

## DRAFT 2014 FISHERIES RESOURCE MONITORING PLAN

### INTRODUCTION

#### BACKGROUND

Since 1999, under the authority of Title VIII of ANILCA, the Federal government has managed subsistence fisheries on Federal public lands in Alaska. Subsistence fisheries management requires substantial informational needs. Section 812 of ANILCA directs the Departments of the Interior and Agriculture, cooperating with the State of Alaska and other Federal agencies, to undertake research on fish and wildlife and subsistence uses on Federal public lands. To increase the quantity and quality of information available for management of subsistence fisheries, the Fisheries Resource Monitoring Program (Monitoring Program) was established within the Office of Subsistence Management. The Monitoring Program was envisioned as a collaborative, interagency, and interdisciplinary approach to support fisheries research for subsistence fisheries management on Federal public lands.

Biennially, the Office of Subsistence Management announces a funding opportunity for projects addressing subsistence fisheries on Federal public lands. The 2014 Funding Opportunity was focused on priority information needs developed either by strategic planning efforts or by expert opinion, followed by review and comment by the Subsistence Regional Advisory Councils. The Monitoring Program is administered by region, and strategic plans sponsored by this program were developed by workgroups of fisheries managers, researchers, Federal Subsistence Regional Advisory Councils' members, and other stakeholders for three of the six regions: Southeast, Southcentral (excluding Cook Inlet Area), and Southwest Alaska. These plans identify prioritized information needs for each major subsistence fishery and can be viewed on, or downloaded from, the Office of Subsistence Management's website: <http://alaska.fws.gov/asm/index.cfm>. Independent strategic plans were completed for the Yukon and Kuskokwim regions for salmon in 2005. For the Northern Region and the Cook Inlet Area, assessments of priority information needs were developed from the expert opinions of the Regional Advisory Councils, the Technical Review Committee, Federal and State managers, and staff from the Office of Subsistence Management. A strategic plan for research on whitefish species in the Yukon and Kuskokwim River drainages was completed in spring 2011 as a result of Monitoring Program project 08-206.

Cumulative effects of climate change will likely affect subsistence fishery resources, their uses, and how these resources are managed. Therefore, all investigators were asked to consider examining or discussing climate change effects as part of their project. Investigators conducting long-term projects were encouraged to participate in a standardized air and water temperature monitoring program for which the Office of Subsistence Management will provide calibrated temperature loggers and associated equipment, analysis and reporting services, and access to a temperature database. The Office of Subsistence Management has also specifically requested projects that would focus on effects of climate change on subsistence fishery resources and uses, and that would describe management implications.

*The mission of the Monitoring Program is to identify and provide information needed to sustain subsistence fisheries on Federal public lands, for rural Alaskans, through a multidisciplinary, collaborative program.*

To implement the Monitoring Program, a collaborative approach is utilized in which five Federal agencies (Fish and Wildlife Service, Bureau of Land Management, National Park Service, Bureau of Indian Affairs, and U.S. Forest Service) work with the Alaska Department of Fish and Game, Regional Advisory Councils, Alaska Native organizations, and other organizations. An interagency Technical Review Committee provides scientific evaluation of investigation plans. The Regional Advisory Councils provide

review and recommendations, and public comment is invited. The Interagency Staff Committee also provides recommendations. The Federal Subsistence Board takes into consideration recommendations and comments from the process, and approves the final monitoring plan.

## PROJECT EVALUATION PROCESS

The Technical Review Committee evaluates investigation plans and makes recommendations for funding. The committee is co-chaired by the Fisheries and Anthropology Division Chiefs, Office of Subsistence Management, and is composed of representatives from each of the five Federal agencies and three representatives from the Alaska Department of Fish and Game. Fisheries and Anthropology staff from the Office of Subsistence Management provide support for the committee.

Four factors are used to evaluate studies:

### 1. Strategic Priority

Proposed projects should address the following and must meet the first criteria to be eligible for Federal subsistence funding.

*Federal Jurisdiction*—Issue or information needs addressed in projects must have a direct association to a subsistence fishery within a Federal conservation unit as defined in legislation, regulation, and plans.

*Conservation Mandate*—Risk to the conservation of species and populations that support subsistence fisheries, and risk to conservation unit purposes as defined in legislation, regulation, and plans.

*Allocation Priority*—Risk of failure to provide a priority to subsistence uses.

*Data Gaps*—Amount of information available to support subsistence management (i.e., higher priority given where a lack of information exists).

*Role of Resource*—Contribution of a species to a subsistence harvest (e.g., number of villages affected, pounds of fish harvested, miles of river) and qualitative significance (e.g., cultural value, unique seasonal role).

*Local Concern*—Level of user concerns over subsistence harvests (e.g., upstream vs. downstream allocation, effects of recreational use, changes in fish abundance, and population characteristics).

### 2. Technical-Scientific Merit

The proposed projects must meet accepted standards for design, information collection, compilation, analysis, and reporting. Projects should have clear study objectives, an appropriate sampling design, correct statistical analysis, a realistic schedule and budget, and appropriate products, including written reports. Projects must not duplicate work already being done.

### 3. Investigator Ability and Resources

Investigators must have the ability and resources to successfully complete the proposed work. Ability will be evaluated in terms of education and training, related work experience, publications, reports, presentations, and past or ongoing work on Monitoring Program studies. Resources

will be considered in terms of office and laboratory facilities (if relevant), technical and logistic support, and personnel and budget administration.

#### **4. Partnership-Capacity Building**

Partnerships and capacity building are priorities of the Monitoring Program. ANILCA mandates that the Federal government provide rural residents a meaningful role in the management of subsistence fisheries, and the Monitoring Program offers tremendous opportunities for partnerships and participation of local residents in monitoring and research. Investigators are requested to include a strategy for integrating local capacity development in their investigation plans. Investigators must complete appropriate consultations with local villages and communities in the area where the project is to be conducted. Letters of support from local organizations add to the strength of a proposal. Investigators and their organizations should demonstrate their ability to maintain effective local relationships and commitment to capacity building.

### **POLICY AND FUNDING GUIDELINES**

Several policies have been developed to aid in implementing funding.

- Projects of up to four years duration may be considered in any year's monitoring plan.
- Studies must be non-duplicative with existing projects.
- Most Monitoring Program funding is dedicated to non-Federal agencies.
- Activities not eligible for funding under the Monitoring Program include: a) habitat protection, restoration, and enhancement; b) hatchery propagation, restoration, enhancement, and supplementation; c) contaminant assessment, evaluation, and monitoring; and d) projects where the primary objective is capacity building (e.g., science camps, technician training, intern programs). These activities would most appropriately be addressed by the land management agencies.
- When long-term projects can no longer be funded by agencies, and the project provides direct information for Federal subsistence fisheries management, the Monitoring Program may fund up to 50% of the project cost.

#### **Finances and Guideline Model for Funding**

The Monitoring Program was first implemented in 2000, with an initial allocation of \$5 million. Since 2001, a total of \$6.25 million has been annually allocated for the Monitoring Program. In 2010, the total funding was reduced to \$6.05 million. The Department of the Interior, through the U.S. Fish and Wildlife Service, has provided \$4.25 million. The Department of Agriculture, through the U.S. Forest Service, has historically provided \$1.80 million annually, but amount of 2014 funds available through the U.S. Forest Service for projects is uncertain. If the Department of Agriculture funding is not provided, none of the project investigation plans submitted for the Southeast Region would be funded.

The Monitoring Program budget funds continuations of existing projects (year-2, 3 or 4 of multi-year projects), and new projects in the biennial year. The Office of Subsistence Management issued funding opportunities on an annual basis until 2008, and then shifted to a biennial basis. Therefore, the next funding opportunity after 2014 will be in 2016. Budget guidelines are established by geographic region and data type, and for 2014, \$3.7 million is projected to be available for new project starts. Investigation Plans are solicited according to the following two data types:

**5. Stock Status and Trends Studies (SST).**

These projects address abundance, composition, timing, behavior, or status of fish populations that sustain subsistence fisheries with linkage to Federal public lands. The budget guideline for this category is two-thirds of available funding.

**6. Harvest Monitoring and Traditional Ecological Knowledge (HM-TEK).**

These projects address assessment of subsistence fisheries including quantification of harvest and effort, and description and assessment of fishing and use patterns. The budget guideline for this category is one-third of available funding.

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For 2014, a total of 56 investigation plans were received for consideration for funding (**Table 1**). Of these, 43 are SST projects and 13 are HM-TEK projects. The Technical Review Committee recommends funding 40 of these investigation plans.

**Table 1.** Number of Investigation Plans received for funding consideration in 2014, and number of recommended for funding by the Technical Review Committee. Data types are stock status and trends (SST), and harvest monitoring and traditional ecological knowledge (HM-TEK).

Geographic Region	Investigation Plans			Technical Review Committee		
	SST	HMTEK	Total	SST	HMTEK	Total
Northern Alaska	4	1	5	3	0	3
Yukon	9	3	12	7	2	9
Kuskokwim	8	6	14	6	5	11
Southwest Alaska	2	1	3	2	0	2
Southcentral Alaska	7	2	9	3	0	3
Southeast Alaska	12	0	12	11	0	11
Multiregional	1	0	1	1	0	1
<b>Total</b>	<b>43</b>	<b>13</b>	<b>56</b>	<b>33</b>	<b>7</b>	<b>40</b>

Total funding available from the Department of the Interior, through the U.S. Fish and Wildlife Service, for new projects in 2014 is \$3.7 million. Currently, the amount of funding available from the Department of Agriculture, through the U.S. Forest Service, is unknown. The proposed cost of funding all 56 projects submitted would be \$6.6 million. The 40 investigation plans recommended for funding by the Technical Review Committee have a total cost of \$4.8 million. In making its recommendations, the committee weighed the importance of funding new projects in 2014 with the knowledge that the next request for proposals will be issued in 2016. As has been done in past years, any unallocated Monitoring Program

funds from the current year will be used to fund subsequent years of new and ongoing projects so that more of the funds available in 2016 can be used to fund new projects.

The 2014 draft Monitoring Plan recommended by the Technical Review Committee would provide 21% of the funding to Alaska Native organizations, 29% to State agencies, 43% to Federal agencies, and 7% to other non-government organizations.

## Northern Alaska Region Overview

### Issues and Information Needs

The 2014 Funding Opportunity for the Northern Region identified three priorities:

1. Baseline and ongoing harvest assessment and monitoring of subsistence fisheries in the Northwest Arctic and North Slope regions to supplement available information.
2. Historic trends and variability in harvest locations, harvests and uses of non-salmon fish, particularly for North Slope communities.
3. Iñupiaq natural history of fish, land use, place name mapping, species distribution, and methods for and timing of harvests, and Iñupiaq natural history of fish.

### Projects Funded Under the Fisheries Resource Monitoring Program

Since the inception of the Monitoring Program in 2000, 38 projects have been funded in the Northern Region; five are funded through 2014 (**Tables 1 and 2**). Two of these projects concern sheefish assessment in the Kobuk and Selawik river drainages (projects 12-100 and 12-103), one concerns Dolly Varden assessment in the Noatak River (project 12-104), one concerns local harvest information of non-salmon fishes in northwest Alaska (project 12-153), and one concerns TEK and harvest monitoring of emerging North Slope salmon fisheries (project 12-154).

### Investigation Plans Forwarded for Funding

Five investigation plans for research in the Northern Region were submitted to the Office of Subsistence Management in response to the 2014 Funding Opportunity. In June 2013, the Technical Review Committee reviewed the investigation plans and recommended three investigation plans for funding. Detailed budgets submitted with each investigation plan allowed identification of funds requested by Alaska Native, State, Federal, and other organizations; funds that would be used to hire local residents; and matching funds from investigating agencies and organizations (**Tables 3 and 4**).

### Available Funds

Federal Subsistence Board guidelines direct initial distribution of funds among regions and data types. While regional budget guidelines provide an initial target for planning, they are not rigid allocations. Upon further review and evaluation, the Technical Review Committee, Regional Advisory Councils, Interagency Staff Committee and the Federal Subsistence Board have the opportunity to address the highest priority projects across regions. For 2014, approximately \$629,000 is available for funding new project in the Northern Alaska Region.

### Recommendations for Funding

The mission of the Monitoring Program is to identify and provide information needed to sustain subsistence fisheries on Federal public lands for rural Alaskans through a multidisciplinary, collaborative program. It is the responsibility of the Technical Review Committee to develop the strongest possible monitoring plan for each region and across the entire state. After reviewing the five investigation plans, the Technical Review Committee recommended funding three of the proposed projects (**Table 5**):

14-101	Unalakleet River Chinook Salmon Escapement Assessment	\$115,023
14-103	Beaufort Sea Dolly Varden Dispersal Pattern	\$156,222
14-104	Selawik River Sheefish Age Structure and Spawning Abundance	\$ 0*
	Total	\$271,245

\*No funding allocated for first year of project.

The three projects recommended for funding by the Technical Review Committee comprise a strong Monitoring Plan for the region by addressing strategically important information needs based on sound science and by promoting cooperative partnerships. All three projects recommended for funding are SST projects; no HM-TEK projects are recommended for funding. Each project submitted for funding in the Northern Alaska Region in 2014 is summarized below (see Executive Summaries for more details on all projects).

**14-101 Unalakleet River Chinook Salmon Escapement Assessment. Fund.** The Unalakleet River supports the largest Chinook salmon subsistence fishery within Norton Sound. A decline in abundance over the last several years has resulted in a decline in subsistence harvests. This project supports a continuing effort to monitor Unalakleet River Chinook salmon with a floating weir. Monitoring of the Unalakleet River Chinook salmon began in 2010. The results from this project would provide Chinook salmon inseason daily passage estimates and run timing. This information aids Federal and State fishery managers in making timely decisions. In addition, the proposed work provides managers with information to characterize spawner/recruit relationships and develop an escapement goal for Unalakleet River Chinook salmon.

**14-102 North Slope Climate Change. Do Not Fund.** This project proposes a prospective experiment to describe the effects of warming under a climate change scenario. This project addresses the 2014 priority information need of exploring changes in subsistence fishery resources in the context of climate change. The North Slope of Alaska, including the National Petroleum Reserve Alaska, Arctic National Wildlife Refuge and Gates of the Arctic National Park, contain extensive lake ecosystems supporting substantial subsistence fisheries which are sensitive to climate change. The investigator proposes establishing two lakes as control and two lakes to receive a warming treatment, then measuring and quantifying changes in the primary, secondary and fish production. The sample size in both the control and the treatment is small  $n=2$ . Inferences to be made from this experiment are ambitious for such a small sample size, a larger sample size would result in a more precise estimate. In addition, during warming periods the uplands warm as well as the lakes. It is unclear how results from just warming the water would be interpreting in an overall environmental context.

**14-103 Beaufort Sea Dolly Varden Dispersal Pattern. Fund.** While this project does not address a specific priority information need in Northern Alaska, Dolly Varden are listed as a general priority for all three Northern Councils in the 2014 Priority Information Needs document. The investigators plan describes using PSAT tags to document marine movement and feeding habitat locations of Dolly Varden in the Beaufort Sea. Since Dolly Varden populations have complex life histories and migration patterns, methods to identify populations or stocks are needed to assess the status of this important resource. The tags will provide information about duration of river residency, timing of ocean entry, swimming speed while transitioning to feeding areas, and duration of summer feeding. Information gained from this project will allow fishery managers to evaluate the important summer feeding areas for the Dolly Varden populations and possible human impact.

**14-104 Selawik River Sheefish Age Structure and Spawning Abundance. Fund.** This investigation plan requests continued funding for Monitoring Program project 12-100 to study the effect of a permafrost slump located about 40 km upstream from the sheefish spawning area in the Selawik River. In 2004, the permafrost slump began emitting large amounts of sediment into the river. In 2010, the investigators began monitor the annual abundance and age structure of the Selawik River sheefish spawning population to determine if the sediment emitted from the permafrost slump resulted in an identifiable impact to the sheefish population over time. The proposed work is technically sound and addresses an important subsistence sheefish fishery associated with Selawik National Wildlife Refuge. This project builds upon

several Monitoring Plan projects (02-020, 02-040, 03-016 and 04-101). Investigators have successfully completed two years of work funded through Monitoring Plan project 12-100. They have collected age structure data for both the Selawik and Kobuk river sheefish populations. In 2011 and 2012, they successfully sampled sheefish using DIDSON sonar to enumerate abundance. Currently, the investigators are funded to collect four years of data, funding this project would add three more years of data.

**14-151 Kotzebue Sound Whitefish Ecology and Seasonal Dynamics. Do Not Fund.** As written, this investigation plan should not be funded at this time. Although this proposal attempted to address three 2014 priority needs for the Northern region, it needs a more systematic and thoughtful approach. The study objectives and methods need to be better explained and clearly detailed. A professional anthropologist or social scientist is needed, particularly to oversee objective 1. The proposal is directly linked to subsistence resources in three Federal conservation units, and whitefish are an important subsistence resource for the people living in the communities of this region. If adequately revised and submitted in the future, this study would build on previous work and has potential to help managers and scientists better understand the relationship between whitefish and the coastal communities in the rural Kotzebue area. If adequately revised and submitted in the future, this study could increase local capacity and partnering by providing rural people with meaningful roles in research and new ways to learn about and get involved with subsistence research and management.

## EXECUTIVE SUMMARY

**Project Number:** 14-101

**Title:** Unalakleet River Chinook Salmon Assessment Continuation

**Geographic Region:** Unalakleet Wild River

**Data Type:** Stock Status and Trends (SST)

**Principal Investigator:** Scott M. Kent, Assistant Area Management Biologist, Alaska Dept. of Fish & Game (ADF&G) Division of Commercial Fisheries

**Co-Investigators:** Merlyn Schelske, United States Bureau of Land Management (BLM),  
Wes Jones, Norton Sound Economic Development (NSEDC).

**Project Cost:**

2014	2015	2016	2017	TOTAL
\$115,013	\$117,322	\$119,731	\$122,250	\$474,316

**Recommendation: Fund**

**Issue:** This proposal seeks funding to continue operating a 320-ft resistance board floating weir on the mainstem of the Unalakleet River from mid-June to mid-August. Since 2010, the weir has been used to fill important data gaps by monitoring the magnitude and age structure of the Chinook salmon *Onchorhynchus tshawytscha* spawning escapement. This has included the collection of age, sex, and length (ASL) data for the long term goals of establishing biological spawning goals and examining trends in relation to environmental changes and harvest practices.

The Unalakleet River Chinook salmon run supports the largest subsistence fishery in Norton Sound and constitutes the northernmost Chinook salmon population of significant size in Alaska. Past radiotelemetry studies revealed that 47–66% of Chinook salmon that return to the Unalakleet River drainage, spawn within the upper mainstem of the Unalakleet River watershed within the Federally-designated Wild and Scenic portion (Wuttig 1999; Joy and Reed *In Prep*). However, Chinook salmon returns to the Unalakleet River have declined precipitously since 2000, eliciting tremendous concern by subsistence users on the river. Existing sustainable escapement goals on the North River tributary have only been reached half the time since 1999 despite management measures aimed at conserving Chinook salmon (Kent and Bergstrom 2012). As a result, Unalakleet River Chinook salmon were designated a stock of yield concern in 2004 by the Alaska Board of Fisheries (board); the board reaffirmed this classification in 2007, 2010, and 2013. Beginning in 2009, the Federal Subsistence Board also took action by prohibiting all fishing for Chinook salmon in the Wild and Scenic corridor of the Unalakleet River to all users.

The mainstem weir escapement and ASL data are used to manage Chinook salmon subsistence and sport fisheries, develop outlooks of run abundance for subsequent years, evaluate brood year productivity, and evaluate effects of harvest practices on the spawning escapement. Concurrent operation of the mainstem weir and North River tower has also led to three years of accurate drainagewide escapement counts and has provided a means to examine historical estimates of drainagewide escapement indexed from North River tower counts and radiotelemetry (Wuttig 1999; Joy and

Reed *in prep*). Construction of a comprehensive database integrating North River and Unalakleet River mainstem escapement, harvest, and ASL data has also been initiated. However, several more years of these data must be compiled before meaningful recruit-per-spawner analyses can be conducted and a scientifically defensible escapement goal established. Thus, long-term operation of the Unalakleet River weir is critical in order to develop a drainagewide escapement goal, and possibly elucidate primary causes for the nearly 15-year pattern of diminishing runs. More importantly, accomplishing these latter two objectives provides the best opportunity for restoring the Unalakleet River Chinook salmon stock to historic abundance levels and consequently, ensuring customary levels of subsistence harvests are reached.

**Objectives:**

1. Determine daily and total Chinook salmon escapement from mid-June to mid-August.
2. Describe the timing of the Unalakleet River mainstem Chinook salmon escapement.
3. Estimate the ASL composition of the annual Unalakleet River mainstem Chinook salmon spawning escapement such that 95% confidence intervals of age composition will be no wider than  $\pm 10\%$  ( $\alpha=0.05$ ,  $d=0.10$ ).

**Methods:** This proposal seeks funding to continue to operate a 320 ft resistance board floating weir on the mainstem of the Unalakleet River for the 2014–2017 field seasons. The weir was constructed in Unalakleet in 2010 following methods described by Stewart (2002) and Tobin (1994) and successfully operated through 2012. The weir site (63°53.32'N, 160°29.41'W) is located approximately 22 rkm upstream from the mouth of the Unalakleet River. Weir operations will occur from mid-June until mid-August in order to fully enumerate the Unalakleet River mainstem Chinook salmon escapement. In addition to timely and accurate escapement counts, the floating weir and integral live trap platform will continue to facilitate collection of large annual sample sizes of unbiased ASL data from the mainstem Chinook salmon spawning escapement. Age class information representative of the entire Chinook salmon run is needed to conduct recruits-per-spawner (R/S) analyses that characterize productivity through time and to develop scientifically defensible escapement goals.

Inseason estimates of Chinook salmon escapements will be available to state and federal fishery managers for evaluating Chinook salmon run strength and timing. Accurate ASL data will also allow managers to assess the impacts of harvest practices on the quality and quantity of the spawning escapement. Long-term datasets compiled of escapement, age data, and harvest information will be used to reconstruct the total run and develop scientifically defensible drainagewide Chinook salmon escapement goals. This will lead to better informed management of the Unalakleet River Chinook salmon subsistence fishery.

**Partnerships/Capacity Building:** Requested funding is for ADF&G, Native Village of Unalakleet, (NVU), and NSEDC to support one crew leader fishery biologist 1 (ADF&G), one NVU fisheries technician, and one NSEDC fisheries technician. Technicians trained by ADF&G, NSEDC, and BLM staff will be responsible for the bulk of field work. The proposed project would continue to seek local hires to promote involvement of resource users in the fisheries management and assessment process, and partnership with NVU and NSEDC encourages even greater local involvement and capacity building in the Unalakleet area. ADF&G, BLM, and NSEDC are providing matching funds towards the Unalakleet River weir in the form of biologist and technician time for weir installation, operation, and removal (BLM and NSEDC), project operational planning, personnel supervision, operations oversight (ADF&G), and

data analysis and report writing (ADF&G). ADF&G and NSEDC are also providing matching funds by operating the North River tower project for the 2014–2017 field seasons.

**EXECUTIVE SUMMARY**

**Project Number:** 14-102

**Title:** Climate change and subsistence fisheries: quantifying the direct effects of climatic warming on arctic fishes and lake ecosystems using whole-lake manipulations on the Alaska North Slope

**Geographic Region:** Northern Alaska

**Information Type:** Stock status and trends (SST)

**Investigators:** Phaedra Budy; Unit Leader, US Geological Survey-Utah Cooperative Fish and Wildlife Research Unit/Professor, Department of Watershed Sciences, Utah State University, Principal Investigator; 5210 Old Main Hill, Logan, UT, 84322; Phone: (435)-797-7564, phaedra.budy@usu.edu, FAX: (435)-797-4025, DUNS: 072984355

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**Project Cost:**

2014	2015	2016	2017	TOTAL
\$184,104	\$148,937	\$151,603	\$168,967	\$653,611

**Recommendation: Do Not Fund**

**Issue Addressed:** Arctic ecosystems are already warming as a result of global climate change. Understanding the direct impacts on system productivity (e.g., harvestable fishes) as a result of this warming is essential to adapt and efficiently manage these systems. In particular, the Alaska North Slope (including the National Petroleum Reserve Alaska, Arctic National Wildlife Refuge Wilderness Area and Gates of the Arctic National Park and Preserve), contains extensive lake ecosystems which are not only sensitive to climatic warming, but also comprise important and valuable subsistence fisheries for Alaska Natives. However, our ability to detect and quantify specific biological responses (e.g., fish growth and survival) in these fisheries is currently limited to modeled scenarios and observational studies in uncontrolled environments. A much greater and active understanding is required and of paramount importance in order to adapt management as these North Slope fisheries are subjected to climatic warming. By implementing a controlled, system-level experimental manipulation, we will directly measure and quantify the potential effects of climate change on critical fish populations and overall system productivity in lakes representative of North Slope subsistence fisheries. Our results will 1) quantify changes in whole-lake production (primary, secondary, fish) as a result of climate change, 2) address the sustainability and guide management of important subsistence fisheries for Alaska Natives, and 3) provide empirical data to test current model predictions across other systems and regions. Implications of this research are of paramount importance. Our current model predictions indicate that if primary and secondary production does not increase with the warming climate, lakes, such as those that support subsistence fisheries on the North Slope, could experience extinctions of fish populations (Budy and Luecke, 2013). Alternatively, if production at lower trophic levels increase, fish production and growth could increase as well, allowing for better and more sustainable subsistence fisheries.

**Objectives:**

1. Identify lake systems representative of regional subsistence fisheries and quantify current and historical trends in system productivity
2. Experimentally extend growing season via whole-lake manipulation to simulate climate change
3. Measure and quantify changes in primary, secondary, and fish production in experimental systems
4. Estimate overwinter survival and measure growth of important fish species; compare with historical data for average length growing seasons
5. Measure bioenergetic inputs (fish growth, fish diet, water temperature) and compare outputs with previous simulations derived from climate change models
6. Calibrate existing models to match observed changes in fish production

**Methods:** We will implement a large-scale experimental manipulation of arctic lakes (within Toolik Lake Research Natural Area) with three distinct phases:

1. We will select two control lakes and two experimental lakes and monitor production at all trophic levels (e.g., primary production, fish growth), along with a suite of abiotic limnological factors (e.g., temperature, dissolved oxygen). We will census long-term aerial imagery files to determine the historical range of ice-off-on-dates on adjacent locations throughout the landscape (Objective I). Combining long-term data and existing bioenergetics models, we will estimate growth and production of trophic levels within the study lakes.
2. We will test predictions from the initial phase by implementing an ecosystem level, experimental manipulation to simulate climatic warming (Objective II). For designated experimental lakes, we will deploy developed lake warming equipment to extend the growing season by at least 15 days. Thus, we will replicate effects of climatic warming which have already been observed across the northern hemisphere. The control lakes will not be altered. We will again monitor production and limnological factors for the control and experimental lakes as in the initial phase (Objectives III, V).
3. We will allow natural ice conditions to return to the experimental lakes and the control lakes will remain unchanged. Again, we will monitor response variables as in the initial and implementation phase. We will investigate if any changes in trophic production (e.g., fish growth) are manifested in the following year, or if winter conditions bring the levels of production back to pre-manipulation conditions (Objective IV). We will analyze the experimental outcomes in regards to our model predictions (Objective VI).

**Capacity Building:** We will develop a series of interactive presentations that will engage native communities and subsistence fisherman in understanding the scientific background and methods of fisheries and aquatic science as they relate to climate change and Native subsistence culture. However, we will not be limited to the presentation of aquatic science. When applicable, we will invite other scientists from Toolik Research Station to present on topics ranging from permafrost to small mammals and birds, within the context of climate change and subsistence.

Specifically we will travel to and engage citizens of all ages and backgrounds in the community of Anaktuvuk Pass. For children, we will work with local teachers to develop hands-on educational

demonstrations that will allow students to learn about general biology and ecology including fish and water basics such as life cycles and life history. We will provide projects and handouts, which can be built upon as our educational series progresses. Children will also be able to view organisms (e.g., zooplankton) and fish parts (e.g., otoliths) through microscopes, and we will use various engaging multimedia techniques (e.g., observing feeding strategies of fishes through underwater video recordings or real time demonstrations). Older students, if interested, would be given the opportunity to spend a day on-site at our study lakes to assist with data collection and learn the scientific process. For adults and elders, we will present short, interactive lectures. Our presentations will begin by covering basics of fish ecology and climate change for the lay person and evolve based on our interactions with community members, likely towards the futures of management and resources in a changing climate. Furthermore, we would initiate an annual field trip to Toolik Research Station. Again, children would get hands on experiences, and in this setting be to learn and practice laboratory and computer skills (e.g., filter chlorophyll from water, examine fish diets). Interested citizens from Anaktuvuk Pass could visit our actual study lakes and view the manipulation in progress, and we would provide real-time updates on our progress and findings. In closing each of these on and off-site events, we would have an informal discussion and social gathering during which we could answer questions while simultaneous engaging and learning about Native livelihoods in respect to fishing, subsistence, and life in general.

## EXECUTIVE SUMMARY

**Project Number:** Project 14-103

**Title:** Dispersal patterns and summer ocean distribution of adult Dolly Varden in the Beaufort Sea using satellite telemetry

**Geographic Region:** Northern Region

**Data Type:** Stock Status and Trends

**Principle Investigator:** Andrew Seitz, Assistant Professor, UAF-SFOS

**Co-Investigator:** Brendan Scanlon, Fishery Biologist, ADF&G-SFD

**Collaborator:** Randy Brown, Fishery Biologist, US FWS-FES

**Project Cost:**

2014	2015	2016	Total
\$156,222	\$158,333	\$83,662	\$398,217

**Recommendation: Fund**

**Issues:** Fisheries managers have long recognized the importance of Dolly Varden to subsistence users on the North Slope. The number of Dolly Varden harvested for subsistence purposes is largely undocumented in northern Alaska, but it is known that residents of villages in this region rely heavily upon this fish species. For example, in Kaktovik, fishers harvested 15,388 pounds of fish for subsistence from 2000–2002, of which 12,297 pounds (80%) was Dolly Varden, equating to approximately 96 pounds of Dolly Varden harvested each year per household. Dolly Varden are captured at river mouths and lagoons with gill nets or beach seines during open water periods, and with hook and line during winter ice fishing.

To understand the biology and ecology of this anadromous fish species that overwinters in rivers and feeds in the summer in the ocean, managers and biologists have conducted periodic aerial survey indices to monitor overwintering abundance dating back to 1971. Most of the surveys have been conducted on overwintering aggregations in the Ivishak River, with occasional surveys conducted on other rivers. A variety of other projects have also been conducted on Dolly Varden during their freshwater phase.

In contrast to the information that is available about Dolly Varden during their freshwater phase, fisheries managers have little direct information about the summer ocean ecology and distribution of Dolly Varden that overwinter in North Slope rivers. This information is important to evaluate the potential effects of habitat perturbations and climatic change, which ultimately may be important for understanding population dynamics and the effects of regulatory proposals and actions on this species.

Developments in satellite telemetry now provide an opportunity to examine the movements of fish as well as their depth and temperature preferences while in saltwater without having to recapture the study organism. In the past, pop-up satellite archival transmitting (PSAT) tags have been used to study the movements of relatively large fishes, however, as the size of the tags has become smaller, PSAT tags have been successfully used to describe movements of smaller fishes such as the striped bass *Morone saxatilis*. More recently, PSAT tags have been used successfully by the investigators of this proposed project to examine the summer oceanic movements and behavior of Dolly Varden that overwinter in northwest

Alaska. Specifically, the tags provided information about duration of river residency, timing of ocean entry, swimming speed while transiting to feeding areas, duration of summer feeding, and depth-specific information about transit and feeding behaviors.

Therefore, we propose to use PSAT tags to provide baseline information about the oceanic habits, distribution and migration patterns of Dolly Varden that are found just after ice-out in the Kaktovik area and spend their summers in the Beaufort Sea.

**Objectives:** The objectives of this proposed project are:

1. Describe baseline ecological information about Dolly Varden tagged in the lagoons near Kaktovik, Alaska, including:
  - a. Timing of outmigration to the Beaufort Sea
  - b. Summer dispersal
  - c. Temporal and spatial distribution
  - d. Depth and temperature occupancy
2. Describe temporal and spatial distribution in relation to areas where human activities such as shipping and hydrocarbon extraction are taking place to provide information to the public, biological resource managers and marine gas and oil resource managers to better understand potential interactions among Dolly Varden and human activities in the Beaufort Sea.

**Methods:** PSAT tags will be used to examine the marine movement and distribution of Dolly Varden that occur in the lagoon system near Kaktovik, AK in the spring. PSAT tags are a fisheries-independent means of studying fish, which is extremely important because there are no large-scale fisheries in the Beaufort Sea in the summer in which to capture Dolly Varden, therefore there is no financially efficient and logistically reasonable alternative to obtaining Dolly Varden migration and distribution data.

During fieldwork in the summers of 2014 and 2015, we propose to externally attach PSAT tags to 15 large (>55 cm) Dolly Varden each year. While externally attached to a fish, the tags measure and record temperature, pressure, and ambient light intensity (for daily geolocation estimates), detach from the fish on a preprogrammed date, “pop-up” to the surface, and transmit the archived data to Argos satellites, which will then be retrieved by the project investigators. While transmitting, the location of the PSAT tag is determined by passing satellites. The pop-up dates will be staggered throughout July and August, with all tags programmed to release before the fish purportedly reenter freshwater in September, as these tags need at least 5 ppt saltwater for the release mechanism to function. Oceanic dispersal and behavior of Dolly Varden from the lagoon near Kaktovik will be inferred from PSAT tag end locations, and depth, temperature and ambient light data.

Based on past PSAT tag experiments conducted by the investigators of this proposed project, combined with the short duration that these Dolly Varden will carry the tags (<10 weeks), it is anticipated that data recovery from the deployed tags will be >80%.

**Partnerships and Capacity Building:** Prior to starting the project, traditional local knowledge of Dolly Varden movements, timing, and capture methods and locations will be solicited from the Kaktovik IRA, North Slope RAC, North Slope Borough Wildlife Department and members of the public. Consultation with the Kaktovik IRA will be conducted to describe the project objectives and to inform fishers about returning tags if they are recaptured prior to their scheduled pop-up date. Additionally, a letter of support will be solicited from the North Slope RAC at their Fall/Winter 2013 meeting in Barrow. During tagging

fieldwork, a portion of the requested funds will provide a honorarium for a locally-hired technician from the village of Kaktovik to assist with fish capture and tag deployment for approximately one week each year. After the tags have popped-up and reported their data each year, annual educational outreach trips to Kaktovik to describe project results and updates will be conducted to give presentations to the public and school classes. These trips will be scheduled to coincide with the annual meeting of the Kaktovik IRA, to whom we will also give an outreach presentation. Additionally, a project investigator will attend a Federal RAC meeting held in Barrow annually to describe project results and updates. Finally, as interest and resources allow, presentations may be made at other regional villages and schools, such as Barrow, Nuiqsut, and Atqasuk and project results will be presented at State Advisory Committees, and in regional newspapers and radio shows.

**EXECUTIVE SUMMARY****Project Number:** 14-104**Title:** Selawik River Inconnu Spawning Population Abundance and Age Structure Evaluation**Geographic Region:** Northwest Alaska**Data Type:** Stock Status and Trends**Principal Investigator:** Raymond Hander, U.S. Fish and Wildlife Service**Co-Investigator:** Randy J. Brown, USFWS**Project Cost:**

2014	2015	2016	2017	TOTAL
\$0	\$144,654	\$146,144	\$68,791	\$359,589

**Recommendation: Fund**

**Issue Addressed:** The Selawik National Wildlife Refuge (Refuge) has a congressional mandate through ANILCA to conserve inconnu (sheefish) *Stenodus leucichthys* populations. This project is a continuance to two priority issues identified for the Northern Region in the 2012 Fisheries Resource Monitoring Program: “spawning distribution, timing, and stock structure of Selawik River whitefish species”; and “identify and characterize critical factors affecting population dynamics of Selawik River inconnu”. This project benefits from information provided by FRMP projects 12-100 (in progress), 04-101, 03-016, 02-040, and 02-020.

There are two known populations of inconnu in Northwest Alaska, one that spawns in the upper Kobuk River and another that spawns in the upper Selawik River. Both populations are subject to intensive fisheries throughout the region. A large permafrost thaw slump (slump) located about 40 km upstream from the inconnu spawning area on the Selawik River began emitting large amounts of sediment into the river in 2004. Since then the normally clear Selawik River has flowed extraordinarily turbid during the summer months transporting huge quantities of sediment downstream, potentially destroying the habitat for stream-spawning fish. Similar slumps in the upper Yukon River drainage have been emitting sediment into the Stewart River for over 40 years so we must assume that the Selawik River slump will continue for the foreseeable future. Habitat qualities of the inconnu spawning area in the Selawik River have undoubtedly changed because of the dramatically increased sediment exposure. These changes will probably reduce the proportion of fertilized eggs that develop successfully and produce young. If production is reduced but not eliminated the inconnu population would be expected to decline over time. If production is eliminated the population would be expected to become extinct as existing fish gradually die off, or possibly to become established in another suitable location. The increased sediment in the upper Selawik River is an environmental factor that may have a profound effect on the inconnu population that spawns there.

**Objectives:**

1. Collect inconnu age structure data from male inconnu from the Selawik and Kobuk River spawning populations in 2014, 2015, and 2016;

2. Identify possible recruitment failures and missing age classes based on Chi-square test of six age class bins;
3. Determine the spawning population abundance of Selawik River inconnu in 2014, 2015, and 2016; and
4. Determine whether age structure and spawning population abundance data support the null hypothesis that sediment deposition from the slump has not affected inconnu recruitment.

**Project Design based on FRMP 12-100 preliminary findings:** This project will involve three distinct components that together will reveal whether the Selawik River thaw slump is affecting recruitment of the inconnu population in the drainage. The first component will be a series of annual age distribution profiles of spawning male inconnu collected from the Selawik River spawning area. We have chosen to focus on males because they will provide the recruitment data we are seeking without reducing the number of fertilized eggs on the spawning grounds each year. These pre-slump age distribution profiles will serve as baselines for comparison with later profiles. The second component will be a series of annual age distribution profiles of spawning male and female inconnu from the Kobuk River population. The Alaska Department of Fish and Game operates an annual chum salmon *Oncorhynchus keta* test fishery on the Kobuk River near the community of Kiana during July and August. They have agreed to sample the inconnu they capture during that test fishery and provide those biological data and age structures for this project. We initially thought that if recruitment failure was observed in both sample collections, it would indicate an effect in their shared rearing environment and not necessarily in the Selawik River spawning area. And, if recruitment failure is observed only in the Selawik River sample collection it would indicate an effect from the Selawik River spawning area. However, given the age distributions observed for both populations in 2011 and 2012, in which both populations appear to have experienced several years of poor recruitment, we modified our statement to read; if recruitment success is observed in both sample collections it would indicate no negative slump effect on spawning success. And if recruitment success is observed only in the Kobuk River sample it would indicate a negative slump effect on spawning success the Selawik River spawning area. The third component of the project will be a series of annual spawning population abundance estimates for the Selawik River inconnu population. Age distribution data are proportional to abundance so one could see identical profiles from a population at radically different spawner abundance levels. The age distribution profiles from the Kobuk and Selawik rivers show a dominance of older inconnu with fewer younger age recruits. A significant increase in recruitment to the spawning population should eventually be reflected in an increase in abundance. The combination of spawner abundance and age structure data provides a robust means of assessing changes in spawning population dynamics.

**Partnerships and Capacity Building:** Residents of Selawik will continue to be sought for assistance with local knowledge, collecting otoliths, overseeing inconnu carcass processing, and transportation and logistical support. Specific training to address project specific sampling procedures and protocols will be conducted for individuals prior to initiating sampling. In the 2011 pilot study year and 2012 there were five to seven Selawik residents plus the Selawik IRA that interacted with the project to help make it a success. The FFWFO has worked with Selawik residents or the NVOS organization for about 27 years.

## EXECUTIVE SUMMARY

**Project Number:** 14-151

**Title:** Kotzebue Sound Whitefish Ecology and Seasonal Dynamics.

**Geographic Region:** Northern Region.

**Information Type:** Stock status and trends (SST), harvest monitoring (HM), and cultural knowledge and traditional ecological knowledge (CK/TEK) information.

**Principle Investigator:** Dr. Martin Robards, Wildlife Conservation Society

**Co-Investigators:** Alex Whiting, Native Village of Kotzebue  
Dr. Mark Wipfli, University of Alaska, Fairbanks  
Dr. James Lawler, National Park Service

**Project Cost:**

2014	2015	2016	2017	TOTAL
\$200,185	\$178,168	\$177,378	\$194,770	\$750,501

**Recommendation: Do Not Fund**

**Issue:** Despite the importance of whitefish for coastal communities in northwest Alaska, managers lack much of the critical data necessary to understand trends in subsistence use, fish habitats, or long-term changes in whitefish health and condition. Increased coastal erosion as a result of climate change may profoundly alter the coastal subsistence fisheries for whitefish, because new dynamics of lagoon breaching will alter overwintering patterns. Furthermore, local fishermen have observed the loss of “countless numbers” of whitefish in Kotzebue Sound, lending credence for the need to better understand the factors driving such perceived declines (Whiting et al., 2001:32). This project will foster a better understanding of the long-term sustainability of the Kotzebue Sound coastal whitefish fisheries and help disentangle the role of climate change impacts, such as from increased coastal erosion, from other potential factors reducing fish catches (e.g., prey availability).

We propose to document seasonal dynamics of whitefish in and around 5 coastal lagoons in the southern Chukchi Sea known to offer habitat for whitefish –Krusenstern, Aqulaaq, Sisualik, Espenberg, and Cowpack, and the fishery catches of 5 communities: Kivalina, Kotzebue, Deering, Shishmaref, and Wales. Irrespective of climate change, this is an increasingly important task, given the rapid escalation in development activities that raise the risks of oil spills or coastal modification; including, maritime transport supporting oil and gas activities in the northern Chukchi Sea, consideration of deep-water ports in the northern Bering Sea, and international shipping along the Northern Sea Route. As Admiral Ostebo (US Coast Guard) emphasized at a recent hearing with Senator Begich, shipping presents some of the greatest risks to the environment in northern Alaska, and the southern Chukchi Sea is at the epicenter of that risk.

Our proposed project responds directly to high priority areas identified for the Northern Alaska Region in the Priority Information Needs for Federal Subsistence Fisheries guidance document (Office of Subsistence Management, USFWS, December, 2012), including the need to a) relate effects of climate change on subsistence fishery resources, and b) the need for baseline and ongoing harvest assessment and monitoring of subsistence fisheries. We will conduct an interdisciplinary project based on a close collaboration between the Wildlife Conservation Society, the Native Village of Kotzebue, University of

Alaska, Fairbanks, and National Park Service. To accomplish our research, we will work with a full-time graduate student or post-doctoral researcher to combine ethnographic data, harvest monitoring, traditional ecological knowledge, and biological/ecological data that will help answer the following overarching research question:

***What are the seasonal and spatial dynamics, and health of coastal whitefish fisheries in the Kotzebue Area?***

**Objectives:**

1. Assess seasonal and inter-annual variability of contemporary whitefish use in coastal communities between Wales and Kivalina.
2. Establish seasonal patterns and ecology of coastal lagoon use by whitefish between Wales and Kivalina.
3. Establish indicators of whitefish health and abundance that can be used for long-term monitoring.

**Methods:**

1. We will synthesize information on whitefish use from current harvest surveys that have been conducted by Kawerak Inc., the Native Village of Kotzebue, and others. Where necessary, we will supplement this information with new interviews that are consistent with existing survey tools, including new research in the villages of Kivalina and Deering.
2. We will collect physical and biological data in June, July, August, September, and March using a calibrated sonde; under-ice deepwater fish habitat with an EM-31; and fish with beach seines (not March), fyke nets (not March), and gillnets. Fish will be subsampled from catches and analyzed for species composition and further analysis (see below)
3. A subsample of up to 30 whitefish of each species will be collected from each lagoon in each sampling period for assessment of a) growth rates, b) diet, and c) proximate composition. Based on these analyses we will establish indicators for long-term changes in growth rate, body composition, and diet for whitefish and indicate the statistical power of detecting change over decadal time scales.

**Partnerships and Capacity Building:** This project will:

1. Provide information of value to resource managers and subsistence fishermen in Kotzebue concerning stocks of whitefish and forage species in the lagoons of Kotzebue Sound. This information will inform outreach materials identified as important to Kotzebue residents telling the “Story of the Lagoons.” These materials will be developed in such a manner that they can be easily adapted for the Kawerak Inc. region on the Seward Peninsula.
2. Develop a long-term program to describe and monitor the subsistence whitefish fishery that can be used by tribal and federal resource managers, those needing to plan for accident mitigation in the case of oil-spills (USCG), or those seeking to understand and track natural resources on federal lands (NPS). In particular, this effort will promote tribal collaborations in the development of the NPS lagoon vital sign – a multi-decadal monitoring program to assess long-term changes in coastal lagoons in the Arctic Network (ARCN) National Park Service Units. Data from this program will then be able to dovetail with, and expand the capacity of other efforts by tribal fishery managers.

3. Place the ecology of Kotzebue Sound coastal lagoons in the context of other efforts along the northern Chukchi and Beaufort sea coasts (e.g., Boswell and colleagues through their North Pacific Research Board support) to support the most comprehensive assessment of lagoon ecology, including whitefish dynamics throughout the entire northern subsistence fishery region (i.e., including the North Slope). Consequently this project will support tribal capacity building for whitefish fishery management across the North Slope Borough, Northwest Arctic Borough, and the Kawerak Inc. regions.
4. Provide part-time employment for residents in Kotzebue and Shishmaref for help with logistics and expert-consultation with under-ice fishing. Honorariums will be provided for all interviews in Kivalina, Kotzebue, Deering, Shishmaref, and Wales.
5. Develop a report focused on how to implement a local response for potential industrial accidents that best protects lagoon fisheries.

**Table 1.** Summary of Fisheries Resource Monitoring Program projects completed in Northern Alaska since 2000. Abbreviations used for investigators are: ADFG=Alaska Department of Fish and Game, AJ=Anore Jones, AKP=City of Anaktuvuk Pass, KI=Kawarek Inc., KIC=Kaktovik Inupiat Corp., MQ=Maniilaq, NPS=National Park Service, NVK=Native Village of Kotzebue, NVU=Native Village of Unalakleet, NSB=North Slope Borough, STB=Stebbins IRA, UAF=University Alaska Fairbanks, USFWS=U.S. Fish and Wildlife Service, and USGS=U.S. Geological Survey.

Project Number	Project Title	Investigators
<u>North Slope</u>		
00-002	Eastern NS Dolly Varden Spawning and Over-wintering Assessment	ADFG, USFWS
01-113	Eastern NS Dolly Varden Genetic Stock ID Stock Assessment	ADFG, USFWS
01-101	Eastern NS (Kaktovik) Subsistence Fish Harvest Assessment	ADFG, KIC
02-050	NS (Anaktuvuk Pass) Subsistence Fish Harvest Assessment	ADFG, 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	ADFG
07-105 <sup>a</sup>	North Slope Dolly Varden Genetic Baseline Completion	USFWS
07-107 <sup>a</sup>	Hulahula River Dolly Varden Sonar Enumeration	USFWS
<u>Northwest Arctic</u>		
00-001	Northwestern Dolly Varden and Arctic Char Stock Identification	ADFG, USFWS
00-020	Hotham Inlet Kotzebue Winter Subsistence Sheefish Harvest	ADFG
01-136	Northwestern Alaska Dolly Varden Genetic Diversity	ADFG, USFWS
01-137	Northwestern Alaska Dolly Varden Spawning Stock Assessment	ADFG
02-023	Qaluich Nigingnaquat: Fish That We Eat	AJ
02-040	Kotzebue Sound Whitefish Traditional Knowledge	ADFG, MQ
03-016	Selawik River Harvest ID, Spring and Fall Subsistence Fisheries	USFWS
04-101	Selawik River Inconnu Spawning Abundance	USFWS
04-102 <sup>a</sup>	Selawik Refuge Whitefish Migration and Habitat Use	USFWS
04-109 <sup>a</sup>	Wulik River Dolly Varden Wintering Stocks	USFWS
04-157	Exploring Approaches to Sustainable Fisheries Harvest Assessment	ADFG, MQ
07-151	Northwest Alaska Subsistence Fish Harvest Patterns and Trends	ADFG, MQ
08-103	Kobuk River Sheefish Spawning and Run Timing	ADFG, USFWS
10-100 <sup>a</sup>	Selawik Drainage Sheefish Winter Movement Patterns	UAF, USGS, USFWS, NVK
10-102 <sup>a</sup>	Unalakleet River Chinook Salmon Abundance Estimate	ADFG, NPS, BLM
10-104 <sup>a</sup>	Hotham Inlet Kotzebue Winter Subsistence Sheefish Harvest	USFWS
10-152	Climate Change and Subsistence Fisheries in Northwest Alaska	UAF
<u>Seward Peninsula</u>		
01-224	Nome Sub-district Subsistence Salmon Survey	ADFG, 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	ADFG, KI
05-101	Unalakleet River Coho Salmon Distribution and Abundance	ADFG, NVU
06-101	Pikmiktalik River Chum and Coho Salmon Enumeration	KI
10-151	Local Ecological Knowledge of Non-Salmon Fish in the Bering Strait	KI

<sup>a</sup> Final Report in preparation.

**Table 2.** Summary of ongoing 2014 projects funded under the Fisheries Resource Monitoring Program in Northern Alaska. Abbreviations used for investigators are: ADFG=Alaska Department of Fish and Game, MQ=Maniilaq, NPS=National Park Service, SWCA=SWCA Inc., and USFWS=U.S. Fish and Wildlife Service, .

Project Number	Project Title	Investigators	Budget (\$1000)	
			2014	2015
	<i>Stock Status and Trends</i>			
12-100	Selawik River Sheefish Spawning Abundance and Age Structure	USFWS	\$90.7	\$0.0
12-103	Kobuk River Sheefish Spawning Frequency, Location, and Run Timing	ADFG, USFWS	\$13.8	\$13.8
12-104	Noatak River Dolly Varden Evaluation of Overwintering Populations	ADFG, NPS	\$142.4	\$76.2
	<i>Harvest Monitoring and Traditional Ecological Knowledge</i>			
12-153	NW Ak Key Subsistence Fisheries Harvest Monitoring Program	ADFG, MQ	\$117.4	\$119.8
12-154	NS Salmon Fishery HMTTEK	ADFG	\$42.3	\$44.8

**Table 3.** Northern Alaska project costs, by organization (Alaska Native, State, Federal, other), for investigation plans submitted to the Fisheries Resource Monitoring Program for funding consideration in 2014.

Project Number	Title	Budget (\$1000s)			
		Alaska Native	State	Federal	Other
	<i>Stock Status and Trends</i>				
14-101	Unalakleet R Chinook Salmon Escapement Assessment	\$38.9	\$76.1		
14-102	NS Climate Change Arctic Fishes and Lake Ecosystems				\$184.1
14-103	Beaufort Sea Dolly Varden Dispersal Patterns			\$0.0	\$156.2
14-104	Selawik R Inconnu Spawning Population Abundance				
	<i>Harvest Monitoring and Traditional Ecological Knowledge</i>				
14-151	Kotzebue Sound Whitefish Ecology and Seasonal Dynamics	\$40.0			\$160.2

**Table 4.** Northern Alaska local hire and matching funds for investigation plans submitted to the Fisheries Resource Monitoring Program for funding consideration in 2014. Abbreviations used are: ADFG=Alaska Department of Fish and Game, UAF=University of Alaska, Fairbanks, USFWS=U.S. Fish and Wildlife Service, USU=Utah State University, and WCS=Wildlife Conservation Society.

Project Number	Lead Organization	Title	Funding (\$1000s)	
			Local Hire	Matching
<i>Stock Status and Trends</i>				
14-101	ADFG	Unalakleet R Chinook Salmon Escapement Assessment	\$36.5	\$61.3
14-102	USU	NS Climate Change Arctic Fishes and Lake Ecosystems	\$0.0	\$24.4
14-103	UAF	Beaufort Sea Dolly Varden Dispersal Patterns	\$2.0	\$0.0
14-104	USFWS	Selawik R Inconnu Spawning Population Abundance	\$0.0	\$10.0
<i>Harvest Monitoring and Traditional Ecological Knowledge</i>				
14-151	WCS	Kotzebue Sound Whitefish Ecology and Seasonal Dynamics	\$11.0	\$35.0

**Table 5.** Funding recommendations by the Technical Review Committee (TRC) for Northern Alaska 2014 Fisheries Resource Monitoring Program.

Project Number	Title	TRC	Requested Budget (\$1000)			
			2014	2015	2016	2017
<i>Stock Status and Trends</i>						
14-101	Unalakleet R Chinook Salmon Escapement Assessment	YES	\$115.0	\$117.3	\$119.7	\$122.3
14-102	NS Climate Change Arctic Fishes and Lake Ecosystems	NO	\$184.1	\$148.9	\$151.6	\$169.0
14-103	Beaufort Sea Dolly Varden Dispersal Patterns	YES	\$156.2	\$158.3	\$83.7	\$0.0
14-104	Selawik R Inconnu Spawning Population Abundance	YES	\$0.0	\$144.7	\$146.1	\$68.8
<i>Harvest Monitoring and Traditional Ecological Knowledge</i>						
14-151	Kotzebue Sound Whitefish Ecology and Seasonal Dynamics	NO	\$200.2	\$178.2	\$177.4	\$194.8
Total			\$655.5	\$747.4	\$678.5	\$554.9
Funding Guideline						\$629.0
TRC Recommendation			\$271.2	\$420.3	\$349.5	\$191.1