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

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

Project Number: 22220201

Project Title: Chugach Regional Ocean Monitoring (CROM) Program

Project Lead(s): Maile Branson, Chugach Regional Resources Commission (CRRC), Alutiiq Pride Marine Institute (APMI)

Reporting Period: Feb 1, 2022 – January 31, 2023

Submission Date (Due March 1 immediately following the reporting period): March 1, 2023

Project Website: https://www.alutiiqprideak.org/crom

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

☒ **Project progress is on schedule.**

☐ **Project progress is delayed.**

☒ **Budget reallocation for this FY**
Despite being given written approval by the EVOSTC to proceed with work under this agreement in February of 2022, CRRC has a board-mandated policy that no work, and therefore no spending, is to occur until a signed agreement is complete. The subaward for this project was signed on October 6, 2022, the timing of which would have caused almost a complete miss of the 2022 summer CROM data collection season. However, CRRC was granted a no-cost extension from the Administration of Native Americans (ANA) (Award Number 90NR0317) for a project titled "Community based Harmful Algal Bloom monitoring to provide an early warning system of paralytic shellfish poisoning in Southcentral Alaska" which had very similar goals and objectives as Project Number 22220201. Unspent funds from the ANA were then able to get CRRC through the gap in funding while still completing some of the objectives proposed to the EVOSTC under this award. It did cause there to be unspent funds in the CRRC budget of Project Number 22220201. Per email with Joy Maglaqui on February 28, 2023, unspent FY22 funds will be extended until spent down prior to using FY23 funds.

☒ **Personnel changes**

At the time of this proposal, CRRC/APMI had existing employees and anticipated positions that would be needed to support this project. CRRC/APMI has hired Henry Rappleyea, BSc to fill the Chemistry Laboratory Technician role. In addition, through a partnership with the Chugach Alaska Corporation internship placement program, CRRC has on staff a Chugach Alaska shareholder, Allison Carl, BSc who is working in the Biology Laboratory Technician role. Mrs. Carl's internship with Chugach Alaska Corporation ends in August of 2023 at which time she will become an employee of CRRC. These key positions will have a positive impact on the project as the organization is now fully staffed to complete the project as proposed and awarded. Below is the list of employees that worked on/charged to Program Number 22220201 during EVOSTC fiscal year 2022.

Position	**Employee Name**
CRRC Executive Director	Willow Hetrick-Price
APMI Science Director	Maile Branson
APMI Biology Laboratory Manager	Annette Jarosz
APMI Technician #1 (Biology)	Allison Carol (on loan from Chugach Alaska Corporation)
APMI Chemistry Laboratory Manager	Jacqueline Ramsay
APMI Technician #2 (Chemistry)	Henry Rappleyea
Grants Administrator	Tanja Davis

1. Summary of Work Performed:

Administration:

This report includes the subset of activities under this project that align with ANA Award Number 90NR0317 (as discussed in the section above) beginning February 1, 2022. However, full project activities, including the complete scope of data collection, did not begin until October 6, 2022. Since October 6, 2022, all scheduled sampling efforts for year one of this project have begun and equipment procurement is underway. To date, two of the budgeted equipment pieces under this award have been purchased, and the remaining equipment pieces have been quoted and are in the final steps of CRRC's procurement process.

Sample Coordination:

From February 1, 2022 to January 31, 2023, APMI sent out sampling kits for dissolved inorganic carbon (to monitor water quality parameters) and phytoplankton net tows (to monitor for the presence of harmful algal toxins) to participating communities (Tables 1-3). APMI has received a total of 99 dissolved inorganic carbon samples, 88 phytoplankton samples, and 18 shellfish samples (Tables 1-3). In addition to these samples, several communities in the spill affected region, but outside the funded scope of this project have asked to be included in monitoring efforts. These data are not included in this report but are included in the FY22 submitted dataset for data sharing purposes only.

Table 1. Dissolved inorganic carbon sample status.

Community	# Samples Received	Lab Analysis Complete	Data Finalized
Chenega	44	44	44
Tatitlek	17	17	17
Eyak (Cordova)	34	34	34
Seward	0	0	0
Nanwalek	0	0	0
Port Graham	0	0	0
Valdez	4	4	0
Total Samples	99	99	95

Table 2. Phytoplankton tow sample status.

Community	# Samples Received	Lab Analysis Complete	Data Finalized
Chenega	39	39	39
Tatitlek	17	17	17
Cordova	0	0	0
Seward	24	24	24
Nanwalek	0	0	0
Port Graham	1	0	0
Valdez	7	7	7
Total Samples	88	88	88

Table 3. Shellfish sample status.

Community	# Samples Received	Lab Analysis Complete	Data Finalized
Chenega	3	3	3
Tatitlek	N/A	N/A	N/A

Cordova	N/A	N/A	N/A
Seward	15	15	15
Nanwalek	N/A	N/A	N/A
Port Graham	N/A	N/A	N/A
Valdez	N/A	N/A	N/A
Total Samples	18	18	18

Ocean Acidification Research Laboratory-Ocean Chemistry (Jacqueline Ramsay, Laboratory Manager & Henry Rappleyea, Laboratory Technician):

A. Dissolved inorganic carbon analyses

Since February 1, 2022, a total of 99 dissolved inorganic carbon samples were received from CRRC communities and 95 have been analyzed. An additional 4 from 2022 are awaiting further analysis (Table 1). Procurement of the new Burke-O-Lator is underway.

A. Nutrient analyses

APMI has identified Aleut Analytical Services as a contractual sample processing laboratory as outlined in the project proposal. APMI has ordered nutrient sampling materials from this laboratory for all participating sampling communities. These materials are currently enroute to APMI for subsequent community delivery. However, for cost and control purposes, APMI has researched and planned for an in-house method for nutrient analyses. Procurement of this equipment is underway, and in-house analyses are expected to be online sooner than projected.

Biology Laboratory-Harmful Algae (Annette Jarsoz, Laboratory Manager & Allison Carl, Laboratory Technician):

B. Phytoplankton net tows

Since February 1, 2022, a total of 88 phytoplankton net tow samples have been received by CRRC communities and analyzed via microscopy for harmful algae species identification by APMI staff (Table 2).

C. Shellfish toxin testing

During the summer of 2022, APMI received 18 shellfish samples from CRRC communities, 3 from Chenega and 15 from Seward (Table 3). Throughout the summer of 2022, Jarosz and Carl worked alongside Dr. Branson and collaborators from University of Alaska Fairbanks College of Fisheries and Ocean Sciences (UAF CFOS) to validate enzyme-linked immunosorbent assays (ELISA) for both domoic acid and saxitoxin in blue mussels (*Mytilus edulis*) for this project. ELISAs were also validated for two other common subsistence species in the region; basket cockles (*Clinocardium nuttallii*), and

softshell clams (*Mya arenaria*) (Figures 1-4). CRRC/APMI plan to publish these interlaboratory validation efforts in a peer-reviewed scientific journal.

D. Phytoplankton qPCR detection

Procurement of the necessary laboratory components for this portion of the project is underway. Two of the three pieces of equipment needed for this work (Thermocycler, Fluorometer) have been purchased, and the third (Tapestation) is undergoing the final steps of CRRC's internal procurement process. Analysis will begin in FY23.

Next Steps:

In collaboration with the Southcentral Alaska Collaborative for Resilience through Education and Decision-making (SACRED) network, APMI plans to host an environmental sampler training and environmental education event at NOAA's Kasitsna Bay Laboratory on April 4th-6th, 2023. All Tribal samplers working involved in the CROM Program have been invited. This training will include educational talks on harmful algae, shellfish toxins, ocean acidification, and the role of nutrients and environmental parameters in the development of harmful algal bloom events. Tribal samplers will also have the opportunity to share traditional ecological knowledge on the intersectionality of science and heritage. Immediately following these trainings, APMI staff will be traveling to each participating village to do one-on-one in-person kickoff trainings with each citizen sampler. These hands-on trainings will include the collection of mussels and set up of hanging mussel nets for shellfish toxin testing (Current ADFG Permit # CF-23-015).

Project Setbacks and Additional Sampling Sites:

While almost all of the seven participating Tribal communities have been regularly sampling in Lower Cook Inlet, APMI has experienced limited communication with the communities of Port Graham and Nanwalek. These communities have both experienced heavy turnover, and many of the local residents eager to work with CRRC/APMI have moved out of the Village. APMI hopes to remedy this setback through the planned training in the spring. To fill geographical sampling gaps and maintain adequate representative coverage, APMI has reached out to Cook Inlet Aquaculture Association (CIAA), the Seldovia Native Tribe and the Kachemak Bay National Estuarine Research Reserve about assisting with sampling. APMI also conducted limited phytoplankton sampling on Port Graham land through guided tourism activities within the Kenai Fjords National Park (KEFJNP).

In Prince William Sound, the Prince William Sound Aquaculture Corporation agreed to sample for FY22 at the Armin F. Koernig Hatchery near Chenega, and the University of Alaska Prince William Sound College agreed to sample in Valdez as part of its marine science program. APMI is also receiving samples from the Prince William Sound Stewardship Foundation, who conducts shellfish sampling during regular research cruises around Prince William Sound in collaboration with the U.S. Forest Service. All of these additional data collections are shared in the final uploaded dataset for FY22, although not included in the sample collection counts for this report.

2. Products:

Peer-reviewed publications:
N/A

Reports:
N/A

Popular articles: (see attached articles)

1. Work to be conducted under this award was featured in: Scientific American, January 2022, Volume 326 #1, "Protecting Alaska's Harvest".
2. Alaska Business Monthly, May 2022. "Alutiiq Pride Marine Institute; Science and industry in Seward" by Guest Author Nancy Erickson. The article was published in the Fisheries Section.
3. Hatchery International, January/February 2023 (Volume 24 | Issue 1). "Alutiiq Institute makes strides in shellfish" by Guest Author Nancy Erickson.

Conferences and workshops:
Within the reporting period, APMI staff have presented on this project at the following conferences (presentations are included in Appendix 1).

Alaska Marine Science Symposium, January 23-27, 2023, Anchorage, AK:

- J. Ramsay, W. Evans, C. Weekes, B. Hales, J. Hetrick. Citizen Monitoring for Ocean Acidification in Alaska. Poster Presentation.
- A. Carl, A. Jarosz, D. Carl, E. Mailman, S. Atkinson, K. Mashburn, M. Branson. Interlaboratory Validation of an Enzyme-Linked Immunosorbent Assay for Domoic Acid in Blue Mussels (*Mytilus edulis*) at the Alutiiq Pride Marine Institute. Poster Presentation.
- K. Mashburn, M. Branson, A. Jarosz, A. Carl, E. Mailman, D. Carl, S. Atkinson. Interlaboratory Validation of a Rapid Saxitoxin Assay for Three Species of Shellfish Commonly Consumed in Alaska. Poster Presentation.
- E. Mailman, A. Jarosz, S. Atkinson, M. Branson. Citizen Science in Early Detection of Harmful Algal Blooms in Southcentral Alaska. Poster Presentation.
- A. Jarosz, E. Mailman, S. Atkinson, and M. Branson. Evaluation of Paralytic Shellfish Toxin Congeners in Resurrection Bay Bivalves. Poster Presentation.

NOAA Ocean Acidification Program (OAP), OAP Community Meeting at the Scripps Institution of Oceanography, January 4-6, 2023, La Jolla, CA:

- J. Ramsay, W. Evans, C. Weekes, B. Hales, J. Hetrick. Citizen Monitoring for Ocean Acidification in Alaska. Poster Presentation.
- W. Hetrick-Price, Communication and Community Relationships with OA: Ocean Acidification and the Chugach Region Ocean Monitoring Program. Oral Presentation.

Alaska Idea Network for Biomedical Research Excellence Retreat, September 23-25, 2022, Talkeetna, AK:

- A. Jarosz, A. Carl, D. Carl, S. Atkinson, K. Mashburn, M. Branson. Intra-laboratory and Inter-laboratory Validations for Saxitoxin Detection using ELISA. Poster Presentation.
- E. Mailman, A. Jarosz, M. Branson, S. Atkinson. Building Tribal capacity for harmful algal bloom monitoring for safe and sustainable community harvest of traditional shellfish resources in Southcentral Alaska. Poster Presentation.

Public presentations:

1. October 5 – 7, 2022 presentation at the kick-off meeting of the Community Organized Restoration and Learning (CORaL) Network (EVOSTC Project 22220400). CRRC gave an oral presentation on this project to the CORaL Network.
2. October 19, 2022 presentation at the Native American Fish and Wildlife Society 2022 Alaska Regional Conference. Oral presentation was focused on the CROM Program.

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

Data sets and associated metadata:
Complete datasets for all activities under this award are available to the public in real time at www.alutiiqprideak.org/crom.

Data from this project are shared to the Alaska Ocean Observing System through both the Alaska Harmful Algal Bloom Network (https://ahab.aoos.org) and the Alaska Ocean Acidification Network (https://aoan.aoos.org/).

Testing results are featured in CRRC's quarterly newsletter, which is distributed to Tribal members in the spill-affected region.

Finalized data and metadata for FY22 of this project can be found on Research Workspace.

Additional Products not listed above:
Multimedia Educational Products:
With support of other funding (NOAA Ocean Acidification Program Education Mini-Grant Program | Award Number NA20OAR0170514 & Environmental Protection Agency Indian General Assistance Program | Award Number GA01J99501), CRRC produced a video about the

CROM Program titled "Ocean Acidification and the Chugach Region Ocean Monitoring Program" which can be found on the organization's YouTube channel. The goal of the video was to produce an informative and entertaining video aimed at summarizing existing water quality/ocean acidification water sample collections from community samplers from coastal communities in Southcentral Alaska. This video will be used as outreach and education to inform Alaska Native communities around the state about the potential threats water quality/ocean acidification can pose on wild shellfish populations and traditional food resources.

Non-peer reviewed publications:
Chugach Regional Resources Commission. 2022. Traditional Foods of Southcentral Alaska. Parks Stewardship Forum 38(2): 305–307.

3. Coordination and Collaboration:

The Alaska SeaLife Center or Prince William Sound Science Center:
Through CRRC's involvement with the Community Organized Restoration and Learning (CORaL) Network (EVOSTC Project 22220400), CRRC has kept the Alaska SeaLife Center or Prince William Sound Science Center apprised of efforts of this funding. As described above, CRRC presented the project at the CORaL Network kick-off meeting in October 2022. Efforts to share these data will continue. See discussion under *EVOSTC Education and Outreach Program* for more information.

EVOSTC Long-Term Research and Monitoring Program:
N/A

EVOSTC Mariculture Projects:
Data for this project are collected near kelp farm test sites funded by EVOSTC Project 22220300 Prince William Sound Kelp Mariculture Development for Habitat Restoration and Local Economy. The nearshore costal data collected through the CROM project will supplement the kelp project data collection and should serve to inform performance assessments for current and future aquatic farm sites.

EVOSTC Education and Outreach Program
Data from this project are shared through the CORaL Network, an EVOSTC funded collaboration between the Alaska SeaLife Center (ASLC), Prince William Sound Science Center (PWSSC), Center for Alaskan Coastal Studies, Alaska Sea Grant, the Alutiiq Museum & Archaeological Repository, and Chugach Regional Resources Commission (EVOSTC Project 22220400). The CORaL Network is designed to build upon existing resources within the EVOS region through collaboration with listed organizations. The overarching goals are to ensure that science outreach is relevant, co-created, and culturally responsive to regional communities

encouraging public use of available knowledge & resources related to the EVOS region. The data collected in this monitoring program are shared with the public, Tribes, and researchers through the CORaL program.

CORaL activities incorporating this project include:

- CRRC attended the Alaska Marine Science Symposium to meet with CORaL partners discuss collaborations and informally presented to Gulf Watch Program Scientists. APMI has welcomed CORaL Network partners to visit and learn about the CROM efforts.
- CRRC is a partner in the SACRED project, established to deepen the exchange of knowledge and experiences on the topics of environmental change, community engagement, and long-term relationship building to advance community resilience in Southcentral Alaska. This program maintains specific focus on environmental observation skill building, hands-on activities, and shared learning together. The CROM Program is among the topics discussed at SACRED gatherings.
- CRRC/ASLC/KEFJNP collaborative Seward meeting how to collectively work together and support each other's projects by sharing and identifying overlap and gaps. CROM was shared as one of the efforts to provide monitoring in the region.
- CRRC is working with ASLC, APMI, and the Qutekcak Native Tribe to provide a dynamic science and cultural education program called the Community Coastal Experience in partnership with CORaL Network. CROM efforts were included in this project as well.
- APMI & CRRC has successfully supported general outreach and education related to APMI CROM efforts through the CORaL Program. Local school groups have visited APMI for site tours, led by APMI staff. APMI/CRRC's education and outreach team has begun to develop a procedure for sharing work and data at CRRC communities. This development includes educational materials to reinforce understanding of marine health & mariculture related to APMI. Additional education and outreach efforts are listed in "*Coordination and Collaboration with ASLC and PWSSC.*"

APMI has been able to support the following students that will be using CROM data as part of their theses:
Admitted graduate students: Ms. Annette Jarosz is an APMI staff member who started the MS program at UAF CFOS using CROM data for her thesis. In addition, Ms. Emily Mailman is an APMI staff member (not funded by this project) has recently been accepted to the MS program at UAF CFOS working on harmful algae bioaccumulation. Both students will be working with the PI for their respective projects, and both students' projects will build on the techniques and data collection efforts in this project.

Prospective graduate students: Mrs. Allison Carl has gained interest in this research through her work in the laboratory. Allison plans to apply to graduate school at the University of Alaska next semester.

APMI has recently added a marine science internship for students in the region (Appendix 2). In Seward, APMI Internship development in collaboration with Seward High School. This internship is designed to share the scientific fields represented at APMI. The internship is designed to have three tracks of focus: Mariculture, Chemistry, and Biology. Seward High School student Aly Guernsey has been working at APMI since summer 2022 in the Biology Laboratory as APMI's first intern through this program and has received introductory training in phytoplankton identification via microscopy and ELISA techniques through this award.

EVOSTC Individual Projects not listed above:
N/A

Trustee or Management Agencies:
N/A

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. CROM was created at the 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 will be providing regular updates to the Board of Directors and Tribal members through a variety of outreach efforts. 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 31, 2022
- June 24, 2022
- September 29, 2022
- December 6, 2022

The inception of this program was a desire for shellfish safety monitoring in the CRRC communities, as expressed to CRRC staff by Tribal members during these board meetings.

APMI staff were able to visit each of the seven villages in the Chugach region during summer 2022. During these visits, APMI staff provided community members with an overview of harmful algal blooms, their ecological impacts, and how our organizations are partnering with Tribes to monitor them. Through the sampling program outlined in this project, CRRC has engaged numerous Tribal members to conduct shellfish sampling. This engagement was largely conducted via town hall style visits to all seven of the Tribal CRRC consortium communities, where staff members presented on or discussed harmful algal blooms, the goals of the project,

and shellfish sampling in order to mitigate the risk of paralytic shellfish poisoning. We estimate this information was shared directly with a total of 50 people across all seven communities.

CRRC maintains an Alaska native hiring preference, and many of our staff are Tribal members from the region. This program employs one Tribal CRRC/APMI staff member as a Laboratory Technician. CRRC and APMI staff have also recruited Tribal youth to participate in sampling activities. Currently, two of the community samplers in this program are Tribal youth. Several CRRC and APMI staff, including multiple Tribal members, have received training in laboratory techniques through this project, providing direct capacity building to Tribal members.

4. Response to EVOSTC Review, Recommendations and Comments (if applicable):

May 2021

This project represents a tribally-led monitoring effort aimed at providing information on the distribution of harmful algal bloom species and toxins to inform shellfish harvest. The Science Panel recognized that a major strength of the proposal is that it is tribally-led and would be capacity building, but noted that the proposers could augment that strength by providing more detail on the specific capabilities that would be developed and the plan for long-term continuity. Concerns raised included the lack of a science plan (including data analysis and archiving), no plan for long-term sustainability of the monitoring, and concerns about how the data provided would actually be used by stakeholders such as subsistence harvesters. The PIs need to address how they will comply with Data Submission requirements -all projects funded by EVOSTC must submit data annually to the Data Management project.

PI Response:
APMI has clarified its data archival and sharing policy throughout the proposal, particularly in section 4C (pages 10-13) and section 9 (page 25).

We would like a more thorough explanation and justification of the sampling scheme to ensure that it would provide adequate and actionable information. As we understood the proposal, sampling was only one sample per week per site-- what are the odds of missing potential HABs with a single sample? How are the samples distributed in space?

PI Response:
Sampling locations are at each of the communities detailed in the proposal. CRRC has proposed utilizing these communities as sampling locations to leverage their existing successful community sampling program. These communities are distributed across Prince William Sound and Lower Cook Inlet, and provide a cost-effective means of sample collection in these remote locations. While discrete sampling on a weekly basis might not provide the most thorough

monitoring coverage, it is the most feasible option that accounts for sample preservation, shipment, and processing in a timely fashion.

More detail is needed on the qPCR methods as it was not clear to the extent to which these methods had already been established vs required development; either way we needed more to evaluate the proposal. Additionally, we had some questions about how cell counts and species identification (not speciation) will be accomplished in the field as described (will these data be too rudimentary to be useful?).

PI Response:
The qPCR methods are in development, this has been noted in the proposal in section 4B (pages 7-9), along with a detailed proposed methodology provided in Appendix 2. APMI participates in a HAB qPCR specific working group to develop methods with several academic and agency partners in the national HAB network.

Under the current funding from the Administration for Native Americans and the USGS Climate Adaptation Science Center, all Tribal field samplers have received specified training on microscopy and cell counts using a hemacytometer from collaborators at both NOAA and UAF. A microscope and hemacytometer are provided to each Tribe for samplers to use onsite. These data are currently being collected under both of these awards. APMI recognizes these data are rudimentary, and while this collection is helpful, the goal of the current proposal is to scale up from basic microscopy to more quantitative methods of detection.

Do the PIs undertake periodic intercalibrations of analyses with other laboratories to ensure accuracy and comparability, e.g., NPRB project 1801: Prevalence of Paralytic Shellfish Toxins in the Marine Food Webs of PWS and Kachemak Bay, Alaska?

PI Response:
All analyses will undergo interlaboratory calibrations with the agency and academic partners listed in the proposal. Interlaboratory calibrations are conducted for seawater chemistry with Dr. Burke Hales (OSU) and Dr. Wiley Evans (Hakai Institute), and for ELISAs with Dr. Shannon Atkinson (UAF). APMI has ranked in the top 10% in blind comparisons of interlaboratory accuracy and precision for DIC analyses. All other methods have been transferred to APMI by experts in the field, and are validated to a standard acceptable for peer-reviewed publication. Methodology for the remaining analyses is currently under development, and APMI participates in working groups to develop methods with several academic and agency partners in the national HAB network. This has been clarified in the proposal in section 4B (Pages 7-9).

We also ask that the PIs clarify how these data would augment current sampling for HABs elsewhere in Alaska and also potentially complement the oceanographic information (OA etc)

provided by other entities. This does not mean that working with other entities is necessary to justify the

proposal, per se, but that we expect that PIs will recognize opportunities for outreach and leveraging other funded projects to help advance their goals and the goals of the overall program. We recognize the potential value of these data for the stated goal of informing harvest decisions, but also sees potential value of these data collected by the tribal community for the broader scientific community.

PI Response:
APMI is aware of other monitoring programs across the state, including those conducted by SEATOR, KBNERR, DEC, and others. Currently, KBNERR receives tow samples from PWSAC hatcheries, and the DEC commercial testing program operates exclusively on commercial shellfish samples for regulatory purposes. Furthermore, DEC testing results are often not timely, are not widely publicized for public access to inform both recreational and subsistence harvesters. Regular shellfish biotoxin testing is not part of any of the current publicly available southcentral Alaska monitoring programs. APMI would be the first and only entity to incorporate this testing into a regular monitoring program in the southcentral region. Although there are other public shellfish monitoring programs around the state, none of these programs cover Prince William Sound and Lower Cook Inlet. These regions are arguably among the most heavily utilized for recreational and subsistence harvest of both shellfish and other intertidal organisms. We feel that the state would benefit from a centralized monitoring and testing facility to serve southcentral Alaska. PIs recognize opportunities for outreach and leveraging other funded projects to help advance their goals and the goals of the overall program. APMI actively participates in collaborations through the AHAB, and have already applied for several grants collaboratively with a number of these institutions. This has been addressed in section 1 (pages 3-4)

Describing how data deposition requirements of the Invitation will be fulfilled will help here.

PI Response: APMI has clarified its data archival and sharing policy throughout the proposal, particularly in section 4C (pages 10-13) and section 9 (page 25).

Several other clarifications are requested. On Pg 9, “This project will compliment APMI’s existing Gulf Watch OA monitoring project as a continuation and extension of these monitoring activities.” This project, 21200127, is a 3-year project. The last year is scheduled for FY22. If this project proposal is funded, would the last year of project 21200127 be incorporated into this proposed project? Clarification is required to determine if proposed efforts are being duplicated.

PI response: These proposals encompass two separate projects, with completely separate sampling locations. This is clarified in section 11B (page 27) of the proposal with the following

text: "While these proposals are similar with respect to ocean acidification monitoring efforts and an overlap in regional coverage, they do not share the same sampling locations. Instead, these two projects encompass entirely separate monitoring activities, each with distinctly unique sampling locations." Our data is publicly available on both our website (www.alutiiqprideak.org) and the IPACOA website (http://www.ipacoa.org/Explorer), and may be accessed at any time by both the scientific community and the public.

We appreciate comments and foresight into GWA monitoring continuation. Efforts were made to partner with GWA on this proposal with the notion of continuation of regular monitoring in the spill- affected region. These efforts were unsuccessful. Furthermore, GWA partners did not contact APMI

for continuation of this proposal. We feel that the more data we can provide, the better we can contribute to monitoring efforts across the region.

We would like to see more justification of funds requested in the proposal. For example, why does new equipment need to be purchased in FY22 if there are existing resources? Why does the Autoanalyzer need to be replaced in FY26?

PI Response:
APMI is taking a tiered approach to capacity building for each analysis. A more detailed explanation of this capacity building approach as it relates to the items requested has been provided in section 4B (pages 9-10). This proposal takes a tiered approach to capacity development. APMI is currently conducting ELISA assays using an existing plate reader. This capacity began in FY21. APMI has also been conducting DIC analyses using the BOL since 2012, however, our current BOL is outdated and cannot handle the significant increase in throughput associated with planned projects. The BOL also requires frequent maintenance and troubleshooting to operate, as it is the second BOL ever produced. Dr. Hales has refined this system since project initiation in 2012, and the new BOL models have the ability to process with greater efficiency/accuracy. APMI is planning on bringing on PCR technology in FY22, and will finalize its analytical capacity with the addition of the Autoanalyzer in FY26. We believe this scaled approach is the most reasonable format with which to add these capacities. The only equipment APMI plans to replace is the BOL, and we are purchasing the autoanalyzer for the first time.

Over 50% of the funding requested is for salary for seven personnel; however, only two CVs are provided in the Project Personnel section of the proposal. Some additional information regarding personnel would be appreciated (e.g., who are they, what will their roles and responsibilities be on the project). Is there a longer-term plan for self-sustainability for this project as we assume there is a desire to continue monitoring after EVOSTC funding is no longer available?

PI Response: The proposal instructions only specified that "The CV's of all Principal Investigators and other senior personnel involved in the proposal must be provided". Therefore, CVs of junior personnel were not included. In response to reviewer comments, CVs of all personnel working on the project have been included, and a brief description of job duties has been added to the section 6 (pages 13- 22).

The external peer reviews of the proposal were supportive but also felt that additional details and methods clarification were needed. They also expressed concerns about the technical expertise needed for the molecular analyses and wanted to see more detail in that part of the proposal.

PI Response:
Proposed protocols for all analyses have been added as Appendices 1-4. Language has also been added to clarify that method development is underway for some of these analyses in section 4B (pages 7-9). Also in section 4B (page 9), we have highlighted technical expertise who plan to partner with in case external staff needs assistance.

PI Branson conducted her PhD work on molecular detection, and has significant experience in molecular-based assays.

Finally, we agree with reviewers that the PIs are wise to be cautious about making specific harvest recommendations based on their data. However, we also noted that informing about safe harvest is the main justification for the proposal. We would like to see a clearer statement of how the specific information made available is going to be used by tribal stakeholders.

PI Response:
The use of the information generated by Tribal citizens has been clarified throughout section 1 (pages 3-4).

September 2021

We were pleased with the PI responses and the resulting additions and clarifications in the proposal. We were persuaded by arguments about tiered capacity building and the lack of existing monitoring associated with subsistence harvest. The detailed protocols in the appendix gave the us confidence that the work would be carried out using accepted and vetted methodologies. However, we remain gravely concerned about the low number of samples taken at each site and time (only one). We appreciate the PI constraints but have serious concerns whether the sampling is sufficient to capture something useful and informative for stakeholders, and without that there is no justification for the proposal. This is a significant enough concern that we seriously considered a recommendation of Do Not Fund. However, given the merits of the proposal, we suggested an alternative that would allow the project to proceed if sampling concerns could be addressed. We suggest using the first year of the proposal to test what

sampling intensity would be needed to detect events of interest, and how much variation there is among samples within a site. The PIs need to have confidence that lack of detection of HAB species is due to absence rather than limited sampling and patchiness in space or time. We note that given that the point of the project is not to make statistical comparisons among sites or times, the PIs may be able to address some concerns by still using a single sample, but sampling a larger volume of water, for example, and filtering it down prior to counting.

We do not wish to prescribe exactly how the PIs will design their sampling, but the justification should be scientific rather than logistical. This can be done through a combination of their own sampling and literature justification. This is a needed step to ensure confidence in the reported data by stakeholder groups. Given the Council's biennial review and five-year meeting cycle starting in FY22, our recommendation is to fund this project for FY22-FY24 and fund FY25-FY26 contingent on the sampling design justification and preliminary results from FY22-FY23. If successful, funding for FY27-31 may be determined in FY26.

PI Response:
We agree wholeheartedly with the concerns of the science panel, and acknowledge that sampler participation and consistency is a limitation of this proposal. However, a major goal of this program is to create science education, engagement, and stewardship opportunities for Tribal members, specifically youth. Currently, two of our Tribal samplers are youth, and one is a college student. These members are actively engaged in both front and back end components of the project, and regular data discussions are held with these members on a monthly basis. While we agree that data collected under this award must be scientifically rigorous, we would also like to acknowledge the value of Tribal engagement and stewardship.

Exxon Valdez Oil Spill Trustee Council
Long-Term Research and Monitoring, Mariculture, Education and Outreach
Annual Project Status Summary

5. Budget:

Budget Category:	Proposed FY 22	Proposed FY 23	Proposed FY 24	Proposed FY 25	Proposed FY 26	5-YR TOTAL PROPOSED	ACTUAL CUMULATIVE
Personnel	$343,695	$352,287	$361,095	$370,122	$379,375	$1,806,574	$86,625
Travel	$17,452	$35,860	$17,452	$35,860	$17,452	$124,076	$12,565
Contractual	$23,925	$17,725	$17,725	$22,725	$18,925	$101,025	$12,100
Commodities	$21,150	$16,800	$17,050	$16,800	$19,900	$91,700	$6,833
Equipment	$150,000	$0	$0	$0	$40,000	$190,000	$1,117
Indirect Costs (report rate here)	$60,608	$63,063	$61,668	$66,470	$64,999	$316,808	$17,624
SUBTOTAL	$616,830	$485,735	$474,989	$511,977	$540,651	$2,630,182	$136,864
General Administration (9% of subtotal)	$55,515	$43,716	$42,749	$46,078	$48,659	$236,716	N/A
PROJECT TOTAL	**$672,345**	**$529,451**	**$517,738**	**$558,054**	**$589,310**	**$2,866,899**	
Other Resources (In-Kind Funds)	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	

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 workshseets**. **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.

6. Figures:

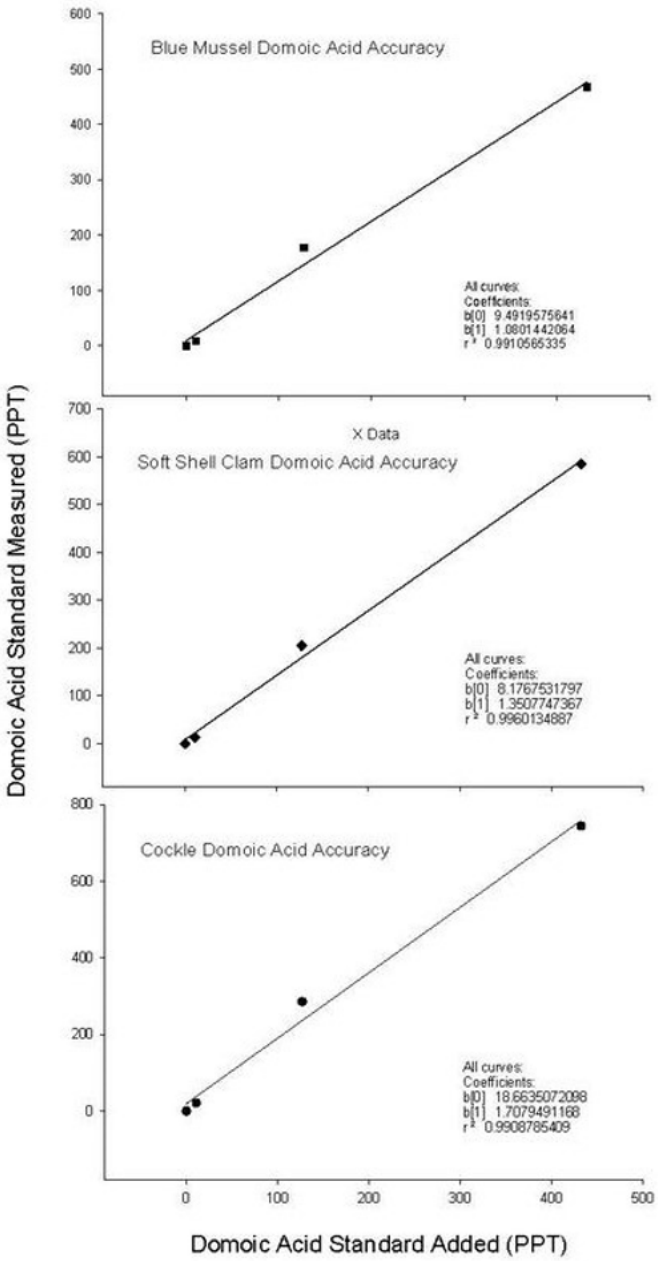
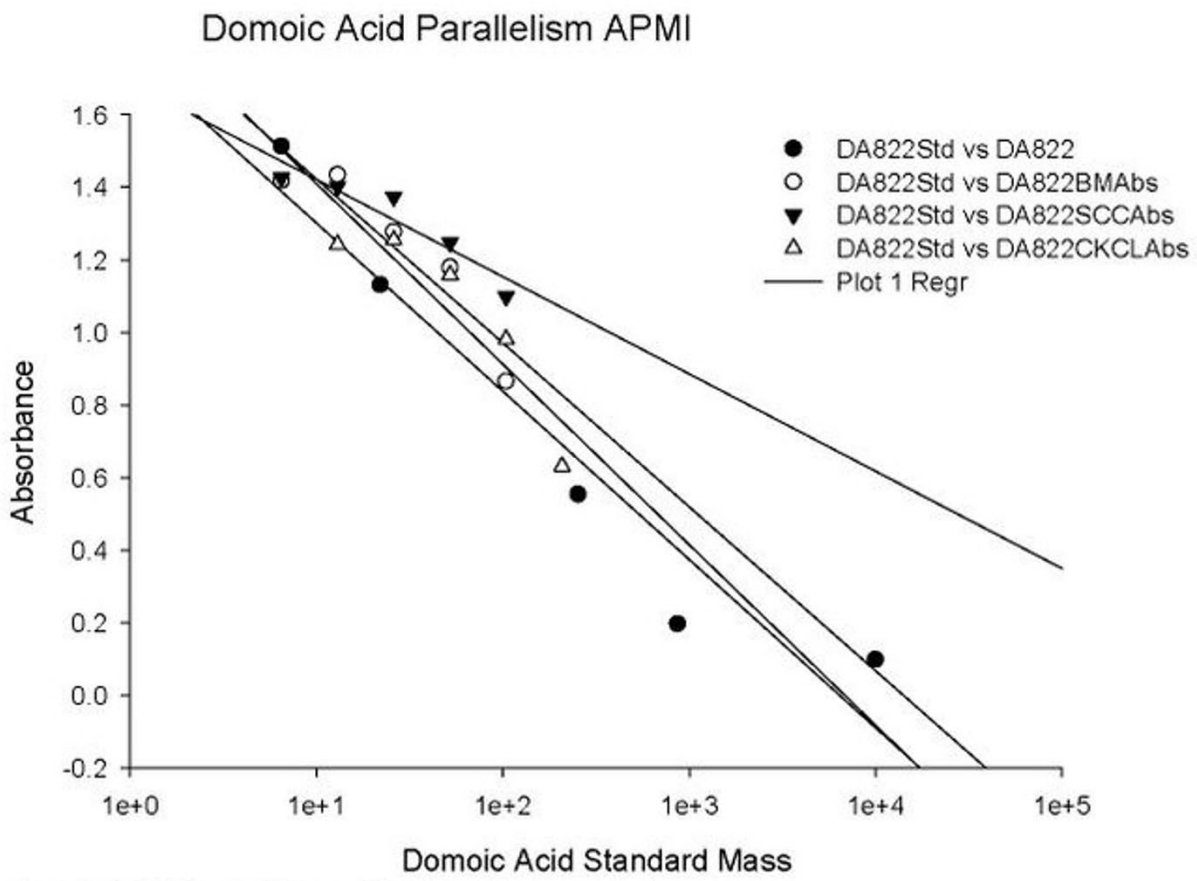


Figure 1. Enzyme linked immunosorbent assay domoic acid accuracy validation conducted for Blue Mussels, Cockles, and Softshell Clams at the Alutiiq Pride Marine Institute.



Domoic Acid Standard Curve Absorbance
Coefficients:
b[0] 1.7642787149
b[1] -0.4634824242
r ² 0.9306095729

Blue Mussels Absorbance:
Coefficients:
b[0] 1.8741257929
b[1] -0.4517157823
r ² 0.8615359088

Soft Shell Clams Absorbace
Coefficients:
b[0] 1.6889114765
b[1] -0.2680131587
r ² 0.8785173288

Cockle Absorbance:
Coefficients:
b[0] 1.906996839
b[1] -0.4973922936

Figure 2. Enzyme linked immunosorbent assay domoic acid parallelism validation conducted for Blue Mussels, Cockles, and Softshell Clams at the Alutiiq Pride Marine Institute.

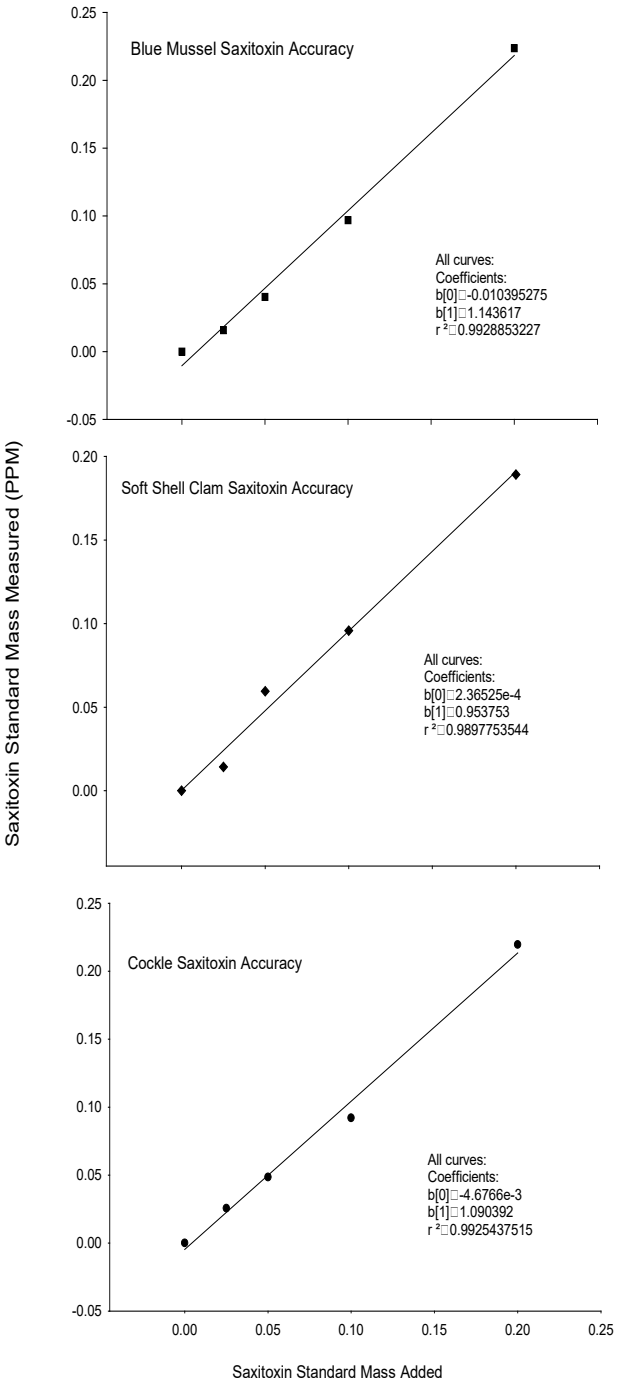
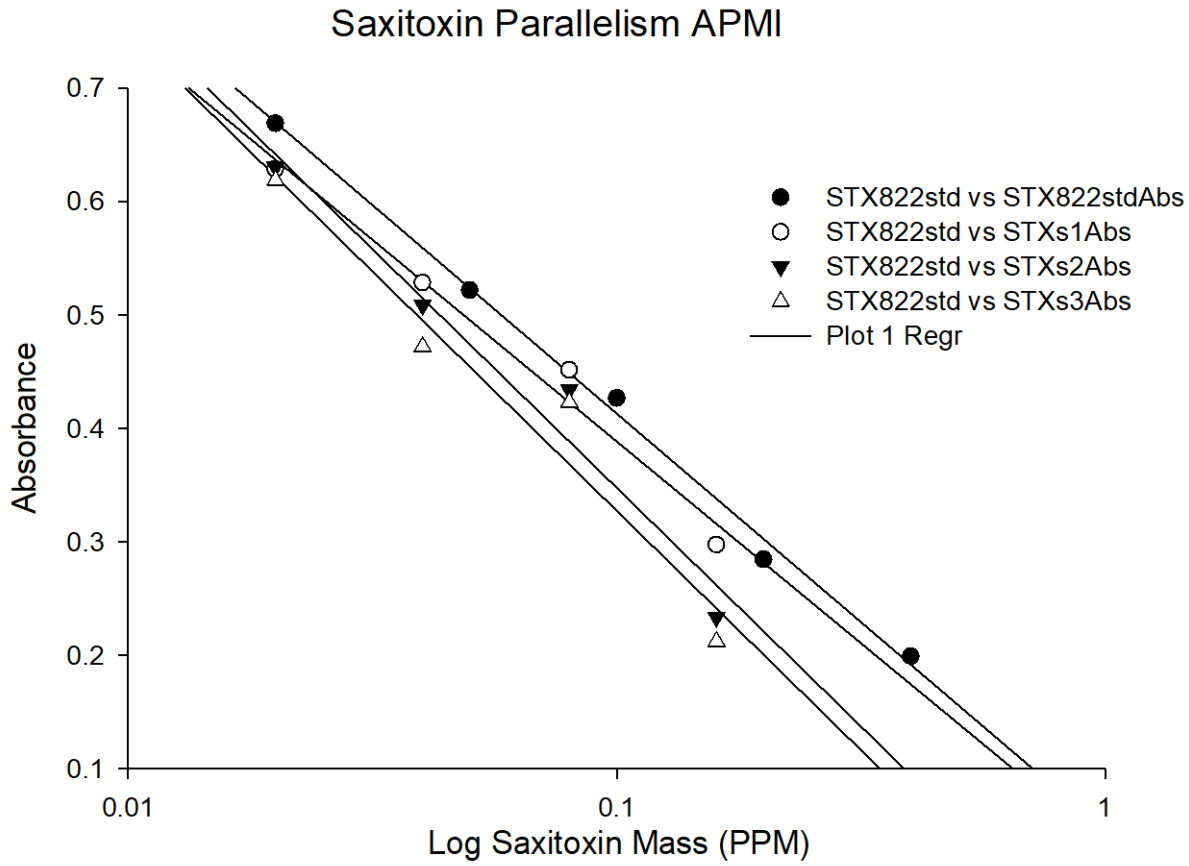


Figure 3. Enzyme linked immunosorbent assay saxitoxin accuracy validation conducted for Blue Mussels, Cockles, and Softshell Clams at the Alutiiq Pride Marine Institute.



Saxitoxin Standard Mass:
Coefficients:
b[0] 0.0514208768
b[1] -0.3616005799
r ² 0.9801134985

Soft Shell Clams:
Coefficients:
b[0] -0.0724317116
b[1] -0.4201408558
r ² 0.9632525657

Blue Mussels:
Coefficients:
b[0] 0.0331484841
b[1] -0.355363258
r ² 0.9789079486

Cockles:
Coefficients:
b[0] -0.0940395896
b[1] -0.4214197948
r ² 0.9479799513

Figure 4. Enzyme linked immunosorbent assay saxitoxin parallelism validation conducted for Blue Mussels, Cockles, and Softshell Clams at the Alutiiq Pride Marine Institute.