the EVOSTC project 23220302 team (MarReCon project, led by Prince William Sound Science Center).

Both meetings provided an opportunity to learn more about ongoing EVOSTC mariculture projects and identify areas of overlap and collaboration. Mapping plans for new species were identified with EVOSTC project 23220301 and will be implemented in Fall 2024.

*EVOSTC Education and Outreach Projects*

Through CRRC's involvement with the CORaL Network (Project 23220400), CRRC has kept the Alaska SeaLife Center or Prince William Sound Science Center apprised of efforts of this funding.

*Trustee or Management Agencies*

CRRC's mariculture liaison coordinated with the Alaska Department of Fish and Game to submit three commercial applications for aquatic farm sites in Latouche Passage (near the communities of Chenega and Qutekcak), Tatitlek Narrows and Boulder Bay (near the communities of Tatitlek and Valdez), and Passage Island (near the communities of Port Graham and Nanwalek). Each of these sites is permitted for approximately 20 acres.

The mariculture liaison has also coordinated with the Army Corps of Engineers (USACE) and the National Marine Fisheries Society (NMFS). CRRC's mariculture liaison and APMI's Mariculture Director are in the process of meeting with USACE and NMFS staff to discuss alternate mitigation efforts to monitoring requirements. Easing monitoring requirements, which have grown more stringent in recent years, with CRRC's most recent permit at Passage Island requiring weekly monitoring of the site throughout the fall and spring and bi-weekly monitoring throughout the winter, will be a necessary step to lower costs of operating an aquatic farm in the interest of growing industry participation. Weekly and bi-weekly monitoring requirements will be a severe impediment for the long-term growth of the industry, by limiting site-selection potential, as participants will have to site farms nearer to towns or harbors, increasing conflict with other users and making the permitting path more difficult. Monitoring trips are extremely onerous and time-consuming for the farmer, as well as costly. In meeting with NOAA/NMFS, CRRC staff hopes to be able to share new mitigation measures that might be acceptable to replace monitoring efforts, such as installation of GPS devices on farm gear to indicate if anchors



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have moved or gear has broken. CRRC hopes to be able to update the EVOSTC on this issue in the FY24 Annual Report.

Among the multitude of mariculture operations and events that have kicked off throughout FY23, NOAA declared Alaska an Aquaculture Opportunity Area (AOA) in June 2023. This designation opens coastal areas throughout Alaska for further exploration during a four-year review period to determine suitable AOAs throughout the state. NOAA-identified AOAs will encourage investment and development in aquaculture operations by defining regions that are environmentally-, economically-, and socially-approved areas for aquaculture. NOAA is currently in Phase 1 of the project, focused on aquaculture suitability analysis. This analysis will develop a suitability score using spatial suitability systems and create a standard, predictable method to provide “siting suitability scores” to certain areas. On February 26, 2024, CRRC’s mariculture liaisons from both the Prince William Sound and Kenai Peninsula Regions attended NOAA AOA workshop, where participants identified data gaps in the site suitability analysis, including nutrient profiles of waterbodies and pollutant and contamination concentrations, gaps which data from this project will be able to fill.

*Native and Local Communities*

CRRC has made Alaska Native and local community involvement a priority throughout all stages of the project thus far. Alaska Native community involvement is inherent in the structure of our organization. Our involvement with kelp was in direct response to a request of CRRC’s board, comprised of seven Tribal governing members. The CRRC Board serves at the direction of each Tribal Council and Board Members are chosen specifically because of their natural resource management inclinations. As part of this project, CRRC provided regular updates to the Board of Directors and Tribal members through quarterly board reporting. During this report period, reports on progress of this project were given at the following CRRC’s Board of Directors’ meetings and Tribal members to keep them apprised of the project’s progress and current findings through distribution of Board packet material.

- March 28, 2023
- June 20, 2023
- September 27, 2023
- December 12, 2023

As discussed above, through this funding, CRRC already has a kelp farm test site at Latouche Passage (near Chenega). Because there are so many restrictions with the test sites, CRRC has converted the site to a commercial farm. Chenega IRA Council, through the State of Alaska public comment process, expressed a desire in obtaining the commercial site when EVOSTC funding ends in 2027, similar to the transfer (on June 24, 2022) of the Crab Bay farm site, ADL 234017, to the Chenega IRA Council. CRRC and the Chenega IRA Council memorialized this



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transfer in a Memorandum of Agreement – Assignment of ADL 234198 which was executed on January 11, 2024.

At the of August 2023, CRRC’s mariculture liaison and APMI’s Mariculture Director traveled to Port Graham to meet with community members to discuss the upcoming installation of a kelp research and commercial site near Passage Island. A meeting was held at Port Graham’s community hall to assess interest in involvement from community members. One resident of Port Graham has expressed significant interest in various aspects of the kelp farming industry and CRRC’s mariculture liaison has worked extensively with this resident to further their opportunities in the industry. This resident, working with CRRC’s mariculture liaison, was accepted for full funding to travel to a kelp processing and food handling workshop in Kodiak, through Alaska SeaGrant. This resident also applied, and was accepted with full funding, to attend Prince William Sound College’s Marine Natural Resources Technician program and will be receiving an Occupational Endorsement Certificate upon completion of the course in spring 2024. The mariculture liaison is also in the process of working with this resident to develop a plan for permitting a commercial aquatic farm site to participate in the mariculture industry. Further relevant advances will be updated in the FY24 Annual Report.

As discussed in the Project Summary section of this report, the BBB Regional Challenge program was awarded to the Alaska Mariculture Cluster by the EDA in October 2022. Due to CRRC’s pioneering involvement in growing the state’s mariculture industry, the organization has been extremely active in responding to RFPs published by this organization and identifying projects that can build on and expand on the ongoing work under this EVOSTC project. BBB funds have a mandate that 25% of funding be allocated to “rural and underserved communities” and 25% be allocated to indigenous communities, entities, and organizations. At the time of this writing, CRRC has been awarded funding for six different projects through the BBB program and has several additional projects for funding pending. A description of CRRC’s currently awarded projects relevant to the overarching goals of this EVOSTC project is included below:

**Joint Innovation Project (Awarded January 2024):** The second RFP to be issued under the BBB program was a solicitation for Joint Innovation Projects, which focused on developing projects that addressed areas of need in the mariculture industry. Anchoring and mooring systems, bull kelp cultivation, and processing and stabilization for kelp mariculture were among the highlighted areas of need under this RFP. CRRC was awarded three projects under this RFP, including partnering with Saltwater Inc., a Homer-based woman-owned business, to hold a kelp processing workshop in spring 2024. This processing workshop will assist with developing a protocol for processing and stabilizing kelp after harvest, a major bottleneck in the industry and inhibitor to new farmers joining the industry, due to questionable economic concerns. Additional information on this project can be found in Appendix F.

**Processing Feasibility Study (CRRC) (Awarded January 2024):** In January 2024,



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CRRC was awarded funding for a processing feasibility study, “An Economic Assessment Harvesting, Processing, and Primary Stabilization Methods for Commercially Grown Kelp.” This project will assess large-scale harvesting, processing, and transportation methods and works with a tolling company and other processors and end-users of seaweed to determine kelp products suitability in existing supply chains. In preparation for the utilization of CRRC’s commercial sites by tribal members, this project uses the 2024 Spring harvest season to assess the viability of using existing commercial fishing infrastructure in harvesting and processing kelp biomass, and establishing cost and time estimates for transporting kelp on the road system to end users out of state. The results of this project will provide insight into the commercial viability of using local processors and salmon tenders to service remote kelp farms located along Alaska’s southcentral coastline throughout the kelp harvest season. The development of an optimized harvest and stabilization process from these results will be a significant step forward for the mariculture industry in Alaska and will provide immediate financial and productivity metrics for CRRC’s commercial farms and communities in preparation for the 2024/2025 commercial growing season.

CRRC has already begun preliminary processing trials and shared small amounts of kelp product with Advanced Power Dynamics (APD), the tolling company that will be contracted to process kelp for this study. A preliminary product development report, “Liquid Specification & Dry-ability Evaluation Test” was developed and is attached to this report in Appendix I. CRRC mariculture liaison and APMI’s Mariculture Director are in the process of sending additional samples to this tolling company in advance of the larger volume (approximately 20,000 pounds) that will be sent following the 2024 harvest.

**Processing Feasibility Study (NC) (Awarded January 2024):** Native Conservancy was also awarded funding for a processing feasibility study through the Build Back Better program to compare the efficiencies and differences between land-based kelp processing and an at-sea floating processor.

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#### **4. Response to EVOSTC Review, Recommendations and Comments:**

For ease of tracking relevant reviewer comments throughout the length of this project, reviewer comments have been attached as an appendix to this report. In the FY22 Annual Report, reviewer comments were assigned a number for tracking purposes; relevant comments and their associated numbers from the FY22 Annual Report (which included **all** reviewer comments, regardless of relevancy to the report or project) have been included here. For ease of tracking, **comments from the FY23 Annual Report have been recorded in green font.**

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**5. Budget:** Chugach Regional Resources Commission submitted the organization's 1<sup>st</sup> invoice for Project 23220300 FY23 budget (see notes on timing of award detailed in the organization's FY22 report).

<b>Budget Category:</b>	Proposed FY 22	Proposed FY 23	Proposed FY 24	Proposed FY 25	Proposed FY 26	5-YR TOTAL PROPOSED	ACTUAL CUMULATIVE
Personnel	\$218,268	\$218,268	\$218,268	\$218,268	\$61,652	\$934,725	\$324,262.68
Travel	\$11,050	\$11,050	\$11,050	\$11,050	\$2,550	\$46,750	\$15,496.88
Contractual	\$254,410	\$209,810	\$189,810	\$194,810	\$15,000	\$863,840	\$267,872.77
Commodities	\$107,449	\$30,707	\$30,707	\$30,707	\$0	\$199,570	\$124,285.02
Equipment	\$26,900	\$0	\$0	\$0	\$0	\$26,900	\$26,347.40
Indirect Costs (report rate here)	\$118,235	\$93,967	\$89,967	\$90,967	\$15,840	\$408,977	\$114,352.63
<b>SUBTOTAL</b>	<b>\$736,313</b>	<b>\$563,802</b>	<b>\$539,802</b>	<b>\$545,802</b>	<b>\$95,042</b>	<b>\$2,480,762</b>	<b>\$872,617.38</b>
General Administration (9% of subtotal)	\$66,268	\$50,742	\$48,582	\$49,122	\$8,554	\$223,269	N/A
<b>PROJECT TOTAL</b>	<b>\$802,581</b>	<b>\$614,545</b>	<b>\$588,385</b>	<b>\$594,925</b>	<b>\$103,596</b>	<b>\$2,704,031</b>	
<b>Other Resources (In-Kind Funds)</b>	<b>\$500,000</b>	<b>\$75,000</b>	<b>\$75,000</b>	<b>\$50,000</b>	<b>\$0</b>	<b>\$700,000</b>	

**INSTRUCTIONS:** This summary page provides a five-year overview (FY 22-26) of proposed funding and actual cumulative spending which includes the **non-trustee agency** and **trustee agency worksheets**. **This Summary Page should automatically populate as the formulas reference the cells in the non-trustee agency and trustee agency worksheets. Please make sure the totals given are correct.** The column titled 'Actual Cumulative' will be updated each fiscal year and included in the annual report (include information on the total amount actually spent for all completed years of the project). On the Project Annual Report Form, if any line item exceeds a 10% deviation from the originally-proposed amount; provide detail regarding the reason for the deviation.