FISHERIES RESOURCE MONITORING PROGRAM
NORTHERN REGION OVERVIEW

Since the inception of the Monitoring Program in 2000, a total of 59 projects have been funded in the Northern Region at a cost of $16.3 million (**Figure 1**). The State of Alaska had the most projects funded in the region, followed by the United States Department of the Interior agencies, Alaska rural organizations, and other organizations (**Figure 2**). See **Appendix 1** for more information on Northern Region projects completed since 2000 and a list of all organizations that have received funding through the Monitoring Program.

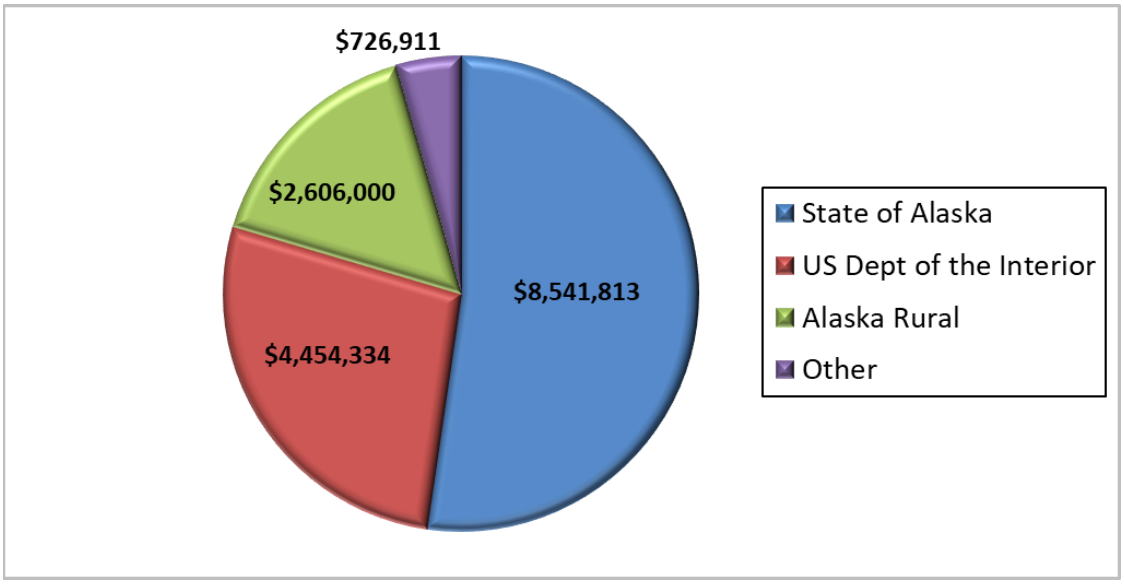

Figure 1. Monitoring Program fund distribution in the Northern Region since 2000.

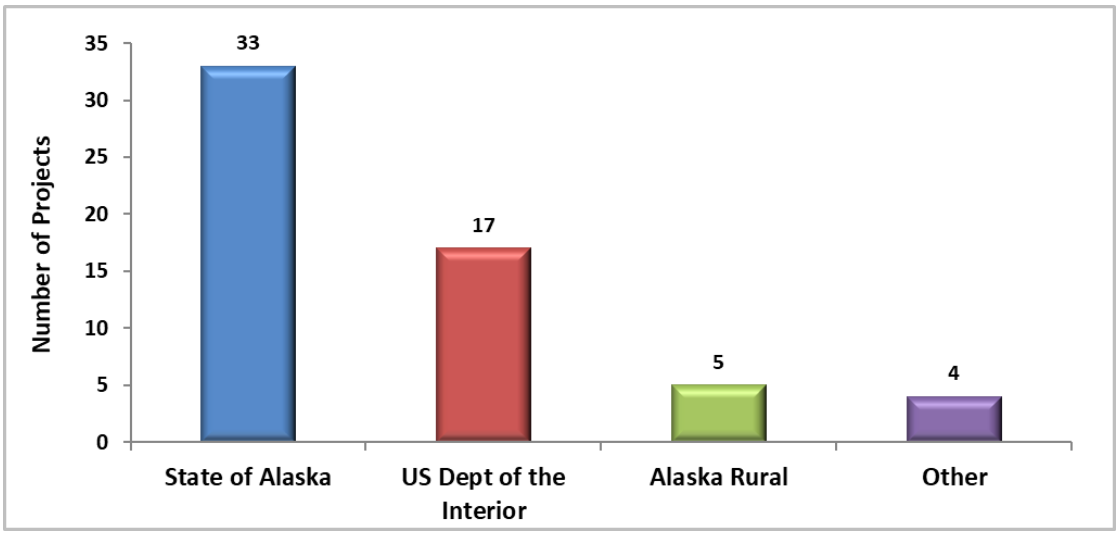

Figure 2. Number of Monitoring Program projects funded in the Northern Region since 2000.

PRIORITY INFORMATION NEEDS

The 2026 Notice of Funding Opportunity for the Northern Region contained the following 25 priority information needs identified by the North Slope, Northwest Arctic, and Seward Peninsula Regional Advisory Councils:

- Inventory and baseline data of fish in major rivers tied to subsistence use in Northwest Alaska. Investigators should consult with local subsistence users and draw on Traditional Ecological Knowledge literature in designing and carrying out research. When possible, applicants are encouraged to include fisheries proximal to the communities of Shishmaref, Buckland, Deering, Selawik, Kivalina, Point Hope, Kotzebue, and villages along the Kobuk and Noatak rivers.

- Evaluate changes in water levels, discoloration and mineral deposits, water temperature, and reduced oxygen in major river systems associated with subsistence fishery resources in the Northwest Arctic Region, and how these changes will affect fish vital for subsistence. Investigators should consult with local subsistence users and draw on their knowledge of historic and recent water conditions in designing and carrying out research.

- Study the effects of expanding beaver populations and range on subsistence fisheries, including whitefish, in the Northwest Arctic Region. Include effects of dams on fish migration and effects of changes to water quality on fish health. Investigators should consult with local subsistence users and draw on their knowledge of historic and changing beaver impacts in designing and carrying out research. Research should also consider the impacts of these changes on subsistence users themselves.

- Document Herring abundance, seasonal movements, and health and investigate causes of large herring mortality events in the Kotzebue area. Investigators should consult with local subsistence users and draw on their knowledge in designing and carrying out research.

- Document the effects of changing river and tributary conditions on salmon spawning in the Noatak and Kobuk River drainages, with focus on the potential effects of factors such as erosion, discoloration and mineral deposits, and changing precipitation on spawning viability. Investigators should consult with local subsistence users and draw on their knowledge in designing and carrying out research.

- Document abundance and migration timing of salmon in the Noatak and Kobuk River Drainages to address changing availability of subsistence fishery resources. Investigators should consult with local subsistence user and draw on their knowledge in designing and carrying out research.

- Document abundance and migration timing, especially of Dolly Varden, Arctic Char, Lake Trout, and whitefish species in the Northwest Arctic, to address changing availability of subsistence fishery resources. Investigators should consult with local subsistence users and draw on their knowledge in designing and carrying out research.

- Identify the spawning areas, critical habitat and range expansion in major rivers tied to subsistence for Whitefish, Northern Pike, salmon, Grayling, and Dolly Varden in the Northwest Alaska Region. Investigators should consult with local subsistence users and draw on their knowledge in designing and carrying out research.

- Chinook Salmon abundance estimate for the Unalakleet River.

- Changes in Grayling, Dolly Varden and Sheefish populations related to climate change.

- Chinook, Chum and Coho abundance estimate for the Pikmiktalik River, with comparison to historical counts.

- Coho Salmon abundance estimate for Boston, Fish, Pargon and Wagon Wheel Rivers.

- Summer and Fall Chum Salmon abundance estimates for the Agiapuk River drainage including American River and Igloo Creek.

- Investigate causes of salmon decline in Norton Sound freshwater drainages.

- Historical analysis of postseason salmon harvest surveys for residents of Unalakleet fishing in the Unalakleet Subdistrict, combined with assessment of causes of low harvest years and overall declines. Investigators must present results to the residents of Unalakleet.

- Using Traditional Ecological Knowledge and/or harvest monitoring, document new fish species and changes in abundance, and size, timing, and distribution of existing fish species.
- Using Traditional Ecological Knowledge and/or harvest monitoring to document the impacts of new or expanding species on other fish that are important to subsistence in the North Slope region.

- Document the effects of climate change including late freeze up on subsistence fishing access, harvest, and preservation, and the impact of these changes on community-wide harvest levels and food security on the North Slope. Research could investigate adaptations for continuing community-wide harvest levels where traditional preservation methods are impacted.

- Baseline fish habitat and water quality monitoring (especially temperature, dissolved oxygen, and silt) on the rivers and tributaries important to subsistence fishing for communities of the North Slope Region. Investigators are encouraged to include overwintering areas.

- Distribution, abundance, and stocks of broad whitefish on the Sagavanirktok, Ikpikpuk, Meade, Inaru, Tupaagruk Rivers, and other rivers important to subsistence.

- Seasonal movement and overwintering habitat of whitefish on the Colville Delta.

- Document population structure of abundance and health of Lake Trout and grayling in Peters, Schrader, Chandler, Shainin, and other Lakes.

- Health and abundance of Arctic Grayling populations in Anaktuvuk Pass area and Point Hope.

- Evaluate changes in water levels, discoloration and mineral deposits, water temperature, and reduced oxygen in major river systems associated with subsistence fishery resources in the North Slope region, and how these changes will affect fish vital for subsistence.

- Document and investigate the possible causes of mold, disease, and discoloration on Broad Whitefish and other subsistence species in the Colville River in the vicinity of Nuiqsut. Compare environmental conditions in the Colville River – including temperature – with those in the Ikpikpuk River, where whitefish are healthy, and mold has not been observed to date. Investigators are encouraged to draw on both stocks status and trends and Traditional Ecological Knowledge research methods.

2026 MONITORING PLAN DEVELOPMENT FOR THE NORTHERN REGION

For the 2026 Monitoring Plan, six proposals were submitted for the Northern Region (**Table 1**).

Table 1. Projects submitted for the Northern Region 2026 Monitoring Plan including project duration and total funds requested.

Project Number	Title	Project Duration (Years)	Total Project Request
26-100	Assessment of Life History Patterns and Hypoxic Stress of Northwest Alaska Whitefish (Coregoninae) and Arctic Grayling	3	$242,150
26-101	Beaver Expansion into the Arctic: Current Impacts and Future Implications for Fishes in Northwest Alaska	4	$938,509
26-102	Selawik Northern Pike Population Dynamics, Movement, and Habitat Use	3	$402,741
26-103	Kobuk River Sheefish Spawning Abundance	3	$299,616
26-150	The Harvest and Use of Sheefish and Other Nonsalmon Fishes in Hotham Inlet, Alaska	4	$615,010
26-151	Kawerak Tribal Fisheries Stewardship Program—Awatipta Ecosystem Monitoring Project	4	$926,318
Total			**$3,424,344**

EXECUTIVE SUMMARIES AND TECHNICAL REVIEW COMMITTEE JUSTIFICATIONS

The following executive summaries were written by the principal investigator and submitted to the Office of Subsistence Management as part of a proposal package. They may not reflect the opinions of the Office of Subsistence Management or the Technical Review Committee. The executive summaries may have been altered for length.

Technical Review Committee justifications are a general description of the committee's assessment of proposals when examining them for strategic priority, technical and scientific merit, investigator ability and resources, partnership and capacity building, and cost/benefit. More in-depth reviews are provided to investigators following project selection.

Investigator Submitted Executive Summary:

Project Number:	26-100						
Title:	Assessment of Life History Patterns and Hypoxic Stress of Northwest Alaska Whitefish (Coregoninae) and Arctic Grayling						
Geographic Region:	Northern						
Data Types:	Stock Status and Trends						
Principal Investigator:	Dr. Kevin Fraley (Wildlife Conservation Society)						
Co-investigator:	None						
Project Request:	**2026:**	$117,798	**2027:**	$99,107	**2028:**	$25,245	**2027:** $0
Total Request:	$242,150						

Issue: Our project will address the whitefish and Arctic grayling-related portions of three Priority Information Needs (PINs) identified by the 2026 Fisheries Resource Monitoring Program through information gathered from Northern Alaska Subsistence Regional Advisory Committees. These PINs are paraphrased to include 1) Identifying the spawning areas, critical habitat and range expansion in major rivers tied to subsistence for whitefish, 2) Documenting abundance and migration timing of whitefish species in the Northwest Arctic, and 3) Evaluating changes in reduced oxygen associated with subsistence fishery resources in the Northwest Arctic Region. The findings from our project will enhance the current information known about whitefish and grayling, allowing federal subsistence managers to make informed decisions in the future based on habitat use and hypoxia stressors on these fish in waterbodies of northwest Alaska.

Objectives:

1. Utilize Strontium (Sr) otolith microchemistry to characterize habitats used (saltwater, brackish, freshwater) throughout the lives of several Coregoninae species collected from lagoons of northwest Alaska

2. Identify common life history patterns based on timing and seasonality of movements between habitats identified from Sr microchemistry to inform habitat priority assessments

3. Characterize the frequency and magnitude that Arctic grayling and Coregoninae species experience hypoxic periods throughout their lives by examining Manganese: Calcium ratios derived from otolith microchemistry.

Methods: To accomplish our goals, we will prepare and analyze 110 sagittal otoliths previously collected from several whitefish species and Arctic grayling in coastal lagoons of northwest Alaska for microchemical analyses, focusing on Sr isotope ratios across fish biochronologies. The data from these analyses will be used to characterize how often fish of each species spend time in freshwater, brackish, or saltwater habitats, and the periodicity of these movements, to better-describe the coastal life histories of Coregoninae, which are largely unknown. Finally, Arctic grayling otoliths collected from the same coastal habitats, as well as a subset of the Coregoninae otoliths used for Sr analyses, will be run to assess Manganese: Calcium ratios across the biochronologies of fish to characterize how often they experience periods of low oxygen throughout their lives. The results of the project will be useful to resource managers for prioritizing critical habitats for whitefish and grayling that may be affected by coastal development or natural processes (i.e., erosion), and to better understand the stressors that fish face during their lives, to ensure that these important subsistence species maintain healthy populations and availability for harvest.

Partnerships/Capacity Building: This project will be a collaborative effort between the Wildlife Conservation Society, the Native Village of Kotzebue, and other scientists involved in fisheries management and research in the region. Collaborating with the Native Village of Kotzebue is paramount to the success of this project, and fostering local and tribal partnerships is principal for all WCS work (both globally and with respect to the Arctic Beringia program). It is essential that this partnership is ongoing and meaningful during each phase of the project, beginning with design. During project implementation, we will fund local consultation and field support to ensure the success of our activities. This will provide opportunities for outreach, synthesis of knowledge, and will cover the cost of any services that local residents may provide during the project duration. Upon completion of the project, we will conduct an outreach meeting in Kotzebue to present findings from the study, modeling this after previous successful fisheries meetings put on by WCS in Kotzebue and Point Hope.

Technical Review Committee Justification: The investigation plan requests three years of funding to characterize habitats, movement patterns, life history, and hypoxia frequency for whitefish and Arctic Grayling in northwest Alaska using otolith microchemistry. This project addresses multiple 2026 Priority Information Needs related to critical habitat and migration timing. While the study employs proven techniques, sample sizes are small, and the sampling design was not described in sufficient detail. The investigator and partners have the experience necessary to complete this project. Capacity will be built primarily through the sharing of research and results. The budget is reasonable, and costs are lower than comparable projects due to the use of pre-collected samples. A letter of support was received from the Native Village of Kotzebue.

Investigator Submitted Executive Summary:

Project Number:	26-101			
Title:	Beaver Expansion into the Arctic: Current Impacts and Future Implications for Fishes in Northwest Alaska			
Geographic Region:	Northern			
Data Types:	Stock Status and Trends			
Principal Investigator:	William Samuel (University of Alaska Fairbanks)			
Co-investigator:	Dr. Ken Tape (University of Alaska Fairbanks)			
Project Request:	**2026:** $234,971	**2027:** $234,011	**2028:** $234,968	**2029:** $234,559
Total Request:	$938,509			

Issue: Beavers (*Castor canadensis*) have recently expanded deep into tundra ecosystems of Northwest Alaska, transforming stream ecosystems and raising concerns from local communities about impacts to fish habitat, water quality, and subsistence food security. Although beaver engineering is known to dramatically alter aquatic ecosystems and affect fish, there is limited understanding of their specific effects on Alaskan fishes, especially in the Arctic. This project directly addresses Priority Information Need (PIN) #3 for the Northern Alaska Region: Study the effects of expanding beaver populations and range on subsistence fisheries. It also contributes toward additional PINs related to fish distributions, habitat change, and salmon ecology (PIN #1, 2, 5, 6, 7 and 8).

Objectives:

1. **Quantify beaver dam impacts on fish occupancy and community composition** using fish sampling, eDNA, and habitat surveys across a latitudinal gradient (Nome, Kobuk, Noatak, and Wulik Rivers).
2. **Evaluate changes to stream habitat suitability** for juvenile salmon and other subsistence fish by modeling how beaver-induced changes to temperature, oxygen, and sediment affect growth and survival (Nome, Kobuk, Noatak, and Wulik Rivers).
3. **Determine whether beaver ponds function as refugia or ecological traps** for Northern Pike and Whitefish in the Selawik River basin using diet, isotopic, and barrier analysis.
4. **Contribute fish and habitat data to statewide databases** to improve baseline understanding of Arctic freshwater ecosystems, which will be useful in monitoring future changes.

Methods:

Study Design and Sites: This project will assess beaver impacts on fishes across a latitudinal gradient in Northwest Alaska, from the Seward Peninsula to the Brooks Range. Sampling will occur on the Seward Peninsula and in the Selawik, Kobuk, Noatak, and Wulik River watersheds, using paired treatment (beaver-impacted) and control (non-beaver-impacted) sites to quantify the effects of beavers on fish communities and fish habitat conditions.

Fish and Habitat Sampling: We will characterize fish communities using both **non-invasive eDNA sampling** and **conventional field methods**, including baited minnow traps, gillnets, seine nets, angling,

and/or electrofishing. Fish will be identified, measured, and weighed, with a subset preserved for **stomach content analysis and energetic content** (via bomb calorimetry). This will allow us to evaluate **species occupancy and distribution, size structure, body condition, and diet** in beaver-impacted versus control habitats.

Concurrently, we will collect detailed **habitat and water quality data**, including stream temperature, dissolved oxygen, turbidity, pH, conductivity, and substrate composition. We will assess **beaver dam height, pond depth, and permeability** to determine their potential to restrict fish movement. Long-term monitoring stations will be established at selected sites to log seasonal variation in **temperature and water levels**, which is critical for understanding habitat accessibility and thermal suitability.

Modeling and Analysis: We will use **bioenergetics models** that integrate field measurements of water temperature, fish diet, and energetic content to estimate potential growth rates. This will allow us to summarize and predict whether beaver ponds enhance or hinder juvenile Coho, Chinook, and Chum Salmon rearing conditions under current and future conditions, which will be critical for understanding changes in food security and salmon expansion into the Arctic.

In the Selawik Basin, we will assess whether **beaver ponds function as refugia or ecological traps** for subsistence species like Northern Pike and Whitefish using **stable isotope analysis ($\delta^{13}C$, $\delta^{15}N$)**, stomach contents, and fish passage modeling. Combined with catch-per-unit-effort (CPUE) estimates and dam characteristics, we will evaluate how beavers reshape trophic dynamics and fish movement.

Partnerships and Capacity Building: The project builds on established collaborations through the Arctic Beaver Observation Network (ABON) and other regional partnerships. Community members from Noatak, Selawik, Nome, and other villages will be engaged through:

- **Annual community meetings** to present findings, gather feedback, and co-develop priorities.
- **Temporary employment/contracts** for local guides, assistants, and knowledge holders to participate in research activities.
- **Co-developed research questions and site selection** based on local observations and Traditional Ecological Knowledge (TEK).
- **Food sharing** by returning fish fillets (when allowed) to elders and communities.
- **Capacity-building materials,** such as a beaver management strategy resource guide.

This approach builds on our prior collaborative efforts and ensures that the research is grounded in local interests and produces actionable and relevant outcomes to guide future management and conservation. The results of this study will provide the first broad-scale evaluation of beaver impacts on Arctic fishes, directly supporting data-driven management of subsistence resources. By integrating ecological monitoring with community engagement, the project will generate actionable insights for adapting to rapid environmental change in Northwest Alaska.

Technical Review Committee Justification: The investigation plan requests four years of funding to study the effects of expanding beaver populations on subsistence fisheries in the Northern Alaska Region using various techniques, including fish sampling and environmental DNA analysis. The project

addresses a 2026 Priority Information Need for the Northern Alaska Region and will contribute information to multiple other priority information needs. However, it is unclear how it will benefit fisheries management in the region. While the study employs sound techniques and is led by experienced investigators, it requires further development of its study design. Capacity will be built through temporary employment, logistical collaboration, and consultation in research design. Although project costs are high, they are justified by the potential to significantly enhance knowledge of beaver expansion and baseline fish distribution. Eight letters of support were received from various organizations and individuals.

Investigator Submitted Executive Summary:

Project Number:	26-102			
Title:	Selawik Northern Pike Population Dynamics, Movement, and Habitat Use			
Geographic Region:	Northern			
Data Types:	Stock Status and Trends			
Principal Investigator:	Jeffrey Muehlbauer (USGS Alaska Cooperative Fish and Wildlife Research Unit, University of Alaska Fairbanks)			
Co-investigator:	William Carter (USFWS)			
Project Request:	**2026:** $113,913	**2027:** $146,592	**2028:** $142,236	**2029:** $0
Total Request:	$402,741			

Issue: Northern pike (*Esox lucius*) are an important subsistence resource in the northwest Arctic. In spite of the prevalence of Federally managed lands in the area and the widespread distribution and subsistence use of pike throughout this area, very little is known about the habitat use requirements, movement by life history, and population structure of pike in the region. This knowledge gap has led to the listing of such pike population structure and movement data as a Priority Information Need (PIN) by the Northwest Arctic Subsistence Regional Advisory Council. Specifically, pike are mentioned in the proposed 2026 PINs within the following category:

> *"Identify the spawning areas, critical habitat and range expansion in major rivers tied to subsistence for Whitefish, Northern Pike, salmon, Grayling, and Dolly Varden in the Northwest Alaska Region. Investigators should consult with local subsistence users and draw on their knowledge in designing and carrying out research."*

This PIN is of particularly high interest to managers and researchers in Selawik NWR, especially given the reliance on pike by people in the Village of Selawik.

This project seeks to provide baseline information about pike movement, habitat use by life history, and identification of potentially discrete sub-populations within Selawik NWR. The proposed project has the support of the refuge, including in particular Refuge Biologist William (Bill) Carter, who is a co-investigator on the project and has been actively involved in its development. No studies, with FRMP funding or otherwise, have been carried out on pike within the refuge. This represents a major data limitation for fisheries and subsistence management on the refuge, but also points to an area of high

potential for rapid knowledge generation to greatly benefit managers and subsistence users of pike populations in the Northwest Arctic.

Objectives: The overarching goal of this project is to determine the life history and movement of pike in Selawik NWR, specifically the Selawik River Delta near the Village of Selawik. Our specific objectives are twofold:

1. To track the movement of pike to discover how pike habitat use varies seasonally and according to pike life history.

2. To identify the extent to which pike in the area exhibit high site fidelity, and thus provide evidence for whether there may be multiple, distinct sub-populations or whether all pike in the area are part of a single, larger population.

Project Activities and Methods:

Project Area:

Project objectives will be met principally by a combination of radiotelemetry monitoring and pike cleithra aging. This project will concentrate on the pike in the Selawik River Delta near the Village of Selawik where the majority of the subsistence fishery takes place. Sampling and tracking will particularly emphasize the confluence of the Fish River and the connected lakes north of the village. Through our consultations with local fishers we will determine the most productive and appropriate fishing areas to deploy the radio tags.

Pike movement will be assessed by implanting approximately 100 pike with radiotransmitters in summer 2026 and 100 more in late winter/early spring 2027 Pike used in this study will be captured using hook-and-line angling within at least 5-10 known locations of pike abundance based on local knowledge. Pike initial capture and subsequent radiotracking will be accomplished primarily by motorboat, with tracking occurring over two years, with aircraft and snowmachine surveys when conditions require. Pike movements by life history will be assessed additionally with limited used of pike cleithra (membrane bone at the rear of the gill cavity) to determine individual fish age. Habitat conditions will be assessed by deployment of multi-parameter water quality sensors for measuring temperature, dissolved oxygen, and other variables. Collectively, these data will allow pike abundance and movements to be correlated to localized water conditions to understand why pike may be choosing certain habitats.

Partnerships and Capacity Building: Critically for the project and for long-term recruitment of rural residents into science and management of Federal subsistence fisheries, we will actively recruit an ANSEP student, ideally with existing local knowledge of the area, to take on the project as their master's thesis research at UAF. We will also involve local individuals and Alaska Native organizations to the extent feasible, particularly by recruiting project fieldwork assistance from the Native Village of Selawik. A local motorboat, captain, and technician will be recruited and paid to assist with the project for two weeks every year, particularly with angling and radiotelemetry. The angling activities will benefit especially from local knowledge. These activities also represent a fisheries training opportunity for those

hired individuals and will promote further interaction between the village and Selawik NWR. We will also involve youth volunteers as a means of outreach, training, and engagement to promote future interest of local individuals in science and working within the refuge. We will recruit older teenagers (2-5 people, ideally) from the refuge's annual Science and Culture camp to join in radiotelemetry and fishing activities. The youth would play a direct role in meaningful sampling and data collection activities and would gain firsthand knowledge that they can "do science", including on the refuge and close to home. We also propose to involve youth in a similar way in the winter, in this case by snowmachine and by foot over Spring Break, to access sites for fishing and tracking pike through the ice.

We will brief village leadership at least yearly be in regular communication with the village and administrators with regards to staffing and youth involvement activities. At least once near project completion, and earlier pending interest, we will facilitate a local presentation about the project and its results, for any interested members of the local public.

Technical Review Committee Justification: The investigation plan requests three years of funding to provide baseline information about Northern Pike in Selawik NWR using radiotelemetry. This project addresses a priority information need while also providing life history information to inform management in the area. The study is technically sound and led by investigators with the experience necessary to ensure project success. Capacity will be built by hiring locals to assist with fieldwork and recruiting an ANSEP student to complete this project as their master's thesis at the University of Alaska Fairbanks. The project would benefit from letters of support, especially from local communities and ANSEP. The budget is well justified, with reasonable costs for the proposed work.

Investigator Submitted Executive Summary:

Project Number:	26-103			
Title:	Kobuk River Sheefish Spawning Abundance			
Geographic Region:	Northern			
Data Types:	Stock Status Trends			
Principal Investigator:	Allison Matter (ADF&G)			
Co-investigator:	None			
Project Request:	**2026:** $0	**2027:** $96,960	**2028:** $99,137	**2029:** $103,519
Total Request:	$299,616			

Issue: The Kobuk River sheefish or inconnu *Stenodus leucichthys* population supports substantial in river subsistence and sport fisheries along with winter subsistence, sport, and commercial fisheries that occur in Hotham Inlet and Selawik Lake. This project primarily addresses the need for baseline population assessment and monitoring of subsistence and sport fisheries. The subsistence and sport fisheries take place throughout Hotham Inlet and Selawik Lake, which are bordered by the Selawik National Wildlife Refuge; near the outlet of the Kobuk River also in the Selawik National Wildlife Refuge; around in river summer feeding areas in Kobuk Valley National Park; and throughout the spawning grounds in Gates of the Arctic National Park & Preserve. Federal management of these fisheries is mandated through the Alaska National Interest Lands Conservation Act (ANILCA) to conserve sheefish stocks (USFWS 1993).

The majority of sheefish harvested in the Selawik National Wildlife Refuge are comprised of the only two known spawning stocks in the region, the Selawik and Kobuk River stocks (Alt 1987, Savereide and Huang 2016, Hander et al. 2017). To effectively manage these fisheries, an understanding of harvest (numbers and composition) and stock abundance is necessary to describe the population dynamics of these stocks and identify sustainable harvest levels. The Alaska Department of Fish and Game (ADF&G) Division of Subsistence is submitting a proposal to OSM titled "The Harvest and Use of Sheefish and other Nonsalmon Fishes in Hotham Inlet, Alaska" to acquire a more recent understanding of sheefish harvest. That proposal pairs well with this proposal to describe the current population dynamics of sheefish in the region. The sheer size of this region coupled with stock differences in seasonal movements and timing (Smith 2013) make deriving estimates of stock abundance from typical mark-recapture experiments unfeasible. It is challenging to obtain estimates of spawning stock abundance because sheefish are iteroparous (spawn more than once) and are known to skip a year or more between spawning events (Nikolskii 1954, Scott and Crossman 1973, Savereide 2014), estimates of spawning frequency would be needed to derive estimates of total mature stock size. Using radiotelemetry, Savereide (2016) derived these estimates of spawning frequency and spawning abundance estimates. However, with an increase in popularity in the winter subsistence fishery, more recent information is required for successful management of both the subsistence and sport fishery. This project will use sonar methodology to enumerate the in-migration of spawning sheefish in the Kobuk River and provide managers with an accurate index of the entire Kobuk River spawning stock.

Objectives: The objective of this project will be to annually (FY2027-2029):

1. Enumerate sheefish during migration to the spawning grounds in the Kobuk River using sonar methodology.

Methods: The objective is to position the sonars so they can record images from the entire river, 24 hours a day, 7 days a week. The Kobuk River is approximately 60 m wide where we would like to set up the sonar station. On low frequency, the sonar can ensonify up to 40 m. A feasibility study has shown that two sonars are needed to ensonify the entire migration area (Matter In prep.). Small weir structures will be deployed to ensure migrating sheefish pass through the sonar beam. The ARIS units will be deployed over the course of the sheefish migration from 15 July to 15 September (Savereide 2014). The ARIS units will be mounted to a portable aluminum stand that is moved manually to adjust for water depth. A small generator will provide the required power to run the sonar equipment.

To confirm that no other fish $\geq$ 675 mm FL are passing the sonar or that sheefish $\leq$ 675 are not moving upriver to spawn, periodic, beach seine hauls throughout the sheefish migration will be conducted to sample fish near the study area to ensure that assumptions of fish size and species composition are being met.

A crew of up to four people with assist with sonar and camp setup, and two technicians will be assigned to enumerate the sheefish migration in the Kobuk River for the duration of the project. The additional biologists will assist with the beach seine hauls and initial ARIS deployments and training. The project will begin during the second week of July and will continue through the end of August each year.

Partnerships and Capacity Development: ADF&G Division of Sport Fish has discussed this sheefish project and previous results with local communities in the Kobuk River drainage and Kotzebue. The boat to be used for this study is stored by a local family in Kobuk that has worked on sheefish projects in the past. The project biologist also contracts the local community occasionally for logistic support such as boat rides and field camp set-up and takedown. All knowledge gathered from this project will be shared with local and agency representatives.

ADF&G will provide project updates to the Regional Advisory Council as well as the local communities. ADF&G is actively seeking letters of support from RAC and local community members, but they were unavailable before the deadline. However, they will be submitted to OSM as soon as they become available. In past years ADF&G has found that local knowledge has been invaluable to the success of sheefish projects. ADF&G will also coordinate logistics such as storage, etc. with Kobuk village, ADF&G Kotzebue as well as the Selawik National Wildlife Refuge.

The area management biologist has discussed concerns of sheefish overharvest and sustainability with members of the Northwest Regional Advisory Council (NWRAC) in Kotzebue as well as the Kotzebue Fish and Game Advisory Committee in 2024 and 2025. In addition, a lifelong Kotzebue area resident and subsistence fisher has provided a letter of support for this research, as has the NWRAC. The principal investigator plans to work with the school in Kobuk to visit the project site, learn about sonar, and create an independent study project on sheefish life history. All knowledge gathered from this project will be shared with local and agency representatives, and final presentations of this research will be presented at the NWRAC meeting, Kotzebue Fish and Game Advisory Committee meeting, and the Lower and Upper Kobuk Fish and Game Advisory Committee meetings.

Technical Review Committee Justification: The investigation plan requests three years of funding to enumerate Sheefish migrating to their spawning grounds in the Kobuk River using sonar techniques. This project aims to provide an index of the Kobuk River spawning stock and addresses priority information needs important for management of subsistence fisheries. The study is technically sound, using proven methods and is led by the Alaska Department of Fish and Game, which has the resources and experience to ensure project success. However, the project would benefit from stronger community partnerships and capacity building. The budget is reasonable and well-justified. Letters of support were received from the Northwest Arctic Regional Advisory Council and Seth Kantner.

Investigator Submitted Executive Summary:

Project Number:	26-150			
Title:	The Harvest and Use of Sheefish and Other Nonsalmon Fishes in Hotham Inlet, Alaska			
Geographic Region:	Northern			
Data Types:	Harvest Monitoring, Traditional Ecological Knowledge			
Principal Investigator:	Helen Cold (ADF&G)			
Co-Investigator:	David Koster (ADF&G)			
Project Request:	**2026:** $205,906	**2027:** $233,847	**2028:** $124,378	**2029:** $50,879
Total Request:	$615,010			

Issue: Sustainable management of nonsalmon fisheries requires accurate, up-to-date harvest and use information. For rural communities within the Northwest Arctic near Hotham Inlet, this information does not exist or is imprecise, outdated, or unsubstantiated. Managing sheefish and other nonsalmon fish species is not possible without accurate, up-to-date information about annual harvests, changes in abundance, and size, timing, and distribution of new and existing species. Using mixed qualitative and quantitative methods, the proposed research will update harvest estimates of sheefish and other nonsalmon fishes for the communities of Kotzebue and Noorvik to explore shifting patterns of harvest. The ethnographic component of the research will document Local Ecological Knowledge (LEK) and Traditional Ecological Knowledge (TEK) of critical nonsalmon fishes for this region with a focus on local fishers' observations of abundance and distribution.

Objectives:

1. Document local and traditional knowledge related to sheefish and other nonsalmon species and sheefish abundance and distribution based on:
    a. traditional and contemporary patterns of nonsalmon fish harvests in Kotzebue and Noorvik, communities who conduct most of their harvest in Hotham Inlet or the Kobuk River;
    b. observational knowledge about fish species new to the area, and changes in abundance, and size, timing, and distribution of existing fish species in the Kobuk River Drainage;
    c. observational knowledge of changes to sheefish and other nonsalmon fish populations, their habitats, or both over time, and any association with changing climate;
    d. observational knowledge of fish ecology, including information about habitat, reproduction, diet, and seasonal movements;
    e. spatial mapping of harvest areas and other significant habitats by species and season.

2. Document subsistence harvest levels as follows:
    a. Estimate subsistence harvest levels and percentages of Koztebue and Noorvik households that use, harvest, give away, and receive sheefish and other nonsalmon fish species, for the calendar years 2026 and 2027 This data set will also include basic demographic

information, households' assessment of harvests and use compared to recent years, and questions tracking the seasonality/location of harvests and gear types used.

b. Spatially map harvest areas and significant habitats by species and season as well as traditional camps and other locations of importance.

Methods: Methods for this project include both qualitative and quantitative methods of data collection. Alaska Department of Fish and Game (ADF&G) researchers will work with the tribal councils in Kotzebue and Noorvik to identify local research assistants (LRAs) to hire and help with traditional ecological knowledge interviews and household surveys.

The ethnographic research for this project will include anthropological methods of participant observation and semi-structured interviews. Specific participant-observation may include talking to community members about the research, assisting community members to set or check nets, helping distribute the harvest to others, assisting with processing, or visiting households to learn about kinship relationships or fishing groups in the community. Field trips will last approximately 5–13 days, and all time in the field will generally be spent either conducting interviews, surveys, or in participant observation. Semi-structured interviews will be conducted with long-time residents in both communities who have a history of fishing for sheefish and other nonsalmon fish in Hotham Inlet and the Kobuk River watershed. Interview data will be downloaded into ATLAS.ti, a qualitative data analysis software, coded, and analyzed. Coding of transcribed interviews will be accomplished using an inductive process that allows for the development and refinement of codes based on emergent themes and relationships present in the interview data rather than a predetermined code list.

The primary harvest data collection method will be systematic household surveys, which will document harvest for each community over a 12-month period. The research will document two years of harvests to mitigate against the potential of a single year of data collection during an anomalous year. Harvest data will be collected face-to-face using a standardized survey form and will last approximately 15 minutes, depending on the nature of each household's experience with subsistence fishing-related activities. In spring 2027 and 2028, researchers will administer a nonsalmon fish harvest survey to a random sample of households in Kotzebue (25% sample) and Noorvik (75% sample). The survey will document species harvested, the amounts, timing of harvest, gear types used, and harvest location. The Division of Subsistence Information Management Section will set up database structures within a Microsoft SQL Server to hold the survey data, which will be backed up nightly. Once survey data are entered into the database and confirmed, information will be processed with the use of R statistical software.

During interviews and surveys, maps of Hotham Inlet and the Kobuk River and nearby surrounding areas will be used as a visual reference. Fishing sites, observations of nonsalmon species, and other relevant information related to the topics of interest will all be mapped using the ESRI Collector application on iPads, or on paper and then transferred to the iPad afterward, to produce maps that will accompany the analysis by providing visual records of harvest areas and any other important spatial data captured in the interviews.

Partnerships/Capacity Building: A primary goal of this project is to engage residents of the study communities throughout the research project to build capacity for fisheries research and to facilitate information sharing between local residents and resource management agencies. This mutual sharing of information is critical for informing regulatory changes to nonsalmon fish resource harvests and potential implications on subsistence practices. Local research assistants will be trained in social science research methods and will help with data collection for surveys, mapping and ethnographic interviews. Working with locally hired team members to collect data allows researchers to better understand local issues, and it can also help local residents further understand scientific research activities as well as management issues. Community residents will have the opportunity to share their knowledge of nonsalmon fish in the Hotham Inlet area with researchers, and in return project staff will share what they learn through ethnographic and harvest-based research with the community. The research seeks to facilitate the two-way exchange of information which can enhance the relationship between the communities and ADF&G and foster additional partnerships in the future.

Technical Review Committee Justification: This project updates harvest estimates and documents local and traditional ecological knowledge of sheefish and other nonsalmon fishes in Hotham Inlet for Kotzebue and Noorvik. Declines in caribou and other resources in the region suggest that federally qualified subsistence users may be increasing their dependence on nonsalmon fish. The investigators will apply mixed qualitative and quantitative methods to document harvests as well as changes in abundance, size, migration timing, and distribution of new and existing nonsalmon fish species in order to inform sustainable management of the fishery in the context of a changing climate. The project addresses four 2026 Priority Information Needs. Subsistence surveys provide one of the only ways to assess changes in harvest and dependence on this fishery for management purposes, and they have not been conducted in these communities for over ten years.

The investigators are extremely well qualified to conduct this work, and they would bring the substantial institutional knowledge and administrative resources of ADF&G Division of Subsistence to the project. The investigators propose to conduct surveys and interviews for two consecutive years. This is a new approach, which may improve the quality and usefulness of results. However, this is a trade-off, as these funds could otherwise have been directed towards including additional communities in the study.

Letters of support were included from Noorvik Native Community (Noorvik) and the Native Village of Kotzebue (Kotzebue). Additionally, the Northwest Arctic Regional Advisory Council authored a letter of support. The Tribal Councils will be invited to provide input into the project design, and will be consulted to help interpret the preliminary results. Local research assistants will be hired and will have an extensive role in the work. Overall, the cost appears reasonable for the work proposed, but is higher than typical due to the inclusion of two study years.

Investigator Submitted Executive Summary:

Project Number:	26-151			
Title:	Kawerak Tribal Fisheries Stewardship Program—Awatipta Ecosystem Monitoring Project			
Geographic Region:	Northern			
Data Types:	Harvest Monitoring, Traditional Ecological Knowledge			
Principal Investigator:	Julie Raymond-Yakubian (Kawerak)			
Co-Investigator:	Hailey Scofield (Kawerak)			
Project Request:	**2026:** $233,696	**2027:** $234,696	**2028:** $234,921	**2029:** $223,005
Total Request:	$926,318			

Issue: Financial and logistical constraints have limited scientific monitoring efforts of salmon and habitat in Northern Alaska Region. Trained community based observers or Sentinels will integrate Traditional Knowledge with standardized monitoring methodologies to collect robust watershed level ecological data on salmon and habitat. These data will inform salmon management and policy and increase capacity for Tribal participation in salmon recovery and conservation planning. Ultimately, this initiative will enhance Indigenous stewardship, fill critical knowledge gaps, and support the sustainability of salmon populations for future generations of subsistence harvesters.

Objectives:

1. Hiring and training Sentinels in salmon ecosystem monitoring using both Western scientific protocols and Traditional Knowledge approaches.

2. Establishing a Traditional Knowledge Expert Group (TKEG) to interpret monitoring results and provide culturally grounded insights.

3. Utilizing the Indigenous Sentinels Network (ISN) for real-time data collection, quality control, and secure data storage.

4. Developing regional and community-specific monitoring priorities in consultation with Tribal Councils.

5. Engaging with Tribal, state, and federal agencies to integrate findings into adaptive salmon conservation and subsistence management.

6. Sharing results through reports, presentations, and peer-reviewed publications co-produced with Tribal partners.

Methods: This project utilizes trained local residents, or Sentinels, with strong subsistence experience to collect observational data on ecological and fisheries-related indicators. In Year 1, Sentinels will

participate in multi-day trainings in Nome to align on regional research priorities and standardized data collection protocols co-developed with Kawerak staff, Tribal Knowledge holders, and the Tribal Knowledge and Ecological Governance (TKEG) group.

Data Collection
Sentinels will monitor environmental conditions using tools like Hobo Pendants (for water temperature and dissolved oxygen), turbidity tubes, and Secchi plates. Monitoring sites and sampling frequencies will be guided by Traditional Knowledge, logistics, and input from fisheries biologists. Post-harvest biological samples (e.g., fish scales, otoliths, DNA, and parasites) will be collected, documented, and sent to the Kawerak office for further analysis or storage.

Quality Control
All data is entered through the Indigenous Sentinels Network (ISN) platform, which includes built-in quality control. Sentinels pre-review their entries, which are then independently reviewed by staff or senior Sentinels. Only complete, validated data is accepted for analysis or reporting. Data collection protocols will be refined over time based on TKEG feedback and annual review findings.

Data Analysis
While ISN does not conduct in-platform analyses, data can be exported and analyzed using tools like R or Python. Analyses are conducted annually by Kawerak staff to detect trends, assess ecological changes, and refine sampling methods. Preliminary results are shared with Tribes, Sentinels, and TKEG for validation and feedback.

Data Sovereignty and Use
All data remains under Tribal ownership, and sharing decisions are made by participating Tribes in collaboration with program staff. ISN's flexible sharing permissions protect Tribal sovereignty while enabling data use in broader conservation and management planning. Results may be disseminated in peer-reviewed publications, reports, or other formats guided by Tribal input.

Framework and Best Practices
The project follows best practices in co-production of knowledge (CPK), guided by Arctic Indigenous-centered models and Kawerak's Tribal research protocols.

Partnerships/Capacity Building: By building an Indigenous-led, watershed-level monitoring network, Kawerak seeks to generate critical ecological data, integrate Traditional Knowledge, and expand Tribal capacity to engage in salmon conservation, federal subsistence management, and policy decision-making.

A central goal of the Awatipta Program is to build capacity within Indigenous communities by training local Sentinels to collect ecological data and conduct watershed monitoring. This work empowers Tribes to actively contribute to salmon management, restoration, and policy development using both Traditional Knowledge and scientific methods.

Locally collected data will strengthen Tribal engagement in adaptive management and foster collaboration with the broader scientific community. The program also supports development of

research partnerships beyond basic monitoring, including sample collection for salmon body condition analysis and genetic diversity studies using tools like eDNA. Funding is included for shipping and preliminary testing of samples to support these partnerships.

Federal and regional partners (e.g., USFWS, USGS, NOAA, ADFG, NSEDC) may assist in refining methodologies in alignment with Tribal priorities throughout the project.

Technical Review Committee Justification: This project would use a co-production of knowledge framework to implement an Indigenous Sentinel monitoring program for salmon and their habitat in the Seward Peninsula region. The project would generally address the following 2026 Priority Information Need for the Northern region: *Investigate causes of salmon decline in Norton Sound freshwater drainages*. Some aspects to be monitored include in-river turbidity, water temperature, and precipitation. The project would use an existing data reporting platform created by the Indigenous Sentinels Network. The investigators indicate that additional monitoring parameters and monitoring sites could not be determined prior to in-depth consultation with relevant tribes, which is contingent on funding. However, it is difficult to fully evaluate the proposal without these details. The proposal could be improved by including information on the location of existing and proposed monitoring activity, so the linkage to Federal public waters could be determined.

Deliverables would include the network of trained Sentinels, environmental data sets, reports from the Traditional Ecological Knowledge Expert Group reports, and a final technical report. Dr. Raymond-Yakoubian and Kawerak would bring substantial resources and experience to this effort. Ms. Scofield appears qualified, but is new to the Monitoring Program. The proposal would be improved by inclusion of information about the Kawerak fisheries biologist. The proposal excels in the dimension of capacity building, contributing to the development of a trained and experienced local Sentinel network and a Traditional Knowledge Expert Group. The cost of the project is high for the work being proposed, but this is difficult to evaluate without the inclusion of additional details on the proposed work.

APPENDIX 1
PROJECTS FUNDED IN THE NORTHERN REGION SINCE 2000

Project Number	Project Title	Investigators
	North Slope	
00-002	Eastern NS Dolly Varden Spawning and Over-wintering Assessment	ADF&G, USFWS
01-113	Eastern NS Dolly Varden Genetic Stock ID Stock Assessment	ADF&G, USFWS
01-101	Eastern NS (Kaktovik) Subsistence Fish Harvest Assessment	AD&FG, KIC
02-050	NS (Anaktuvuk Pass) Subsistence Fish Harvest Assessment	ADF&G, NSB, AKP
03-012	SST of Arctic Cisco and Dolly Varden in Kaktovik Lagoons	USFWS
04-103	North Slope Dolly Varden Sonar Feasibility	USFWS
06-108	North Slope Dolly Varden Aerial Monitoring	ADF&G
07-105	North Slope Dolly Varden Genetic Baseline Completion	USFWS
07-107	Hulahula River Dolly Varden Sonar Enumeration	USFWS
12-154	North Slope Salmon Fishery HM/TEK	ADF&G
14-103	Beaufort Sea Dolly Varden Dispersal Patterns	UAF
16-101	Arctic Dolly Varden Telemetry	USFWS
16-106	Aerial Monitoring of Dolly Varden Overwintering Abundance	ADF&G, USFWS
16-107	Chandler Lake Trout Abundance Estimation	ADF&G
16-152	Meade River Changes in Subsistence Fisheries	ADF&G
18-100	Colville River Grayling Habitat and Migration	ADF&G
	Northwest Arctic	
00-001	Northwestern Dolly Varden and Arctic Char Stock Identification	ADF&G, USFWS
00-020	Hotham Inlet Kotzebue Winter Subsistence Sheefish Harvest	ADF&G
01-136	Northwestern Alaska Dolly Varden Genetic Diversity	ADF&G, USFWS
01-137	Northwestern Alaska Dolly Varden Spawning Stock Assessment	ADF&G
02-023	Qaluich Nigingnaqtuat: Fish That We Eat	AJ
02-040	Kotzebue Sound Whitefish Traditional Knowledge	ADF&G, MQ
03-016	Selawik River Harvest ID, Spring and Fall Subsistence Fisheries	USFWS
04-101	Selawik River Inconnu Spawning Abundance	USFWS
04-102	Selawik Refuge Whitefish Migration and Habitat Use	USFWS
04-109	Wulik River Dolly Varden Wintering Stocks	USFWS, ADF&G
04-157	Exploring Approaches to Sustainable Fisheries Harvest Assessment	ADF&G, MQ
07-151	Northwest Alaska Subsistence Fish Harvest Patterns and Trends	ADF&G, MQ
08-103	Kobuk River Sheefish Spawning and Run Timing	ADF&G, USFWS
10-100	Selawik Drainage Sheefish Winter Movement Patterns	UAF, USGS, USFWS, NVK
10-104	Hotham Inlet Kotzebue Winter Subsistence Sheefish Harvest	USFWS
10-152	Climate Change and Subsistence Fisheries in Northwest Alaska	UAF
12-100	Selawik River Sheefish Spawning Abundance and Age Structure	USFWS
12-103	Kobuk River Sheefish Spawning Frequency, Location, and Run Timing	ADF&G, USFWS

Project Number	Project Title	Investigators
12-104	Noatak River Dolly Varden Evaluation of Overwintering Populations	ADF&G, NPS
12-153	NW AK Key Subsistence Fisheries Harvest Monitoring Program	ADF&G, MQ
14-104	Selawik R Inconnu Spawning Population Abundance	USFWS
16-103	Kobuk River Dolly Varden Genetics	ADF&G, USFWS
16-104	Selawik Sheefish Age Structure and Spawning Population	USFWS
16-105	Kobuk River Sheefish Abundance	ADF&G
18-101	Kobuk River Dolly Varden Genetic Diversity	ADF&G, USFWS
20-101	Life-history Variability and Mixed-stock analysis of Dolly Varden in the Noatak River	ADF&G
20-150	Traditional Ecological Knowledge of Dolly Varden and whitefish species in Northwest Alaska	ADF&G
22-101	Kotzebue Sound Sheefish – Describing Coastal Movement, Temperature Preference, and Potential Range Expansion	WCS
22-104	Selawik River Inconnu Spawning Population Age Structure Evaluation and Spawner Recruitment Response to a 2004 Permafrost Thaw Slump	USFWS
22-150	Traditional Ecological Knowledge of Salmon in the River Drainages of Kotzebue Sound	ADF&G
	Seward Peninsula	
01-224	Nome Sub-district Subsistence Salmon Survey	ADF&G, KI
02-020	Pikmiktalik River Salmon Site Surveys and Enumeration	USFWS, NPS, STB, KI
04-105	Pikmiktalik River Chum and Coho Salmon Enumeration	KI
04-151	Customary Trade of Fish in the Seward Peninsula Area	ADF&G, KI
05-101	Unalakleet River Coho Salmon Distribution and Abundance	ADF&G, NVU
06-101	Pikmiktalik River Chum and Coho Salmon Enumeration	KI
10-102	Unalakleet River Chinook Salmon Abundance Estimate	ADF&G, BLM, NSEDC
10-151	Local Ecological Knowledge of Non-Salmon Fish in the Bering Strait	KI
14-101	Unalakleet River Chinook Salmon Abundance Estimate	NSEDC, NVU
18-103	Unalakleet River Chinook Salmon Escapement Assessment	ADF&G, BLM NSEDC, NVU
20-100	Fish Assemblages and Genetic Stock Determination of Salmon in Bering Land Bridge National Preserve	ADF&G, BLM NPS
22-103	Unalakleet River Chinook Salmon Escapement Assessment	ADF&G

Abbreviations used for investigators are: **ADF&G** = Alaska Department of Fish and Game, **AJ** = Anore Jones, **AKP** = City of Anaktuvuk Pass, **BLM** = Bureau of Land Management, **KI** = Kawarek Inc., **KIC** = Kaktovik Inupiat Corp., **MQ** = Maniilaq, **NSEDC** = Norton Sound Economic Development Corporation, **NVU** = Native Village of Unalakleet, **NSB** = North Slope Borough, **STB** = Stebbins IRA, **SWCA** = SWCA Environmental Consultants, **WCS** = Wildlife Conservation Society, **UAF** = University Alaska Fairbanks, **USFWS** = U.S. Fish and Wildlife Service, and **USGS** = U.S. Geological Survey.