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EXECUTIVE SUMMARY

Biennially, the Office of Subsistence Management announces a funding opportunity for project investigation plans addressing information needed to sustain subsistence fisheries on Federal public lands. The 2014 Notice of Funding (previously known as a “Request for Proposals”) focused on priority information needs developed from strategic plans, input from fishery managers, stakeholders, and Federal Subsistence Regional Advisory Councils.

In 2014, it is anticipated that \$4.5 million from the Department of Interior will be available through the U.S. Fish and Wildlife Service to fund fisheries projects through the Fisheries Resource Monitoring Program. A total of 16 projects previously approved by the Federal Subsistence Board will continue be funded in 2014 at an estimated cost of \$808,000. After accounting for these prior funding commitments, the remaining \$3.7 million is expected to be available in 2014 from the Department of the Interior. The Department of Agriculture, through the U.S. Forest Service, has historically provided \$1.80 million annually, but the amount of funds available for 2014 is uncertain. Currently, the Department of Agriculture funds are used exclusively for projects in Southeast Alaska Region.

In response to the 2014 Notice of Funding, 57 investigation plans totaling \$6.8 million were received in April 2013. These plans were initially evaluated by the Technical Review Committee using four ranking factors: Strategic Priority, Technical-Scientific Merit, Investigator Ability and Resources, and Partnership-Capacity Building. Of the 57 investigation plans submitted, the Technical Review Committee recommended funding 40 investigation plans totaling \$4.8 million. These investigation plans comprised the draft 2014 Fisheries Resource Monitoring Plan (Monitoring Plan). The draft Monitoring Plan was presented to Federal Regional Advisory Councils and the Interagency Staff Committee. For 17 investigation plans, recommendations made by Regional Advisory Councils and the Interagency Staff Committee differed from those made by the Technical Review Committee. The Regional Advisory Councils and the Interagency Staff Committee supported the Technical Review Committee’s recommendation for the other 40 investigation plans.

Two projects (Western Gulf of Alaska Subsistence Harvests and Social Networks Project 14-452 and Predicting the Effects of Climate Change on Alaska Blackfish: An integrative approach Project 14-508) were received by the deadline but misfiled. They were discovered and entered into the review process along with the other investigation plans in November 2013. They were sent via email for review to the Technical Review Committee. The Southcentral Regional Advisory council met by teleconference on 31 December 2013 and provided its recommendation on Project 14-508. The Bristol Bay and Kodiak Aleutians regional Advisory councils will meet by teleconference on 8 January and 10 January 2014, respectively to provide their recommendations on Project 14-452.

INTRODUCTION

BACKGROUND

Since 1999, under the authority of Title VIII of ANILCA, the Federal government has assumed expanded management responsibility for subsistence fisheries on Federal public lands in Alaska. Expanded subsistence fisheries management has imposed substantial new informational needs for the Federal system.

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, interdisciplinary approach to enhance existing fisheries research, and effectively communicate information needed for subsistence fisheries management on Federal public lands.

Biennially, the Office of Subsistence Management announces a funding opportunity for investigation plans 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 by 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 the Office of Subsistence Management's website:

<http://www.doi.gov/subsistence/monitor/fisheries/index.cfm>. Individual plans are available by placing a request to the Office of Subsistence Management. 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. Additionally, a strategic plan for research on whitefish species in the Yukon and Kuskokwim River drainages was completed in spring 2011 as a result of efforts supported through Monitoring Program project 08-206.

Cumulative effects of climate change will likely fundamentally 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.

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 Divisions, 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:

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 (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).

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.

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.

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 –\$8 million has been annually allocated for the Monitoring Program (Figure 1). In 2014, the Department of the Interior, through the U.S. Fish and Wildlife Service, has provided \$4.5 million in funding. 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.

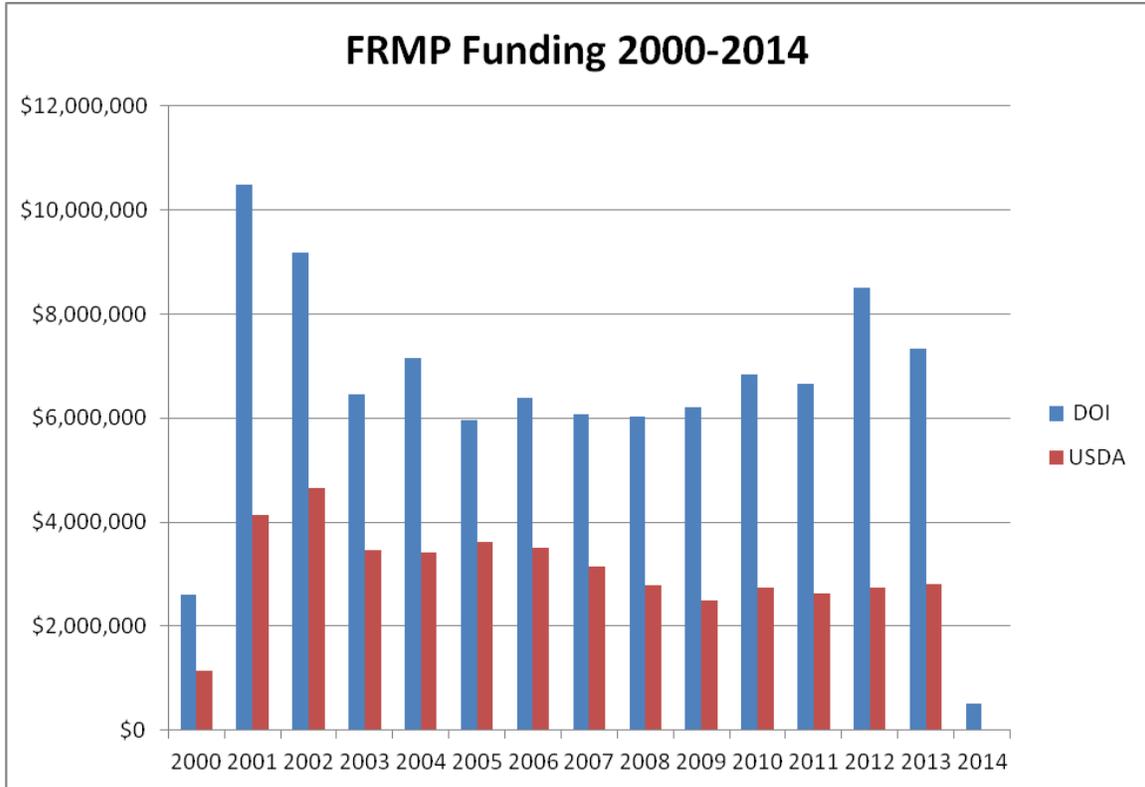


Figure 1. Fisheries Resource Monitoring (FRMP) yearly from the Department of the Interior (DOI) and Department of Agriculture (USDA) for 2000-2014.

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:

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.

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.

2014 FISHERIES RESOURCE MONITORING PLAN

For 2014, a total of 57 investigation plans were received for consideration for funding (Table 1). Of these, 44 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			Recommended by the 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	2	4	2	0	2
Southcentral Alaska	8	2	10	3	0	3
Southeast Alaska	12	0	12	11	0	11
Total	43	14	57	32	7	39

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 57 projects submitted would be \$6.8 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 36% of the funding to Alaska Native organizations, 26% to State agencies, 29% to Federal agencies, and 9% to other non-government organizations.

Continuation Projects in 2014

Northern Alaska

- 12-100 Selawik River Inconnu Assessment
- 12-103 Kobuk River Sheefish Assessment
- 12-104 Noatak River Dolly Varden Assessment
- 12-153 Northwest Alaska Fisheries Harvest Surveys
- 12-154 North Slope Salmon Fishery Traditional Ecological Knowledge

Yukon

- 12-200 Alatna River Inconnu Population Structure
- 12-205 Kaltag Chinook Salmon Sampling
- 12-207 Yukon river Bering Cisco Spawning Origins Telemetry Investigation
- 12-251 Inseason Salmon Harvest Teleconferences

Kuskokwim

- 12-302 Lower Kuskokwim River Chinook Salmon Harvest ASL
- 12-312 Highpower Creek Sheefish Status and Upper Kuskokwim River
- 12-313 Kuskokwim River Bering Cisco Spawning Origins
- 12-352 Upper Kuskokwim River Whitefish Climate Change Trends

Southwest Alaska

- 12-450 Aleutian Islands Salmon and Other Subsistence Harvests
- 12-452 Lake Clark Whitefish Climate Change Trends
- 12-453 Kodiak Salmon Fishery Changing Patterns

Southcentral Alaska

- 12-550 Upper Copper River Changing Environments & Subsistence

Southeast Alaska

None

Multi-Regional

None

Technical Review Committee Membership

Stephen Fried (Co-Chair)	U.S. Fish and Wildlife Service, Office of Subsistence Management
David Jenkins (Co-Chair)	U.S. Fish and Wildlife Service, Office of Subsistence Management
Cecil Rich	U.S. Fish and Wildlife Service
Amy Craver	National Park Service
Rachel Mason	National Park Service
Daniel Sharp	Bureau of Land Management
Pat Petrivelli	Bureau of Indian Affairs
Cal Casipit	U.S. Forest Service
Linda Kruger	U.S. Forest Service
Eric Volk	Alaska Department of Fish and Game, Commercial Fisheries
Robert Clark	Alaska Department of Fish and Game, Sport Fish
James Fall	Alaska Department of Fish and Game, Subsistence

Technical Review Committee, Regional Advisory Council, and Interagency Staff Committee Recommendations

Of the 57 investigation plans submitted under the 2014 Notice of Funding, 27 were recommended for funding by the Technical Review Committee and 13 were not recommended for funding. A total of 40 recommendations to “Fund” or “Do Not Fund” were agreed upon by the Regional Advisory Councils and Interagency Staff Committee. The remaining 17 funding recommendations made by the Technical Review Committee were not met with consensus by the Regional Advisory Council(s) within those funding regions and/or Interagency Staff Committee. Funding recommendations and/or project prioritizations made by the Technical Review Committee, the Regional Advisory Council(s), and Interagency Staff Committee are provided for each of the six funding regions as follows: Northern Region (**Table 2**); Yukon Region (**Table 3**); Kuskokwim (**Table 4**); Southwest (**Table 5**); Southcentral (**Table 6**); and Southeast Regions (**Table 7**).

Table 2. Funding prioritization recommendations by the Interagency Staff Committee (ISC), Regional Advisory Councils (RAC), and Technical Review Committee (TRC) for the Northern Region 2014 Fisheries Resource Monitoring Program.

Project Number	Title	Recommendation or Ranking			Requested Budget (\$000)
		TRC	RAC	ISC	2014
14-101	Unalakleet R Chinook Salmon Escapement Assessment	FUND	FUND	FUND	\$115.0
14-103	Beaufort Sea Dolly Varden Dispersal Patterns	FUND	FUND	FUND	\$156.2
14-104	Selawik R Inconnu Spawning Population	FUND	FUND	FUND	\$0.0
14-102	NS Climate Change Arctic Fishes and Lake Ecosystems	DNF	DNF	DNF	\$184.1
14-151	Kotzebue Sound Whitefish Ecology and Seasonal Dynamics	DNF	DNF	DNF	\$200.2
Total					\$655.5
Funding Guideline					\$629.0
TRC Recommendation					\$271.2

2014 Draft Fisheries Monitoring Plan

Table 3. Funding prioritization recommendations by the Interagency Staff Committee (ISC), Regional Advisory Councils (RAC), and Technical Review Committee (TRC) for the Yukon Region 2014 Fisheries Resource Monitoring Program.

Project Number	Title	Recommendation or Ranking			Requested Budget
		TRC	RAC	ISC	(\$000) 2014
14-201	Gisasa River Salmon Weir Videography	FUND	FUND	FUND	\$24.9
14-202	East Fork Andreafsky River Chinook and summer chum salmon abundance and run timing, Yukon Delta National Wildlife Refuge, Alaska	FUND	FUND	FUND	\$149.1
14-203	Gisasa River Chinook and summer chum salmon abundance and run timing assessment, Koyukuk National Wildlife Refuge, Alaska	FUND	FUND	FUND	\$137.7
14-206	Yukon River Coho Salmon Microsatellite Baseline	FUND	FUND	FUND	\$29.3
14-207	Application of mixed-stock analysis for Yukon River chum salmon	FUND	FUND	FUND	\$148.4
14-208	Koyukuk River Chum Salmon Radio Telemetry	FUND	FUND	FUND	\$125.4
14-209	Abundance and Run Timing of adult salmon in Henshaw Creek	FUND	FUND	FUND	\$73.4
14-252	Harvest monitoring and TEK of Whitefishes in the Lower Yukon River	FUND	FUND	FUND	\$114.3
14-253	Customary Trade in the Upper Yukon River	FUND	FUND	FUND	\$131.8
14-204	Anvik River Sonar	DNF	DNF	DNF	\$97.1
14-205	Enumeration of the Spawning Migration of Yukon River Bering Cisco using DIDSON Sonar	DNF	FUND	DNF	\$79.0
14-251	Upper Yukon River Salmon Oral History	DNF	DNF	DNF	\$106.9
Total					\$1,110.4
Funding Guideline					\$1,073.0
TRC Recommendation					\$934.3

Table 4. Funding prioritization recommendations by the Interagency Staff Committee (ISC), Yukon Kuskokwim Delta and Western Interior Regional Advisory Councils (RAC), and Technical Review Committee (TRC) for the Kuskokwim 2014 Fisheries Resource Monitoring Program.					
Project Number	Title	Recommendation or Ranking			Requested Budget (\$000)
		TRC	RAC	ISC	2014
14-352	Kuskokwim Area Salmon Post-season Subsistence Harvest Surveys	1	1	4	\$166.0
14-353	Kuskokwim River Salmon Inseason Subsistence Survey	2	2	6	\$33.9
14-356	L Kuskokwim Villages Whitefish Non-salmon Local Knowledge	3	3	7	\$127.9
14-308	Kwethluk River Salmon Weir Abundance and Run Timing	4	4	1	\$198.4
14-303	George R Salmon Salmon Weir	5	5	3	\$208.4
14-304	Kanektok Goodnews R Salmon Weir	6	DNF	9	\$237.9
14-302	Tatlawiksuk R Salmon Weir	7	8	8	\$210.9
14-354	Kuskokwim River Support for Cooperative Management	8	9	5	\$63.0
14-351	Kuskokwim Delta Chinook Salmon Non-local Harvesters	9	10	10	\$106.8
14-301	Kuskokwim R Broad Whitefish Spawning above McGrath	10	11	11	\$100.0
14-307	U Kuskokwim River Sheefish Enumeration	11	DNF	DNF	\$114.6
14-355	N Kuskokwim Bay Chinook Salmon Natural Indicators	DNF	DNF	DNF	\$189.3
14-305	Takotna R Salmon Weir	DNF	7	DNF	\$102.2
14-306	Tuluksak R Salmon Weir	DNF	6	2	\$177.6
Total					\$2,036.9
Funding Guideline					\$1,073.0
TRC Recommendation					\$1,567.8

Table 5. Funding prioritization recommendations by the Interagency Staff Committee (ISC), Regional Advisory Councils (RAC), and Technical Review Committee (TRC) for the Southwest Region 2014 Fisheries Resource Monitoring Program.

Project Number	Title	Recommendation or Ranking			Requested Budget
		TRC	RAC	ISC	(\$000) 2014
14-401	Buskin River Sockeye Salmon Stock Assessment and Monitoring, Kodiak, Alaska	FUND	FUND	FUND	\$108.0
14-402	Afognak Lake Sockeye Salmon Stock Monitoring	FUND	FUND	FUND	\$77.2
14-451	Bristol Bay Subsistence Salmon Network Analysis	DNF	FUND	DNF	\$0.0
14-452	Western Gulf of Alaska Subsistence Harvest and Social Networks	DNF	DNF	DNF	\$73.7
Total					\$258.9
Funding Guideline					\$555.0
TRC Recommendation					\$185.2

Table 6. Funding prioritization recommendations by the Interagency Staff Committee (ISC), Regional Advisory Councils (RAC), and Technical Review Committee (TRC) for the Southcentral Region 2014 Fisheries Resource Monitoring Program.

Project Number	Title	Recommendation or Ranking			Requested Budget (\$000)
		TRC	RAC	ISC	2014
14-501	Abundance and Run Timing of Adult Salmon in Long Lake	FUND	FUND	FUND	\$13.7
14-503	Abundance and Run Timing of Salmon in Tanada Creek	FUND	FUND	FUND	\$75.3
14-505	Estimate the Inriver Abundance of Copper River Chinook Salmon	FUND	FUND	FUND	\$399.7
14-502	Copper River Chinook and Sockeye Salmon Management Data Compendium and Review	DNF	DNF	DNF	\$56.8
14-504	Abundance and Run Timing of Salmon in Tanada Creek and Ahtell Creek	DNF	DNF	DNF	\$88.4
14-506	Long-term trends in distribution and stock-specific run timing of Copper River Chinook salmon, using streambed RFID detection systems	DNF	DNF	DNF	\$149.8
14-507	Develop and Test a Portable Graduated Field Fish Barrier as a Tool to Monitor Salmon Escapements	DNF	DNF	DNF	\$185.1
14-508	Predicting the effects of climate change on Alaska blackfish: An integrative approach	DNF	DNF	DNF	\$128.9
14-551	Kenai Peninsula Subsistence Use Areas for Salmon and Nonsalmon Fish Species: Current and lifetime use areas of residents of Cooper Landing, Hope, and Ninilchik	DNF	DNF	DNF	\$47.0
14-552	Harvest and Use of Subsistence Fishery Resources and Related Ecological Knowledge among Residents of Hope, Ninilchik, and Cooper Landing in Southcentral Alaska	DNF	DNF	DNF	\$58.2
Total					\$1,202.9
Funding Guideline					\$640.0
TRC Recommendation					\$488.7

Table 7. Funding prioritization recommendations by the Interagency Staff Committee (ISC), Southeast Regional Advisory Councils (RAC), and Technical Review Committee (TRC) for the Southeast Alaska 2014 Fisheries Resource Monitoring Program.

Project Number	Title	Project Ranking			Requested Budget (\$000)
		TRC	RAC	ISC	2014
14-607	Unik R District 1 Hooligan Monitoring	1	8	1	\$60.2
14-608	Kanalku L Subsistence Sockeye Salmon Assessment	2	2	2	\$160.1
14-602	Falls Lake Subsistence Sockeye Salmon Stock and Harvest Assessment	3	4	4	\$121.7
14-605	Hatchery Creek Sockeye Salmon Assessment	4	9	5.1*	\$144.3
14-610	Kook Lake Sockeye Salmon Stock Assessment	5	11	8	\$169.8
14-611	Sitkoh Lake Sockeye Salmon Stock Assessment	6	6	5.2*	\$97.0
14-603	Hetta Lake Subsistence Sockeye Salmon Stock Assessment	7	3	3	\$173.4
14-609	Klag Lake Sockeye Salmon Assessment	8	7	7	\$120.5
14-612	Neva Lake Sockeye Salmon Stock Assessment	9	5	6	\$145.9
14-606	Klawock Lake Sockeye Salmon Assessment	10	1	9	\$27.6
14-601	Redoubt Lake Sockeye Salmon Stock Assessment	11	10	10	\$26.6
14-604	Eek Lake Subsistence Sockeye Salmon Stock Assessment	DNF	12	11	\$80.7
Total					\$1,327.8
Funding Guideline					\$875.0
TRC Recommendation					\$1,247.1

* Hatchery Creek would be funded for 2014 and 2015; Sitkoh Lake would be funded for 2016 and 2017 (but with sufficient funds, Sitkoh could be earlier). This funding strategy is recommended since USFS subsistence staff believes that only two more years of escapement monitoring will be needed at Hatchery Creek for management purposes. For Sitkoh Lake, delaying for two years the initiation of this new monitoring technology is reasonable in light of the “pilot project” nature of this proposed project.

Summary of Regional Advisory Council Recommendations and Rationale

Northern Region

Northwest Alaska - The Council unanimously approved proposal 14-104 Selawik Sheefish, and deferred action on proposals 14-101 Unalakleet River, and 14-103 Beaufort Sea, to the respective Subsistence Regional Advisory Councils. The Council neither discussed nor took action on proposals 14-102 and 14-151.

North Slope – Motion to support the TRC recommendations failed for lack of a second because the Council felt that the priority information needs they had identified for the FRMP process were not adequately addressed by the proposals submitted.

Seward Peninsula – The Council voted to support the TRC recommendations.

Yukon Region

Yukon Kuskokwim Delta – The Council voted to support the TRC recommendations.

Western Interior – The Council voted to support the TRC recommendations.

Eastern Interior – The Council’s only action was to pass a motion to support the TRC recommendations with the exception of prioritizing funding proposal 14-205 over 14-252. NOTE: The TRC recommendation on Proposal 14-205 is “Do Not Fund”.

Council member Donald Woodruff of Eagle noted that whitefish, including Bering cisco, which travel up the Yukon all the way past Eagle are very important to subsistence. The Council expressed concern that with Chinook conservation concerns, whitefish have become more important or the only subsistence fish caught in some communities. The Council requested a motion to recognize the significant value of all whitefish species for subsistence and ensure it is included in the priority information needs for the Eastern Interior region. Due to concerns about the Lower Yukon River cisco commercial fishery, the Council stressed the importance of whitefish research in order to obtain basic population data to prevent overharvest and ensure subsistence priority is met. The Council was very interested in funding 14-205 “Yukon River Bering Cisco spawning using DIDSON Sonar” and suggested (contrary to TRC recommendation) that the State has no incentive to invest any funds in this research since they have been allowed to prosecute this commercial fishery for many years without any population or stock data. 14-205 Principal Investigator, Randy Brown, attended the EIRAC meeting and was available to answer questions from the Council about his research proposal. He did clarify that his proposal was ranked high in technical merit but that the TRC identified other aspects that should occur first.

The Council briefly reviewed all the Yukon proposals submitted and concluded they felt the “Lower Yukon Whitefish Harvest Monitoring” proposal 14-252 was of less importance to them in ranking and questioned the cost of the project and value of the proposal objectives without fish population data (no one was available to speak to the specifics of this proposal; however, OSM staff anthropologist Pippa Kenner did clarify for the council that the project was thoroughly reviewed by the TRC and the objectives and costs were found to be quite sound and met priority information needs identified for the Yukon River). The Council stressed they thought the order of priority should be assessing the cisco spawning population as proposed in 14-205 over a harvest monitoring assessment at this time because lack of population data prevented sound management. The Council is very concerned about the potential detrimental impact of the cisco

commercial fishery and request action being taken now to prevent overharvest of this important subsistence resource.

Kuskokwim Region

Yukon Kuskokwim Delta – The Council approved a motion in which its priorities differed from the TRC recommendation.

The Council stated that the Tuluksak and Takotna River fisheries projects have provided long term and important salmon return spawning ground data that is important for subsistence salmon fisheries management. If funding for these projects is discontinued, very important data will be lost, not just for Chinook salmon but for all other important salmon species such as Coho and Sockeye.

Western Interior – The Council approved a motion in which its priorities are the same as the YKD Council, and emphasized that the Tatlawiksuk Weir, project 14-302, should also be funded (first project over the 2014 funding guideline).

The Council stated that the Takotna and Tuluksak weir projects are necessary to monitor declining chinook runs for the Western Interior Region. The Takotna is the only stream being monitored in headwaters, and accurate data is needed for management and preservation of fish runs.

Southwest Region

Kodiak/Aleutian Islands - The Council voted to support 14-401 and 14-402 for funding as recommended by the TRC.

The *Kodiak/Aleutian Islands* Regional Advisory Council did not take action on Investigation plan 14-452 during its January 6, 2014 teleconference. The Council moved to recess until Friday, January 10, 2014 at 10:00 AM when it will hold another teleconference to continue discussions and address proposal 14-452. The Council's discussion on January 6 indicated that the proposed objectives for 14-452 should include impacts to subsistence from sport hunting and fishing and predation.

Bristol Bay - The Council moved to support 14-401, and 14-402 for funding. The Council also voted to fund proposal 14-451. NOTE: The TRC recommendation on Proposal 14-451 is "Do Not Fund".

The Council supported for funding, with the modification to fund 14-451, noting the project is consistent with the FRMP priorities the Council identified as an information need to understand the subsistence salmon network in the Bristol Bay region. This project will build capacity and provide guidance to the Regional Advisory Council in the future to develop regulatory recommendations based on the information.

Southcentral Region

Southcentral – The Council voted to support the TRC recommendation. The Council met by teleconference a second time on December 31, 2013 to discuss and vote on project 14-508, Predicting the effects of climate change on Alaska blackfish (*Dalia pectoralis*): An integrative approach. There were no public or agency comments received for the council to review. The council voted to oppose funding project 14-508.

Due to decreased funding in the region the council had an open discussion in which some council members stated their preference was to prioritize project 14-505 over other projects. Some members did not agree with the preference to prioritize project 14-505 and stated that project 14-503, Tanada Lake project, has a high historic importance. Tanada Lake sockeye are harvested traditionally by the native villages of Mentasta and Chistochina and the traditional fishing site, Batzulnetas, has been used by the Ahtna for over 1,000 years. This is the location where Katie John, Doris Charles, and others worked to reestablish the traditional fishery through litigation in Federal courts. This decision is also known as the “Katie John Decision.” The council members all support 14-501, 14-503 and 14-505: action to support funding. The projects will provide additional information needs and are strong in capacity building. The projects will also benefit subsistence users.

Southeast Region

Southeast Alaska – The Council approved a motion in which its priorities differed from the TRC recommendation.

The Council highlighted possible conservation concerns at Klawock and Hetta Lakes from the 2013 season that were not considered by the Technical Review Committee. The Council noted the importance of the Kanalku and Kook Lake projects to the extended jurisdiction petition. The prioritized list was developed by evaluating: conservation concerns, Tribal capacity, importance to evaluating the extended jurisdiction petition, importance to subsistence users, and geographic distribution of the projects.

NORTHERN REGION OVERVIEW

Issues and Information Needs

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

- Baseline and ongoing harvest assessment and monitoring of subsistence fisheries in the Northwest Arctic and North Slope regions to supplement available information.
- Historic trends and variability in harvest locations, harvests and uses of non-salmon fish, particularly for North Slope communities.
- 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	\$271,200

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. Each project submitted for funding in the Northern Alaska Region in 2014 is summarized below (see Executive Summaries for more details on all projects).

**Summaries of Projects Recommended for Funding
by the Technical Review Committee**

14-101 Unalakleet River Chinook Salmon Escapement Assessment. 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.

14-103 Beaufort Sea Dolly Varden Dispersal Pattern. 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 describe 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. This investigation plan requests continued funding for 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 to 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 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.

**Summaries of Projects Not Recommended for Funding
by the Technical Review Committee**

14-102 North Slope Climate Change. 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 interpreted in an overall environmental context.

14-151 Kotzebue Sound Whitefish Ecology and Seasonal Dynamics. As written, this investigation plan should not be funded at this time. Although this proposal attempted to address three 2014 priority information 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 partnerships by providing rural people with meaningful roles in research and new ways to learn about and get involved with subsistence research and management.

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
<i>North Slope</i>		
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	North Slope Dolly Varden Genetic Baseline Completion ^a	USFWS
07-107	Hulahula River Dolly Varden Sonar Enumeration ^a	USFWS
<i>Northwest Arctic</i>		
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 Nigingnaqtuat: 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	Selawik Refuge Whitefish Migration and Habitat Use ^a	USFWS
04-109	Wulik River Dolly Varden Wintering Stocks ^a	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	Selawik Drainage Sheefish Winter Movement Patterns ^a	AF, USGS, USFWS, NV
10-102	Unalakleet River Chinook Salmon Abundance Estimate ^a	ADFG, NPS, BLM
10-104	Hotham Inlet Kotzebue Winter Subsistence Sheefish Harvest ^a	USFWS
10-152	Climate Change and Subsistence Fisheries in Northwest Alaska	UAF
<i>Seward Peninsula</i>		
01-224	Nome Sub-district Subsistence Salmon Survey	ADFG, KI
02-020	Pikmiktalik River Salmon Site Surveys and Enumeration	USFWS, NPS, STB,
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

^a 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 HMTEK	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				\$156.2
14-104	Selawik R Inconnu Spawning Population Abundance			\$0.0	
<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

14-101 - Unalakleet River Chinook Salmon Assessment Continuation

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), and Wes Jones, Norton Sound Economic Development (NSEDC).

Project Cost:

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

Total: \$474,316

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°53.32N, 160°29.41W) 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.

14-102 - 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

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

Stephen Klobucar; Ph.D. student, Department of Watershed Sciences, Utah State University; 5210 Old Main Hill, Logan, UT, 84322; Phone: (608)-289-5687, stephen.klobucar@gmail.com, FAX: (435)-797-4025

Project Cost:

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

Total: \$653,611

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.

14-103 - Dispersal patterns and summer ocean distribution of adult Dolly Varden in the Beaufort Sea using satellite telemetry

Project Number: 14-103
Project 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
\$156,222	\$158,333	\$83,662

Total: \$398,217

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.

14-104 - Selawik River Inconnu Spawning Population Abundance and Age Structure Evaluation

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-Investigators: Randy J. Brown, U.S. Fish and Wildlife Service

Project Cost:

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

Total: \$359,589

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.

14-151 - Kotzebue Sound Whitefish Ecology and Seasonal Dynamics

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
\$200,185	\$178,168	\$177,378	\$194,770

Total: \$750,501

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.

YUKON REGION OVERVIEW

Issues and Information Needs

The 2014 Notice of Funding Opportunity for the Yukon Region identified the following priority information needs:

- Reliable estimates of Chinook and chum salmon escapements (for example, projects using weir, sonar, mark-recapture methods).
- Methods for including “quality of escapement” measures (for example, potential egg deposition, sex and size composition of spawners, spawning habitat utilization) in establishing Chinook salmon spawning goals and determining the reproductive potential and genetic diversity of spawning escapements.
- Effects of diminished salmon abundance on contemporary economic strategies and practices. Topics could include an evaluation of barter, sharing, and exchange of salmon for cash (customary trade), as well as other economic strategies and practices that augment and support subsistence activities. Of particular interest are distribution networks, decision making, and the social and cultural aspects of salmon harvest and use.
- Harvest and spawning escapement level changes through time in relation to changes in gillnet construction and use (for example, set versus drift fishing, mesh size changes) for Chinook salmon subsistence harvest in the mainstem Yukon River.
- Complete genetic baseline sampling and population marker development for sheefish spawning populations in the Yukon River drainage. Harvests, associated contextual information, and local knowledge of whitefish species in lower Yukon drainage communities, including Alakanuk, Kotlik, Nunam Iqua, Saint Marys, Pilot Station, and Marshall.
- An indexing method for estimating annual species-specific whitefish harvests for the Yukon drainage.
- Inseason harvest enumeration and sex and length information for northern pike taken during the winter subsistence fishery from Paimiut Slough to Holy Cross on the Yukon River.

Projects Funded Under the Fisheries Resource Monitoring Program

Since the inception of the Monitoring Program in 2000, 95 projects have been funded in the Yukon Region, and four will still be operating during 2014 (**Tables 1 and 2**). The ongoing projects address Chinook salmon, chum salmon and Bering cisco. Several projects are investigating age, sex, and length data, and run reconstructions of Chinook salmon. Assessments are being conducted for Chinook and chum salmon, and mixed-stock analyses are being conducted on chum salmon and Bering cisco. Inseason salmon harvest teleconferences hosted by the Yukon River Drainage Fisheries Association are also being funded through the Monitoring Program.

2014 Investigation Plans

Twelve investigation plans for research in the Yukon Region were submitted to the Office of Subsistence Management in response to the 2014 Notice of Funding Opportunity. In June 2013, the Technical Review Committee reviewed the investigation plans and recommended nine 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 review and evaluation, the Technical Review Committee, Regional Advisory Councils, Interagency Staff Committee and Federal Subsistence Board have the opportunity to address the highest priority projects across regions. For 2014, approximately \$1,073,000 will be available for funding new projects in the Yukon 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 twelve investigation plans, the Technical Review Committee recommended funding the following nine proposed projects (**Table 5**):

14-201	Gisasa River Salmon Weir Videography Integration	\$	24,900
14-202	East Fork Andreafsky R Chinook and Summer Chum Abundance	\$	149,100
14-203	Gisasa River Salmon Weir Chinook and Summer Chum Abundance	\$	137,700
14-206	Yukon River Coho Salmon Microsatellite Baseline	\$	29,300
14-207	Yukon River Chum Salmon Mixed-stock Analysis	\$	148,400
14-208	Koyukuk River Chum Salmon Radio Telemetry	\$	125,400
14-209	Henshaw Creek Adult Salmon Abundance and Run Timing	\$	73,400
14-252	Lower Yukon River Whitefish Harvest Monitoring	\$	114,300
14-253	Upper Yukon Area Customary Trade	\$	131,800
	Total	\$	934,300

The nine 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.

Summaries of Projects submitted for Funding

Each project submitted for funding in the Yukon Region in 2014 is summarized below (see Executive Summaries for more details on all projects).

Summaries of Projects Recommended for Funding by the Technical Review Committee

14-201 Gisasa River Salmon Weir Videography Integration

The Gisasa River weir is an established and successful salmon monitoring project that provides the primary escapement and run strength data used to ensure sustainability of subsistence fisheries in the Koyukuk National Wildlife Refuge and to conserve fisheries stocks in the Gisasa River. Funding of this project would allow for the installation and operation of an underwater video system in conjunction with the existing Gisasa River weir project (project 10-207), which has been supported by the OSM since 2004. Adding video monitoring capability to the Gisasa River weir is anticipated to provide more reliable estimates of salmon abundance and identification, and also improve the long term data set necessary to monitor changes in adult salmon run strength on the Koyukuk National Wildlife Refuge. Annual cost savings are estimated to be approximately \$18,000 per year after installation, resulting in cost recovery of this project's request within the first two years of this four-year project.

14-202 East Fork Andreafsky River Chinook and Summer Chum Abundance

Funding of this proposal would allow the East Fork Andreafsky River weir to continue an established and successful monitoring project providing escapement and run strength data in the Andreafsky River. These stocks are harvested by a large lower river subsistence fishery, and pass through commercial fishing districts between the mouths of the Yukon River and Andreafsky River confluence. Fisheries managers regard escapement monitoring data provided by this project as a primary indicator of the status of lower Yukon River Chinook and summer chum stocks. The weir on this river system was initiated in 1994 making it one of the longest continuous data sets on the number and quality of escapement of salmon in the Yukon Basin. The data collected at the project site is used by U.S. Fish and Wildlife Service and Alaska Department of Fish and Game managers to help in-season management decision and post-season evaluations. This weir provides escapement counts for Chinook, chum, pink, sockeye, and coho salmon. A pilot study was conducted in 2012 to assess this East Fork Andreafsky River as a site to develop a monitoring plan for arctic lamprey.

14-203 Gisasa River Salmon Weir Chinook and Summer Chum Abundance

This four-year project would continue the operation of the Gisasa River weir. The Gisasa River weir is an established and successful salmon monitoring project that provides the primary escapement and run strength data used to ensure sustainability of subsistence fisheries in the Koyukuk National Wildlife Refuge and to conserve fisheries stocks in the Gisasa River. This project is supported by State and Federal fisheries managers and addresses an important data need identified in the Notice of Funding. The project is technically sound and supports one of the most comprehensive data sets (18 consecutive years to date) for salmon escapement in the middle Yukon River. This project is also viewed as high priority because of its strategic location as an index of escapement for Chinook and summer chum salmon in the lower Koyukuk River and as a platform for conducting other salmon studies, including temperature monitoring under project 08-701. Koyukuk River salmon stocks contribute to subsistence harvests in communities located along the Koyukuk and lower Yukon Rivers.

14-206 Yukon River Coho Salmon Microsatellite Baseline

This two-year project is being proposed to update Yukon River coho salmon genetic information to improve the ability of managers to conduct a mixed-stock analysis (MSA) for Yukon River coho salmon. Objectives for this study are clear, measurable, and achievable and the study design is appropriate for genetic analysis and testing.

14-207 Yukon River Chum Salmon Mixed-stock Analysis

This proposal seeks four years of funding for continuing the in-season mixed stock genetic assessment of summer and fall chum salmon in conjunction with passage estimates at the Pilot Station sonar project at river mile 123 of the Yukon River. Information garnered from this project allows fisheries managers to calculate in-season stock abundance estimates supporting in-season management of chum salmon fisheries. Estimates of stock composition are provided to managers within 24–48 hours of receiving the genetics samples at the lab in Anchorage. This project addresses one of the priority information needs identified in the 2014 Notice of Funding and would support continuation of inseason stock assessment/genetic identification of summer and fall runs of Yukon River chum salmon. With the high cost of current monitoring projects, it is hoped that this genetic stock identification project in the lower Yukon River will provide a long term and cost effective alternative for salmon management.

14-208 Koyukuk River Chum Salmon Radio Telemetry

Koyukuk River summer chum salmon stocks make up one of the largest contributors to the Yukon River summer chum population, however accurate information on their overall abundance and

distribution is lacking. The proposed project will use radio telemetry to estimate the proportional distribution of chum salmon throughout the Koyukuk River drainage. Results from the project will provide fisheries managers with more detailed information on the proportional distribution, run timing, and critical spawning areas of chum salmon in the Koyukuk River drainage. The project addresses a priority information need, is well-designed and objectives appear achievable with proposed budget. Koyukuk River chum salmon are an important stock in the Yukon River drainage.

14-209 Henshaw Creek Adult Salmon Abundance and Run Timing

This proposal seeks funding for a four-year continuation of the Henshaw Creek weir. This project allows managers to determine daily escapement, run timing, and age, sex, and length composition of adult salmon as well as the number of resident fish passing the weir during the study period. Additionally, the weir site serves as an outreach platform for Kanuti National Wildlife Refuge staff and Tanana Chiefs Conference Partners Program fisheries biologists to conduct an onsite science camp. The Henshaw Creek weir is the only upper Koyukuk River drainage escapement project and is valuable in providing data to effectively manage the subsistence Yukon salmon fisheries.

14-252 Lower Yukon River Whitefish Harvest Monitoring.

This study proposes to collect traditional ecological knowledge on and assess the harvest of whitefish species (along with other nonsalmon fish species) utilized by residents of Alakanuk, Kotlik, Nunam Iqua, Saint Marys, Pilot Station, and Marshall in the lower Yukon River area. This project would provide useful information to subsistence fisheries managers for the lower Yukon River. It addresses at least two priority information needs identified for the Yukon Region, has a strong link to Federal land, and is focused on an important subsistence resource, whitefish.

14-253 Upper Yukon Area Customary Trade.

Funding of this project would support ethnographic studies to document historic and contemporary practices of customary trade in upper Yukon River communities, with particular attention to understanding the nature and scope of customary trade and its role in a larger continuum of exchange practices. This project builds on earlier research on customary trade in the region, focusing specifically on the customary trade of salmon in upper Yukon River communities.

Summaries of Projects Not Recommended for Funding by the Technical Review Committee

14-204 Anvik River Sonar

This four-year project would continue funding of the Anvik River sonar project for escapement monitoring and management of chum salmon in the Yukon. Daily estimates of chum salmon passage collected at this project site are provided to Federal and State fishery managers daily for consideration in management actions that can directly affect subsistence harvest in the Yukon Delta National Wildlife Refuge, as well as other upstream harvest and escapement needs. During the fishing season information is also presented during the weekly Yukon River Drainage Fisheries Association teleconference.

The recommendation of “Do Not Fund” is based largely on the review and recommendations provided for this project in the 2012 application for funding (Project 12-204). In the 2012 review, it is stated that: “...the overall long term priority of this project to address Federal subsistence management issues may not be sufficient to justify longer term support. Therefore, it is recommended that the project be funded for only an additional two years. Funding beyond 2013

could be considered in response to the 2014 Notice of Funding; but given competing priorities and budget limitations, investigators should begin seeking other funding sources.”

14-205 Yukon River Bering Cisco Spawning using DIDSON Sonar

This three-year project would attempt to estimate a catchability coefficient for Bering cisco at Rampart Rapids, which would then be used to develop a minimum spawning population abundance and abundance-based, commercial harvest allocations, while ensuring population sustainability and continued subsistence use of this fishery resource.

The reasons for a recommendation of “Do Not Fund”: This project has lots of implications for the commercial fishery at the mouth of the Yukon River. In addition, the project is premature, in that the level of subsistence harvest of Bering Cisco should be determined first. Projects of this nature should have a State co-investigator, with a State of Alaska match involved, due to the State-sanctioned commercial harvest of Bering Cisco in the Yukon River.

14-251 Upper Yukon River Salmon Oral History

This project would address the effects of diminished salmon abundance on contemporary economic strategies and practices of the subsistence fishermen in the Yukon Flats and Upper Yukon area, in relation to traditional trade, sharing and bartering. Studies on customary trade of salmon were identified as a priority information need in the 2014 Notice of Funding. This study would gather information that is needed to support management of traditional subsistence use and customary trade practices in the Upper Yukon area between Rampart and Eagle and would establish historical data and an understanding of customary trade and how subsistence management can establish provisions that address the practice.

The reason for a recommendation of “Do Not Fund”: Per her resume, the investigator does not have a track record for doing the type of social science research proposed in this project. Therefore, the investigator is encouraged to partner with additional social scientists, and modify and re-submit this proposal during the next funding cycle (2016).

Table 1. Summary of Fisheries Resource Monitoring Program projects completed in the Yukon since 2000. Abbreviations: AC=Alaskan Connections, ADFG=Alaska Department of Fish and Game, AVCP=Association of Village Council Presidents, AV= Arctic Village, BF=Bill Fliris, BLM=Bureau of Land Management, BSFA=Bering Sea Fisherman's Association, CATG=Council of Athabaskan Tribal Governments, COK=City of Kaltag, DFO=Department of Fisheries and Oceans, EMV= Emmonak Village Council, NPS=National Park Service, LTC=Louden Tribal Council, NVE=Native Village of Eagle, NVHB= Native Village of Hooper Bay, NVV=Native Village of Venetie, RN=Research North, RW=Robert Wolfe and Associates, SVNRC= Stevens Village, SZ=Stan Zuray, TCC=Tanana Chiefs Conference, TTC=Tanana Tribal Council, UAF=University of Alaska Fairbanks, USFWS=U.S. Fish and Wildlife Service, USGS=U.S. Geological Survey, UW=University of Washington, and YRDFA=Yukon River Drainage Fisheries Association.

Project Number	Project Title	Investigators
<i>Yukon River Salmon Projects</i>		
00-003	Effects of <i>Ichthyophonus</i> on Chinook Salmon	UW
00-005	Tanana Upper Kantishna River Fish Wheel	NPS
00-018	Pilot Station Sonar Upgrade	ADFG
00-022	Hooper Bay Test Fishing	ADFG, NVHB
00-024	Pilot Station Sonar Technician Support	AVCP
00-025	Henshaw Creek Salmon Weir	USFWS
00-026	Circle and Eagle Salmon and Other Fish TEK	NVE
01-014	Yukon River Salmon Management Teleconferences	YRDFA
01-015	Yukon River Salmon TEK	YRDFA
01-018	Pilot Station Sonar Technician Support	AVCP
01-026	East Fork Andreafski River Salmon Weir	BSFA
01-029	Nulato River Salmon Weir	BSFA
01-032	Rampart Rapids Tagging Study	USFWS
01-038	Kateel River Salmon Weir	USFWS
01-048	Innoko River Drainage Weir Survey	USFWS
01-050	Kaltag Chinook Salmon Age-Sex-Length Sampling	COK
01-058	East Fork Andreafsky Weir Panel Replacement	USFWS
01-122	Lower Yukon River Salmon Drift Test Fishing	ADFG, EMV
01-177	Rampart Rapids Extension	USFWS
01-197	Rampart Rapids Summer CPUE Video	SZ
01-199	Tanana Fisheries Conservation Outreach	TTC
01-200	Effects of <i>Ichthyophonus</i> on Chinook Salmon	USGS
01-211	Upper Yukon, Porcupine, & Black River Salmon TEK	CATG
02-009	Pilot Station Sonar Technician Support	AVCP
02-011	Rampart Rapids Fall Chum Handling/mortality	USFWS
02-097	Kuskokwim & Yukon Rivers Sex-ratios of Juvenile & Adult Chinook	USFWS
02-121	Yukon River Chinook Salmon Genetics	USFWS, ADFG, DFO
02-122	Yukon River Chinook & Chum Salmon In-season Subsistence	USFWS
03-009	Tozitna River Salmon Weir	BLM
03-013	Gisasa River Salmon Weir	USFWS
03-015	Phenotypic Characterization of Chinook Salmon Subsistence Harvests	YRDFA, USFWS
03-034	East Fork Andreafsky River Salmon Weir	USFWS
03-038	Yukon River Sub-district 5-A Test Fishwheel	BF

Table 1. continued.		
Project Number	Project Title	Investigators
<i>Yukon River Salmon Projects (continued)</i>		
04-206	Tozitna River Salmon Weir	BLM
04-208	East Fork Andreafsky River Salmon Weir	USFWS
04-209	Gisasa River Salmon Weir	USFWS
04-211	Henshaw Creek Salmon Weir	USFWS
04-217	Rampart Rapids Fall Chum Salmon Abundance	USFWS
04-228	Yukon River Chum Salmon Genetic Stock Identification	USFWS
04-229	Lower Yukon River Salmon Drift Test Fishing	ADFG
04-231	Yukon River Chinook Salmon Telemetry	ADFG
04-234	Kaltag Chinook Salmon Age-Sex-Length Sampling	COK
04-251	Fort Yukon Traditional Ecological Knowledge Camp	TCC,CATG, ADFG
04-255	Yukon River Salmon Fishery Traditional Ecological Knowledge	NPS
04-256	Tanana Conservation Outreach	TTC, USFWS
04-263	Yukon River Salmon Management Teleconferences	YRDFA
04-265	Yukon River TEK of Customary Trade of Subsistence Fish	YRDFA
04-268	Hooper Bay Subsistence Monitoring	ADFG, HBTC
05-203	Yukon River Coho Salmon Genetics	USFWS
05-208	Anvik River Salmon Sonar Enumeration	ADFG
05-210	Tanana River Fall Chum Salmon Abundance	ADFG
05-211	Henshaw Creek Salmon Weir	TCC, USFWS
05-254	Yukon River Salmon Inseason Subsistence Harvest Monitoring	USFWS
06-205	Yukon River Chum Salmon Mixed Stock Analysis	USFWS
07-202	East Fork Andreafsky River Salmon Weir	USFWS
07-204	Lower Yukon River Salmon Drift Test Fishing	ADFG
07-207	Gisasa River Salmon Weir	USFWS
07-208	Tozitna River Salmon Weir	BLM
07-209	Yukon River Salmon Management Teleconferences	YRDFA
07-210	Validation of DNA Gender Test Chinook Salmon	USFWS
07-211	Kaltag Chinook Salmon Age-Sex-Length Sampling	COK
07-253	Yukon River Salmon Harvest Patterns	RWA, AC
08-200	Kaltag Chinook Salmon Age-Sex-Length Sampling	COK
08-201	Henshaw Creek Salmon Weir	TCC
08-202	Anvik River Chum Salmon Sonar Enumeration	ADFG
08-253	Yukon River Teleconferences and Inseason Management	YRDFA
10-206	Nulato River Salmon Assessment	TCC

Table 1. continued.

Project Number	Project Title	Investigators
<i>Yukon River Non-Salmon Projects</i>		
00-004	Humpback Whitefish/Beaver Interactions	USFWS, CATG
00-006	Traditional Ecological Knowledge Beaver/Whitefish Interactions	ADFG, CATG
00-021	Dall River Northern Pike	ADFG, SV
00-023	Upper Tanana River Humpback Whitefish	USFWS
01-003	Old John Lake TEK of Subsistence Harvests and Fish	ADFG, AV, USFWS
01-011	Arctic Village Freshwater Fish Subsistence Survey	ADFG, AV, USFWS
01-100	Koyukuk Non-salmon Fish TEK and Subsistence Uses	ADFG, TCC
01-140	Yukon Flats Northern Pike	ADFG, SV
01-238	GASH Working Group	USFWS
02-006	Arctic Village Freshwater Fish Subsistence	ADFG, NVV
02-037	Lower Yukon River Non-salmon Harvest Monitoring	ADFG, TCC
02-084	Old John Lake Oral History and TEK of Subsistence	USFWS, AV, ADFG
04-253	Upper Tanana Subsistence Fisheries Traditional Ecological Knowledge	USFWS,UAF, ADFG
04-269	Kanuti NWR Whitefish TEK and Radio Telemetry	USFWS, RN
06-252	Yukon Flats Non-salmon Traditional Ecological Knowledge	ADFG, BLM, USFWS,
06-253	Middle Yukon River Non-salmon TEK and Harvest	ADFG, LTC
07-206	Innoko River Inconnu Radio Telemetry ^a	USFWS, ADFG
08-206	Yukon and Kuskokwim Coregonid Strategic Plan	USFWS, ADFG
08-250	Use of Subsistence Fish to Feed Sled Dogs	RN, AC

^a Final Report in preparation.

Table 2. Summary of ongoing 2013 projects funded under the Fisheries Resource Monitoring Program in the Yukon Region. Abbreviations used for investigators are: ADFG=Alaska Department of Fish and Game, BC=Bue Consulting, CoK=City of Kaltag, USFWS=U.S.Fish Wildlife Service, and YRDFA=Yukon River Drainage Fisheries Association.

Project Number	Project Title	Investigators	Budget 2013
<i>Yukon River Salmon</i>			
10-200	Yukon River Chinook Salmon Run Reconstruction	BC	\$6.9
10-201	Yukon River Chinook Salmon ASL Data	YRDFA	\$16.7
10-202	East Fork Andreafsky River Salmon Assessment	USFWS	\$149.6
10-205	Yukon River Chum Salmon Mixed-Stock Analysis	USFWS	\$124.8
10-207	Gisasa River Chinook and Summer Chum Salmon Assessment	USFWS	\$141.9
12-204	Anvik River Sonar	ADFG	\$97.0
12-205	Kaltag Chinook Salmon Sampling	CoK	\$12.0
12-251	Inseason Salmon Harvest Teleconferences	YRDFA	\$127.7
<i>Yukon River Non-Salmon</i>			
10-209	Yukon Delta Bering Cisco Mixed-Stock Analysis	USFWS	\$13.9
Total Yukon Monitoring Program			\$690.5

Table 3. Yukon 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 (\$000s)			
		Alaska Native	State	Federal	Other
<i>Stock Status and Trends Projects</i>					
14-201	Gisasa River Salmon Weir Videography Integration			\$24.9	
14-202	East Fork Andreafsky R Chinook and Summer Chum Abundance			\$149.1	
14-203	Gisasa River Salmon Weir Chinook and Summer Chum Abundance			\$137.7	
14-204	Anvik River Sonar		\$97.1		
14-205	Yukon River Bering Cisco Spawning using DIDSON Sonar			\$79.0	
14-206	Yukon River Coho Salmon Microsatellite Baseline			\$29.3	
14-207	Yukon River Chum Salmon Mixed-stock Analysis			\$148.4	
14-208	Koyukuk River Chum Salmon Radio Telemetry	\$23.8		\$101.5	
14-209	Henshaw Creek Adult Salmon Abundance and Run Timing	\$73.4			
<i>Harvest Monitoring and Traditional Ecological Knowledge Projects</i>					
14-251	UYukon R Salmon Oral History		\$21.1		\$85.8
14-252	LYukon R Whitefish Harvest Monitoring		\$114.3		
14-253	U Yukon Area Customary Trade		\$80.4		\$51.4

2014 Draft Fisheries Monitoring Plan

Table 4. Yukon 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, RCons=Raven's Wing Consulting, TCC=Tanana Chiefs Conference, USFWS=U.S. Fish and Wildlife Service, and YRDFA=Yukon River Drainage Fisheries Association.				
Project Number	Lead Organization	Title	Funding (\$000s)	
			Local Hire	Matching
<i>Stock Status and Trends Projects</i>				
14-201	USFWS	Gisasa River Salmon Weir Videography Integration	\$0.0	\$25.7
14-202	USFWS	East Fork Andreafsky R Chinook and Summer Chum Abundance	\$12.5	\$58.0
14-203	USFWS	Gisasa River Salmon Weir Chinook and Summer Chum Abundance	\$12.4	\$37.7
14-204	ADFG	Anvik River Sonar	\$0.0	\$101.3
14-205	USFWS	Yukon River Bering Cisco Spawning using DIDSON Sonar	\$0.0	\$8.2
14-206	USFWS	Yukon River Coho Salmon Microsatellite Baseline	\$0.0	\$5.5
14-207	USFWS	Yukon River Chum Salmon Mixed-stock Analysis	\$31.5	\$27.5
14-208	USFWS	Koyukuk River Chum Salmon Radio Telemetry	\$16.3	\$47.1
14-209	TCC	Henshaw Creek Adult Salmon Abundance and Run Timing	\$0.0	\$6.8
<i>Harvest Monitoring and Traditional Ecological Knowledge Projects</i>				
14-251	RCons	Upper Yukon River Elders Speak: Traditional Knowledge	\$12.0	\$2.5
14-252	ADFG	Lower Yukon River Whitefish Harvest Monitoring	\$0.0	\$18.6
14-253	YRDFA	Upper Yukon Area Customary Trade	\$3.0	\$0.8

Table 5. Funding recommendations by the Technical Review Committee (TRC) for the Yukon 2014 Fisheries Resource Monitoring Program.						
Project Number	Title	TRC	Requested Budget (\$000)			
			2014	2014	2014	2014
<i>Stock Status and Trends Projects</i>						
14-201	Gisasa River Salmon Weir	YES	\$24.9	\$0.0	\$0.0	\$0.0
14-202	East Fork Andreafsky R Chinook and Summer Chum Abundance	YES	\$149.1	\$140.1	\$146.9	\$154.4
14-203	Gisasa River Salmon Weir Chinook and Summer Chum Abundance	YES	\$137.7	\$143.6	\$150.7	\$158.3
14-204	Anvik River Sonar	NO	\$97.1	\$98.6	\$101.1	\$102.6
14-205	Yukon River Bering Cisco Spawning using DIDSON Sonar	NO	\$79.0	\$119.2	\$73.6	\$0.0
14-206	Yukon River Coho Salmon Microsatellite Baseline	YES	\$29.3	\$29.3	\$0.0	\$0.0
14-207	Yukon River Chum Salmon Mixed-stock Analysis	YES	\$148.4	\$150.1	\$150.0	\$151.6
14-208	Koyukuk River Chum Salmon Radio Telemetry	YES	\$125.4	\$113.7	\$121.5	\$0.0
14-209	Henshaw Creek Adult Salmon Abundance and Run Timing	YES	\$73.4	\$70.4	\$70.4	\$0.0
<i>Harvest Monitoring and Traditional Ecological Knowledge Projects</i>						
14-251	U Yukon R Salmon Oral History	NO	\$106.9	\$78.3	\$0.0	\$0.0
14-252	L Yukon R Whitefish Harvest Monitoring	Yes w/Mod	\$114.3	\$164.3	\$137.0	\$43.1
14-253	U Yukon Area Customary Trade	Yes w/Mod	\$131.8	\$84.9	\$64.6	\$0.0
Total			\$1,217.3	\$1,192.5	\$1,015.8	\$610.0
Funding Guideline			\$1,073.0			
TRC Recommendation			\$934.3	\$896.4	\$841.1	\$507.4

14-201 - Gisasa River Salmon Weir Videography Integration

Project Number: 14-201
Title: Gisasa River Salmon Weir Videography Integration
Geographic Region: Yukon
Information Type: Stock Status and Trends
Principle Investigator: Jeffery Melegari, U.S. Fish and Wildlife Service, 101 12th Ave., Room 110, Fairbanks Alaska, 99701, phone: 907-456-0550, Fax: 907-455-1853, email: jeff_melegari@fws.gov.
Co- investigator(s): Jeremy Mears, U.S. Fish and Wildlife Service, 101 12th Ave., Room 110, Fairbanks Alaska, 99701, phone: 907-456-0390, Fax: 907-455-1853, email: jeremy_mears@fws.gov.
Jeremy Carlson, U.S. Fish and Wildlife Service, 101 12th Ave., Room 110, Fairbanks Alaska, 99701, (907) 456-0515, FAX (907) 455-1853, email: jeremy_carlson@fws.gov.

Project Costs:

2014	2015	2016	2017
\$24,850	\$0	\$0	\$0

Total: \$24,850

Issue: This project will address the priority information need of obtaining reliable estimates of Chinook salmon and chum salmon. Accurate escapement estimates are necessary for managers to make informed decisions. Integration of videography into the existing Gisasa River weir, if funded, will: allow for long term cost savings by reducing the time required to count passing fish, thus reducing crew size and personnel costs; reduce the impact to migrating salmon by reducing the period of time that the weir would be closed and potentially interrupting salmon migration; increase accuracy of counts by allowing video to be reviewed to verify counts or species identification; and provide the opportunity to increase public awareness by sharing video through social media.

Objectives:

1. Construct, install, and operate an underwater video system at the existing Gisasa River weir to improve escapement monitoring.
2. Verify video system performance by validating motion capture video counts with real time counts.

Methods: The necessary components, supplies, and equipment to construct and install the video system will be purchased; based on information from previously successful video weir operations. Normal weir operations (counting and sampling) will continue while the video system is setup and verified. An underwater video camera will be housed in a sealed box filled with filtered water, and connected to a passage chute on the front of the existing weir trap. To maintain consistent lighting and video quality the passage chute will be isolated from exterior light and illuminated with pond lights. Video will be recorded with a computer based Digital Video Recorder (DVR) 24 hours per day, 7 days a week. During the evaluation period, the DVR will record real time and with motion detection to allow comparison and evaluation of performance. Once performance has been verified, the DVR will record with motion detection to minimize the amount of empty video footage and review time. Both numbers and species identification will be considered during comparisons. After initial validation of the motion capture video, periodic comparisons of hourly counts from motion capture video to counts from

real time video will be conducted to ensure accuracy is maintained.

Partnerships and Capacity Building: Both FFWFO and the Koyukuk Refuge are committed to continually promoting capacity building. Some local hires have been hired over the years, and a few students in the Alaska Native Science & Engineering Program (ANSEP) have assisted at the Gisasa weir, and one of these ANSEP students was hired as a technician in subsequent years by our office. If this project is funded, the opportunity to increase public awareness by sharing video through social media and other means could contribute to these partnerships and capacity building efforts.

14-202 - East Fork Andreafsky River Chinook and summer chum salmon abundance and run timing, Yukon Delta National Wildlife Refuge, Alaska

Project Number: 14-202
Title: East Fork Andreafsky River Chinook and summer chum salmon abundance and run timing, Yukon Delta National Wildlife Refuge, Alaska.
Geographic Region: Yukon
Data Type: Stock Status and Trends.
Principal Investigator: Jeremy Mears, US Fish and Wildlife Service, Fairbanks Field Office, Subsistence Fisheries Branch. 101 12th Ave., Room 110, Fairbanks, Alaska 99701. Phone (907) 456-0390; Fax (907) 455-1853; e-mail: jeremy_mears@fws.gov.

Project Costs:

2014	2015	2016	2017
\$149,102	\$140,069	\$146,935	\$154,445

Total: \$590,551

Issue Addressed: The USFWS considers Yukon River salmon stocks as high priority species for research and management due to their prominence in the watershed, the public's direct reliance upon these species as food resources, and because of recent instability in the stocks production rates. The East Fork Andreafsky River is of particular interest to the service as it lies within the Yukon Delta Wildlife Refuge and is listed as Wild and scenic river and provides important spawning and rearing habitat for both salmon species that significantly contribute to the complex Yukon River mixed stock fisheries. The data collected at the project site is used by USFWS and ADF&G-DCF managers to help in-season management decisions and post-season evaluations.

Assessment of management actions for Yukon River salmon fisheries is difficult due to the limited number of escapement studies in the drainage. In-season management of Yukon River salmon is outcome based and delivered by adapting management actions as the run develops and the success or failure is measured by the conservation of those stocks. The East Fork Andreafsky River weir has been collecting data on Chinook and summer chum escapement for 19 years and is one of the longest continuous data sets on the number and quality of escapement for the Yukon Basin. Given current data gaps such as the mechanisms behind shifts in productivity, effects of changing gear types in the subsistence and commercial fisheries, or the effects of climate change, it is imperative to continue collecting these data. The project's core function is to collect data on migratory salmon which are a major resource for subsistence users throughout the Yukon region; stocks headed for the Andreafsky River contribute to the approximately 11,000 Chinook, 60,000 summer chum, 4,500 pink, and 2,500 coho salmon annually harvested below the Andreafsky River by subsistence users (Jallen et al. 2012). In recent years there has been an effort to expand data collection to include other fishes taken by subsistence users such as whitefish and Arctic lamprey.

This project addresses or contributes information to the following priority information needs for Yukon River salmon identified for 2014:

1. Reliable estimates of Chinook and chum salmon escapements: Weir data offers robust and reliable counts based on direct observation in close proximity to the fish

(versus towers or aerial surveys) and generally does not need to be expanded or apportioned.

2. Measures of quality of escapement: Age, sex, and length data is collected to assess run composition. The systematic sampling used at the weir was designed according to the recommendations of Cochran (1977), have been evaluated for performance, and are among the most reliable types of data collected for migratory salmon.
3. Harvest and spawning escapement level changes through time: In 2014, this project will have been in operation for 20 years. Continued collection of long term data sets is essential in understanding temporal trends for Yukon salmon. Furthermore, these data assist in establishing and implementing conservation measures (e.g. run projections and in-season assessment), and monitoring the effects of those actions (e.g. run reconstructions, assessing the effects of altering gear types).
4. Harvests associated contextual information, and local knowledge of whitefish species in the lower Yukon River: The weir has monitored whitefish (*Coregonus* sp.) movement through the weir since 1994. Since 2011, additional data (i.e. gonadosomatic indices) has been collected on whitefish to understand spawning condition for whitefish species on the East fork Andreafsky River which will enhance understanding of basic whitefish biology and habitat use and contribute to the management of the developing commercial market in the lower Yukon River. Further, the conversion of the weir to video weir monitoring will allow for better species level reporting on whitefish.

Objectives: This project is proposed as a four year (2014-2017) study. The objectives are:

1. Determine the daily and seasonal passage of Chinook salmon and summer chum salmon;
2. Describe the age, sex, and length of these species for the year and add to the long-term data collection at this site;
3. Enumerate the daily passage of other fish species, and where possible act as a platform to expand our understanding of lesser studied salmon and non-salmon species.

Methods: A resistance board weir will be constructed in mid-June and be operational through early-August in each of the project years. All fish species that move through the weir are counted. An effort to convert the manual count to video count is currently underway; this will only verify counts and enhance accuracy. The project timing coincides with both the Chinook and summer chum salmon runs. Fish are counted 7 days a week, 24-hours a day to provide daily inseason data on the run to both state and federal managers. Sampling for age, sex, and length will be conducted on Chinook and summer chum salmon to understand run composition. A stratified random sample design allows for the count data to be combined with ASL data, from which the composition of runs of Chinook and summer chum and accurately estimated.

Partnerships/Capacity Building: The FFWFO has strived for local involvement and capacity building with this project and is committed to continually promoting capacity building by describing project opportunities at RAC, YRDFA, and Refuge coordination meetings. For several years the project has served as a platform to host a science camp for children from Yukon River communities. The Alaska Department of Fish and Game has been consulted and will assist by ageing scales. In 2013 the project is in the process of bringing on a local hire from St. Mary's to work at the weir.

14-203 - Gisasa River Chinook and summer chum salmon abundance and run timing assessment, Koyukuk National Wildlife Refuge, Alaska

Project Number: 14-203
Title: Gisasa River Chinook and summer chum salmon abundance and run timing assessment, Koyukuk National Wildlife Refuge, Alaska.
Geographic Region: Yukon River
Data Type: Stock Status and Trends
Principle Investigator: Jeremy Carlson, U.S. Fish and Wildlife Service, 101 12th Ave., Room 110, Fairbanks Alaska, 99701, phone: (907)-456-0515, email: jeremy_carlson@fws.gov.
Co-Investigator: Jeff Melegari, U.S. Fish and Wildlife Service, 101 12th Ave., Room 110, Fairbanks Alaska, 99701, phone: (907)-456-1853, email: jeff_melegari@fws.gov.

Project Costs: *Please see Budget section for explanation of the two alternatives.*

<i>Alternative 1-</i>			
2014	2015	2016	2017
\$137,726	\$143,561	\$150,741	\$158,278

Total: \$590,306 without video conversion

<i>Alternative 2-</i>			
2014	2015	2016	2017
\$137,726	\$126,402	\$132,754	\$139,423

Total: \$536,305 with video conversion.

Issue Addressed: The USFWS is considering Yukon River Chinook and chum salmon stocks as high priority species for research and management due to their prominence in the watershed, the public's direct reliance upon these species as food resources, and because of recent instability in the stock's production rates. Adult Chinook and chum salmon returning to the Gisasa River, Koyukuk River Sub-basin, directly contribute to the subsistence harvest of communities throughout the lower and middle Yukon River Basin (Basin). However, the successful delivery and assessment of management actions, conservation and utilization alike, in this region is difficult due to the complexity of the individual salmon runs, the mixed stock fishery, and the limited number of escapement studies like the Gisasa River weir in the Basin. The Koyukuk River which flows through the Koyukuk National Wildlife Refuge (Refuge) is one of the largest tributaries to the middle-lower Yukon River and has significant runs of Chinook and summer chum salmon. The Gisasa River weir is currently one of only two projects within the Koyukuk River drainage that provide in-season run information. These data assist in the adaptive management process Federal and State managers use throughout the Basin. For 19 years, federal and state managers and research biologists have consistently identified this project as an important source of information for fishery management and assessment.

Annual returns of Yukon River Chinook salmon and summer chum salmon have displayed wide variability in run size, timing, and age and sex composition, with recent Chinook salmon returns dropping to alarming levels. Last year the Gisasa River weir recorded the lowest number of

returning Chinook in 19 years which corresponded with low returns throughout the Yukon Basin. The reasons for these reductions have been difficult to determine due to the multitude of factors (e.g. marine bycatch and productivity, commercial and subsistence fishing time and mesh regulations), but match reductions in harvest experienced across the Yukon Basin. These circumstances accentuate the need to collect accurate escapement estimates from Yukon River tributaries and underscore the importance of augmenting long term data sets, especially in the face of stressors such as climate change, disease, selective harvest, and overall demand on the resources of the dynamic Yukon River system. After the 2013 field season, this project will have 20 years of data on Chinook and chum salmon making it one of the most consistent long term data sets in the Yukon Basin. In addition, the Gisasa River weir provides a platform from which to conduct additional sampling in the local area at a reduced cost.

This project addresses or contributes information to the following priority information needs for Yukon River salmon identified for 2014:

1. Obtain reliable estimates of Chinook and chum salmon escapements (e.g. weir and sonar projects).
2. Examine long-term trends in age, sex, and length composition of Chinook salmon harvests and escapements in relation to environmental changes and harvest practices.
3. Utilize methods for including “quality of escapement” measures (e.g., egg deposition, size composition, habitat utilization) in establishing Chinook salmon spawning goals and determining the reproductive potential of spawning escapements.

Objectives:

1. Determine daily passage, estimate seasonal escapement, and describe run timing of adult Chinook salmon and summer chum salmon.
2. Determine sex and size composition of adult Chinook salmon and summer chum salmon.

Methods: A resistance board weir will be installed and operated on the Gisasa River from mid-June to the end of July/early August each year from 2014-2017. A live trap, installed near mid-channel, will allow fish to be held for sampling or passed through and enumerated. All fish, except whitefish *Coregonus* and *Prosopium* spp., passing through the weir will be identified to species and enumerated. Sex, age, and length information from salmon species will be collected and this data will then be phoned in to the Fairbanks Fish and Wildlife Field Office by satellite phone daily. Sampling will begin at the beginning of each week with a goal to sample approximately 25 fish per day over a seven day period for each species until the weekly goal is reached. Three scales will be collected from Chinook salmon and one scale will be collected from summer chum salmon. Once the scales are removed, they will be placed on scale gum cards for later analysis. Lengths of Chinook and chum salmon will be measured to the nearest 1 mm from mid-eye to fork of the caudal fin (MEF). Sex will be determined by visual inspection of secondary sexual characteristics. Sex and length data will be entered into an electronic ADF&G adult salmon age-sex-length excel spreadsheet. The age-sex-length spreadsheet and accompanying scale gum cards will be sent to ADF&G, Commercial Fisheries Division for age analysis.

Partnerships and Capacity Building: FFWFO and the Refuge have strived for local involvement and capacity building with the project. Plans are also being made for FFWFO staff to assist the Refuge in a mark and recapture pilot study within the Koyukuk River drainage. In addition, the Refuge has contributed support in the FFWFO effort to assist the Tanana Chiefs Conference (TCC) with the installation and maintenance of the Henshaw Creek weir project which is also located in the Koyukuk River drainage near Allakaket. Both FFWFO and the

Refuge have been committed to continually promoting capacity building by describing project opportunities at RAC, YRDFA, and Refuge coordination meetings. During the 2008 season a student in the Alaska Native Science & Engineering Program (ANSEP) working at the Koyukuk NWR assisted at the Gisasa weir for a short period of time, and she was hired by our office for the 2009 field season. Field seasons 2010 and 2011 also included ANSEP students assisting with weir installation. In 2012, a local hire from Koyukuk helped out at the weir site for a couple of weeks. She received training and subsequent experience in project planning, weir installation, watercraft operations, data entry and data sharing with ADFG. She is scheduled to return for the 2013 season.

14-204 - Anvik River Sonar Project

Project Number: 14-204
Title: Anvik River Sonar Project
Principal Investigator: Carl T. Pfisterer, Alaska Department of Fish and Game, 1300 College Road, Fairbanks, AK 99701. Office: (907) 459-7323, Fax: (907) 459-7271. E-mail: carl.pfisterer@alaska.gov
Co-Investigator: Malcolm McEwen, Alaska Department of Fish and Game

Cost:

2014	2015	2016	2017
\$97,128	\$98,610	\$101,118	\$102,600

Total Cost: \$399,456

Issue: The Anvik River contributes to the subsistence chum salmon fishery in the lower Yukon River, which is part of the Yukon Delta National Wildlife Refuge. The subsistence summer chum fishery occurs in the Yukon Delta National Wildlife Refuge from approximately June 10 through July 15. The Anvik River sonar project is a continuing project that directly addresses the identified Yukon Region priority need “reliable estimates of Chinook and chum salmon escapements (e.g., weir and sonar projects)”.

The Anvik River sonar project has provided reliable estimates of chum salmon escapement to the Anvik River since 1979 and is one of only two projects in the Yukon River drainage with an established Biological Escapement Goal (BEG) for summer chum salmon (Brannian, Evenson et al. 2006). A BEG is the escapement that provides the greatest potential for maximum sustained yield and is the primary management objective for escapement. The Anvik River sonar project's longevity and history of being one of the largest producers of summer chum salmon in the Yukon River drainage (Lingnau 2002) combine to make this one of the most important projects for escapement monitoring and management of chum salmon in the Yukon Region. Daily estimates of chum salmon passage are provided to Federal and State fishery managers daily for consideration in management actions that can directly affect subsistence harvest in the Yukon Delta National Wildlife Refuge and the rest of the Yukon River drainage.

Objectives:

1. Estimate chum salmon fish abundance in the Anvik River using DIDSON sonar from approximately June 16 through July 26.
2. Collect between 162-210 chum salmon samples during each of 3 to 4 stratum throughout the season to estimate the age, sex, and length (ASL) composition of the Anvik River chum salmon passage, such that simultaneous 95% confidence intervals of age composition in each sample are no wider than 0.20 ($\alpha = 0.05$ and $d = 0.10$).
3. Monitor selected climatic and hydrological parameters daily at the project site for use as baseline data.

Methods: The Anvik River sonar project will be operated from its customary location approximately 76 km upstream of the confluence of the Anvik and Yukon Rivers, 5 km below Theodore Creek in Sections 34 and 35, Township 31 North, Range 61 West, Seward Meridian, at latitude/longitude 62° 44.208" N 160° 40.724" W.

Dual Frequency Identification Sonar (DIDSON) will be used to count salmon migrating past the site. The DIDSON sonar is a state-of-the-art imaging sonar that produces video like images

making it easy to identify fish, the direction of travel, and even limited ability to estimate size. Sonar will be deployed on each bank of the Anvik River and data will be collected 30 minutes of each hour, 24-hours per day, 7 days a week for the duration of the study. This will provide a total of 12 hours of data per day per bank. Counts will be expanded for the fraction of the day sampled to estimate daily passage. The only fish species present in large numbers during the chum salmon run is pink salmon. When pink salmon are present a tower will be used to estimate the relative proportion of chum and pink salmon. These proportions will be used to apportion the sonar counts to species.

Region wide standards have been set for the sample size needed to describe age composition of a salmon population. These would apply to the time period or stratum in which the sample is collected. Sample size goals are based on accuracy (d) and precision (a) objectives of $d = 0.10$ and $a = 0.05$ for a rejection rate of 10%. Sample sizes will be based on obtaining 162 summer chum salmon for each of the following time strata: June 16-30; July 1-7; July 8-14; and July 15-26.

Climatic and hydrologic data will be collected at approximately 1800 hours each day at the sonar site. River depth is monitored using a staff gauge marked in 1 cm increments. Change in water depth will be presented as negative or positive increments from the initial reading of 0.0 cm. Subjective notes on wind speed and direction, cloud cover and precipitation will be recorded. Water and air temperature will be measured using a HOBO temperature logger, which will electronically record the temperature every hour.

Partnerships/Capacity Building: Due to the technical nature of the work, limited opportunities exist to develop partnerships and build local capacity. During the fishing season information is presented during the weekly YR DFA teleconference. Currently we have a technician working on the project from a village downriver of Anvik. When there is a vacancy with the crew we are trying to hire from the local villages.

14-205 - Enumeration of the Spawning Migration of Yukon River Bering Cisco using DIDSON Sonar

Project Number: 14-205
Title: Enumeration of the Spawning Migration of Yukon River Bering Cisco using DIDSON Sonar
Geographic Region: Yukon Region (Yukon River main stem from the mouth to upper Yukon Flats)
Data Type: Stock Status and Trends (SST).
Principal Investigators: Randy J. Brown, U.S. Fish and Wildlife Service, Fairbanks FWFO;
 Suresh A. Sethi, U.S. Fish and Wildlife Service, FES Biometrics
Co-Investigator: Stan Zuray, Rapids Research Center

Project Cost:

2014	2015	2016
\$78,972	\$119,178	\$73,643

Total: \$271,793

Issue Addressed: Bering cisco *Coregonus laurettae* are anadromous salmonids with three known spawning populations, one each in the Yukon, Kuskokwim, and Susitna rivers. The Yukon River population is thought to spawn in main-stem reaches of the upper Yukon Flats and rear in coastal habitats in western Alaska. Most maturing fish return to spawn between 5 and 7 years of age. The scarcity of older fish in the spawning population suggests high mortality following spawning. Subsistence fishers harvest Bering cisco throughout their range and the species is particularly favored in most coastal communities of western Alaska. Annual subsistence harvest data for Bering cisco have not been collected, however, harvest is assumed to be substantial. The Yukon Delta commercial Bering cisco fishery has reported annual catches averaging more than 9,000 fish since its inception in 2005. This amount has been considered conservative by fishery managers but there are no abundance estimates to support or refute this perspective. A recent genetics project estimated that more than 97% of Bering cisco captured in the commercial fishery came from the Yukon River population and a statistically negligible fraction from the Kuskokwim River population. The commercial fishery on Yukon Delta Bering cisco supplies a market in New York City, which has always requested a much larger allocation than they have been allowed. Some coastal subsistence users are concerned about the developing commercial fishery and its potential impact on their harvests, particularly if the fishery is permitted to expand. While we have learned a great deal about Bering cisco populations during the last few years, we still have no quantitative data on the magnitude of the annual spawning population in any of the three natal rivers. This project will provide a means of getting the quantitative data required for effective management of the fishery.

Objectives:

1. enumerate daily passage of the Yukon River Bering cisco spawning migration along north and south banks of the Yukon River at Rapids using two DIDSON sonar units;
2. test the hypothesis that daily catches of Bering cisco from the Rapids video fish wheel (fish per 24 hrs; CPUE) are directly proportional to daily passage of Bering cisco (daily sonar counts);
3. assuming that fish wheel CPUE data for Bering cisco are proportional to sonar passage data, estimate minimum annual Bering cisco spawning population abundances with appropriate confidence intervals.

Methods: The Rapids is a unique location where the Yukon River is highly constricted in a canyon with a rock island in the middle of the river. The currents of the two deep channels of the river that split around the rock island are extraordinarily swift. Upstream migrating fish are therefore concentrated along the sides of the river making them more available to shore-based capture methods. Between mid-June and early August, three primary fish species are captured at Rapids: Bering cisco (30 and 45 cm FL), Chinook salmon (50 to 100 cm MEFT), and chum salmon (50 to 72 cm MEFT). Because of the large size differences between Bering cisco and salmon species, Bering cisco can be identified in the imaging sonar and counted as they migrate upstream. By mid-August other coregonid species similar in size to Bering cisco become common and our ability to count Bering cisco with the imaging sonar will decline.

Objective 1; enumerating Bering cisco

During summers of 2014 and 2015, daily passage of pre-spawning Bering cisco migrating upstream in the Yukon River will be counted using DIDSON imaging sonar technology. Two standard DIDSON sonar units will be operated in high-frequency mode for approximately 6 weeks between late June and early August; one on the left (south) bank, approximately 100 m downstream from the test fish wheel, and the other across the river from the test fish wheel on the right (north) bank. A 10 m window will be used to optimize our capacity to measure length.

Objective 2; data analysis and hypothesis testing

For this project to be useful for long term management of the Bering cisco fishery and monitoring of the spawning population, the daily fish wheel catch, expressed as Bering cisco per 24 hours (CPUE), must be proportional to the number of Bering cisco passing upstream each day along the left bank of the Yukon River as counted using a DIDSON sonar system. Further, the proportion of total Bering cisco passage (left bank plus right bank) that migrate upstream along the left bank of the Yukon must remain similar over time, both within and among years, which would lead to a situation where Bering cisco CPUE was proportional to total passage. Following the basic notation of Harley et al. (2001), the proportional relationship (q) between daily catch (C_t) and daily passage (P_t) can be expressed mathematically as:

Equation 1 $C_t = qP_t$, which can be rearranged to solve for q : $q = C_t \cdot P_t^{-1}$,

Objective 3: estimating minimum spawning population abundance

Assuming that we are able to estimate an acceptable catchability coefficient, q , we will calculate minimum spawning population abundances for years in which full season CPUE data are available. Daily passage (P_i) will be estimated as:

Equation 3 $P_i = C_i \frac{1}{q}$,

Minimum annual passage (P_a) will be estimated as:

Equation 5 $P_a = \sum_{i=1}^n P_i$,

Variance calculations for these estimates are detailed in the full proposal.

Partnerships and Capacity Building: The primary partnership in this project is with Mr. Stan Zuray, an elder fisherman from the community of Tanana. We have had a long term association with Mr. Zuray, since 1996, and his annual contributions to fish monitoring and management activities on the Yukon River testify to the great capacity he has gained through this association and many others that have sprung from it. We have gained also from Mr. Zuray’s experiential knowledge of the river and the fish and our projects have been enhanced through this partnership.

Additionally, we gain exposure to the rural community by working with Mr. Zuray. Many people traveling the river stop in and ask questions about our activities and other research and management issues up and down the river. Many of these people would not stop and talk with us if we were not associated with Mr. Zuray. By working at Rapids, we have an extended opportunity to share our perspectives with the rural community and clarify matters related to bycatch in the Bering Sea pollock fishery, commercial fishery issues within the Yukon River drainage, Board of Fish proposals, escapement goals for salmon into the Canadian portion of the drainage, and many other topics that we are familiar with through our professions but are difficult for rural residents to access and understand. Additionally, Mr. Zuray has sponsored summer work experiences with young rural residents who are paid to assist Mr. Zuray in his fisheries activities and he assigns them to work with us while we are there. In this way, we provide a certain amount of fisheries training and professional exposure to a substantial number of young people as they consider their future education and employment goals.

14-206 - Yukon River Coho Salmon microsatellite baseline

Project Number: 14-206
Title: Yukon River Coho Salmon microsatellite baseline
Geographic Area: Yukon River
Information Type: Stock Status and Trends (SST).
Investigator(s): Blair Flannery, Conservation Genetics Laboratory (CGL), U.S. Fish and Wildlife Service (USFWS), 1011 East Tudor Road, Anchorage, AK 99503; (907) 786-3355; Fax (907) 786-3978; blair_flannery@fws.gov.
Co-Investigator: John Wenburg, CGL, USFWS, 1011 E. Tudor Rd., Anchorage, AK 99503. Phone (907) 786-3858. Fax (907) 786-3978. Email: john_wenburg@fws.gov

Cost:

2014	2015
\$29,260	\$29,260

Total: \$58,520

Issue: Coho salmon are an important Yukon River subsistence fishery, comprising 10% of the salmon subsistence harvest. With the recent decline in Yukon River chum and Chinook salmon, demand for coho has risen, with 76% of the coho salmon run harvested in 2011, emphasizing the need for more data to manage this resource. The current Yukon River coho salmon genetic baseline was assayed at microsatellite loci of inherently low variability, an average of only four alleles per locus (Flannery et al. 2006). This has resulted in limited power for identifying stocks in mixtures, with only two stocks having greater than 90% mixed-stock analysis (MSA) simulation accuracy. Since the formation of the Yukon River coho salmon genetic baseline, a standardized suite of microsatellite loci has been developed for coho salmon by the Washington Department of Fish and Wildlife and the Department of Fisheries and Oceans Canada. This standardized suite of loci is highly variable, an average of 30 alleles per locus. Power for MSA is directly related to the number of independent alleles, so these loci should greatly improve baseline performance for Yukon River coho salmon. Therefore, we propose to update the Yukon River coho salmon baseline by genetically analyzing 1,672 samples at 18 standardized microsatellite loci in order to increase the applicability of MSA for Yukon River coho salmon.

Objectives:

1. Genotype 14 coho salmon stocks with a standardized suite of microsatellite loci;
2. Provide preliminary estimates of the power of genetic data for use in various mixed-stock analyses (MSA) of Yukon River coho salmon.

Methods: The population structure and genetic diversity for Yukon River coho salmon will be evaluated using samples collected from 14 locations: Archuelinguk, Andrefsky, Anvik, Rodo, Kaltag, Clear, Kantishna, Glacier, Nenana-17 mile slough, Otter, Lignite, Delta, Old Crow, Fishing Branch. These samples will be assayed for genetic variation at 18 microsatellite loci currently in use for coho salmon research. The data will be tested to determine if sufficient variation exists for mixed-stock analysis applications.

Partnerships/Collaboration: Due to the technical nature of this project, partnership and capacity development are limited.

14-207 - Application of mixed-stock analysis for Yukon River chum salmon

Project Number: 14-207
Title: Application of mixed-stock analysis for Yukon River chum salmon
Geographic Area: Yukon River
Information Type: Stock Status and Trends
Investigators: Blair Flannery, Conservation Genetics Laboratory (CGL), USFWS, 1011 E. Tudor Rd., Anchorage, AK 99503. Phone (907) 786-3355. Fax (907) 786-3978. Email: blair_flannery@fws.gov
Co-Investigator: John Wenburg, CGL, USFWS, 1011 E. Tudor Rd., Anchorage, AK 99503. Phone (907) 786-3858. Fax (907) 786-3978. Email: john_wenburg@fws.gov

Project Cost:

2014	2015	2016	2017
\$148,362	\$149,951	\$149,951	\$151,606

Total: \$599,870

Issue: This project relates to the following priority information need identified in the 2014 Office of Subsistence Management (OSM) Notice of Funding:

- *Reliable estimates of Chinook and chum salmon escapements.*

This proposal is a continuation of Fisheries Resource Monitoring Program (FRMP) projects 04-228, 06-205, and 10-205, which have provided in-season stock composition estimates of chum salmon to fishery managers within 24 to 48 hours of receiving samples from the Pilot Station sonar test fishery. The products of the sonar and stock composition estimates provide stock abundance estimates in the lower river, which facilitates management of the fishery and run to meet escapements for specific drainages.

Yukon River chum salmon move through numerous federal holdings during their spawning migration and are an important food resource for residents of the Yukon River drainage, whose take of chum salmon accounts for 81% of the Yukon River salmon harvested in subsistence fisheries. Returns of Yukon River chum salmon have fluctuated widely, and low returns have resulted in subsistence shortfalls because of fishery closures and restrictions. Such shortfalls are especially hard on residents where a subsistence lifestyle is a necessity because of limited economic opportunities.

The disparate strength of individual stocks within and among years makes it clear that in-season stock return data assists management to meet escapement. It provides a real-time tool that allows for informed decisions on regulating fisheries to meet escapement and harvest goals, whereas terminal escapement projects provide a post-season report card on whether management decisions were successful in meeting escapement. The USFWS, ADFG, and Department of Fisheries and Oceans Canada (DFO) personnel responsible for fishery management have requested that this work be continued. In this project, we will provide estimates of stock compositions for major summer and fall chum salmon stock groups to continue to facilitate Yukon River chum salmon management.

Objectives:

1. Estimate the stock compositions of summer and fall chum salmon sampled from the Pilot Station test fishery each year (June 1 – September 7).
2. Assess the accuracy of the results and their utility for management by comparison with other sources of escapement and harvest data.

Methods: Genetic samples will be collected from every chum salmon caught in the Pilot Station sonar test fishery from June 1 – September 7, and sent to the CGL every week and at the conclusion of each run pulse. Samples will be stratified by time period or run pulse and a subsample of size 288, selected so that daily sample size is proportional to the daily sonar passage estimate within a stratum, will be genotyped for each stratum of the run. Stock composition will be estimated using Bayesian mixture modeling and reported to fishery managers as soon as practicable. Stock abundance estimates will be derived by combining the sonar passage estimates with the stock composition estimates. To evaluate the concordance of various data sources, a post-season analysis will be conducted to compare these stock specific abundance estimates against escapement and harvest estimates, which should prove useful for assessing the study design of this and other enumeration projects.

Partnerships/Collaboration: We will work with ADFG biologists to coordinate sample collection from the Pilot Station sonar test fishery. We will contract with the Association of Village Council Presidents (AVCP) to hire a local to collect the genetic samples. We will work with USFWS Yukon Delta National Wildlife Refuge staff to transport samples from Pilot Station. We completed the baseline in partnership with the DFOC. We will consult, collaborate and coordinate with ADFG, USFWS, and DFOC managers.

14-208 - Koyukuk River Chum Salmon Radio Telemetry, Proportional Distribution Study

Project Number: 14-208
Title: Koyukuk River Chum Salmon Radio Telemetry, Proportional Distribution Study.
Geographic Region: Yukon Region.
Data Type: Stock Status and Trends.
Principal Investigator: Frank Harris, U.S. Fish and Wildlife Service (USFWS), Koyukuk/Nowitna National Wildlife Refuge.
Co-Investigator(s): Aaron Martin, USFWS.
 Brian McKenna, Tanana Chiefs Conference.

Project Cost:

2014	2015	2016	2017
\$125,356	\$113,676	\$121,484	\$0

Total Cost: \$360,516

Issue: Koyukuk River summer chum salmon (*Oncorhynchus keta*) stocks make up one of the largest contributors to the Yukon River summer chum population, yet accurate information on their overall abundance and distribution is severely lacking. The reliance on Koyukuk River stocks as a subsistence resource to people along the Yukon River through the Yukon Delta National Wildlife Refuge (NWR) and along the Koyukuk River within the Koyukuk and Kanuti NWRs has likely increased during the last five years as other major stocks of Yukon River chum populations have experienced decreasing returns. Overall, returns throughout the Yukon River drainage have remained relatively constant, indicating a shift in production to other rivers. For example, the Anvik River (lower Yukon River) used to account for 40% of the summer chum returning to the Yukon River, and has declined to less than 25% during recent times (McEwen 2011). Conversely, the Koyukuk River has experienced an increase in escapements in its tributaries over the past 12 years (Bergstrom et al 2009, Berkgigler 2010, Dupuis 2012, and Carlson 2012). Currently it is not understood why these shifts are occurring. Recent changes in commercial fishing policy within the Yukon River Basin will likely increase commercial fishing opportunities during years of low Chinook salmon abundance; potentially increasing harvest pressure on certain stocks of chum salmon. An increased harvest on the first half of the chum run may increase the harvest of chum bound for the Koyukuk River drainage. Increasing harvest on a stock requires increased knowledge on the stock to keep returns viable. Current subsistence harvest estimates show a minimum of 8%-15% of the entire summer chum harvested in Yukon subsistence districts 1-4 come from the Koyukuk River drainage (Busher et al 2009; Jallen and Hamazaki 2011; and Jallen et al 2012). Those estimates are only from villages on the Koyukuk River and do not include subsistence harvest outside of that drainage.

The proposed project will use radio telemetry to estimate the proportional distribution of chum salmon throughout the tributaries of the Koyukuk River (middle Yukon River Drainage). Aside from two functioning escapement projects (Gisasa River weir and Henshaw Creek weir), aerial survey data provides the only recent information (Alaska Department of Fish and Game 2013b) on the abundance and distribution of chum throughout the 81,327 km² drainage (National Hydrography database, 2011). Results will provide fisheries managers with more detailed information on the proportional distribution, run timing, and critical spawning areas of chum salmon in Koyukuk River drainage.

Current mixed stock genetic analysis groups the upper Koyukuk River chum salmon stocks (i.e. S.F. Koyukuk, Jim River, Henshaw Creek) with middle Yukon River stocks (i.e. Tozitna, Tanana) and are therefore grouped together for reporting for inseason management goals (Flannery et al 2009, Flannery and Evenson 2010, and Flannery and Wenburg 2012). Information from this study will give managers a better idea how important the upper Koyukuk River stocks are in respect to the overall production of this genetic group. Detailed information on spawning locations of chum in the Koyukuk River drainage will be mapped and reported, which will further build on the baseline information needed prior to assessing the effects of various management actions or environmental changes on these stocks.

Objectives:

1. Use radio telemetry to estimate proportional distribution of chum salmon in the Koyukuk River drainage with 95% confidence that the estimate is within 10% of true proportion.
2. Use radio telemetry to detect the ultimate spawning destination upstream of tagging location (rkm 38), via the presence of at least two tagged fish, of a population comprising 2.5% or more of all the chum passing the capture site during each temporal stratum.
3. Describe migration rates and run timing in the Koyukuk River.
4. Identify and document previously unknown chum spawning locations.

Methods: Radio telemetry will be used to track migrating adult chum to their spawning grounds in the Koyukuk River drainage. A two person team will capture the fish using drift gill nets (10.6 cm x 18.3m x 3m) approximately 30 km upstream from the mouth of the Koyukuk River. One person will set the net while the other operates the boat. Once a fish is detected in the net, the net will be removed from the water. The tangled fish will be placed in a tote filled with water while being untangled. Mid eye to fork length collected, sex determined, and date recorded. All healthy fish will receive an individually numbered spaghetti tag.

Two hundred and twenty Advanced Telemetry Systems model F1835B (16 grams in air) will be inserted into adult chum following standard esophageal implantation techniques. All radio tagged fish will also receive a numbered spaghetti tag along with an individually coded radio tag. Radio tags will be deployed in proportion to run abundance. A tag deployment schedule will be developed based on run timing at the Gisasa River weir and run timing at the tagging locations. Preliminary information from the 2012 field season showed about 12 days of travel time from Pilot Station to the proposed tagging locations, approximately 55 km/day (34 miles/day).

Radio tracking will be conducted by both fixed station receivers and aerial telemetry. Fixed station logging receiver will be located at strategic locations throughout the drainage to record tags as the fish swim past. Aerial telemetry will cover the majority of the drainage to record fish in spawning locations. Waypoints will be collected for each tag detected. Spawning locations will be documented and distribution throughout the drainage will be mapped.

Partnerships and Capacity Building: This project will partner with Tanana Chiefs Conference (TCC). Seasonal employees will be hired by TCC, and attempts will be made to hire from local communities. The Kanuti NWR has agreed to fly the upper drainage aerial surveys and supports the project.

14-209 - Abundance and Run Timing of adult salmon in Henshaw Creek

Project Number: 14-209
Title: Abundance and Run Timing of adult salmon in Henshaw Creek
Geographic Region: Yukon Region
Federal Conservation Unit: Kanuti National Wildlife Refuge (KNWR)
Data Type: Stock Status Trends (SST)
Investigator(s): Alyssa Frothingham, Tanana Chiefs Conference

Co-Investigator(s): Aaron Martin, US Fish and Wildlife Fairbanks Field Office

Cost:				
2014	2015	2016	2017	
\$73,444	\$70,434	\$70,434	\$0	

Total: \$214,312

Issue: Management of the Koyukuk River salmon fishery is complex. The Alaska Department of Fish and Game, Division of Commercial Fisheries (ADF&G-DFC) has conducted aerial surveys within this drainage since 1960 (Barton, 1984) but the usefulness and reliability of that information is limited. This project addresses the priority information needs outlined for Yukon River salmon, including maintaining reliable estimates of Chinook and chum salmon escapement over time, and assessment of trends in Chinook age, sex and length.

Both Chinook *Oncorhynchus tshawytscha* and chum *O. keta* salmon from Henshaw Creek contribute to the harvests of subsistence and commercial fisheries occurring in the Yukon River. Information collected at Henshaw Creek weir is important to fisheries managers who possess the difficult task in managing the complex mixed stock subsistence and commercial salmon fisheries in the Yukon River. In-season management and post-season evaluations of management actions are enhanced by the data from this project. Further, the Henshaw Creek weir is the only Upper Koyukuk River drainage salmon escapement monitoring project and its information can facilitate comparisons with lower drainage escapement projects (Berkbigler and Elkin 2006). In more recent years, subsistence and commercial harvesters have identified a concern with the apparent decrease in the size of Chinook salmon (JTC 2013). The continuation of reliable escapement estimates and the collection of age, sex, and length (ASL) data at Henshaw Creek will assist in future analyses of trends in Chinook salmon and summer chum salmon run timing, escapements, gender composition, and size and age structure over time. In addition, this project aids the Kanuti National Wildlife Refuge (KNWR) in meeting objectives outlined in the 1993 KNWR Fishery Management Plan, and addresses the priority information needs outlined for Yukon Region salmon by providing reliable estimates of Chinook and chum escapements. With the Tanana Chiefs Conference (TCC) as the primary investigator and through the hire of local residents, this project will enhance capacity building to allow local communities a continued role in the management of the resources.

Objectives:

1. Determine daily escapement and run timing of adult salmon
2. Determine age, sex and length (ASL) composition of adult salmon
3. Determine the number of resident fish passing the weir
4. Serve as an outreach platform for KNWR staff and TCC Partners Program fisheries biologist to conduct an onsite science camp

Methods: A resistance board weir will be installed and operated on Henshaw Creek located 721 km upriver from the mouth of the Koyukuk River in north central Alaska (Figure 1). A live trap, installed near mid-channel, will allow salmon and resident species to move through the weir. Their passage will be enumerated daily and will provide an area where fish will be sampled to collect biological information. The daily counting period will begin at midnight and end at midnight the following day. Sampling will begin at the beginning of each week and will be conducted over a 3-4 day period to collect 160 fish per week for each species. Sample size goals were established so that simultaneous 90% interval estimates of the sex and age composition for each week have maximum widths of 0.20 (Bromaghin 1993). The sample size obtained using this method was increased to account for the expected number of unreadable scales. Lengths of Chinook salmon will be measured to the nearest 1 mm and chum measured to the nearest 5mm from mid-eye to fork of the caudal fin (MEFL). Sex ratios will be determined by visual inspection of secondary sexual characteristics. Scales will be used for aging salmon, with ages being reported using the European technique (Foerster 1968). Three scales will be collected from Chinook salmon and one scale will be collected from summer chum salmon. Scales will be taken from the area located on the left side of the fish, two rows above the lateral line on a diagonal line from the posterior insertion of the dorsal fin to the anterior insertion of the anal fin (Price, ADF&G, personal communication). Once the scales are removed, they will be placed on scale gum cards for later analysis with ADF&G.

The staff at KNWR and TCC will continue to work with the local schools to identify students from each of the four villages, Bettles/Evansville, Allakaket, Alatna, and Hughes to be participants in the Henshaw Creek science camp. Students will be exposed to the operations of a weir and will receive lessons in fisheries management, stream ecology, aquatic invertebrates, fish identifications, natural resources career opportunities, the plants and wildlife in the KNWR, and traditional and cultural knowledge.

Partnerships/Capacity Building: The partnerships the TCC has developed with the USFWS, KNWR, ADF&G and local tribal councils presents a great opportunity to build capacity within the TCC and the local communities of the Upper Koyukuk River. The relationships TCC already has with Federal and state resource management agencies will continue to be strengthened through the continuation of this project and will be an important asset to the fishery program at TCC. The local communities of the Upper Koyukuk River will be strengthened through this project as well. TCC plans to continue to hire weir staff within these communities, which will provide much needed employment opportunities and will expose people to the project and different aspects of fishery management. Additionally, the annual science camp will engage local youth with the issues facing fishery resource managers and will provide elders a chance to interact with the students and teach them traditional skills.

14-251 – Upper Yukon River Salmon Oral History

Project Number: 14-251
Project Title: Upper Yukon River Salmon Oral History
Geographic Region: Upper Yukon
Data Type: Harvest Monitoring / Traditional Ecological Knowledge
Principal Investigator: Jeanne Boyle, School Counselor, North Star Borough

Project Cost:

2014	2015
\$106,860	\$78,250

Total: \$185,110

Issue: This project will address the effects of diminished salmon abundance on contemporary economic strategies and practices of the subsistence fishermen in the Yukon Flats and Upper Yukon area, in relation to traditional trade, sharing and bartering. Studies on customary trade of salmon was identified as a priority information need in the 2014 Notice of Funding.

Included in the final report will be data/information on distribution networks, decision making, and the social and cultural aspects of salmon harvest and use, including analyzing all aspects of customary trade-cultural context, language, work groups, exchange of money, and the historical continuum of customary trade. This study will address data gaps that are needed to support management of traditional subsistence use and customary trade practices in the Upper Yukon area between Rampart and Eagle, Alaska. This study will establish historical data and an understanding of customary trade and how subsistence management can establish provisions that address the practice.

Objectives:

1. This study will help clarify the customary trade practices of traditional subsistence salmon users in the Upper Yukon River region and the way their transactions take place and the conditions they take place under.
2. This study will document how trade occurs within a village and with neighboring villages, as well as rural/urban trade practices.
3. This study will establish historical data and an understanding of customary trade and how subsistence management can establish provisions that address the practice.
4. The information gathered in this project (both in recordings and in mapping will disseminated by creating an Upper Yukon River Project Jukebox within the larger Project Jukebox website. This will also be available for people worldwide to access the information as well as make it available via the Internet to local schools and to anyone interested in the preservation of the material as well as fish and wildlife in Alaska.

Methods:

- A. Each community (Eagle, Circle, Ft. Yukon, Beaver, Stevens Village, Rampart, Arctic Village, Venetie, Chalkyitsik, and Birch Creek will be contacted prior to the study in order to gain approval. Six elder advisors will be hired to assist with the project. Elders will assist with the following:
 1. The Elders will be the point of contact for the Village Tribal Councils.
 2. Speaking with elders about the project, and discussing with elders project goals, and information about the Elder Camp that will take place.

3. When the project director or historian needs assistance with clarifying the data/information that has been gathered, the Elder Advisor from that specific language group/area shall be contacted to assist.
 4. Setting up individual interviews of additional people in the community who may have information to offer about customary trade.
 5. Assist in the mapping of the subsistence fishing areas, both traditional and modern.
- B. Interviewing at the Elder Camp will be completed through the semi-directed interview method. Possible questions for discussion/approval by the Elder Advisors are attached later in this proposal.
- C. Project Jukebox Oral History Program from the University of Alaska Fairbanks agrees to assist with the documentation of this information through the following steps.
1. Provide training to local students on oral history in general, interviewing techniques and how to use the recording equipment;
 2. Assist in recording all interviews and groups;
 3. Accessing all recordings into the Oral History Collection;
 4. Catalog all recordings into the Library Catalog and into World Cat;
 5. Create a 'Upper Yukon River Project Jukebox' project on the www.jukebox.uaf.edu website;
 6. Using templates already created, up create a person page for each person, inserting the biography/context statement – will need their title*, last name*, first name, nickname, themes associated with them*, place associated with them, date of birth, date of death, if applicable (* indicates required field);
 7. Inscribe the transcript (listen to recording in real time, code at time breaks – this allows the running transcript to work in the transcripts, we can also create themes list at this point if need be).
 8. Create chapter headings;
 9. Upload photos into templates using a particular person's slideshow and information about the photo;
 10. Upload recordings;
 11. Upload Oral History Gift and Release Agreements into the templates for extra archival storage.
 12. Return digital copies of Oral History Gift and Release Agreements from each narrator back to the Jeanne M. Boyle and Raven's Wing Consulting in PDF/A format;
 13. Match associated themes to people;
 14. Create a mapping page similar that one found at <http://jukebox.uaf.edu/site7/sites/default/files/kenai fjords/voices.html> to show voices and traditional land use of the area;
 15. Search through the archives to see if any related material (photographs, film)
 16. Create copies of the recordings for your community (currently we charge \$8.00 per recording for supplies and time to do this)
 17. Provide one UAF staff person to return to a community, as paid for by Jeanne M. Boyle and Ravens Wing Consulting near the end of the project to present the final draft.
 18. Upper Yukon River Project Jukebox to the community and incorporate any changes requested thereafter.
- C. Mapping for project jukebox.
- D. Interviewing at the Elder Camp will be completed through the semi-directed interview method. Possible questions for discussion/approval by the Elder Advisor are attached.

Partnerships and Capacity Building: This project will work in conjunction with the Yukon-Charley Rivers National Preserve staff in Eagle (Pat Sanders), and Yukon-Charley Rivers National Preserve Subsistence program (Marcy Okada) and Cultural Resources program (Chris Allan, historian) in

Fairbanks. A Project Jukebox will be created by the University of Alaska team using the materials collected.

Up to four (4) Circle High School students will work with professional photographers and University of Alaska Fairbanks Oral History Department, Project Jukebox staff to record through photography the daily life of the Elders at camp. They will receive training in photography and video-recording prior to the start of the project. These students will be paid a stipend for their assistance. The project proposes to work with Yukon Flats School District to offer high school elective credit for photography training during the spring semester of 2014. The Project Director will work with the Principal/Teacher and Yukon Flats School District Superintendent on a training component at Circle School during the spring 2014 semester in order to prepare the students for this project and to ensure that they receive credit. Mapping of traditional, as well as modern day family fish camps will also take place. Visits to each village to meet with elders after the Elders Camp may be necessary for follow-up information and interviews of other village members. The Dazhitt Han Laii Corporation Board members will assist with the mapping of the project information during the project. The mapping component will be available on the Project Jukebox website.

Interview transcriptions shall be completed during the winter of 2014-2015. The Project Director shall complete a rough draft of all of the transcripts by November 2015, with the help of knowledgeable oral history experts. Spellings and place names will be verified. Additionally, a rough draft will be sent to each of the Village Councils and elders involved in the project for comments. The Project Director shall also work with Project Jukebox staff to assist in transcribing and re-interviewing elders in which information needs to be clarified. The Project Director shall work with Project Jukebox and Dazhitt HanLaii Corporation members to assist in the development of, and approval of, the final map for the project and the online version for Project Jukebox.

Circle Village Council shall be instrumental in organizing the Circle Youth Camp to be utilized for the Elders Camp. The Circle Village Council will assist in the local hiring process for cooks, camp assistants, and boats for transporting elders. In addition, the Circle Village Council will provide in-kind office assistance, housing/food assistance for elders in transit to the camp, and consultation throughout the project.

Participation by local residents including elders and other community members shall be welcomed in this project.

14-252 - Harvest Monitoring and Tradition Ecological Knowledge of Whitefishes in the Lower Yukon River

Project number: 14-252
Title: Harvest Monitoring and TEK of Whitefishes in the Lower Yukon River
Geographic Region: Lower Yukon Area
Data Type: Harvest Monitoring / Traditional Ecological Knowledge
Principal Investigator: Dave Runfola, Division of Subsistence, Alaska Department of Fish and Game
Co-Investigators: Caroline Brown and Dave Koster, Division of Subsistence, Alaska Department of Fish and Game; Deena Jallen, Division of Commercial Fisheries, Alaska Department of Fish and Game

Project Cost:

2014	2015	2016	2017
\$114,309	\$164,324	\$137,025	\$43,113

Total Cost: \$458,771

Issue: Whitefish resources are a critical subsistence resource and an emerging commercial one; however, the management of these species is not well informed regarding stock status, harvest levels, or critical life history variables given the paucity of research on these species. This proposal is submitted in response to a more recent focus on whitefish species for subsistence and commercial use, information needs identified by the USFWS 2014 Fisheries Resource Monitoring Program Priority Information Needs, and the information gaps identified in Brown et.al. (2012) that call for traditional knowledge research on whitefish species in the lower Yukon River along with a monitoring program for the subsistence harvests of whitefish species. This study proposes to collect Traditional Ecological Knowledge (TEK) on and assess the harvest of whitefish species (along with other nonsalmon fish species) utilized by residents of the lower Yukon river area communities of Alakanuk, Kotlik, Nunam Iqua, Saint Marys, Pilot Station, and Marshall (Map 1). A component of the project will also be devoted to exploring the development of methods that will assist in estimating annual whitefish harvests in the Yukon drainage through the use of “index” communities. An index-based model applies adjustment factors from the index community to the reported mean harvest of the sampled index community.

Objectives:

1. Document local knowledge related to traditional and contemporary patterns of subsistence whitefish harvests in Alakanuk, Nunam Iqua, Saint Marys, and Kotlik, including:
 - species utilized and local names used with introductory nomenclature analysis
 - fish ecology, including information about habitat, spawning and seasonal movements
 - contemporary and traditional methods and timing of harvest
 - contemporary and traditional methods of preparation and preservation
 - spatial mapping of harvest areas and other significant habitats by species and season
 - traditional management practices and the effects on fish populations
 - fish-related place-names
 - relative abundance and population trends.

2. Estimate subsistence harvest levels and percentages of households using, harvesting, giving away, and receiving resident freshwater fish species (nonsalmon) for the calendar years 2014 and 2015 by species and season for the communities of Alakanuk, Kotlik, Nunam Iqua, Saint Marys, Pilot Station, and Marshall in the lower Yukon River. Harvest data set will also include basic demographic information, households' assessment of harvests and use compared to recent years, and questions tracking the harvest, processing, and sharing networks present within and between communities.
3. Explore Indexing method of estimating annual community subsistence harvests of whitefish species in the lower Yukon River area. Appropriate statistical tests will be applied to collected variables to identify significant factors in whitefish harvests. Further exploration will occur using multiple regression to identify more complex relationships in collected data, and inform the development of adjustment factors to the mean of the index community.

Methods: Methods for this project are largely defined by an ethnographic approach, including both qualitative and quantitative methods of data collection. The ethnographic research for this project will include anthropological methods of participant observation and semi-structured interviews. In each community, individuals considered to be knowledgeable about whitefish species will be identified with the assistance of tribal council and other community members using a snowball method of learning about other experts. Researchers will attempt to interview 6-10 individuals per community, depending on size; researchers will strive to include experts across a variety of demographics, including age, gender, and profession. Key respondent interviews will lead off the data collection effort with the first round of interviews occurring in the fall and winter of 2014-2015. A smaller set of interviews will occur after the harvest data collection and initial analysis in order to follow-up on any questions arising from the harvest data. Subsequent to the interviews, interview data will be downloaded into Atlas.ti, a qualitative data analysis software, coded, and analyzed based on emergent themes and relationships captured in the coding.

The primary harvest data collection method will be systematic household surveys. Because of the relatively large sizes of most of the communities, researchers anticipate that an estimated 60% of households would be invited to participate in the harvest survey. The first year of harvest data will be collected between January and March 2015 for the calendar year 2014; the second year of harvest data will be collected a year later (January to March 2016) for calendar year 2015. SPSS will also be used for analyzing the harvest survey information.

The research will be conducted consistent with the Division of Subsistence policy on research ethics. Participation in both key respondent interviews and the survey will be voluntary and information will be kept confidential, except in the case of key respondent interviews where respondents will be asked if they want to be identified by name. All study communities will have the opportunity to review and comment upon the preliminary study findings, and final results will be provided to each community.

Partnerships/Capacity Building: The principal investigators will work with tribal councils in the study communities to hire local project assistants to select key respondents and facilitate community meetings. The local research assistants will be trained in sampling methods. This adds to local involvement and local understanding of the Yukon River whitefish management issues; PIS will work with local research assistants to develop a presentation on study results for community review. It will also increase coordination between agencies, Tribal entities, and community members working together in data collection increases communication and leads to better understanding of local issues and local understanding of science and management issues.

14-253 - Customary Trade in the Upper Yukon River

Project number: 14-253
Title: Customary Trade in the Upper Yukon River
Geographic Region: Upper Yukon Area
Data Type: Harvest Monitoring / Traditional Ecological Knowledge
Principal Investigator: Catherine Moncrieff, Yukon River Drainage Fisheries Association
Co-Investigators: Caroline Brown and David Koster, Division of Subsistence, Alaska Department of Fish and Game

Project Cost:

2014	2015	2016
\$131,781	\$84,886	\$64,570

Total Cost: 281,237

Issue: This projects builds on earlier research on customary trade in the region (Moncrieff 2007), focusing specifically on the customary trade of salmon in upper Yukon River communities. At their 2013 meeting and in response to growing concerns about the sale of a declining resource, the Federal Subsistence Board restricted the customary trade of Yukon River Chinook salmon to transactions between those who live in communities with a customary and traditional use determination—that is, between rural users. While discussing these proposed regulations, the Board identified the need for additional information regarding the nature and scope of customary trade of fish throughout the Yukon River.

With the continued low Chinook salmon numbers, Yukon River residents remain divided over the issue of customary trade. Indeed, the YR DFA Board executive committee was unable to obtain consensus on the issue before the Federal Subsistence Board meeting of 2013. Board members' concerns ranged from the need to limit the harvest of Chinook salmon to provide for adequate spawning and escapement numbers, the role of traditional practices in subsistence economies, the need for opportunities for earned income, and an equitable distribution of the harvest.

This project will examine the historic and contemporary customary trade of salmon in the Upper Yukon and Tanana Rivers. It will take place in three communities: Fort Yukon, Stevens Village, and Manley Hot Springs. Declining Chinook salmon abundance has required Yukon River fishers to reevaluate the ways in which they use salmon as evidenced by declining harvests, shifting strategies for maximizing harvests (Brown et al. in prep), and increased debate over various priority uses of salmon, such as customary trade. This research will greatly increase our understanding of the role of customary trade, both historically and today, in the customary and traditional patterns of salmon use in the upper Yukon River.

Objectives: This two-year study will develop case studies, addressing the following objectives:

1. Through ethnographic methods, describe how customary trade practices fit within the overall subsistence use of salmon in the upper Yukon area, both historically and in present times of declining salmon.
2. Using a survey on barter and exchange practices, document the scope and local nature of customary trade in three upper Yukon River communities. Describe exchange networks and transaction in terms of the species and types (e.g. processing) of fish traded. Where possible, quantify transactions.
3. Improve understanding of the role of customary trade within a continuum of exchange practices, including any potential effects on customary trade resulting from declining runs

within the context of subsistence management and uses.

Methods: This study will take place in three communities along the upper Yukon and Tanana rivers, including Stevens Village and Fort Yukon on the upper Yukon River and Manley Hot Springs in the Tanana River drainage. The ethnographic research for this project will include anthropological methods of participant observation and semi-structured interviews. Individuals will be interviewed using a semi-structured interview format outlining general areas of knowledge and developed in advance by ADF&G, YRDFA, and Tribal personnel. Researchers will attempt to interview 5-8 individuals per community, depending on size. Key respondents should represent a variety of demographics primarily focused on fishing household characteristics and other economic variables in order to capture the breadth of motivations for engaging in customary trade or other exchange practices in order to explore more broadly how salmon are distributed and general perspectives on the sale of subsistence caught fish. Key respondent interviews will lead off the data collection effort with the first round of interviews occurring in the fall and winter of 2014-2015. Subsequent to the interviews, interview data will be downloaded into Atlas.ti, a qualitative data analysis software, coded, and analyzed based on emergent themes and relationships captured in the coding.

Community-level characterizations of customary trade will be made through the use of a short, confidential survey on barter and trade practices by community households. The survey will be primarily designed to document local views and prevalence of different types of exchange involving salmon, in addition to quantifying or estimating the actual extent of those practices on a household or community level. Researchers will administer surveys to a stratified random sample of all households in each community based on the same strata used in the Division of Commercial Fishing post-season salmon survey. Because many salmon exchanges occur between fishing households and non-fishing households, the sample will include households in all strata of fishing effort from heavy harvesters to non-fishing households. The survey will include questions about the frequency of different types of exchanges, including sharing (analyzed through forms of reciprocity), barter, and customary trade. These questions will be directed toward both individual household activities (recorded as “actual” exchanges), as well as the community in general (recorded as “typical” exchanges). It will also include questions about the types of items traded and bartered and the reported reasons for doing so. Community surveys will be administered during ethnographic field trips to conduct key respondent interviews and analyzed using SPSS.

A final trip will be taken to each community to present preliminary findings and follow-up with any outstanding gaps in information. These trips will occur between January and March 2016. All activities within this study will begin with informed consent and if allowed, will be tape-recorded.

Partnerships/Capacity Building: The principal investigators will work with tribal councils in the study communities to hire local project assistants, to select key respondents, and facilitate community meetings. The local research assistants will be trained in anthropological sampling methods. This adds to local involvement and local understanding of the Yukon River Chinook salmon management issues. This also increases coordination between agencies, Tribal entities, and community members – working together in data collection increases communication and leads to better understanding of local issues and local understanding of science and management issues.

KUSKOKWIM REGION OVERVIEW

Issues and Information Needs

The 2014 Notice of Funding Opportunity for the Kuskokwim Region identified ten priority information needs:

- Reliable estimates of Chinook, chum, sockeye, and coho salmon escapement (for example, projects using weir, sonar, mark-recapture methods).
- Methods for including “quality of escapement” measures (for example, potential egg deposition, sex and size composition of spawners, spawning habitat utilization) in establishing Chinook salmon spawning goals and determining the reproductive potential and genetic diversity of spawning escapements.
- Subsistence harvest of Chinook salmon from the Bethel Area by nonresidents of the Kuskokwim River drainage.
- Temporal timing of tributary stocks of Chinook salmon through the lower Kuskokwim River subsistence fishery.
- Early life history of Chinook salmon stocks, with particular emphasis on determining freshwater density dependence factors.
- Broad whitefish population assessment, including distribution and age structure.
- Complete genetic baseline sampling and population marker development for sheefish spawning populations in the Kuskokwim River drainage.
- Local knowledge of whitefish species to supplement information from previous research. Groups of communities might include Kwethluk, Akiachak, Napaskiak, and Tuluksak or Cheforak, Kipnuk, Kongiganek, and Kwigillingok.
- Harvest and associated contextual information for whitefish species in the lower Kuskokwim drainage communities of Eek, Tuntutuliak, Nunapitchuk, Atmauthluak, and Kasigluk.
- An indexing method for estimating species-specific whitefish harvests on an annual basis for the Kuskokwim drainage. Researchers should explore and evaluate an approach where sub-regional clusters of community harvests can be evaluated for regular surveying with results being extrapolated to the rest of the cluster, contributing to drainage-wide harvest estimates.

Projects Funded Under the Fisheries Resource Monitoring Program

Since the inception of the Monitoring Program in 2000, 81 projects have been funded in the Kuskokwim Region, and four of these will still be operating during 2014 (**Tables 1 and 2**). These projects provide information needed to manage and conserve subsistence fisheries resources, address fisheries issues and priorities identified by the Kuskokwim Regional Advisory Councils, and address regulatory actions. Presently, the Monitoring Program supports over 50% of all fisheries monitoring and research conducted in the Kuskokwim Region.

2014 Investigation Plans

Fourteen investigation plans for research in the Kuskokwim Region were submitted to the Office of Subsistence Management in response to the 2014 Notice of Funding Opportunity. In June 2013, the Technical Review Committee reviewed the investigation plans and recommended 11 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 review and evaluation, the Technical Review Committee, Regional Advisory Councils, Interagency Staff Committee and Federal Subsistence Board have the opportunity to address the highest priority projects across regions. For 2014, approximately \$1,073,000 would be available for funding new projects in the Kuskokwim Region (**Table 5**).

Technical Review Committee 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 14 investigation plans, the Technical Review Committee recommended funding 11 of the proposed projects (also shown in **Table 5**):

14-301 Broad Whitefish Spawning above McGrath	\$ 100,032
14-302 Tatlawiksuk River Salmon Escapement Monitoring	\$ 210,879
14-303 George River Salmon Escapement Monitoring	\$ 208,409
14-304 Kanektok & Goodnews Rivers Salmon Run Assessments	\$ 237,927
14-307 Upper Kuskokwim Sheefish Enumeration	\$ 114,636
14-308 Kwethluk River Salmon Run Timing and Abundance	\$ 198,431
14-351 Kuskokwim Delta Chinook Salmon Non-local Harvesters	\$ 106,763
14-352 Kuskokwim Area Salmon Post-season Subsistence Harvest Surveys	\$ 166,011
14-353 Kuskokwim River Salmon Inseason Subsistence Survey	\$ 33,929
14-354 Kuskokwim River Support for Cooperative Management	\$ 62,991
14-356 Lower Kuskokwim Villages Whitefish Non-salmon Local Knowledge	<u>\$ 127,972</u>
TOTAL	\$1,567,980

The eleven 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. Each project submitted for funding in the Kuskokwim Region in 2014 is summarized below (see Executive Summaries for more details on all projects).

**Summaries of Projects Recommended for Funding
by the Technical Review Committee**

14-301 Broad Whitefish Spawning above McGrath. This three-year project addresses the priority information need in the 2014 Notice of Funding Opportunity regarding Broad whitefish population assessment in the Kuskokwim River drainage and also addresses one of the priority research needs identified in the OSM-funded *Strategic Plan for Research of Whitefish Species in the Yukon and Kuskokwim River Drainages in Alaska*. Broad whitefish are presumed to be heavily utilized by Federally-qualified subsistence users within the Yukon Delta National Wildlife Refuge, as well as other locations in the Kuskokwim River drainage. Local users have expressed concerns that numbers have decreased and some populations may be over-exploited; however, population demographics and harvest data are very limited in the upper Kuskokwim River. Study design calls for collecting up to 610 mature broad whitefish destined for spawning areas above McGrath. Data will be collected and recorded on the age, sex, length and weight of these fish. Investigators will take advantage of their time while collecting broad whitefish to do a feasibility assessment of future studies using mark-recapture techniques to estimate abundance.

14-302 Tatlawiksuk River Salmon Escapement Monitoring. This four-year project would continue operation of the Tatlawitsuk River weir to monitor salmon escapement. Daily and annual escapement estimates and the annual composition of age, sex, and length will be made for Chinook, chum, sockeye, and coho salmon. In addition, high school interns will be mentored on-site and an education curriculum will be administered. Daily weather and stream observations will also be made and recorded at the weir site. High school interns will be mentored on-site and an education curriculum will be administered. The weir has been operated cooperatively by Alaska Department of Fish and Game and Kuskokwim Native Association since 1998, and supported by Monitoring Program funds since 2005. This project addresses one of the 2014 priority information needs

14-303 George River Salmon Escapement Monitoring. This four-year project would continue operation of the George River weir to monitor salmon escapement. Daily and annual escapement estimates and the annual composition of age, sex, and length will be made for Chinook, chum, sockeye, and coho salmon. In addition, high school interns will be mentored on-site and an education curriculum will be administered. The weir has been operated cooperatively by Alaska Department of Fish and Game and Kuskokwim Native Association since 1996, and supported by Monitoring Program funds since 2005. This project addresses one of the 2014 priority information needs

14-304 Kanektok & Goodnews Rivers Salmon Run Assessments. This four-year project would continue operations of the Kanektok River and Goodnews River weirs to enumerate escapements of Chinook, sockeye, chum and coho salmon, and Dolly Varden. The Goodnews and Kanektok River salmon stocks spawn in the upper reaches of the Togiak National Wildlife Refuge. These stocks support subsistence fisheries in the villages of Platinum, Goodnews and Kwinhagak. Escapement data from these weirs are utilized for the management and conservation of stocks in the Kuskokwim Bay subregion. The two weirs provide the primary data on the timing, structure and abundance of escapements for Kuskokwim Bay fisheries. Used in concert with other projects, these projects have greatly increased the depth of knowledge about Dolly Varden char and will help to ensure future sustainable salmon populations. This project addresses one of the 2014 priority information needs

14-307 Upper Kuskokwim Sheefish Enumeration. This three-year project is basically a feasibility study of the use of DIDSON sonar to enumerate sheefish (also referred to as inconnu) in the lower Big River. Sheefish are highly valued by Kuskokwim Area subsistence users and account for a large percentage of the total annual subsistence harvest of non-salmon fish species. This project addresses one of the 2014 priority information needs, as well as at least one of the inconnu research needs identified in the OSM-funded Whitefish Strategic Plan for the Yukon and Kuskokwim Rivers

14-308 Kwethluk River Salmon Run Timing and Abundance. This four-year project would continue operation of the Kwethluk River weir to monitor salmon escapement. The project will estimate escapements of Chinook, sockeye, chum, pink, and coho salmon into the Kwethluk River. The Kwethluk River drainage is within the boundaries of the Yukon Delta National Wildlife Refuge and harvest of this stock occurs within Refuge boundaries. In addition to the subsistence, Kuskokwim River salmon stocks also support commercial and recreational fisheries. The Kwethluk River has the second largest average Chinook return out of the six tributaries with weir projects; in some years the Kwethluk River Chinook return surpasses the Chinook return to the Kogruklu River. The weir has been operated since 2000 (except for three years of high water) by the U.S. Fish and Wildlife Service and the Organized Village of Kwethluk, supported by Monitoring Program funds. This project addresses one of the 2014 priority information needs.

14-351 Kuskokwim Delta Chinook Salmon Non-local Harvesters. The goal of this one-year project is to describe the subsistence harvest of salmon from the Bethel and Aniak areas by non-local residents of the drainage. Investigators will interview airplane passengers at local airports during the summer months to obtain the information. Through this one-year pilot study, investigators will develop a statistical sampling design to be used in future research. Investigators should respond with the sampling design to the 2016 Notice of Funding for continuing funding. The project is a partnership with the Association of Village Council Presidents, the Kuskokwim Native Association, and the University of Montana, Missoula. The project addresses a 2014 priority information need.

14-352 Kuskokwim Area Salmon Post-season Subsistence Harvest Surveys. This four-year project funds the Kuskokwim Subsistence Salmon Harvest Monitoring Program, which the Alaska Department of Fish and Game has implemented since 1960. The overall goal of the project is to estimate the annual harvest of salmon for subsistence purposes, which is of high importance to both state and federal managers of this fishery. The project includes proven partnerships between the state, Kuskokwim Native Association, and Orutsarmiut Native Council. The technical and scientific merit and the investigators' abilities and resources are highly rated. The Office of Subsistence Management has contributed funds to the project since 2000. This investigation plan is a request to continue that funding. Residents of the Kuskokwim Fisheries Management Area harvest five species of salmon for subsistence uses within the boundaries of the Yukon Delta and the Togiak national wildlife refuges. This investigation plan describes little to no consultation or partnering with the wildlife refuges in the region. Increased communication and collaboration with these federal land managers would improve the quality of this project.

14-353 Kuskokwim River Salmon Inseason Subsistence Survey. The Office of Subsistence Management has contributed funds to the project since 2000. This investigation plan is a request to continue that funding. The project uses a structured questionnaire to survey rural residents at their family fish camps during the subsistence salmon season in the vicinity of the community of Bethel. The study provides in-season information to the Kuskokwim River Salmon Working Group, which can be used to aid management of the salmon fisheries in the Kuskokwim Area. The project is viewed as a high priority by fisheries managers and stakeholders in the region. This project provides a capacity building component that has proven successful, but it has been modified by adding the requirement of a community deliverable to increase partnering and sharing of data with subsistence fishers in the region. The investigators will develop a deliverable for the communities and arrange a presentation at a high school or council meeting in Bethel to summarize and communicate trends in the data over the years in a community- friendly format(s). The community deliverable will focus on survey data about subsistence needs for salmon and how well these have been met over the life of the project. Investigators may also examine trends in fishers' observations about how natural conditions affect fishing across the study years. The budget for this proposal has been increased to fund the additional deliverable.

14-354 Kuskokwim River Support for Cooperative Management. The subsistence salmon fishery of the Kuskokwim River is one of the largest in the state, and this project is of high strategic importance. This investigation plan requests four years of funding for the Kuskokwim River Salmon Management Working Group. Formed in 1988, the Working Group is considered to be a successful model of collaboration, and it provides a much needed public forum in which rural subsistence fishers and other stakeholders can meet and have discussions with managers regarding use and management of this important salmon resource. The investigator's ability and resources are highly rated. The Office of Subsistence Management has contributed funds to the

Working Group process since 2006. This is a request to continue that funding. The budget for this study proposal has been modified.

14-356 Lower Kuskokwim Villages Whitefish Non-salmon Local Knowledge. Over four years, residents of the lower Kuskokwim River drainage communities of Nunapitchuk, Atmautluak, Kasigluk (the tundra villages); and Napakiak, Napaskiak, and Oscarville will document their patterns of nonsalmon fish use. The primary method will be “topic specific gatherings.” A gathering of representatives of all six villages in Bethel will be followed by a gathering in one of the three tundra villages and a gathering in one of the three lower river villages. An important goal of the project is to provide experience and instruction to an assistant bi-lingual interpreter. Two sets of transcripts from the gatherings will be produced in English and Yup’ik. Transcripts will be analyzed to identify emergent themes, which will then be developed into a narrative. Emergent themes might include local taxonomy of whitefish, life history, and past and present harvesting methods. This project addresses a 2014 priority information need.

**Summaries of Projects Not Recommended for Funding
by the Technical Review Committee**

14-305 Takotna River Salmon Weir. This four-year project would continue operation of the Takotna River weir to monitor salmon escapement. The weir has been operated cooperatively by the Alaska Department of Fish and Game and Takotna Tribal Council since 1999, and supported by Monitoring Program funds since 2005. While the investigation plan addresses a priority information need for salmon escapement monitoring, the Takotna River weir project has only enumerated an average of 388 Chinook salmon over the past 13 years (includes 2012 data). In addition, the ADF&G is implementing a new, lower escapement goal for Chinook salmon for the Kuskokwim River as a whole, starting in 2013. The ADF&G will mainly be relying on information from the Bethel Test Fishery for inseason management decisions, and from the weirs on the Kwethluk River, the Kogrukluk River and the George River, postseason, to determine the level of escapement throughout the Kuskokwim River basin. The information collected from the Takotna River weir would be ancillary, at best, for management decision making. The low escapement that occurs on the Takotna contributes minimally to the overall management of Chinook salmon into the Kuskokwim River, and the overall cost to run this weir for four years may no longer be justified, based on the amount of fish, especially Chinook salmon, enumerated.

14-306 Tuluksak River Salmon Weir. This four-year project would continue operation of the Tuluksak River weir to monitor salmon escapement. The weir has been operated by the U.S. Fish and Wildlife Service from 1991 through 1994, and then again from 2002 to present; the latter time period with funding from the Monitoring Program. The Chinook salmon run from 1991 through 2006 averaged 1,611 fish, while the run from 2007 to 2011 averaged 384 fish. While this project would address the 2014 priority information need for reliable estimates of salmon escapement for the Kuskokwim River, the low number of Chinook returning to the Tuluksak to spawn contributes minimally to the overall Chinook salmon management of the Kuskokwim River, and the overall cost to run this weir for four years may no longer be justified, based on the amount of fish, especially Chinook salmon, enumerated.

14-355 North Kuskokwim Bay Chinook Salmon Natural Indicators. This three-year project would investigate and document the salmon fishing patterns of residents of the coastal communities of Toksook Bay, Kipnuk, Kongiganek, and Kwigillingok. Investigators plan to spend about a month in each community engaged in participant observation and semi-structured interviews with people of varied ages, abilities, and knowledge. General themes and patterns that

emerge will be described in a final report. A shorter report will be written in Yup'ik. The project does not address a 2014 priority information need, the investigation plan and budget lack consistency and accuracy, the principal investigator has not completed a traditional knowledge study of this size in the past, and a key participant in the research could not be identified.

Table 1. Summary of Fisheries Resource Monitoring Program projects completed in the Kuskokwim since 2000. Abbreviations: ADFG=Alaska Department of Fish and Game, AVCP=Association of Village Council Presidents, BC=Bue Consulting, BSFA=Bering Sea Fisherman's Association, KNA=Kuskokwim Native Association, MNVC=McGrath Native Village Council, NPT=Nuniwarmiut Piciryarata Tamaryalkuti, Inc., ONC=Orutsararmiut Native Council, OVK=Organized Village of Kwethluk, TNC=Tuluksak Native Community, and USFWS=U.S. Fish and Wildlife Service.

Project Number	Project Title	Investigators
<i>Kuskokwim River Salmon</i>		
00-007	Tatlawiksuk River Salmon Weir	ADFG, KNA
00-008	Bethel Inseason Subsistence Harvest Data	ONC
00-009	Bethel Postseason Harvest Monitoring	ADFG, ONC
00-019	Kwethluk River Salmon Weir	USFWS, OVK
00-029	Documentation/Communication on Floating Weirs	AVCP
00-030	Kuskokwim Salmon Project Site Surveys	ADFG, USFWS
01-019	Planning Meetings in AVCP Region	AVCP, KNA
01-023	Upper Kuskokwim River Inseason Data	ADFG, MNVC
01-024	Bethel Postseason Fishery Household Surveys	ADFG, ONC
01-053	Tuluksak River Salmon Weir	USFWS, TNC
01-070	Kuskokwim River Chinook Salmon Genetic Diversity	ADFG, USFWS
01-086	Kuskokwim River Escapement Project Technician	ONC
01-088	Natural Resource Internship Program	KNA
01-116	Kuskokwim River Salmon Work Group support	ADFG
01-117	Kuskokwim Salmon Age-Sex-Length Assessment	ADFG
01-132	Bethel Inseason Subsistence Salmon Harvest Data	ONC, ADFG
01-141	Holitna River Chinook, Chum and Coho Telmentry	ADFG
01-147	Aniak River Sport Fisheries Survey	ADFG, KNA
01-225	Middle Kuskokwim River Inseason Salmon Harvest	KNA, ADFG, USFWS
01-226	Subsistence Fisheries Research Capacity Building	ADFG
02-036	Aniak Postseason Subsistence Fishery Surveys	ADFG, KNA
02-046	Kuskokwim River Chinook Salmon Inriver Abundance	ADFG
03-030	Kuskokwim River Salmon Mark-Recapture	ADFG, KNA
03-041	Kuskokwim Coho Salmon Genetics	ADFG, USFWS
03-931	Kuskokwim Science Plan	BSFA
04-301	Kwethluk River Salmon Weir	USFWS, OVK
04-302	Tuluksak River Salmon Weir	USFWS, TNC
04-306	Holitna River Chinook and Chum Salmon Telemetry	ADFG
04-307	Kuskokwim Age-Sex-Length Sampling	ADFG
04-308	Kalskag Salmon Mark-Recapture	ADFG
04-309	Kuskokwim Native Association Intership Program	KNA
04-310	Tatlawiksuk River Salmon Weir	ADFG, KNA
04-311	Kuskokwim Coho Salmon Genetic Mixed Stock Assessment	USFWS
04-353	Bethel Inseason Subsistence Salmon Data Collection	ADFG, ONC
04-359	Kuskokwim Postseason Salmon Subsistence Harvest Surveys	ADFG, KNA, ONC
05-302	Kuskokwim River Chinook Salmon Inriver Abundance	ADFG

Table 1 continued.		
Project Number	Project Title	Investigators
<i>Kuskokwim River Salmon (continued)</i>		
05-304	George and Takotna River Salmon Weirs	ADFG
05-305	Kuskokwim Chinook Salmon Genetic Stock Identification	ADFG
05-307	Lower Kuskokwim Subsistence Fisheries Catch Monitoring	ONC
06-306	Lower Kuskokwim Salmon Inseason Subsistence Catch Monitoring	ADFG
06-307	Kuskokwim River Salmon Management Working Group	ADFG
07-302	Kuskokwim River Chum Salmon Run Reconstruction	ADFG, BC
07-304	Tatlawiksuk River Salmon Weir	ADFG, KNA
07-306	Kwethluk River Salmon Weir	USFWS, OVK
07-307	Tuluksak River Salmon Weir	USFWS, TNC
08-302	Lower Kuskokwim Subsistence Chinook Salmon Age-Sex-Length	ADFG
08-303	George River Salmon Weir	ADFG
08-304	Takotna River Salmon Weir ^a	ADFG
08-351	Tuluksak River Subsistence Chinook Salmon Age-Sex-Length	USFWS
08-352	Bethel and Aniak Postseason Subsistence Salmon Harvest Surveys	ADFG
<i>Kuskokwim Bay Salmon</i>		
00-027	Goodnews River Salmon Weir	ADFG
00-028	Kanektok River Salmon Weir	ADFG, USFWS
01-118	Kanektok River Salmon Weir	ADFG, BSFA
04-305	Kanektok River Salmon Weir	ADFG, BSFA
04-312	Goodnews River Coho Salmon Weir	ADFG
04-351	Kuskokwim Bay Traditional Ecological Knowledge and Oral History	USFWS
05-353	Nunivak Island Subsistence Cod Fisheries	NPT
<i>Resident Species</i>		
01-052	Whitefish Lake Humpback & Broad Whitefish	USFWS, KNA
01-112	Aniak River Subsistence Fisheries Study	ADFG, KNA
01-235	Upper Kuskokwim Community Use Profiles	ADFG
04-304	Whitefish Lake Whitefish Telemetry	USFWS
05-301	Whitefish PIT Tags	USFWS
06-303	Kuskokwim River Whitefish Migratory Behaviour	USFWS, KNA
06-305	Kuskokwim River Inconnu Spawning Distribution	ADFG
06-351	Lower Kuskokwim Non-salmon Harvest and TEK	ADFG, AVCP
08-300	Aniak River Rainbow Trout Seasonal Distribution	ADFG
10-305	Kuskokwim River Sheefish Spawning, Distribution and Timing ^a	ADFG

^a Final Report in preparation.

Table 2. Summary of ongoing 2014 projects funded under the Fisheries Resource Monitoring Program in the Kuskokwim by subsistence fishery. Abbreviations are: ADFG=Alaska Department of Fish and Game; KNA=Kuskokwim Native Association.

Project Number	Project Title	Investigators	2014
12-302	L Kuskokwim River Chinook Salmon Harvest ASL	ADFG	\$82.4
12-312	Highpower Creek Sheefish	ADFG	n/a
12-313	Kuskokwim River Bering Cisco	KNA	n/a
12-352	Upper Kuskokwim River Whitefish Climate Change	ADFG	n/a
Total Kuskokwim Monitoring Program			\$82.4

Table 3. Kuskokwim 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 (\$000s)			
		Alaska Native	State	Federal	Other
<i>Stock Status and Trends Projects</i>					
14-301	Kuskokwim R Broad Whitefish Spawning above McGrath			\$100.0	
14-302	Tatlawiksuk R Salmon Weir	\$93.8	\$117.1		
14-303	George R Salmon Salmon Weir	\$91.8	\$116.6		
14-304	Kanektok Goodnews R Salmon Weir		\$214.6	\$23.3	
14-305	Takotna R Salmon Weir	\$3.8	\$97.8		
14-306	Tuluksak R Salmon Weir	\$54.5		\$123.1	
14-307	U Kuskokwim River Sheefish Enumeration		\$114.6		
14-308	Kwethluk River Salmon Weir Abundance and Run Timing	\$60.1		\$138.3	
<i>Harvest Monitoring and Traditional Ecological Knowledge</i>					
14-351	Kuskokwim Delta Chinook Salmon Non-local Harvesters	\$53.5			\$53.3
14-352	Kuskokwim Area Salmon Post-season Subsistence Harvest Surveys	\$64.5	\$94.8		
14-353	Kuskokwim River Salmon Inseason Subsistence Survey	\$18.7	\$15.2		
14-354	Kuskokwim River Support for Cooperative Management		\$63.0		
14-355	N Kuskokwim Bay Chinook Salmon Natural	\$102.2	\$87.1		
14-356	L Kuskokwim Villages Whitefish Non-salmon Local Knowledge	\$127.9			
Total		\$670.8	\$920.8	\$384.7	\$53.3

Table 4. Kuskokwim 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, AVCP=Association of Village Council Presidents, USFS=U.S. Forest Service, and USFWS=U.S. Fish and Wildlife Service.

Project Number	Lead Organization	Title	Funding (\$000s)	
			Local Hire	Matching
<i>Stock Status and Trends Projects</i>				
14-301	USFWS	Kuskokwim R Broad Whitefish Spawning above McGrath	\$0.0	\$38.0
14-302	ADFG	Tatlawiksuk R Salmon Weir	\$32.6	\$40.3
14-303	ADFG	George R Salmon Salmon Weir	\$32.6	\$40.1
14-304	ADFG	Kanektok Goodnews R Salmon Weir	\$0.0	\$214.0
14-305	ADFG	Takotna R Salmon Weir	\$35.1	\$71.4
14-306	USFWS	Tuluksak R Salmon Weir	\$37.4	\$33.4
14-307	ADFG	U Kuskokwim River Sheefish Enumeration	\$3.0	\$84.2
14-308	USFWS	Kwethluk River Salmon Weir Abundance and Run Timing	\$44.7	\$45.0
<i>Harvest Monitoring and Traditional Ecological Knowledge</i>				
14-351	USFS	Kuskokwim Delta Chinook Salmon Non-local Harvesters	\$19.2	\$45.6
14-352	ADFG	Kuskokwim Area Salmon Post-season Subsistence Harvest Surveys	\$29.3	\$146.0
14-353	ADFG	Kuskokwim River Salmon Inseason Subsistence Survey	\$0.0	\$23.6
14-354	ADFG	Kuskokwim River Support for Cooperative Management	\$0.0	\$55.8
14-355	AVCP	N Kuskokwim Bay Chinook Salmon Natural Indicators	\$0.0	\$31.1
14-356	AVCP	L Kuskokwim Villages Whitefish Non-salmon Local Knowledge	\$23.1	\$14.0
Total			\$257.0	\$882.5

Table 5. Funding recommendations by the Technical Review Committee (TRC) for the Kuskokwim 2014 Fisheries Resource Monitoring Program.							
Project Number	Title	TRC	Requested Budget (\$000)				
			2014	2015	2016	2017	
<i>Stock Status and Trends Projects</i>							
14-301	Kuskokwim R Broad Whitefish Spawning above McGrath	Yes	\$100.0	\$60.5	\$13.5	\$0.0	
14-302	Tatlawiksuk R Salmon Weir	Yes	\$210.9	\$216.0	\$221.4	\$226.8	
14-303	George R Salmon Salmon Weir	Yes	\$208.4	\$213.5	\$218.8	\$224.2	
14-304	Kanektok Goodnews R Salmon Weir	Yes	\$237.9	\$206.2	\$213.6	\$184.0	
14-305	Takotna R Salmon Weir	No	\$102.2	\$105.3	\$107.9	\$111.2	
14-306	Tuluksak R Salmon Weir	No	\$177.6	\$183.9	\$196.2	\$226.8	
14-307	U Kuskokwim River Sheefish Enumeration	Yes	\$114.6	\$93.9	\$82.4	\$0.0	
14-308	Kwethluk River Salmon Weir Abundance and Run Timing	Yes	\$198.4	\$202.4	\$217.6	\$234.7	
<i>Harvest Monitoring and Traditional Ecological Knowledge</i>							
14-351	Kuskokwim Delta Chinook Salmon Non-local Harvesters	Yes	\$106.8	\$0.0	\$0.0	\$0.0	
14-352	Kuskokwim Area Salmon Post-season Subsistence Harvest Surveys	Yes	\$166.0	\$174.8	\$182.8	\$191.3	
14-353	Kuskokwim River Salmon Inseason Subsistence Survey	Yes	\$33.9	\$35.4	\$36.9	\$38.5	
14-354	Kuskokwim River Support for Cooperative Management	Yes	\$63.0	\$64.7	\$66.4	\$68.3	
14-355	N Kuskokwim Bay Chinook Salmon Natural Indicators	No	\$189.3	\$166.0	\$143.7	\$0.0	
14-356	L Kuskokwim Villages Whitefish Non-salmon Local Knowledge	Yes	\$127.9	\$124.4	\$115.5	\$29.5	
Total			\$2,036.9	\$1,847.0	\$1,816.7	\$1,535.3	
Funding Guideline			\$1,073.0				
TRC Recommendation			\$1,567.8	\$1,391.8	\$1,368.9	\$1,197.3	

14-301 - Describe Kuskokwim River Broad Whitefish Spawning Demographics above McGrath, Alaska

Project Number: 14-301
Title: Describe Kuskokwim River Broad Whitefish Spawning Demographics above McGrath, Alaska.
Geographic Region: Kuskokwim Region
Information Type: Stock Status and Trends
Principal Investigator(s): Kenneth S. Gates, U.S. Fish and Wildlife Service, Kenai Fish and Wildlife Field Office (KFWFO)
Co-Investigator: Ken C. Harper, U.S. Fish and Wildlife Service, Kenai Fish and Wildlife Field Office (KFWFO)
Project Cost:

FY2014	FY2015	FY2016
\$100,032	\$60,532	\$13,497

Total: \$174,061

Issue Addressed: Basic life-history information is needed for broad whitefish *Coregonus nasus* to establish population baselines, assess future population status, and develop management strategies. Current federal subsistence regulations are limited and allow for unlimited year-round harvest for broad whitefish within the Kuskokwim River region. Broad whitefish are an important subsistence species in the Kuskokwim River region and are harvested within the Yukon Delta National Wildlife Refuge including Whitefish Lake in the Ophir Creek drainage and other locations along the Kuskokwim River including a spawning area identified above McGrath. There has been a growing concern from area residents along the Kuskokwim River that fewer whitefish are available for harvest today compared to recent history, particularly larger whitefish. Krauthhoefer et al. (2007) noted during an interview of a subsistence fisher that there are fewer whitefish now compared to the past and that whitefish reached much larger sizes in the past than what are seen today. Simon et al. (2007) also documented that the most significant non-salmon resident fish species harvested by Bethel residents during 2001 was whitefish. This project will assist the U.S. Fish and Wildlife Service (Service) in meeting the legislative intent of Section 303 (7) (B) of ANILCA. Section 303 sets forth the purpose for which the Yukon Delta National Wildlife Refuge (Refuge) was established, and mandates the Service to: (i) conserve fish and wildlife populations and habitats in their natural diversity, and (ii) provide, in a manner consistent with the purposes set forth in paragraph (I), the opportunity for continued subsistence uses by local rural residents. This project will also address a biological objective developed for broad whitefish in the Service’s Strategic Habitat Conservation approach to landscape-scale conservation of managing broad whitefish in the Yukon and Kuskokwim rivers for sustainable subsistence and commercial fisheries. In addition, the project will address the need to collect population-specific length and age data identified by Brown et al. (2012) which carried forward as a specific priority information need outlined by the 2014 Federal Subsistence Fisheries Resource Monitoring Program (U.S. Fish and Wildlife Service, Office of Subsistence Management 2012).

Objective(s):

1. Estimate the proportional age and sex composition of mature broad whitefish spawning above McGrath, Alaska such that estimates are within 5% of the actual true population proportions 95% of the time.

2. Estimate the mean length and weight of mature broad whitefish spawning above McGrath, Alaska such that estimate are within 10% of the actual population means 95% of the time.

The project will also address two tasks in addition to the above objective. Tasks include:

- A feasibility assessment of future studies using mark-recapture techniques to estimate abundance. Capture methods for a mark-recapture study would likely be similar to methods used in this study and would require a standardized measure of catch per unit effort, identification of areas important for marking and recapturing tagged fish, knowledge of broad whitefish run timing past the study area, and the ability to capture sufficient numbers of fish to be marked and recaptured for marks;
- To record and catalog any reported harvests of Floy® t-bar anchor tagged fish from this study during subsequent subsistence fisheries. All handled fish in this study will be marked with a Floy tag labeled with contact information and a unique tag number. By recording the times and locations of harvested fish, a database can be created and if sufficient numbers are reported we can begin to identify where and when broad whitefish are being harvested. This will aid in the development of future creel census studies of the subsistence fishery.

Methods: A boat outfitted with an electrofishing unit and a three person crew will be used to sample 610 broad whitefish from 15 August to 10 October during 2014 and 2015. The boat will be equipped with a pulsed-DC variable-voltage pulsator (Coffelt Model VVP-15), or equivalent model, powered by a 5,000-W single-phase gasoline generator. The electrical output (voltage, amperage, and duty cycle) will be adjusted to the minimum level necessary to achieve electrotaxis (forced swimming) and will be adjusted based on observed response of shocked fish to minimize stress. Gillnets set along the shorelines will be used as a secondary capture technique in the event that the electrofishing boat requires repairs or maintenance. Set gillnets would be actively monitored and anchored in likely habitats and checked every 1-3 hours or more frequently depending on fish abundance to minimize fish mortality. Capture of fish using either technique will extend from approximately 25 rkm below McGrath (N62.86649; W155.65817, NAD 83) to approximately 75 rkm above McGrath (N62.99231; W155.20682, NAD 83; Figure 1).

Sampling methods including merwin traps, electrofishing, and gillnets, were tested and used to capture 294 broad whitefish during a feasibility study near McGrath from 18 September to 10 October, 2012 (U.S. Fish and Wildlife Service, Kenai Fish and Wildlife Field Office, 2012 unpublished data). Of the three methods, electrofishing was the most versatile and produced the greatest number of broad whitefish (n=187). Gillnets set in strategic locations proved to be successful (n=104) late in the sampling period when fish were found in larger groups near or on spawning areas.

Partnerships and Capacity Building: The KFWFO gained full support from residents of McGrath for the feasibility study conducted during 2012. We also employed individuals from the Village of Kwethluk to help in data collection. This included training in whitefish identification, sampling protocols, operation of electrofishing boats, and radio telemetry techniques. We intend to distribute Region 7's 2014 Fishery Technician Pre-Announcement to the communities in the surrounding area. This announcement outlines the available seasonal employment opportunities with the U.S. Fish and Wildlife Service and provides contacts and web addresses for further inquiries.

14-302 - Tatlawiksuk River Salmon Weir

Project Number: 14-302
Title: Tatlawiksuk River Salmon Weir
Geographic Region: Kuskokwim Region
Information Type: Stock Status and Trends (SST)
Principle Investigator: Brittany J. Blain, Alaska Department of Fish and Game.
Co-Investigators: Dan Gillikin, Kuskokwim Native Association,
Kevin Schaberg, Alaska Department of Fish and Game

Project Cost:

2014	2015	2016	2017
\$210,879	\$215,982	\$221,401	\$226,816

Total: \$875,078

Issue: Tatlawiksuk River salmon contribute to subsistence, commercial, and recreational fisheries within the Yukon Delta National Wildlife Refuge Federal nexus. Contributing to numerous initiatives that are inclusive of the entire Kuskokwim River drainage, the Tatlawiksuk River weir is one of several projects used to develop reliable estimates of abundance, run timing, stock structure, productivity, and carrying capacity of salmon stocks over a broad geographic scale in the Kuskokwim Region (Area), issues identified by OSM as a priority information need. The project provides fundamental escapement information necessary to facilitate inseason management decisions and to assess trends in salmon populations. This project has been essential as a platform for several other projects such as the Chinook salmon run reconstruction, serving as a tag recovery site, and for developing escapement goals. In addition, the escapement age, sex, and length information collected at Tatlawiksuk River provides part of the context needed to assess the impacts of subsistence harvest practices.

Salmon escapements from this project have been monitored successfully at the Tatlawiksuk River weir 13 out of 15 years since operations began in 1998. Information from this project has become integrated into the annual management process, both by providing insights into escapement and stock specific run timing through the fishery. In 2013, a drainage-wide goal was introduced, which will be implemented during the 2013 field season which is currently the last year of funding by OSM. Tatlawiksuk River weir is an important input into the run reconstruction tool which managers will use to assess this newly developed drainage-wide escapement goal and its continuation is vital.

Similar run reconstruction models are currently under development for Kuskokwim River coho and sockeye salmon, and the potential development for chum salmon exists as well. Such models are important management tools, as total run abundance estimates contribute to determination of annual exploitation rates, comparison of exploitation among age/sex components, assessment of high seas interception, examination of the influence of environmental factors on variability in abundance, and creation of drainage-wide escapement goals. The Tatlawiksuk River weir is one of many projects in the Kuskokwim Region that plays an important role in the run reconstruction model and the development of escapement goals.

Most importantly, this project also incorporates substantial capacity building and outreach components, including a KNA High School Internship program that has fostered understanding and cooperation between stakeholders and agencies across the region. In addition, the project

hosts KNA college interns that gain valuable career building experience working at the weir and learning biological sampling techniques.

Objectives:

1. Determine daily and total annual Chinook, chum, sockeye, and coho salmon escapements from 15 June to 20 September;
2. Estimate age-sex-length (ASL) composition of annual Chinook, chum, and coho salmon escapements to the Tatlawiksuk River such that 95% confidence intervals of age composition will be no wider than $\pm 10\%$ ($\alpha=0.05$, $d=0.10$);
3. Provide mentorship and administer education curriculum to KNA high school interns.

Methods: Investigators will install a resistance board weir on the Tatlawiksuk River. Passage gates in the weir will allow fish to be identified by species and counted as they pass upstream and a live trap will be used to sample salmon for sex and length information and scales for age data that will be processed post-season. Data collected will be published in an *Escapement Monitoring Report* and an *Age, Sex, Length Catalogue*. Investigators will also record daily water temperature, water level, and weather conditions. A local technician hired by KNA will operate the project along with a lead crew member provided by ADF&G. The project will also serve as a platform for future studies such as a recovery site for mark-recapture projects.

Partnership/Capacity Building: KNA and ADF&G operate the Tatlawiksuk River weir jointly at the Partnership Level. Planning, operation, and data analysis associated with the weir is done through an interactive feedback between staff from both organizations, including the KNA fishery biologist who is employed through the OSM Fishery Partners Program. KNA has a proven track record of effective involvement in weir operation. Past interactions between KNA, ADF&G/CF, and local communities has created a high level of public awareness about salmon management and stock status, and has fostered career interests in fisheries through the student internship program.

The Tatlawiksuk River weir hosts an established high school internship program, which facilitates broad community awareness and understanding, interest, and direct involvement fisheries management. The KNA High School intern program sponsors between 15 and 20 high school age students from throughout the Kuskokwim Area on week-long internships, which includes a curriculum of activities and assignments on salmon life history and management. Student interns witness how western science works in conjunction with traditional knowledge to protect their fisheries resources, and interns share their experiences with other family and community members. This outreach program is a long-term investment that develops informed individuals who will serve as the future technicians, biologists, board members, public leaders, and the voting citizens who will influence the course of future events through their decisions. Many past interns have subsequently been hired as fisheries technicians or college interns by KNA, Association of Village Council Presidents, or ADF&G.

14-303 - George River Salmon Weir

Project Number: 14-303

Title: George River Salmon Weir

Geographic Region: Kuskokwim Region

Information Type: Stock Status and Trends (SST)

Principle Investigator: Brittany J. Blain, Alaska Department of Fish and Game.

Co-Investigators: (1) Dan Gillikin, Kuskokwim Native Association, (2) Kevin Schaberg, Alaska Department of Fish and Game

Project Cost:

2014	2015	2016	2017
\$208,409	\$213,452	\$218,804	\$224,156

Total: \$864,821

Issue: George River salmon contribute to subsistence, commercial, and recreational fisheries within the Yukon Delta National Wildlife Refuge Federal nexus. Contributing to numerous initiatives that are inclusive of the entire Kuskokwim River drainage, the George River weir is one of several projects used to develop reliable estimates of abundance, run timing, stock structure, productivity, and carrying capacity of salmon stocks over a broad geographic scale in the Kuskokwim Region (Area), issues identified by OSM as a priority information need. The project provides fundamental escapement information necessary to facilitate inseason management decisions and to assess trends in salmon populations. This project has been essential as a platform for several other projects such as the Chinook salmon run reconstruction, serving as a tag recovery site, and for developing escapement goals. In addition, the escapement age, sex, and length information collected at George River provides part of the context needed to assess the impacts of subsistence harvest practices.

Salmon escapements from this project have been monitored successfully 15 out of 17 years since 1996. Information from this project has become integrated into the annual management process, both by providing insights into escapement and stock specific run timing through the fishery. In 2007, an escapement goal was established for Chinook salmon on the George River. In 2013, revisions were made to the tributary escapement goal and a drainage-wide goal was introduced, both of which will be implemented during the 2013 field season already funded by OSM. George River weir is an important input into the run reconstruction tool which managers will use to assess this newly developed drainage-wide escapement goal and its continued operation is vital to determining the success of this tool.

Similar run reconstruction models are currently under development for Kuskokwim River coho and sockeye salmon, and the potential development for chum salmon exists as well. Such models are important management tools, as total run abundance estimates contribute to determination of annual exploitation rates, comparison of exploitation among age/sex components, assessment of high seas interception, examination of the influence of environmental factors on variability in abundance, and creation of drainage-wide escapement goals. The George River weir is one of many projects in the Kuskokwim Region that plays an important role in the run reconstruction model and the development of escapement goals.

Most importantly, this project also incorporates substantial capacity building and outreach components, including a KNA High School Internship program that has fostered understanding

and cooperation between stakeholders and agencies across the region. In addition, the project hosts KNA college interns that gain valuable career building experience working at the weir and learning biological sampling techniques.

Objectives:

1. Determine daily and total annual Chinook, chum, sockeye, and coho salmon escapements from 15 June to 20 September;
2. Estimate age-sex-length (ASL) composition of annual Chinook, chum, and coho salmon escapements to the George River such that 95% confidence intervals of age composition will be no wider than $\pm 10\%$ ($\alpha=0.05$, $d=0.10$);
3. Provide mentorship and administer education curriculum to KNA high school interns.

Methods: Investigators will install a resistance board weir on the lower George River. Passage gates in the weir will allow fish to be identified by species and counted as they pass upstream and a live trap will be used to sample salmon for sex and length information and scales for age data that will be processed post-season. Data collected will be published in an *Escapement Monitoring Report* and an *Age, Sex, Length Catalogue*. Investigators will also record daily water temperature, water level, and weather conditions. A local technician hired by KNA will operate the project along with a lead crew member provided by ADF&G. The project will also serve as a platform for future studies such as a recovery site for mark-recapture projects.

Partnership/Capacity Building: KNA and ADF&G operate the George River weir jointly at the Partnership Level. Planning, operation, and data analysis associated with the weir is done through an interactive feedback between staff from both organizations, including the KNA fishery biologist who is employed through the OSM Fishery Partners Program. KNA has a proven track record of effective involvement in weir operation. Past interactions between KNA, ADF&G/CF, and local communities has created a high level of public awareness about salmon management and stock status, and has fostered career interests in fisheries through the student internship program.

The George River weir hosts an established high school mentorship program, which facilitates broad community awareness and understanding, interest, and direct involvement fisheries management. The KNA High School intern program sponsors between 15 and 20 high school age students from throughout the Kuskokwim Area on week-long internships, which includes a curriculum of activities and assignments on salmon life history and management. This outreach program is a long-term investment that develops informed individuals who will serve as the future technicians, biologists, board members, public leaders, and the voting citizens who will influence the course of future events through their decisions. Several former High School and college interns from this program have already gone on to become fisheries technicians with both KNA and the Department of Fish and Game. Several others are now completing college degrees, having gotten a start through this program.

14-304 - Kanektok and Goodnews River Salmon Run Assessment Projects

Project Number: 14-304
Project Title: Kanektok and Goodnews River Salmon Run Assessment Projects
Geographic Region: Kuskokwim Region
Information Type: Stock Status and Trends (SST)
Principle Investigator: Aaron Tiernan, Alaska Department of Fish and Game.
Co-Investigators: Jacqueline Cleveland, Native Village of Kwinhagak
Mark Lisac, U.S. Fish and Wildlife Service, Togiak National Wildlife Refuge.

Project Cost:

2014	2015	2016	2017
\$237,927	\$208,798	\$216,286	\$186,699

Total: \$849,710

Issue: Kanektok and Goodnews River salmon contribute to subsistence, commercial, and recreational fisheries within the Togiak National Wildlife Refuge (TNWR). Weir projects on these rivers are used to develop estimates of abundance, run timing, and escapement estimates, in the Kuskokwim Bay area, issues identified by OSM as a priority information need. The projects provide escapement information necessary to facilitate inseason management decisions and to assess trends in salmon populations. This project also incorporates capacity building for the Native Village of Kwinhagak (NVK) and outreach components with the communities of Kwinhagak and Goodnews Bay.

Salmon escapement on the Kanektok River has been monitored adequately for 9 out of last 10 years. The floating weir on Goodnews River has been in operation since 1998. These weirs are the only projects available to address information gaps in salmon escapement data within Kuskokwim Bay drainages. Escapement and other data collected by both projects increase the ability to effectively manage for the subsistence priority and other uses of Kuskokwim Bay salmon resources.

Age and sex samples collected at both weirs, can contribute to management forecasting, and aid in monitoring for sustainable yields. Total abundance estimates facilitate the identification of both harvestable surpluses and conservation concerns. Environmental variables monitored at the project sites provide a baseline for charting environmental change over time. Information from these projects contributes to regulatory and management decisions that directly affect subsistence use, addressing the issue of “allocation priority” as defined in the RFP.

Objectives:

1. Determine daily and total annual escapement of Chinook, chum, sockeye, and coho salmon, and Dolly Varden through the Kanektok and Middle Fork Goodnews River weirs;
2. describe the run-timing or proportional daily passage of Chinook, chum, sockeye, and Coho salmon through the weir(s);
3. Estimate age-sex-length (ASL) composition of annual Chinook, chum, and sockeye salmon escapements to the Kanektok and Middle Fork Goodnews Rivers such that 95% confidence intervals of age composition will be no wider than 0.20 ($\alpha=0.05$, $d=0.10$).

- Goodnews River weir estimates will include composition of Coho salmon; and
4. Monitor environmental variables at the project sites such as relative water level, water temperature and air temperature.

Methods: Resistance board weirs will be installed on the Kanektok and Middle Fork Goodnews Rivers. Passage chutes in the weir will allow species identification and passage monitoring. Live traps will be used to sample Chinook, sockeye, chum, and Coho salmon for scales, sex and length information (ASL). ASL data is processed post-season under Kuskokwim Salmon ASL Assessment Project (OSM 10-303). Results and samples collected will be shared with cooperative organizations. Investigators will also record daily water temperature, water level, and weather conditions. ADF&G/CF staff will be responsible for maintaining the information used for in-season management.

Partnership/Capacity Building: The Kanektok River weir project is operated cooperatively by ADF&G, NVK, and TNWR. Staff includes ADF&G technicians and two to three NVK Fishery Technicians assisting in project operations. The camp is a cooperative setting teaching fisheries monitoring skills and encouraging teamwork and self-motivation. ADF&G provides a proactive role in the mentoring of NVK staff and technicians.

The Middle Fork Goodnews River weir project is operated cooperatively by ADF&G and the TNWR. Staff includes ADF&G technicians and one local hire TNWR Fisheries Technician. Staffing may be supplemented in-kind by ADF&G and TNWR technicians and interns.

ADF&G will continue its lead role in the development of both projects, oversight of seasonal operations, and post-season data analysis and reporting requirements. Regular consultations between ADF&G, NVK, USFWS, CVRF, and local stakeholders will occur throughout the year to coordinate logistics, discuss results, and exchange ideas.

14-305 - Takotna River Salmon Weir

Project Number: 14-305
Title: Takotna River Salmon Weir
Geographic Region: Kuskokwim Region
Information Type: Stock Status and Trends (SST)
Principle Investigator: Brittany J. Blain, Alaska Department of Fish and Game.
Co-Investigators: Nell Huffman, Takotna Community Association,
Dick Newton, Takotna Community Association
Kevin Schaberg, Alaska Department of Fish and Game

Project Cost:

2014	2015	2016	2017
\$102,158	\$105,278	\$107,878	\$111,161

Total: \$426,475

Issue: Takotna River salmon contribute to subsistence, commercial, and recreational fisheries within the Yukon Delta National Wildlife Refuge Federal nexus. Contributing to numerous initiatives that are inclusive of the entire Kuskokwim River drainage, the Takotna River weir is one of several projects used to develop reliable estimates of abundance, run timing, stock structure, productivity, and carrying capacity of salmon stocks over a broad geographic scale in the Kuskokwim Region (Area), issues identified by OSM as a priority information need. The project provides fundamental escapement information necessary to facilitate inseason management decisions and to assess trends in salmon populations. This project is essential as a platform for several other projects and for developing escapement goals. This project also incorporates substantial capacity building and outreach components, including a TCA High School Internship program that has fostered understanding and cooperation between stakeholders and agencies across the region.

Salmon escapements from this project have been monitored successfully 15 out of 18 years since 1996. Escapement and age, sex, length information provided from Takotna River weir, in conjunction with other projects, are valuable input for the Chinook salmon run reconstruction model that estimates total annual Chinook salmon abundance for the entire Kuskokwim River. Similar run reconstruction models are currently under development for Kuskokwim River coho and sockeye salmon, and the potential development for chum salmon exists as well. Such models are important management tools, as total run abundance estimates contribute to determination of annual exploitation rates, comparison of exploitation among age/sex components, assessment of high seas interception, examination of the influence of environmental factors on variability in abundance, and creation of drainage-wide escapement goals.

While the Takotna River also contributes to run reconstruction models and assessment of drainage-wide escapement goals, it also represents an area of interest to managers in that it appears to be a system recovering from over fishing and habitat loss in the early twentieth century. The original development of this project was based on resident and ADF&G interest in documenting this perceived recovery. Continued study may offer researchers and managers perspectives on managing recovering salmon runs.

Objectives:

1. Determine daily and total annual Chinook, chum, and coho salmon escapements from 15 June to 20 September;
2. Estimate age-sex-length (ASL) composition of annual Chinook, chum, and coho salmon escapements to the George River such that 95% confidence intervals of age composition will be no wider than $\pm 10\%$ ($\alpha=0.05$, $d=0.10$);
3. Provide mentorship and administer education curriculum to KNA high school interns.

Methods: Investigators will install a resistance-board weir on the lower Takotna River to encompass the target operational period of 24 June to 20 September. Passage gates in the weir will allow fish to be identified by species and counted as they pass upstream and a live trap will be used to sample salmon for sex and length information and scales for age data that will be processed post-season. Data collected will be published in an *Escapement Monitoring Report* and an *Age, Sex, Length Catalogue*. Investigators will also record daily water temperature, water level, and weather conditions. A local, lead crew member hired by ADF&G along with local technicians provided by TCA will operate the project. The project will also serve as a platform for future studies.

Partnership/Capacity Building: TCA and ADF&G operate the Takotna River weir jointly at the Partnership Level. Planning, operation, and data analysis associated with the weir is done through an interactive feedback between staff from both organizations. TCA is the recognized village government of the village of Takotna and has a proven track record of grant and project management, with effective involvement in weir operation since 2012 when they took over project responsibility from Takotna Tribal Council. TCA is committed to continuing development of public awareness about salmon management and stock status, and fostering career interests in fisheries through the student internship program.

The Takotna River weir hosts an established high school internship program, which facilitates broad community awareness and understanding, interest, and direct involvement fisheries management. The TCA internship program provides part-time employment throughout the season to high school students who work directly with full-time adult crew members. This outreach program is a long-term investment that develops informed individuals who will serve as the future technicians, biologists, board members, public leaders, and the voting citizens who will influence the course of future events through their decisions. The current ADF&G technician started as a high school intern with TCC.

14-306 - Tuluksak River Salmon Run Timing and Abundance

Project Number: 14-306
Title: Tuluksak River Salmon Run Timing and Abundance
Geographic Area: Kuskokwim (Map 6)
Data Type: Stock Status and Trends
Principal Investigator: Ken Harper, U.S. Fish and Wildlife Service, Kenai Fish and Wildlife Field Office
Co-Investigator(s): Steve J. Miller, U.S. Fish and Wildlife Service, Kenai Fish and Wildlife Field Office
 steve_miller@fws.gov; Fax (907) 543-4413.
 Wassca Fly, Council President, Tuluksak Native Community (TNC)

Project Cost:

2014	2015	2016	2017
\$177,586	\$183,926	\$196,184	\$226,752

Total Cost: \$784,448

Issue Addressed: This project focuses on strategic priority information needs identified in the 2012 Fisheries Resource Monitoring Plan (eg. Obtaining reliable estimates of salmon returns; methods including the quality of escapement). Management of Kuskokwim Area salmon fisheries is complex because of annual variability in run size, timing, and harvest of mixed stocks, overlapping runs of multiple species, allocation issues, and the immense size of the Kuskokwim River drainage. Weirs that monitor salmon returning to Kuskokwim River tributaries provide: 1) accurate escapement numbers, 2) fish age and sex information, 3) run timing, 4) a platform for other research projects, as well as 5) provide insight for sustainable salmon management. These data are heavily relied upon by state and federal managers for management of the Kuskokwim River commercial fisheries and one of the largest subsistence fisheries in Alaska. Without adequate and accurate escapement monitoring of salmon returns to the Kwethluk River, there is a risk to the conservation and maintenance of Chinook *Onchorynchus tshawytscha*, chum *O. keta*, sockeye *O. nerka*, pink *O. gorbuscha*, and coho salmon *O. kisutch* populations. Monitoring of salmon returns to the Kwethluk River is essential to ensuring that Federal conservation mandates are fulfilled within the Yukon Delta National Wildlife Refuge (Alaska National Interest Lands Conservation Act ((Section 303 (7) (8) a, b, c)). Escapement monitoring also helps reduce the risk of failure to provide a priority to subsistence uses, and risk that subsistence harvest needs will not be met. This project has been in operation during 1991–1994, 2001–2013 and if funded continue to operate through 2017.

Objectives:

1. Enumerate the daily passage and characterize the run timing of Chinook, chum, coho, sockeye, and pink salmon and resident fish species through the weir.
2. Estimate the weekly sex and age composition of Chinook, chum, and coho salmon such that the simultaneous 95% confidence intervals have a maximum width of 0.20.
3. Estimate the mean length of Chinook, chum and coho salmon by sex and age.
4. Identify and count other fish species passing through the weir and enumerate salmon carcasses passing back over the weir.

Methods: The monitoring project has been operated during 1991–1994 and 2001–2012. It is funded for 2013 (OSM-FRMP project 10-307). The KFWFO and TNC operates a resistance board weir affixed with an underwater video system spanning a 60 m section of the Tuluksak River approximately 49 river kilometers (rkm) upstream from the confluence with the Kuskokwim River . Enumeration of salmon normally occurs between June 20 and September 10. Fish will be passed through the weir and video camera chute twenty four hours each day, seven days a week. All fish passing upstream will be counted and identified to species. Gill net marked fish will be included in the daily escapement counts, but recorded separately.

The video system will facilitate fish sampling during various river stage heights and allow for salmon passage and enumeration 24 hours each day. The video system and weir are operated in unison. The video system will provide live video of fish passage and capture video footage using motion detection software and a DVR. An object will be passed in front of the video camera periodically to confirm the camera is operating correctly, and to adjust the motion sensing software if needed. Paired comparison counts of fish passage using live video and captured video footage (motion detection) will be conducted daily to validate the motion detection software. For a paired count comparison a one hour time block will be selected randomly and fish tallied by species. This passage will be compared by reviewing the same time using the captured video (archived) from the DVR. If discrepancies are found the trap will be closed for a short time until adjustments to the motion detection can be corrected.

Data on fish age, sex, and length (ASL) will be collected using a temporally stratified sampling design, with statistical weeks defining strata. A sample of fish will be drawn weekly for ASL information. Sample size goals for each stratum will be adopted to meet Objective 2. Sampling consists of measuring length, determining sex, collecting scales, examining fish for gill net marks, and then releasing the fish upstream of the weir. Salmon will be measured from mid-eye to fork of caudal fin, and to the nearest 5 mm. Sex will be determined by observing external characteristics. Sample data for salmon will be recorded on all-weather ASL field forms and transferred into electronic format for Service and State databases. One scale will be collected from each chum salmon and four scales will be collected from each Chinook and coho salmon. Scales will be removed from the preferred area for age determination. Salmon scales will be clean and properly affixed to gummed scale cards and pressed on acetate to make an impression. Scales will be aged by the Service's Kenai Fish and Wildlife Field Office (KFWFO) in Soldotna, Alaska. Scale analysis and reporting will utilize methods described by Mosher (1969). Age determinations for Chinook salmon include the number of years spent in freshwater as a juvenile and the number of years spent in saltwater as an adult. The KFWFO will archive scale cards and acetates, and tabulated ASL data will be provided to ADF&G and maintained in ADF&G's Arctic Yukon Kuskokwim salmon escapement database.

Characteristics of fish passing through the weir were estimated using standard stratified random sample estimators. Days with partial or zero counts will be considered incomplete and estimates will be calculated for those dates. Estimates will be based on the average daily proportion of passage from previous years. An average of the daily proportions for previous years will be calculated since daily escapement can vary between years. The sum of the averaged daily proportions, calculated for days with partial or zero counts, will be the estimated total proportion of the missed escapement. The total escapement will be the sum of the observed counts for the current year divided by one minus the proportion missed during the current year. Prior years with estimates will not be used to calculate the current year estimates.

Partnerships and Capacity Building: TNC is a co-investigator with the Tuluksak River weir project (1991–1994 and 2001–present). Tribal members from the village of Tuluksak comprise the majority of staff operating the Tuluksak River weir. TNC members are trained in biological techniques, computer skills, and safety (e.g. bear and firearms, watercraft, aircraft). Administrative support for the weir project is also provided by TNC. Village council members are encouraged to visit project sites. TNC and OVK technicians have been exchanged intermittently between weir projects during the season and have been incorporated into other Kuskokwim River projects to expand their knowledge of fisheries projects in the drainage. Kenai-FWFO continues to mentor and train residents hired by the villages to work at the weirs and other project operations.

This project has been supported by the TNC, the Yukon Delta National Wildlife Refuge, the Kuskokwim River Salmon Management Working Group (Working Group), Orutsarmuit Native Council (ONC), Kuskokwim Native Association (KNA), the Association of Village Council Presidents (AVCP), the Lower Kuskokwim State Advisory Committee and ADF&G. The Kuskokwim River Salmon Management Working Group is comprised of village elders, subsistence users, representatives from sport and commercial interests and ADF&G. Working group is funded by OSM.

14-307 - Enumeration and Spawning Area Characterization of Sheefish in the Upper Kuskokwim River

Project Number: 14-307
Title: Enumeration and spawning area characterization of sheefish in the Upper Kuskokwim River
Geographic Region: Kuskokwim Region.
Data Type: Stock Status and Trends
Principle Investigator: Lisa Stuby, Alaska Department of Fish and Game, Sport Fish Division

Project Cost (State Fiscal Years):

2014	2015	2016
\$114,636	\$93,888	\$82,374

Total: \$290,898

Issues: The greatest use of sheefish in the Kuskokwim River drainage has been for subsistence with the majority of this harvest occurring in the lower and middle Kuskokwim River within the boundaries of the Yukon Delta National Wildlife Refuge. Little is known of the stock composition of the harvest or the abundance or productivity of the various spawning populations, and this information is essential for evaluating sustainability of the fishery. Using the knowledge gained from FIS 06-305 and FIS 10-305, an attempt will be made to deploy a dual-frequency identification sonar (DIDSON produced by Sound Metrics Corp.) near the Big River mouth during 2014-2016 to acquire inriver estimates of spawning sheefish. Approximately 80% of radiotagged sheefish from this 5 year study travelled to the Big River to spawn. Given these fish were tagged at major lower and middle Kuskokwim River tributaries, it can be assumed that the Big River spawners represent a significant proportion of the total inriver sheefish population.

The mouth of Highpower Creek and Swift Fork was documented as a sheefish spawning area in the 1970's. Several residents from Nikolai and Telida have informed the project biologist that this once important resource has not been seen since the 1990's. An effort (OSM Project 12-312) is being made to try and identify the current status of this spawning stock. So far efforts to capture and radiotag sheefish that spawn in Highpower Creek and Swift Fork have been unsuccessful. To better understand habitat changes that may have adversely affected this spawning population, the project biologist will examine a time series of synthetic aperture radar (SAR) and optical satellite images, paying particular attention to upwelling locations at this and the other 4 sheefish spawning areas. Winter upwelling is important to egg survival. In addition, 50 radio transmitters will be deployed at previously unidentified summer upriver feeding areas near McGrath. These upriver feeding sheefish may exhibit life history patterns that have not been noted, such as fall spawning migrations to Highpower Creek and/or additional undocumented spawning areas. Fin clips taken during tagging would add data to the genetic baseline data for the Kuskokwim.

Radiotagged sheefish from OSM Project 12-312 were detected on the South Fork of the Kuskokwim River near the Little Tonzona River at an area not previously noted for spawning activity. Locating aggregations of radiotagged sheefish during the spawning period does not necessarily provide conclusive evidence of spawning in a particular location. Verification of spawning requires site visits to those areas to sample sheefish and assess their spawning condition. Therefore, a site visit will be made in 2015 to collect age, sex, and length data, record habitat characteristics, and collect fin clips for genetics analysis.

Development of methods to estimate the abundance of sheefish spawning populations in the Kuskokwim River drainage, completing genetic baseline sampling and population marker development, locating and confirming additional spawning areas, determining the status of the sheefish spawning population in Highpower Creek, and collecting population-specific length and age data for known spawning populations have been identified as priority research needs by the strategic plan for research of whitefish species in the Yukon and Kuskokwim River Drainages (Brown, et al. 2012) and the 2014 Fisheries Research Monitoring Program. Management of sheefish populations for long-term sustainability requires a better understanding of their reproductive biology, life history traits, and their population size and composition.

Objectives: The objectives of this project will be to:

1. Assess the feasibility of enumerating out-migrating, post spawning sheefish in the lower Big River in 2014 using a DIDSON sonar system, and if successful, continue the enumeration program in 2015 and 2016 to estimate abundance of out-migrating fish.
2. Attempt to locate additional spawning areas in the upper Kuskokwim River by radiotagging 50 sheefish at upriver feeding areas above and near McGrath.
3. Verify a suspected sheefish spawning area on the South Fork of the Kuskokwim River near the confluence with the Little Tonzona River by conducting a site visit and capturing sheefish to assess their spawning condition.
 - a. Describe habitat characteristics of the South Fork spawning area.
4. Identify and document upwelling groundwater or hyporheic exchange water with respect to the five documented sheefish spawning habitats in the upper Kuskokwim River drainage.
 - a. Compare yearly optical and SAR satellite data from 2007-2011 for five documented sheefish spawning areas to investigate localized habitat changes.
 - b. Deploy temperature, conductivity, and dissolved oxygen data loggers in the upwelling areas identified from the SAR data.

Methods: A DIDSON will be deployed at the mouth of Big River to examine the feasibility of enumerating sheefish that spawn in this drainage in 2014. If successful, the DIDSON will be deployed again during 2015 and 2016. Efforts will focus on the relatively compressed fall outmigration in early to mid-October. The sonar set up will commence on 25 September and will run until 15 October unless icing forces earlier stopping dates. Abundance and migration timing data will be collected 24 hours a day, 7 days a week, in 60-minute sample periods. A proportion of the sheefish that will be radiotagged at upriver tributaries will probably enter the Big River to spawn and thus provide up-to-date information on outmigration timing that will be used to assess the enumerated proportion if counts cease due to ice.

Remote sensing data will be used to locate and document ice-free areas (groundwater influence) at sheefish spawning locations for the winters of 2007-2011. The project biologist has applied for and received permission from the National Aeronautic and Space Administration via the Alaska Satellite Facility to access 2011 and earlier SAR data from ERS1, ERS-2, and RADARSAT-1 and has access to Landsat optical satellite images. Variations in the size and reach of upwelling areas over the 5-year period will be noted. Temperature, dissolved oxygen, and conductivity data loggers will be deployed into key upwelling areas.

Fifty sheefish will be captured using gillnets and hook and line gear and implanted with radio transmitters between the mouths of the Katlitna and Big rivers during June and July 2014. These fish will be tracked through the fall of 2016 with a combination of stationary tracking stations and aerial tracking flights.

A site visit to the sheefish spawning area on the South Fork of the Kuskokwim River will be made in late September 2015. A minimum of 10 sheefish will be collected. Extrusion of gametes will confirm spawning readiness and some will be sacrificed and gonadosomatic indices calculated to quantify maturity, both saggital otoliths will be removed, and age, sex, and length will be recorded. Habitat characteristics including water temperature, channel characteristics, spawning substrate, flow, pH, and turbidity will be recorded for later comparisons with the other Kuskokwim River sheefish spawning areas.

Partnerships and Capacity Development: The project biologist will work closely with the Kuskokwim Native Association (KNA), McGrath, Telida, Nikolai, and Takotna, Ltd., and the McGrath Native Village Council to garner college interns and/or local hires and will encourage local participation. She will continue to present at the Kuskokwim Area interagency meetings where representatives from various native associations, federal and state agencies, and other pertinent parties will be in attendance. She will work with residents of McGrath to decipher the best times to capture and tag sheefish at upriver feeding areas. The project biologist will also give project presentations to residents of Nikolai and McGrath and put together an update pamphlet describing project results. She will also look into other avenues for capacity development with upriver residents such as giving school presentations and radio updates. The project biologist is a co-investigator with “Yukon and Kuskokwim Rivers Inconnu Genetic Baseline” (OSM Project 12-700) and works cooperatively with OSM Project “Location, Migration Timing, and Description of Kuskokwim River Bering Cisco Spawning Origins” (OSM Project 12-313) and shares stationary tracking station maintenance duties with KNA and incorporates frequencies into aerial tracking flights.

14-308 - Kwethluk River Salmon Run Timing and Abundance

Project Number: 14-308 (Previously FIS 10-306)
Title: Kwethluk River Salmon Run Timing and Abundance
Geographic Area: Kuskokwim (Map 6).
Data Type: Stock Status and Trends.
Principal Investigator: Ken Harper, U.S. Fish and Wildlife Service, Kenai Fish and Wildlife Field Office
Co-Investigator(s): Steve J. Miller, U.S. Fish and Wildlife Service, Kenai Fish and Wildlife Field Office

Project Cost:

2014	2015	2016	2017
\$198,431	\$202,407	\$217,552	\$234,687

Total: \$853,077

Issue Addressed: This project focuses on strategic priority information needs identified in the 2012 Fisheries Resource Monitoring Plan. Management of Kuskokwim Area salmon fisheries is complex because of annual variability in run size, timing, and harvest of mixed stocks, overlapping runs of multiple species, allocation issues, and the immense size of the Kuskokwim River drainage. Weirs that monitor salmon returning to Kuskokwim River tributaries provide: 1) accurate escapement numbers, 2) fish age and sex information, 3) run timing, 4) a platform for other research projects, as well as 5) provide insight for sustainable salmon management. These data are heavily relied upon by state and federal managers for management of the Kuskokwim River commercial fisheries and one of the largest subsistence fisheries in Alaska. Without adequate and accurate escapement monitoring of salmon returns to the Kwethluk River, there is a risk to the conservation and maintenance of Chinook *Oncorhynchus tshawytscha*, chum *O. keta*, sockeye *O. nerka*, pink *O. gorbuscha*, and coho salmon *O. kisutch* populations. Monitoring of salmon returns to the Kwethluk River is essential to ensuring that Federal conservation mandates are fulfilled within the Yukon Delta National Wildlife Refuge (Alaska National Interest Lands Conservation Act ((Section 303 (7) (8) a, b, c)). Escapement monitoring also helps reduce the risk of failure to provide a priority to subsistence uses, and risk that subsistence harvest needs will not be met. This project has been in operation during 1992, 2000–2013 and if funded continue to operate through 2017.

Objectives:

1. Enumerate the daily passage and characterize the run timing of Chinook, chum, coho, sockeye, and pink salmon and resident fish species through the weir.
2. Estimate the weekly sex and age composition of Chinook, chum, and coho salmon such that the simultaneous 95% confidence intervals have a maximum width of 0.20.
3. Estimate the mean length of Chinook, chum and coho salmon by sex and age.
4. Identify and count other fish species passing through the weir and enumerate salmon carcasses passing back over the weir.

Methods: The monitoring project has been operated during 1992, and 2000–2012 and funded for 2013 (OSM-FRMP project 10-306). The KFWFO and OVK operates a resistance board weir affixed with an underwater video monitoring system spanning a 60 m section of river approximately 88 river kilometers (rkm) upstream from the confluence with the Kuskokwim River. Enumeration of salmon normally occurs between June 20 and September 10.

Fish will be passed through the weir and video camera chute twenty-four hours per day, seven days a week. All fish passing upstream will be counted and identified to species. The video system and weir are operated in unison. Video counts will be collected 24 hours per day, seven days each week. If the video system goes down for a period of time visual counts will start at approximately 0600 hours every day and continue until fading-daylight reduces visibility (~23:00 hours) and/or the video is back operating. Video and visual counts will be compared. Count data from field notebooks will be transcribed to hourly weir escapement forms and entered in to the electronic database. All video images will be recorded on an external hard drive using a computer-based digital video recorder (DVR) 24 hours each day. Daily escapement counts will be relayed by radiophone or by internet to Service staff and the Alaska Department of Fish and Game (ADF&G) contributing to daily in-season commercial fishery management decisions.

Data on fish age, sex, and length (ASL) will be collected using a temporally stratified sampling design, with statistical weeks defining strata. A sample of fish will be drawn weekly for ASL information. Sample size goals for each stratum will be adopted to meet Objective 2. Sampling consists of measuring length, determining sex, collecting scales, examining fish for gill net marks, and then releasing the fish upstream of the weir. Salmon will be measured from mideye to forkofcaudalfin, and to the nearest 5 mm. Sex will be determined by observing external characteristics. Sample data for salmon will be recorded on all-weather ASL field forms and transferred into electronic format for Service and State databases. One scale will be collected from each chum salmon and four scales will be collected from each Chinook and coho salmon. Scales will be removed from the preferred area for age determination. Salmon scales will be clean and properly affixed to gummed scale cards and pressed on acetate to make an impression. Scales will be aged by the Service's Kenai Fish and Wildlife Field Office (KFWFO) in Soldotna, Alaska. Scale analysis and reporting will utilize methods described by Mosher (1969). Age determinations for Chinook salmon include the number of years spent in freshwater as a juvenile and the number of years spent in saltwater as an adult. The KFWFO will archive scale cards and acetates, and tabulated ASL data will be provided to ADF&G and maintained in ADF&G's Arctic Yukon Kuskokwim salmon escapement database.

Characteristics of fish passing through the weir were estimated using standard stratified random sample estimators. Days with partial or zero counts will be considered incomplete and estimates will be calculated for those dates. Estimates will be based on the average daily proportion of passage from previous years. An average of the daily proportions for previous years will be calculated since daily escapement can vary between years. The sum of the averaged daily proportions, calculated for days with partial or zero counts, will be the estimated total proportion of the missed escapement. The total escapement will be the sum of the observed counts for the current year divided by one minus the proportion missed during the current year. Prior years with estimates will not be used to calculate the current year estimates.

Partnerships and Capacity Building: OVK is a co-investigator with the Kwethluk River weir project (2000–2013). Tribal members from Kwethluk comprise the majority of staff operating the Kwethluk River weir. OVK members are trained in biological techniques, computer skills, and safety (e.g. bear and firearms, watercraft, aircraft). Administrative support for the weir project is also provided by OVK. Village council members are encouraged to visit project sites. OVK and TNC technicians have been exchanged intermittently between weir projects during the season and have been incorporated into other Kuskokwim River projects to expand the understanding of fisheries projects in the drainage. KFWFO continues to mentor and train residents hired by the villages to work at the weirs and other project operations.

This project has been supported by the Kuskokwim Fisheries Resource Coalition (KFRC) and the Kuskokwim River Salmon Management Working Group (Working Group). The KFRC is an organization consisting of representatives from the Service, Orutsararmuit Native Council (ONC), Kuskokwim Native Association (KNA), the Association of Village Council Presidents (AVCP), Takotna Tribal Council, McGrath Native Village Council, and ADF&G. The Kuskokwim River Salmon Management Working Group Members of this group is comprised of Village elders, subsistence users, representatives from sport and commercial interests and ADF&G. Working group is funded by OSM.

14-351 - Developing a baseline measure and prescribing monitoring protocol to estimate previously unreported Chinook Salmon harvested by non-local harvesters in the Kuskokwim Delta

Projects Number: 14-351
Title: Developing a baseline measure and prescribing monitoring protocol to estimate previously unreported Chinook Salmon harvested by non-local harvesters in the Kuskokwim Delta
Geographic Region: Kuskokwim
Data Type: Harvest Monitoring/Traditional Ecological Knowledge
Principal Investigator: Alan E. Watson, Aldo Leopold Wilderness Research Institute, US Department of Agriculture, Forest Service Rocky Mountain Research Station
Co-Investigator: Brooke McBride, University of Montana, Missoula;
Casie Stockdale, Association of Village Council Presidents
Dan Gillikin, Kuskokwim Native Association

Project Cost:

2014	2015	2016	2017
\$106,763	\$0	\$0	\$0

Total: \$106,763

Issue: Subsistence harvest of Chinook salmon from the Bethel area by non-residents of the Kuskokwim River drainage is the priority issue, but pilot testing will include all species of salmon.

Objectives: The primary objectives are the following:

1. to develop and test a sound method of estimating the subsistence harvest of salmon (including all species, but priority is Chinook) from the Bethel and Aniak areas of the Kuskokwim River drainage by non-local people to contribute to a complete understanding of the overall harvesting and supply system,
2. to prescribe application of the method to monitor change in subsistence and sport harvest of salmon from the Bethel and Aniak areas of the Kuskokwim River drainage by non-local people, including providing accurate estimates of precision.

Methods: On sample days, multiple data collection specialists will be prepared and knowledgeable of anticipated regional flights leaving Bethel and Aniak in order to pilot test a survey to find out if passengers were engaged in fishing activities. Contacts will take place at the airports and if visitors fished, they will be asked several questions, including the following: place of residence, were they sport or subsistence fishing, type of equipment used, did they consume any fish that they harvested in the area, whether they fished as a group, with a guide or with relatives or friends from the area, are they taking fish (and if so, type of fish) with them, are they shipping fish through other routes, and if so, in what form and quantity, and whether the harvest of subsistence resources is likely or has been reported by this traveler or any other person through any other channels (to avoid double counting). Another area of interest is to determine the number of times this person has engaged in fish harvest in the Kuskokwim Delta this year, the total number of trips planned for this year, and a probing question on how their use level is different from previous years and if it is different, why it is different.

The pilot test period will be determined and prescribed from observation, interviews and other considerations, but will likely occur from approximately June 1 to September 1 of 2014, with some limited intense data collection in order to demonstrate usefulness of data and methods of illustration of findings. Data will be recorded through a short survey form that will be completed by the visitor but monitored by the data collection specialists. Data will be coded into a spreadsheet form and sent electronically for appending to existing data and continuous monitoring of quantity and quality of data received. All data will remain the property of Association of Village Council Presidents and Kuskokwim Native Association, but shared among cooperators for analysis and reporting.

Partnerships/Capacity Building: This project will be conducted with input from the Alaska Department of Fish and Game, U.S. Fish and Wildlife Service, Yukon Delta National Wildlife Refuge staff, U.S. Fish and Wildlife Service Alaska Regional social scientist; and the Kuskokwim River Salmon Management Working Group, regional advisory councils, regional Tribal organizations including the Association of Village Council Presidents and Kuskokwim Native Association and the Tribal councils and communities of Bethel and Aniak. Staff in the Natural Resources Department of the Association of Village Council Presidents in Bethel, and Kuskokwim Native Association Fisheries Program staff in Aniak are local cooperators within the survey communities.

Capacity building in local communities and tribal organizations is one of the primary objectives of this study. Project development, survey design methods, implementation, and presentation of results will be coordinated with the above recognized stakeholders as well as other stakeholder identified groups. Partnerships will be built through each Tribal council office and advisory group, and research plans will be developed in coordination with each local community. We intend to train and employ local hires to conduct airport surveys and code data. It will be important to identify bilingual local hires. Before beginning the project, we will formally consult with the Orutsararmiut Tribal Council and will inform the public at a Bethel City Council meeting, which is aired over the radio. Similarly, before beginning the project we will formally consult with the Aniak Traditional Council and City Council. Full reports back to the community will also be part of the reporting process.

14-352 - Kuskokwim Area Salmon Post Season Subsistence Harvest Surveys

Project Number: 14-352 (continuation of FRMP #10-352)
Title: Kuskokwim Area Salmon Post Season Subsistence Harvest Surveys
Geographic Area: Kuskokwim Region
Data Type: Harvest Monitoring, Stock Status/Trends
Principle Investigator: Christopher A. Sheldon, Alaska Department of Fish and Game, Commercial Fisheries Division (ADF&G CF).
Co-Investigators: Greg Roczicka, Natural Resources Department, Orutsararmiut Native Council (ONC).
 Hamachan Hamazaki, Alaska Department of Fish and Game
 Daniel Gillikin, Kuskokwim Native Association (KNA)

Project Cost:

2014	2015	2016	2017
\$167,082	\$174,761	\$182,829	\$191,294

Total: \$715,966

Issue Addressed: This project provides managers with critical information for effective stewardship of subsistence salmon resources in the Kuskokwim Area and associated federal conservation units. Data provided by this project are the basis for the development of Amounts reasonably Necessary for Subsistence (ANS) for salmon, and for assessing whether these needs have been met. In early 2013, the Alaska Board of Fisheries reviewed Kuskokwim Area salmon ANS, and results from this project and an associated salmon subsistence harvest reconstruction (Hamazaki 2011) were the basis for that discussion and the resulting updates to ANS regulation (Ikuta 2012). This project directly addresses and is explicitly identified as a priority project to achieve the goals established by the Kuskokwim Fisheries Resource Coalition in the 2006 *Gap Analysis for Kuskokwim Area Salmon Research Plan*, Goals 3.13, 3.17, 4.2, and 4.4.

Beyond serving as a measure for ANS, data collected during this survey contributes a vital input to fisheries managers for Kuskokwim Area salmon stocks. Quantifying subsistence harvest has been an essential data element of recent salmon reconstructions, run reconstructions, and stock assessment (Hamazaki 2011, Bue et al 2012, AYK SSI Project No. 45565 and 45920; Gap Analysis Goal 3.12), this project allows for the development of productivity models of salmon species that are then used in every aspect of salmon resource management, including preseason forecasting, inseason management, post-season assessment, and the definition of escapement goals. Recent assessments by Schaberg et al. (2012) and Bue et al. (2012), which data from this project laid the foundation for investigating new ways in which salmon forecasts and inseason projections are accomplished, and in which forecasting tools and escapement goals have been established (Elison et al. 2012). Therefore, this project addresses the Gap Analysis priority goals 3.1, 3.2, 3.5, 3.6, 3.10, and 3.11.

Objectives:

1. Conduct Subsistence Salmon Harvest surveys for the purpose of estimating the number of Chinook, chum, sockeye, coho, and pink salmon harvested for subsistence uses by residents of Bethel.

2. Conduct Subsistence Salmon Harvest surveys for the purpose of estimating the number of Chinook, chum, sockeye, coho, and pink salmon harvested for subsistence uses by residents of Aniak.
3. Conduct Subsistence Salmon Harvest surveys for the purpose of estimating the number of Chinook, chum, sockeye, coho, and pink salmon harvested for subsistence uses by residents of up to 26 Kuskokwim Area communities including communities on south Kuskokwim Bay.
4. Estimate subsistence salmon harvest by community.
5. Estimate total subsistence salmon harvests in the Kuskokwim Area.

Methods:

Project Area: The project area will be defined in three distinct segments: 1) the community of Bethel, 2) the community of Aniak, and 3) the remaining communities of the Kuskokwim Area, including the three villages of south Kuskokwim Bay (Quinhagak, Goodnews, and Platinum), one village on the north Kuskokwim Bay (Kongiganak), and all other communities within the Kuskokwim River drainage (Figure 1).

Project Design: Stratified Random Survey Methodology: The Division of Commercial Fisheries will maintain current harvest estimation methodology for 26 communities. The survey design in each community will be either census (100% survey) or stratified sampling survey, depending on community size. In this stratified random survey method, households will be stratified by five user-types: “High Harvester,” “Medium Harvester,” “Low Harvester,” “usually do not fish,” and “unknown.” From each stratum, survey households will be selected randomly in the following percentages: Heavy Harvester—100%; Medium Harvester—100%; Light Harvester—30%; usually do not fish—30%; unknown—100%. When the number of households in each stratum is less than 5 households, all households in the stratum will be surveyed. Likewise, when the total number of households in a community is less than or equal to 40, all households in the community will be surveyed and the survey method will become a census (100% surveyed). Prior to survey season, each household will be re-classified based on past 3 years of harvests, and survey sampling households will be randomly selected. Household survey in Bethel is based on simple random survey of 50%, and that in Aniak is 100% census. Harvest calendars will be mailed to users and will assist by serving as a record of catch and providing additional information on harvest timing.

Data Analysis: Expanded Community Harvest: Subsistence salmon harvest reported by sampled households will be expanded to estimate community harvest for each species using a stratified random sampling expansion technique (Hamazaki 2011). The stratified expansion procedure will be performed for a community only if a sufficient number of households were sampled. The criteria for whether or not to do an expansion for large communities (greater than 30 households) requires a sample size of at least 10 respondent households. In instances when the minimum sample requirements are not met, statistical expansion will not be performed. Instead, community-based harvest will be estimated using Bayesian methods (Hamazaki 2011).

Partnership and Capacity Building: Two important partnerships are supported by this project. ADF&G and ONC will conduct the Bethel community survey; and ADF&G and KNA will conduct the Aniak community survey. Both relationships represent close collaboration on the Partnership Level. ADF&G will provide thorough training and frequent follow-up to track progress and effectiveness, providing guidance throughout the process. ONC and KNA will each oversee surveyor work directly, frequently participating in surveys to observe surveyor effectiveness and provide feedback on approach. Each pair of partners will collaborate frequently on the Partnership Level on project planning, inseason project support, staff selection, staff

performance and scheduling, data interpretation, and in discussion of fishery management implications.

These mutually dependent partnerships have created a level of dialogue, feedback, and synergy that benefits each organization, and the public. Formal and informal discussions that have arisen through the interaction between the three agencies and between agencies and associated communities; and these discussions have created a level of public awareness about salmon management and subsistence harvest that did not previously exist.

Results of this project will be made available to researchers and the public. ONC, KNA and ADF&G will communicate this information to the public through venues such as the annual community meetings, Federal RAC meetings, Kuskokwim River Salmon Management Working Group meetings, and newspaper and radio news segments, among others.

This project will continue to strengthen the capacity of the Orutsarmiut Native Council and the Kuskokwim Native Association to carry out subsistence fisheries harvest assessment projects in the region. Subsistence fishing households throughout the Kuskokwim River drainage will have an opportunity to share personal observations about the subsistence salmon fishery. Households will have an opportunity to identify qualitative aspects the subsistence salmon fishing season.

14-353 - Kuskokwim River Salmon Inseason Subsistence Survey

Project Number: 14-353
Title: Kuskokwim River Salmon Inseason Subsistence survey
Geographic Area: Kuskokwim Region
Data Type: Harvest Monitoring (HM), Traditional Ecological Knowledge (TEK)
Principle Investigator: Christopher A. Sheldon, Alaska Department of Fish and Game, Commercial Fisheries Division (ADF&G CF).
Co-Investigators: Greg Roczicka, Natural Resources Department, Orutsararmiut Native Council

Project Cost:

2014	2015	2016	2017
\$33,929	\$35,387	\$36,918	\$38,525

Total: \$144,759

Issue Addressed: Inseason interviews of subsistence fishers have been conducted in the Bethel area since 2001. Information from the interviews, in combination with other fisheries information, is used to assess subsistence salmon harvest timing, relative fishing success, and whether subsistence harvesters have adequate opportunity to meet their needs. Together, this information assists fishery managers in making decisions to achieve salmon escapement goals, to provide subsistence fishers opportunity for subsistence harvest, and to provide opportunity for other resources users if adequate surpluses exist. This program provides timely insight into these factors as they are occurring. Other assessments of subsistence activity are conducted in the area post-season and provide the means to estimate total subsistence salmon harvest; however, the inseason survey provides managers with insights at the crucial time in which subsistence is occurring. This project is identified in the 2006 Gap Analysis for Kuskokwim Area Salmon Research Plan produced by the Kuskokwim Fisheries Resource Coalition as an important input for its value in helping managers assess whether management actions 1) are/will be effective for providing opportunity for fishers to meet their needs as measured by Amounts Reasonably necessary for Subsistence (ANS; Gap Analysis Goal 3.17); and 2) are effective for achieving escapement goals (Gap Analysis Goal 3.13).

Comparisons of inseason interview responses can be made among weeks, within a year, and between years to help identify differences in salmon harvest timing and catchability, and gain insight into the fishery (gear usage, timing of subsistence activity, and effectiveness of harvesters). Summaries of interview responses will be presented to the Kuskokwim River Salmon Management Working Group, (Working Group) once per week during the study period. Fishery managers and the Working Group will use these summaries in the decision-making process for the Kuskokwim River subsistence salmon fishery.

Objectives: During May, June, and July use summaries of interviews from the inseason survey to:

1. Describe salmon harvest timing as observed through subsistence fishing activity in the Bethel area;
2. Describe subsistence users' assessment of whether they are meeting their subsistence salmon needs;
3. Describe subsistence users' assessment of whether adequate opportunity has been

- provided for meeting subsistence salmon fishing needs;
4. Describe subsistence fishing activity and gear usage through weekly interviews with Bethel Area subsistence salmon fishers in May, June, and July.
 5. Provide local input into the management process for the salmon subsistence fishery through the presentation of weekly summaries of interviews with Bethel Area subsistence salmon fishers at Working Group meetings inseason.

Methods:

Project Area: The project will be conducted within the Bethel area, which includes areas of Gweek River, Church Slough, Steamboat Slough, Straight Slough, Old Bethel Airport, Oscarville Slough, Napaskiak Slough, the main Kuskokwim River and Bethel.

Project Design: The Kuskokwim River salmon inseason subsistence survey project relies on voluntary participation of local subsistence fishers. Participants are allowed to remain anonymous and most have participated since 2001 when the project began. Most are life-long residents of the Kuskokwim Area and represent the most experienced and knowledgeable fishers in the Bethel area. Nearly all participants are interviewed at seasonal fishing locations (fish camps) that have been maintained across generations. Most participants are of Alaska Native descent with a long tradition of practicing subsistence as a way of life. Fish camp locations were generally established by the ancestors of today's participants based on access to a consistent supply of salmon. Generally, the subsistence fisher responsible for the majority of the subsistence salmon harvest will be interviewed at each fish camp. This fisher generally represents a larger group of people participating in the harvest, processing and preserving of subsistence caught salmon. Time in the fishery by those interviewed ranges from 10 to 50 years each. Fishers interviewed represent a cumulative contribution of up to 1,000 years of fishing experience and observation (40 interviews with 25 years average experience) in any given weekly period. The technicians employed by ONC to conduct the surveys have multiple years of experience both fishing and conducting surveys in the Kuskokwim River.

Data Collection and Reduction: Each year, the ONC project investigator will hire and train one fisheries technician in consultation with ADF&G project investigators to begin field season preparations in late May, and conduct subsistence survey interviews the first week of June. This technician will work in partnership with the ONC technician hired by ONC for FRMP 12-302. The list of interviewees from the previous year, and developed since 2001, will form the initial list for 2014. Fifty-one subsistence fishing families were identified at fish camps within the project area. The goal will be to interview these 51 families supplemented with opportunistic encounters with fishers, e.g. at the Bethel boat ramp, during which additional families wishing to participate will be added. Based on the success in past years the same member of a fish camp is interviewed each week. The Technician¹ will travel by boat to outlying fish camps and contact Bethel fishers by phone at home. The technician will conduct interviews beginning Thursday of every subsistence-fishing-week through July 15th with subsistence fishers in Bethel² and vicinity fish camps. The interviewer will ask questions and complete a two page survey instrument (Appendix A). Interview responses will be summarized across each weekly fishing period. Summaries will be provided to ADF&G for distribution to FWS, RAC members, Working Group members, and the public at Working Group meetings (Appendix B).

¹ This project technician will not travel in a boat alone but will be accompanied by the technician from OSM project FRMP 12-302 and will coordinate and share duties.

² The Bethel vicinity is defined as those waters of the main stem Kuskokwim between Napaskiak and the lower end of Kuskokuak Slough, including Church Slough.

Data Analysis: The summaries of answers to survey questions will be compared within years (between weeks); and between years (same weeks) to provide perspectives on salmon run timing, subsistence harvest success, the provision of subsistence opportunity, gear type usage and method of fishing (drift, set, hook/line). The value of this qualitative study is not strictly in the compilation of specific metrics, but in the overall perspective provided to managers regarding the factors listed above. Managers rely heavily on user input during the season to help them interpret inseason data related to fish abundance and behavior, to assess whether management objectives are being achieved, and for suggestions of alternate means by which objectives could be achieved.

Partnership & Capacity Building: The project provides a local tribal organization the opportunity to have input into the fishery management process. Data is collected by Orutsararmiut-hired technicians. The data is then collated, summarized, and disseminated to fisheries managers, members of the Kuskokwim River Salmon Working Group, and other stakeholders often several times a week by Orutsararmiut staff. The Orutsararmiut co-investigator draft performance reports, annual reports, and coauthor the final report.

14-354 - Support for Cooperative Management of the Kuskokwim River Subsistence Salmon Fishery

Project Number: 14-354
Title: Support for Cooperative Management of the Kuskokwim River Subsistence Salmon Fishery
Geographic Area: Kuskokwim Region
Data Type: Stock Status Trends (SST), Harvest Monitoring (HM), Traditional Ecological Knowledge (Tek)
Principle Investigator: Christopher A. Sheldon, Alaska Department of Fish and Game, Commercial Fisheries Division (ADF&G CF).

Project Cost:

2014	2015	2016	2017
\$62,991	\$64,670	\$66,435	\$68,285

Total: \$262,381

Issue Addressed: This project supports the proceedings of the Kuskokwim River Salmon Management Working Group (Working Group) and directly affects subsistence salmon fisheries that occur within the waters of the Yukon Delta National Wildlife Refuge conservation unit. The Working Group is a forum by which Alaska Department of Fish and Game (ADF&G), U.S. Fish and Wildlife Service (USFWS), and area salmon resource users representing subsistence, commercial, sport fishing interests, and federal advisory councils meet to discuss, collaborate and co-manage salmon resources in the Kuskokwim River drainage. The Working Group serves as a preseason, in-season, and post-season public forum for Federal and State fisheries managers to meet with local users of the salmon resource and review run assessment information (SST) and user input (HM, TEK), and to reach a consensus on how to proceed with management of Kuskokwim River salmon fisheries, especially as it affects subsistence fishing. Federal managers are mandated with ensuring a subsistence priority for rural residents on federal public lands and applicable waters and state managers are bound by regulation to manage for subsistence needs above other uses. Working Group members are elected from communities and fishing interests throughout the region to represent a broad cross-section of users in discussions related to salmon fishing and conservation. Support for the Working Group process has been identified in the 2006 *Gap Analysis for Kuskokwim Area Salmon Research Plan* produced by the Kuskokwim Fisheries Resource Coalition, under Goals 3.13 and 3.17 pertaining to its contribution to the ability of managers to take inseason action to meet salmon escapement goals and to facilitate the achievement of subsistence goals as measured by Amounts reasonably Necessary for Subsistence (ANS).

Objectives:

1. Provide inseason run assessment information to all parties participating in cooperative management of the Kuskokwim River subsistence salmon fishery.
2. Facilitate meetings through dedicated staff support in meeting preparation, conduct, and follow-up.
3. Report the discussion and decisions made during the cooperative management process.

Methods: The Working Group process is governed by the By-Laws of the Kuskokwim River Salmon Management Working Group (see Appendix A in Whitmore and Martz 2005). The By-Laws define the Working Group process, purpose, rules of conduct, representation, and officers.

The Working Group typically first meets in March or April each calendar year; has intensive and frequent meetings during June, July, and August; and has a wrap-up session in September or October. Meetings are generally conducted by teleconference with efforts made to conduct one meeting per year where all members are able to attend in person. Working Group member representatives, through funding provided by USFWS Office of Subsistence Management (OSM) in support of project FIS 06-307 (Ward and Horn 2003 and Whitmore and Martz 2005), and FRMP 10-352 (author's note) have had the opportunity to testify at Alaska BOF and Federal Subsistence Board (FSB) meetings, and participate in Kuskokwim Area Interagency and other associated meetings as Working Group representatives.

Working Group meetings (inseason) are conducted according to 'Roberts Rules of Order' following a standard agenda that provides for a full and complete discussion of area and related salmon fisheries (Appendix A). Working Group motions are passed by consensus and ADF&G has no voting status on management related motions. The Working Group makes recommendations to ADF&G and USFWS concerning Kuskokwim River salmon fishery management decisions after subsistence and commercial catch, test fishery, weir, and sonar reports and other information is provided to the group. Final fishery management decisions are the responsibility of the ADF&G through emergency order authority and USFWS through Federal Special Actions. In addition, the Working Group passes resolutions in order to represent their consensus opinion on a wider stage, and appoints representatives to attend BOF, FSB, Fish and Game Advisory Committee meetings, RAC meetings, and other public meetings dealing with relevant salmon issues.

Project Area: Meetings of the Kuskokwim River Salmon Management Working Group will primarily be held in the ADF&G office in Bethel. Meetings will be teleconferenced. Working Group membership spans the entire Kuskokwim drainage and therefore the project encompasses that entire area. Extensive use of internet, fax, and telephone will be made in an effort to keep Working Group members informed and engaged, and to provide access for the public and various state, federal, and native, and nongovernment organizations.

Project Design: The project will take the form of multiple meetings held throughout the fishing season at the call of the Working Group chair. Typically, meetings will occur on a weekly basis during the fishing season to discuss run indices and potential management actions. At least once per year, a large meeting of the Working Group will be scheduled for the purpose of either planning for a coming fishing season, or recapping the events of a season just passed. Larger meetings may be held in Anchorage or in Bethel depending on the needs of the Working Group and resources available.

Data Collection and reduction: Two types of products will be prepared routinely for each Working Group meeting: a pre-meeting informational packet and a post meeting summary. Informational packets will be composed of run index information developed from test fishery and escapement projects and reports of fishing activity from partner organizations. Additional documentation, such as presentation materials and agency memos will be included at the request of Working Group members. Summaries will contain detailed synopses of meeting proceedings, including context to run index information, commentary from the public and members, details about pending or recommended management actions, and discussion notes regarding motions made. Meeting materials will be archived and printed in a formal ADF&G report format.

Partnerships and Capacity Building: Local organizations that are involved with the Working Group process include area village governments, ONC, Association of Village Council Presidents, Kwethluk IRA Council, KNA, and the Native Village of McGrath.

The Working Group process has received considerable attention as a model for Cooperative resource Management. Local subsistence users, RAC members, and local fisheries representatives are given the opportunity to examine and discuss fisheries data as they are being collected and develop recommendations, which managers consider carefully. Managers and stakeholders consider the Working Group process essential to the management and conservation of Kuskokwim salmon resources.

14-355 - Natural Indicators of Chinook Salmon in the North Kuskokwim Bay and Bering Sea Coast: Run timing and abundance

Project Number: 14-355
Title: Natural Indicators of Chinook Salmon in the North Kuskokwim Bay and Bering Sea Coast: Run timing and abundance
Geographic Region: Kuskokwim
Data Type: Harvest Monitoring/Traditional Ecological Knowledge
Principal Investigator: Casie Stockdale, Department of Natural Resources, Association of Village Council Presidents
Co-Investigator: Hiroko Ikuta, Ph.D., Division of Subsistence, Alaska Department of Fish and Game

Project Cost:

2014	2015	2016	2017
\$189,310	\$165,974	\$143,686	\$0

Total: \$498,970

Issue: This research proposes to collect traditional ecological knowledge and contemporary harvest figures to address local concerns about Chinook salmon in the Kuskokwim coastal region, including the impact on subsistence harvesting in light of decreasing Chinook salmon stock and other environmental factors. While recent research conducted by the Alaska Department of Fish and Game, entitled the Kuskokwim Salmon Ethnography, provides a rich ethnographic description for the salmon fishing in the Kuskokwim River drainage, it does not include any attention to the coastal communities. Earlier research suggests that salmon play an important role in the subsistence economies of the area, but there is little contemporary information, qualitative or quantitative, that describes the salmon fisheries of the region or the changes residents have experienced over the last several decades. Additionally, a recent study of local traditional knowledge of salmon in Yukon River communities demonstrated the importance that residents place on using a variety of indicators to determine the timing, abundance, and distribution of salmon runs for the Yukon River drainage. Given the problem of Chinook salmon populations in the nearby Kuskokwim drainage and the likelihood of having continued low Chinook population numbers and continued closures through subsistence fishing seasons, fishery managers would benefit from a more robust understanding of how residents know when Chinook will appear in abundance, how this influences fishing effort, and how these types of knowledge and practices have changed within the context of ongoing climate change.

Objectives:

1. Document local knowledge related to traditional and contemporary patterns of subsistence salmon harvest including:
 - Species utilized and local names used with introductory taxonomic analysis.
 - Fish ecology, including information about habitat, spawning and seasonal movements
 - Contemporary and traditional methods and timing of harvest.
 - Contemporary and traditional methods of preparation and preservation.
 - Spatial mapping of harvest areas and other significant habitats by species and season.
 - Traditional management practices and efforts on fish populations.
 - Salmon-related place names.
 - Local observation of climate change and its impact on salmon fisheries.
 - Concerns about salmon management.
2. Promote capacity building in local communities, tribal organizations, and non-profit organizations.
 - Consult with local Tribal councils in developing the research plan, designing interview questions, and collecting, reviewing, and analyzing data.
 - Collaborate with the Bering Sea Elders Group in holding a meeting of the elders to share their background, knowledge, and help answer interview questions regarding Chinook salmon fishing and to discuss management implications and applications of this research.
 - Train local tribal entities in the use and applications of research results and maps.
 - Produce a technical report of results and a short book, accessible to and readable by the general public, in Yup'ik and English showing photos and stories of Chinook salmon fishing gathered during project fieldwork. Tribal councils and study participants will review products before publication. Both publications will be available to all partnering organizations and tribal councils involved.

Methods: This study will take place in the communities of the north Kuskokwim Bay and Bering Sea coast: Kwigillingok, Kongiganak, Kipnuk, and Toksook Bay. The ethnographic research for this project will include group gatherings with elders, semi-structured interviews, and participant observation. 1) A group gatherings with elders will start the project will start with an initial group gathering with the Bering Sea Elders Group in September 2014. Group members, particularly from the Nelson Island and Kuskokwim Bay region, are familiar and comfortable sharing knowledge and information in group gatherings through work with Ann Fienup-Riordan and Calista Elders Council. This technique can encourage a dynamic exchange among respondents that elicits a richer social memory than individual interviews alone. 2) Semi-structured interview protocols provide a format for systematically documenting comparable information about the same or an overlapping set of topics while providing flexibility for each key respondent's level of expertise, experience, and focus. 3) Participant observation fundamentally involves spending time with people in a way that allows the research to build rapport and trust and gain the ability to record observations about their lives from an insider's perspective.

Partnerships/Capacity Building: This project will help the Alaska Department of Fish and Game, Division of Subsistence, build relations with the four north Kuskokwim Bay and Bering Sea Coast communities. By partnering with respected organizations the division will be able to begin research in these communities and build contacts for potential future requests for survey research. Building relationships to support potential future research in these villages will allow

for more accurate data to be used in determining Amount reasonably Necessary for Subsistence in the region.

This project will also help the Association of Village Council Presidents to continue research in these communities. Already having relations in Toksook Bay and Kipnuk, the Association needs to begin harvest research and build relations, especially in Kwigillingok and Kongiganak, a crucial area near the mouth of the Kuskokwim River for understanding Kuskokwim drainage stocks.

The Bering Sea Elders Group and local tribal governments will benefit from this project by convening a meeting to discuss and document knowledge on a culturally precious resource, Chinook salmon. The group will also meet multiple goals for their 2012-2016 strategic planning of improving communication between the group and tribal councils, documenting elder knowledge on climate change, and collaborating with government experts and resource managers in documenting and furthering ways to implement local traditional knowledge in natural resource management. The group will also be able to collaborate with researchers on documenting local traditional knowledge in a form that can be saved and passed down for future generations.

14-356 - Local and Traditional Knowledge of Whitefish and Other Non-salmon Fishes in Lower River Villages and Tundra Villages of the Kuskokwim Drainage

Project Number: 14-356
Title: Local and Traditional Knowledge of Whitefish and Other Non-salmon Fishes in Lower River Villages and Tundra Villages of the Kuskokwim Drainage
Geographic Region: Kuskokwim Region
Information Type: Harvest Monitoring/Traditional Ecological Knowledge
Investigators: Casie Stockdale, Department of Natural Resources, Association of Village Council Presidents, Bethel, Alaska
Co-Investigators: Marie Meade, University of Alaska, Anchorage
Ann Fienup-Riordan, Anchorage

Project Cost:

2014	2015	2016	2017
\$127,872	\$124,446	\$115,505	\$29,504

Total: \$397,327

Issue Addressed: The project addresses a priority information need in the 2014 Notice of Funding: “Local knowledge of whitefish species to supplement information from previous research” and “Harvest and associated contextual information for whitefish species in the lower Kuskokwim drainage communities.” Local and traditional knowledge of fish other than salmon, and the social and cultural important of non-salmon fish species, will be collected in a series of topic-specific gatherings. The study communities include the three tundra villages of Nunapitchuk, Atmauthluak, and Kasigluk and three lower Kuskokwim communities that are situated in proximity to the Johnson River, Napakiak, Napaskiak, and Oscarville. This project will build upon existing whitefish research, in particular, Ray et al. (2010). It will be coordinated with proposed, current, and recent whitefish research in other regions and other areas of the Kuskokwim drainage. This project will contribute to recent research aimed at filling identified data gaps according to the Whitefish Strategic Plan by Brown et al. (2011).

Objectives:

1. Document local knowledge of historic and contemporary uses of fish other than salmon in Nunapitchuk, Atmauthluak, Kasigluk, Napakiak, Napaskiak, and Oscarville.
2. Promote capacity building in local communities and tribal organizations through: partnering in research, involving youth and elders in cultural and traditional knowledge documentation, and employing a Yup’ik studies student as an interpreter/translator in training.

Methods: A series four topic-specific gatherings according to methods described by Fienup-Riordan and Rearden (2012) will be conducting including an initial gathering in Bethel, two sub-regional gatherings, and a final product review gathering in Bethel. Topic-specific gatherings will be conducted in Yup’ik and English, facilitated by Yup’ik interpreter/translator Marie Meade to allow for more in-depth description and understanding of local knowledge. Gatherings will include at least one elder and one current fisher from each community, making sure to include both men and women to incorporate specialized areas of knowledge. Youth will be encouraged to participate in the gatherings to facilitate transmission of this knowledge from elders to youth as well as to familiarize youth with subsistence research. The Association of Village Council

Presidents and tribes will gain experience building partnerships in research with assistance from Yup'ik interpreter/translator and instructor Marie Meade and anthropologist Ann Fienup-Riordan.

Partnerships and Capacity Building: This project will build on past research conducted in the region by the Calista Elders Council, the Association of Village Council Presidents, and other organizations. It is timely as it can be coordinated with recently initiated Calista Elders Council research documenting the Yup'ik view of human interactions with other animals and traditional rules and management. The project will be coordinated with other sub-regional whitefish studies being conducted by organizations, such as, the Alaska Department of Fish and Game, U.S. Fish and Wildlife Service, and Kuskokwim Native Association. Casie Stockdale and Marie Meade will develop research plans in coordination with each community. Opportunities for youth to participate in topic-specific gatherings will be developed. Additionally, students in the University of Alaska Fairbanks, Kuskokwim Campus, Yup'ik studies program will be offered a role in the research. An intern position will be filled by a student of Yup'ik studies to gain experience interpreting, translating, and transcribing the Yup'ik language. Yup'ik place names will be documented and contributed to the Yup'ik Environmental Knowledge Project, which is a collaboration with the Exchange of Local Observations and Knowledge in the Arctic. This will build capacity in the existing Department of Natural Resources at the Association of Village Council Presidents to continue research documenting place names. Tribal councils will be asked to help in the development, data collection, and analysis stages of the study. Results of the project will be reviewed and approved by participating communities. A gathering in Bethel will be organized for the participants to review the final results. A bi-lingual ethnographic book will be written that describes local knowledge related to historic and contemporary uses of whitefish and other non-salmon fishes in Nunapitchuk, Atmauthluak, Kasigluk, Napakiak, Napaskiak, and Oscarville.

SOUTHWEST ALASKA OVERVIEW

Issues and Information Needs

The 2014 Notice of Funding Opportunity for the Southwest Alaska Region identified two priority information needs:

- Obtain reliable estimates of Chinook salmon escapements (for example, projects using weir, sonar, mark-recapture methods).
- Description and analysis of social network(s) underlying the allocation and management of subsistence salmon fisheries in villages in the Bristol Bay-Chignik Area.

Projects Funded Under the Fisheries Resource Monitoring Program

Since the inception of the Monitoring Program in 2000, 50 projects have been funded in the Southwest Region, and two will still be operating during 2014 (**Tables 1 and 2**). The ongoing projects address salmon harvests in the Aleutians Islands and Lake Clark climate change trends.

2014 Investigation Plans

Four investigation plans for research in the Southwest Alaska Region were submitted to the Office of Subsistence Management in response to the 2014 Notice of Funding Opportunity. The Technical Review Committee reviewed the investigation plans and recommended two 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 review and evaluation, the Technical Review Committee, Regional Advisory Councils, Interagency Staff Committee and Federal Subsistence Board have the opportunity to address the highest priority projects across regions. For 2014, approximately \$555,000 would be available for funding new projects in the Southwest 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 four investigation plans, the Technical Review Committee recommended funding the two following proposed projects (**Table 5**):

14-401 Buskin River Sockeye Salmon Stock Assessment and Monitoring	\$ 108,044
14-402 Afognak Lake Sockeye Salmon Stock Monitoring	\$ 77,153
Total	\$ 185,197

The two 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.

Summaries of Projects submitted for Funding

Each project submitted for funding in the Southwestern Alaska Region in 2014 is summarized below (see Executive Summaries for more details on all projects).

Summaries of Projects Recommended for Funding by the Technical Review Committee

14-401 Buskin River Sockeye Salmon Stock Assessment and Monitoring. This four-year project would continue to provide estimates of sockeye salmon spawning escapement into the Buskin river system through operation of two weirs, and obtain information on residency and traditional fishing sites from subsistence fishery participants. The sockeye salmon run to Buskin River supports what is usually the largest subsistence fishery in terms of both harvest and permits issued in the Kodiak Management Area. This project is essentially a continuation, with slight modification, of work funded through the Fisheries Resource Monitoring Program since 2000. This project would address a priority information need identified in the 2014 Notice of Funding Opportunity.

14-402 Afognak Lake Sockeye Salmon Stock Monitoring. This four-year project would continue the current sockeye salmon smolt enumeration and limnology data collection project at Afognak Lake. Continuation of this project, combined with the sockeye salmon adult enumeration project funded through the Alaska Sustainable Salmon Fund (AKSSF), will enable researchers to better identify factors affecting sockeye salmon production, and consequently, the availability of this subsistence resource for harvest opportunities, relative to current climatic conditions. This project will also help identify how past management actions have affected sockeye salmon production vital to the Afognak Bay subsistence fishery, providing management biologists a frame of reference to better assess current conditions and future actions. This project would address a priority information need identified in the 2014 Notice of Funding Opportunity.

Summaries of Projects Not Recommended for Funding by the Technical Review Committee

14-451 Bristol Bay Subsistence Salmon Network Analysis. This three-year project would investigate both the social networks of shared subsistence salmon resources in selected Bristol Bay communities, and how such networks could be understood within the Federal subsistence management system. While this project would partially address a priority information need identified in the 2014 Notice of Funding Opportunity, it is not recommended for funding. The Technical Review Committee recommended that the investigators submit a new proposal during the next funding cycle (2016), but with fewer investigators, which will cut down on the cost of travel and salaries, reducing the overall budget. The investigators are also encouraged to redesign their proposal so that those investigators with training in anthropological research methods and application will be responsible for the research, analysis, and the final report.

14-452 Western Gulf of Alaska Subsistence Harvest and Social Networks. This proposed study does have a strong link to federal public lands and is focused on subsistence uses of salmon and other subsistence foods in three national wildlife refuges. This proposed work has potential to help close numerous data gaps in the region. Information and insights from this proposed study would situate salmon in a larger subsistence context and provide data on salmon availability and importance in relation to other subsistence foods. While this project has potential to integrate past studies and provide a comprehensive subsistence and socioeconomic analysis of the Aleutian and Alaska Peninsula areas, it is not recommended for funding at this time. Not all members of the

Technical Review Committee provided an assessment of 14-452. A majority of the technical reviewers who did provide an assessment of this proposal do not feel justified funding this study because they feel that the investigation plan failed to provide clear and direct implications for subsistence management in southwestern Alaska. In addition, the proposed study does not address social network analysis in the Bristol Bay/Chignik Area, which was a priority information need for the Southwest Alaska Region. The reviewers highly encourage the Principal Investigator to revise this investigation plan and resubmit for consideration during the next funding cycle. The revision would require collaboration with the affected federal refuge managers and social scientists at the Alaska Department of Fish and Game, Subsistence Division.

Table 1. Summary of Fisheries Resource Monitoring Program projects completed in Southwest Alaska since 2000. Abbreviations used for investigators are: ADFG=Alaska Department of Fish and Game, APIA= Aleutian-Pribilof Islands Association, BBNA=Bristol Bay Native Association, ISU= Idaho State University, KANA=Kodiak Area Native Association, NTC= Nondalton Tribal Council, NPS=National Park Service, QT=Qawalangin Tribe, USFWS=U.S. Fish and Wildlife Service, USGS=U.S. Geological Survey, USS&E=US Science and Education, and UW=University of Washington.

Project Number	Project Title	Investigators
<i>Bristol Bay Salmon</i>		
00-010	Togiak River Salmon Weir	USFWS
00-031	Alagnak River Sockeye Salmon Escapement	ADFG, NPS, BBNA
00-033	Alagnak River Angler Effort Index	ADFG
00-042	Lake Clark Sockeye Salmon Assessment	USGS
01-047	Togiak River Subsistence Harvest Monitoring	BBNA, ADFG, USFWS
01-075	Nondalton Sockeye Salmon and Freshwater Fish TEK	NPS, NTC
01-095	Lake Clark Sockeye Salmon Escapement	USGS, UW
01-109	Traditional Ecological Knowledge of AkPeninsula/Becharolf NWR	ADFG, BBNA
01-173	Alagnak River Harvest Salmon Assessment of Recreational Fishery	ADFG
01-204	Ugashik Lakes Coho Salmon Escapement Estimation	USFWS, ADFG, BBNA
03-046	Fisheries Biotechnician Training Program	NPS
04-411	Lake Clark Sockeye Salmon Run Timing ^a	ADFG
04-454	Bristol Bay Sharing, Bartering, and Trade of Subsistence Resources	ADFG, BBNA
05-402	Lake Clark Sockeye Salmon Escapement	NPS, USGS
08-402	Togiak River Chinook Salmon Radio Telemetry	USFWS, BBNA
08-405	Lake Clark Sockeye Salmon Assessment ^a	NPS, USS&E, BBNA
10-402	Togiak River Chinook Salmon Adult Assessment ^a	USFWS, BBNA, ADFG
<i>Chignik Salmon</i>		
02-098	Kametalook River Coho Salmon Escapement & Carrying Capacity	USFWS, BBNA
02-099	Clark River Estimation of Sockeye and Coho Salmon Escapement	USFWS, BBNA
03-043	Perryville Coho Salmon Escapement	USFWS
05-405	Perryville-Chignik Coho and Sockeye Salmon Aerial Surveys	USFWS
07-404	Perryville-Clark River Coho and Sockeye Salmon Aerial Surveys	USFWS
<i>Bristol Bay-Chignik Freshwater Species</i>		
00-011	Togiak River Dolly Varden Genetic Baseline Development	USFWS
00-012	Bristol Bay Traditional Knowledge of Fish	ADFG
02-034	Kvichak River Resident Species Subsistence Fisheries Assessment	ADFG, BBNA
04-401	Ungalikthlik and Negukthlik Rivers Rainbow Trout Assessment	USFWS
04-415	Tazimina Rainbow Trout Assessment	ADFG
05-403	Lake Clark Whitefish Assessment ^a	ADFG, BBNA
07-408	Togiak River Rainbow Smelt Assessment ^a	USFWS, BBNA
07-452	Kvichak Watershed Subsistence Fishing Ethnography	ADFG, BBNA, NPS

Table 1 Continued

Project Number	Project Title	Investigators
<i>Kodiak-Aleutians</i>		
00-032	Buskin River Sockeye Salmon Stock Assessment	ADFG
01-059	McLees Lake Sockeye Salmon Escapement	USFWS
01-206	Mortenson Creek Sockeye and Coho Salmon Escapement	USFWS
02-032	Lower AK Peninsula/Aleutians Subsistence Fish Harvest Assessment	ADFG, APIA, ISU
03-047	Afognak Lake Sockeye Salmon - Smolt Enumeration Feasibility	ADFG
04-402	Mortenson Creek Sockeye and Coho Salmon Escapement	USFWS
04-403	McLees Lake Sockeye Salmon Escapement	USFWS
04-412	Afognak Lake Sockeye Salmon Stock Assessment	ADFG
04-414	Buskin River Sockeye Salmon Stock Assessment	ADFG
04-457	Kodiak Subsistence Fisheries Harvest Assessment and TEK	ADFG, KANA
07-401	Afognak Lake Sockeye Salmon Smolt Assessment	ADFG
07-402	Buskin River Sockeye Salmon Weir	ADFG
07-405	McLees Lake Sockeye Salmon Weir	USFWS, ADFG, QT
10-401	Afognak Lake Sockeye Salmon Smolt and Adult Assessment ^a	ADFG
10-403	Buskin River Sockeye Salmon Adult Assessment ^a	ADFG
10-404	Buskin River Sockeye Salmon Smolt Assessment Feasibility ^a	ADFG
10-406	McLees Lake Sockeye Salmon Weir ^a	USFWS, ADFG, QT
12-453	Kodiak Salmon Fishery Changing Patterns ^a	ADFG

^a Final Report in preparation.

Table 2. Summary of ongoing 2014 projects funded under the Fisheries Resource Monitoring Program in Southwest Alaska. Abbreviations used for investigators are: ADFG=Alaska Department of Fish and Game, ISU=Idaho State University.

Project Number	Project Title	Investigators	Budget	
			2014	2015
<i>Bristol Bay Salmon</i>				
12-450	Aleutian Islands Salmon and Other Subsistence Harvests	ISU	\$100.0	
12-452	Lake Clark Whitefish Climate Change Trends	ADFG	\$53.4	
Total Southwest Alaska Monitoring Program			\$153.4	\$0.0

Table 3. Southwest Alaska project costs, by organization (Alaska Native, State, Federal, other), for investigation plans submitted to the Fisheries Resource Monitoring Program for funding consideration in 2012.

Project Number	Title	Budget (\$000s)			
		Alaska Native	State	Federal	Other
<i>Stock Status and Trends</i>					
14-401	Buskin River Sockeye Salmon Stock Assessment and Monitoring		\$108.0		
14-402	Afognak Lake Sockeye Salmon Stock Monitoring		\$77.2		
<i>Harvest Monitoring and Traditional Ecological Knowledge</i>					
14-451	Bristol Bay Subsistence Salmon Network Analysis			\$187.9	
14-452	Western Gulf of Alaska Subsistence Harvests and Social Network				\$73.7

Table 4. Southwest 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 and ISU=Idaho State University.

Project Number	Lead Organization	Title	Funding (\$000s)	
			Local	Matching
<i>Stock Status and Trends</i>				
14-401	ISU	Buskin River Sockeye Salmon Stock Assessment and Monitoring	\$8.6	\$34.0
14-402	ADFG	Afognak Lake Sockeye Salmon Stock Monitoring	\$30.8	
<i>Harvest Monitoring and Traditional Ecological Knowledge</i>				
14-451	ADFG	Bristol Bay Subsistence Salmon Network Analysis		
14-452	ISU	Western Gulf of Alaska Subsistence Harvest and Social Network		

Table 5. Southwest Alaska funding recommendations by the Technical Review Committee (TRC) for the 2014 Fisheries Resource Monitoring Program.							
Project Number	Title	TRC	Requested Budget (\$000)				
			2014	2015	2016	2017	
<i>Harvest Monitoring and Traditional Ecological Knowledge</i>							
14-401	Buskin River Sockeye Salmon Stock Assessment	Yes	\$108.0	\$111.8	\$115.5	\$149.4	
14-402	Afognak Lake Sockeye Salmon Stock Monitoring	Yes	\$77.2	\$88.5	\$91.2	\$34.9	
14-451	Bristol Bay Subsistence Salmon Network Analysis	No		\$186.9	\$135.4	\$54.9	
14-452	Western Gulf of Alaska Subsistence Harvests and Social Network	No	\$73.7	\$199.0	\$193.8	\$66.8	
Total			\$258.9	\$586.2	\$535.9	\$306.0	
Guidelines			\$555.0				
TRC Recommended			\$185.2	\$200.3	\$206.7	\$184.3	

14-401 - Buskin River Sockeye Salmon Stock Assessment and Monitoring, Kodiak, Alaska

Project Number: 14-401
Title: Buskin River sockeye salmon stock assessment and monitoring, Kodiak, Alaska
Geographic Area: Kodiak Island, Kodiak/Aleutians Region
Information Type: Stock Status and Trends (SST)
Principal Investigator(s): Donn Tracy, Alaska Department of Fish and Game (ADFG), Sport Fish Division, 211 Mission Road, Kodiak, AK 99615-6399

Project Cost

2014	2015	2016	2017
\$108,044	\$111,806	\$115,454	\$149,426

Total Cost: \$484,730

Issue: Investigators will annually enumerate escapement and sample the age composition of sockeye salmon migrating into Buskin River drainage for inseason management of subsistence and other fisheries and evaluate and refine a biological escapement goal (BEG). Investigators will also interview subsistence fishers to determine their residency demographics and historical participation in subsistence fisheries occurring within the Kodiak-Aleutians region. Lastly, genetic samples from the sockeye salmon subsistence harvest will be collected and analyzed to apportion run components comprising the total catch.

Objectives:

1. Census the sockeye salmon escapement into Buskin Lake approximately from June 1 to August 1, and Louise/Catherine lakes tributary approximately from June 1 through August 31.
2. Estimate the age composition of the sockeye salmon run (combined subsistence harvest in the Chiniak Bay section and escapement) to Buskin Lake such that the estimates are within 5 percentage points of the true value 95% of the time.
3. Estimate the age composition of the sockeye salmon run (escapement) to Louise/Catherine lakes tributary such that the estimates are within 7.5 percentage points of the true value 95% of the time.
4. Estimate proportions of the sockeye salmon subsistence harvest in the Buskin River Section of Chiniak Bay of Buskin and Louise/Catherine lakes run components through DNA analysis such that the estimates are within 7 percentage points of the true value 90% of the time in the absence of genetic error.
5. Construct a brood table to evaluate the sockeye salmon BEG.
6. Provide education and career development opportunity for federally qualified subsistence users.

Methods: Investigators will install a salmon counting weir on the Buskin River and Louise/Catherine lakes tributary to annually census the spawning escapement of sockeye salmon. Additionally, sockeye salmon will be sampled at the weirs and subsistence harvest for age, sex and length (ASL), providing estimates of the escapement and subsistence harvest by age. Also, samples for genetic stock identification collected from the subsistence harvest will be analyzed to apportion the Buskin Lake and Louise/Catherine lakes components and more accurately re-construct total returns. Analyses of the return and age data will be incorporated into a brood table and used to evaluate the BEG. Participants in the subsistence fishery will be surveyed to

determine their residency and traditional areas fished.

Products: Weir counts, total harvest (including subsistence), age, and fishery participant survey data will be reported annually by the investigators in ADF&G publications and in performance and annual progress reports to the Office of Subsistence Management (OSM). Daily weir counts during each year of the project will be posted on the ADF&G website and also made available to managers and the public in Kodiak verbally and in print. Annual reports will be delivered to the Fisheries Information Services Division (FIS) of the OSM by May 1 in 2015-2017. The final report will be delivered to the FIS by May 1, 2018.

Investigators Ability and Resources: The ADF&G has a long history of fisheries data collection and analysis and presently operates 16 salmon escapement weirs within the Kodiak Region. The investigator and support staff have approximately 30 years combined experience in fisheries research and management, including annual oversight of sockeye and coho salmon weirs on the Buskin River during the last 13 years. All department research projects undergo rigorous review by highly qualified and experienced biometric and administrative staff. All materials needed for installing and operating the Buskin River drainage salmon weirs are in possession of ADF&G in Kodiak. Additionally, ADF&G annually administers a subsistence fishing permit system that provides subsistence harvest data.

Partnerships/Capacity Building: The investigators promote local hire of federally qualified subsistence users as project technicians. During each year of funding the investigators will continue a high school student intern program established in 2003 to provide education and career development opportunities for federally qualified subsistence users. Through cooperation with the Kodiak National Wildlife Refuge (KNWR) the investigators have utilized the Buskin River weir as an educational tool for the KNWR Summer Science and Salmon Camp program.

14-402 - Afognak Lake Sockeye Salmon Stock Monitoring

Project Number: 14-402
Project Title: Afognak Lake Sockeye Salmon Stock Monitoring
Geographic Area: Southwest Region / Kodiak-Aleutians Area
Principal Investigator: Steven Thomsen, Alaska Department of Fish and Game (ADF&G), Division of Commercial Fisheries, 211 Mission Road, Kodiak, AK 99615
Co-Investigator: Heather Finkle, ADF&G, Division of Commercial Fisheries, Kodiak

Project Cost:

2013	2014	2015	2016
\$77,153	\$88,463	\$91,232	\$34,863

Total Cost: \$291,711

Issue: This proposal seeks funding to continue the current sockeye salmon *Onchorhynchus nerka* smolt enumeration and limnology data collection projects at Afognak Lake. Local subsistence users rely on the harvest of Afognak Lake sockeye salmon for subsistence. In fact, the Afognak River has historically supported one of the largest sockeye salmon subsistence fisheries for Kodiak Archipelago residents. The number of sockeye salmon returning to Afognak River has diminished substantially in recent years, resulting in closures to commercial, sport, and subsistence fishing in Afognak Bay. Commercial, subsistence, and sport fisheries targeting the Afognak River stock have steadily increased since 2008 but have yet to attain previous harvest levels. Although the most recent three years of sockeye salmon escapements are promising, the 2012 smolt outmigration estimate was the lowest since estimates began in 2003, indicating that future adult returns may be lower, potentially resulting in further closures. Continuation of the sockeye salmon smolt and limnological studies at Afognak Lake, combined with adult enumeration funded through AKSSF, will enable researchers to better identify factors affecting sockeye salmon production, and therefore, the availability of subsistence opportunities, relative to current climatic conditions. This project will also help identify how past management actions have affected sockeye salmon production vital to the Afognak Bay subsistence fishery, providing management biologists a frame of reference to better assess current conditions and future actions.

Objectives:

Smolt

1. Estimate the abundance, age composition, and average size of sockeye salmon smolt outmigrating from Afognak Lake annually from 2014 through 2016.
2. Continue to build the time-series dataset of smolt population size, age composition, and condition for comparison to available historical fisheries and limnological data.

Lake Studies and Climate Change

1. Evaluate the effects of the water chemistry, nutrient status, and plankton (phytoplankton and zooplankton) production of Afognak Lake on the smolt production and future adult returns from 2014 through 2016.
2. Re-evaluate Afognak Lake bathymetry, while collecting high resolution water quality data and juvenile salmon distribution using an Aquamapper AUV, once in 2014.
3. Assess available historical fisheries and limnological data in relation to climate change effects, upon completion of objectives 1–4.

Methods:

Objectives 1 and 2 (smolt). Two inclined-plane smolt traps will be operated in the Afognak River to capture a portion of the sockeye salmon smolt outmigration from Afognak Lake with mark-recapture techniques to estimate the total smolt outmigration. Age, weight, and length data from sockeye salmon smolt will be collected and used to estimate the age composition, average length, weight, and condition of the outmigration. Smolt data will be added to the ADF&G database and used for comparison with available historical fisheries and limnological data.

Objectives 3 and 5 (lake studies). Five limnological surveys of Afognak Lake will be conducted on a yearly basis. Data will be added to the ADF&G database and used for comparison with available historical fisheries and limnological data.

Objective 4 (lake studies). An YSI Ecomapper autonomous underwater vehicle (AUV) will be used, on one occasion in 2014, to accurately map lake bathymetry in Afognak Lake. Simultaneously, the AUV will collect high resolution water quality data and fish distribution. Objectives 2 and 5: Further modeling and assessment using recent smolt emigration data paired with bioenergetics modeling, paleolimnological data, nutrient-phytoplankton-zooplankton models, and spawner-recruit models will be used to help identify environmental factors (changing lake conditions, prey availability and climate change) and their impact on sockeye salmon rearing success. This modeling can provide a complete picture of system health and juvenile production and allow for separation of freshwater and marine effects on overall population production.

Products: The ADF&G will complete two annual Fisheries Data Series reports and one final Fisheries Data Series report presenting the results of all research activities associated with the objectives. Presentations will be made by ADF&G staff to the Kodiak Regional Advisory Council and to the Kodiak Regional Salmon Planning Team. A student presentation will be made and posted on afognak.com by Afognak Native Corporation (ANC) students participating in partnership/capacity building. Collected scale samples will be archived in the ADF&G office in Kodiak. Final edited copies of all data files will be archived electronically in a standard format by the Division of Commercial Fisheries, Research Section.

Investigators Ability and Resources: Steven Thomsen and Heather Finkle are both experienced fisheries research biologists with ADF&G in Kodiak. Together they have over 30 years experience implementing and managing multiple adult and juvenile salmonid projects and investigating lake limnology. In addition, ADF&G provides supporting staff, including supervisory oversight, publication specialists, peer review staff, supporting management and sport fish staff, biometric review, and logistical staff. The Kodiak ADF&G Commercial Fisheries Research section conducts five sockeye salmon smolt abundance projects and collects limnological data from over 20 lakes within the Kodiak Area each year. Much of the equipment and other resources needed to successfully conduct this project have been acquired previously and are available for this investigation. Lastly, the Division of Commercial Fisheries maintains a subsistence fishing permit system, which provides both state and federal managers with subsistence harvest data.

Partnership and Capacity Building: The ADF&G in collaboration with ANC and Native Village of Afognak will continue to work together in an annual educational project. The collaborative effort is designed to educate and train native student interns with fisheries management and research practices and ADF&G staff with subsistence harvesting methods and traditional ways of life.

14-451 - Description and Analysis of the Subsistence Salmon Network in Bristol Bay

Project Number: 14-451
Title: Description and analysis of the subsistence salmon network in Bristol Bay
Geographic Area: Southwest Alaska
Information Type: Harvest Monitoring (HM) and Cultural Knowledge-Traditional Ecological Knowledge (CK/TEK)
Principal Investigator(s) Davin Holen, Alaska Department of Fish and Game; Courtenay Gomez, Bristol Bay Native Association; Dr. Drew Gerkey, National Socio-Environmental Synthesis Center at the University of Maryland (current) and Department of Anthropology at Oregon State University (during project)
Co-Investigator(s): Danielle Stickman and Gayla Woods, Bristol Bay Native Association; Lisa Hutchinson-Scarborough and Theodore Krieg, Alaska Department of Fish and Game

Project Cost:				
2014	2015	2016	2017	
\$0	\$186,871	\$135,377	\$54,850	

Total: \$377,098

Issue: The 2014 Fisheries Resource Monitoring Program has identified an information need for a “description and analysis of social networks underlying the allocation and management of subsistence salmon fisheries in villages in the Bristol Bay-Chignik Area,” within the priority information needs for Southwest Alaska. This project has identified 6 key communities with different regional sharing patterns based on previous studies carried out by project researchers. The goal of this project is to provide information on how the social network “functions in the allocation and management of subsistence resources... and how such a model might be applied and utilized in Federal subsistence management.”

This project would investigate both the social network of shared subsistence salmon resources in Bristol Bay communities and also how such networks could be understood within the Federal subsistence management system. All residents of the Bristol Bay Management Area qualify for participation in Federal subsistence fisheries. Because of the number of communities in Bristol Bay and the depth of knowledge this project seeks to gather a sample of communities was chosen representing different areas of Bristol Bay where sharing networks have been identified by researchers. In addition they represent different Federal nexus within the Bristol Bay – Chignik area. These communities include Chignik Lake, Chignik Lagoon, Egegik, Nondalton, Port Heiden, and Togiak.

The Federal Subsistence Board has recognized customary and traditional uses of salmon, other finfish, and shellfish for rural residents of this management area. The study would focus specifically on how subsistence salmon harvests are shared between communities. Different communities target different salmon species depending on a variety of circumstances. For example, Togiak focuses on harvesting Chinook salmon, which is readily available in the Togiak River drainage, and Nondalton almost exclusively harvests sockeye salmon in the subsistence fishery in the Lake Clark drainage.

This project would provide information to help the Alaska Board of Fisheries, ADF&G Fisheries Managers, the Bristol Bay Regional Advisory Council, state fish and game local advisory committees, and the Federal Subsistence Board to better understand the dynamics of the underlying sharing network of salmon harvested in both state and federally managed subsistence fisheries throughout the Bristol Bay and Chignik area. Under state law all Alaskans are eligible to participate in subsistence regardless of community of residence in the state. Salmon harvested by local residents and family and friends from urban centers is widely distributed throughout the state. This project seeks to understand this sharing network, which is important for all Alaska residents.

Objectives:

1. Estimate the harvest of salmon by residents of Chignik Lake (pop. 73), Chignik Lagoon (pop. 78), Egegik (pop. 109), Nondalton (pop. 164), Port Heiden (pop. 102), and Togiak (pop. 817).
2. Describe the harvest of salmon in terms of species, gear, location, and timing of harvests.
3. Through harvest surveys and key respondent interviews describe the sharing network both within the community, the broader region, and throughout Alaska.

Methods: This community-based research project emphasizes community approval of research designs, informed consent and anonymity of study participants, community review of draft study findings, and the provision of study findings to each study community upon completion of the research. Prior to conducting field research, project investigators will develop and adopt a formal MOA to guide research activities based upon their organization and individual research specialties.

Household Harvest Survey. The harvest survey is useful to meet Objective 1 to estimate the harvest of salmon by project community residents and Objective 2 to describe the harvest of salmon in terms of species, gear, location, and timing of harvests. Household harvest surveys will be coded after each data-gathering trip and provided to ADF&G information management staff for data entry. Data analysis will occur between June and September 2015. These results will be checked and analyzed by information management staff at ADF&G and final tables created after review by project researchers. Tables will be available for the community meeting to take place in April 2016. Once all mapping is complete the data is downloaded from the server into ArcGIS 10. Maps are then generated from the geodatabases and will be prepared for the community review meetings in April 2016.

Key Respondent Interviews. Key respondent interviews will provide information on sharing networks within the community, the broader Bristol Bay – Chignik area, and Alaska. These interviews are the focus of this research and there will be two rounds of interviews and will be conducted by BBNA and ADF&G research staff. Researchers will identify key respondents in each community during household harvest surveys and through consultation with community members during the community scoping meetings. Key respondents will represent a range of harvesting effort and experience in the fishery. The key respondent interviews will be coded and sections of the interviews transcribed and analyzed along with notes taken during the interviews. A qualitative data analysis software will be used to code the data.

Partnership and Capacity Building: ADF&G and BBNA will share the responsibilities for conducting field investigations in this project, including identifying study communities, obtaining community approvals, administering the survey, interviewing key respondents, and distributing

follow-up materials in the study communities. Tribal councils in study communities will be consulted about the project, and project approvals will be obtained prior to conducting fieldwork. Temporary field assistants will be hired by BBNA in each study community to assist with administration of the survey instrument and to help coordinate local logistical support and participation.

14-452 - Western Gulf of Alaska Subsistence Harvests and Social Networks

Project Number: 14-452
Title: Western Gulf of Alaska Subsistence Harvests and Social Networks
Geographic Area: Southwest Region, Alaska Peninsula Area.
Data Type: Harvest Monitoring and Cultural Knowledge/Traditional Ecological Knowledge
Principal Investigator: Dr. Katherine Reedy-Maschner
Department of Anthropology, Idaho State University
921 S. 8th Avenue, Stop 8005, Pocatello, Idaho 83209
208-282-6137, 208-478-9582; reedkath@isu.edu

Project Cost: Based upon a calendar year cycle.

2014	2015	2016	2017
\$73,685	\$199,045	\$193,761	\$66,800

Total: \$533,291

Issue: This proposal addresses the priority information need identified under multi-regional needs for data on changes in subsistence fishery resources and uses that includes fishing locations, fish quality, harvest methods and means, and methods of fish preservation. This project will address these changes in three Alaska Peninsula communities--Sand Point, King Cove and Cold Bay--in the context of changing community compositions, socioeconomic impacts, climatic change, and changing subsistence access. Basic subsistence harvest data in this area is decades old or has never been collected (Cold Bay), and harvest numbers contextualized in the broader climatic shifts and political environment are absent. Current detailed information on all subsistence harvests is needed for management of fish species in federal public lands. This information is of strategic importance given, for example, data gaps for the recent EIS developed for the proposed King Cove-Cold Bay land exchange/road corridor. This work will describe and analyze the social networks underlying the allocation and management of fish species, and demonstrate the value of social network models to management. Findings from this study, including social networks, will be linked to one previous study in Akutan, False Pass, Nelson Lagoon, and Port Heiden, and one ongoing study in Unalaska, Nikolski, Atka and Adak. In total, the OSM will receive comprehensive and comparative data on eleven Bering Sea/North Pacific communities, all of whom are part of vast sharing networks. Data will be analyzed by species, season, community, harvest methods, and in layers of aggregation, that will provide Federal subsistence fisheries managers with analytical options and multiple scales of evaluation. The study will also gather information on recent changes to subsistence harvests so managers can better understand factors that have shaped current practices, for example lost or increased access, changing regulations, climatic influences, and socioeconomic influences.

Objectives: The overarching research questions are; what is the current role of subsistence fisheries to Alaska Peninsula Area residents? What is the social map of food harvesting and distribution, and how is it shaped by other socioeconomic and environmental circumstances? How can this social map be useful to subsistence managers?

The objectives are:

1. Estimate the harvest levels and methods of all subsistence species in the study communities for calendar year 2014, especially fish.
2. Estimate sharing and distribution patterns of species and products between individuals, households, and communities.
3. Link and compare household harvests and uses by communities to eight other Bering Sea study communities, providing a regional quantitative and qualitative assessment.
4. Determine changes in subsistence species, access, and uses over time.
5. Contextualize subsistence fisheries in the broader regional economy, emphasizing the portion on Federal lands and waters.
6. Compare household survey data with harvests reported in the State's permit system and identify reporting issues, making recommendations for improvements.
7. Discover community subsistence concerns, observed changes in species abundances and locations, and observed environmental changes. Project climate scenarios and demographic conditions to forecast potential strength and weaknesses of human communities.
8. Use social networks of food exchange to model sustainability and resilience of communities.
9. Provide Federal subsistence managers with a description and analysis of community social networks, demonstrating network utility supporting allocation and management of subsistence.

Methods: Methods, in order of implementation, are 1. Connect with Alaska Peninsula communities, give presentations on the goals and methods of the project, and set out opportunities for local involvement. 2. Conduct key informant interviews to determine harvest access, methods, frequency and use, village socioeconomics, local politics, demographics, and cultural factors. Perform a literature review. 3. Conduct household surveys for the three study communities (100% of Cold Bay, 50% of King Cove and Sand Point) that capture genealogical relationships; harvest numbers of salmon, other marine fish, freshwater fish, land mammals, birds and eggs, and plant species for all household members; sharing and distribution of whole species and products between individuals; household economics; harvest locations; and species health/abundance observations. Participants shall be remunerated for their time and effort. 4. Integrate these data into a database from one recent and another ongoing study containing similar harvest and network data on eight other communities in the region. 5. Compare survey data with harvest numbers reported to the State to address data gaps. 6. Analyze survey field data, perform social network analysis, and use qualitative data to guide interpretation. Demonstrate how social network analysis is useful to the management of these species on federal lands. 7. Prepare reports to the OSM and to the communities.

Products: This project will yield several products: annual reports that will include a review of previous literature and subsistence studies, the survey instrument, and ethnographic fieldwork on subsistence and sharing behaviors to obtain local perspectives that will aid in interpreting survey results; performance reports; a draft report and technical summary reviewed by the study communities a final report and technical summary which will contain survey and other household data, and thoroughly address all objectives. At least one peer-reviewed journal article and conference papers will also result.

Investigator Ability and Resources: Dr. Reedy-Maschner will serve as PI and award administrator. She has a Ph.D. in Social Anthropology from the University of Cambridge, has worked in Aleut and Alutiiq communities for more than a decade, and is an Associate Professor of Anthropology at ISU. She will be responsible for human subjects approval, building community interest and involvement, key informant interviews, survey development and implementation, supervising data entry, data analysis, and all report writing and delivery. Resources at ISU include an Ethnographic Laboratory managed by Dr. Reedy-Maschner employing students who will perform data entry and interview transcriptions. A database manager and GIS technician are also part of the project team. A research assistant, students, and local participants will assist Reedy-Maschner in conducting surveys and mapping. ISU's Department of Anthropology has a Financial Technician that manages grants and spending.

Partnerships and Capacity Building: This project actively solicits local research assistants who will be trained in administering the surveys. Assistants and survey respondents will be compensated for their time and efforts. A protocol for facilitating community participation and/or partnership will be established. The project also actively seeks analytical input from local communities in interpreting survey results.

SOUTHCENTRAL REGION OVERVIEW

Issues and Information Needs

The 2014 Notice of Funding Opportunity for the Southcentral Alaska Region identified four priority information needs:

- Obtain reliable estimates of Chinook salmon escapement into Copper River and Kasilof River (for example, projects using weir, sonar, and mark-recapture methods).
- Information related to spawning distribution and stock specific run timing of Chinook and sockeye salmon that can be used to identify long-term stock trends in the context of climate change.
- Effects of climate change on water temperature and flow as it relates to survival of salmon and other fish species.
- Mapping of lifetime and current subsistence use areas for harvest of salmon and non-salmon fish species by residents of Ninilchik, Hope, and Cooper Landing. Research should include intensity of use as well as use on Federal public lands and waters, and should supplement and build upon existing knowledge.

Projects Funded Under the Fisheries Resource Monitoring Program

Since the inception of the Monitoring Program in 2000, 46 projects have been funded and completed in the Southcentral Alaska Region. None of these projects are ongoing during 2014 (**Tables 1**).

2014 Investigation Plans

Ten proposals for research in the Southcentral Alaska Region were submitted to the Office of Subsistence Management for funding consideration in 2014. In June 2013, the Technical Review Committee reviewed the investigation plans and recommended three investigation plans for funding. Investigators used comments from the Technical Review Committee review of proposals to develop investigation plans. 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 2 and 3**).

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 review and evaluation, the Technical Review Committee, Regional Advisory Councils, Interagency Staff Committee and Federal Subsistence Board have the opportunity to address the highest priority projects across regions. For 2014, approximately \$640,000 is available for funding new projects in the Southcentral Alaska Region (**Table 4**).

Technical Review Committee 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 ten investigation plans, the Technical Review Committee recommended funding three of the proposed projects (**Table 4**):

14-501 Long Lake Adult Salmon Abundance and Run Timing	\$ 13,704
14-503 Abundance and Run Timing of Salmon in Tanada Creek	\$ 75,310
14-505 Estimate the Inriver Abundance of Copper River Chinook Salmon	\$ 399,721
Total	\$ 488,735

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.

**Summaries of Projects Recommended for Funding
by the Technical Review Committee**

14-501 Long Lake Adult Salmon Abundance and Run Timing. This request for four years of funding would assure the continuance of 39 years of monitoring salmon in Long Lake. Although this project does not address a 2014 priority information need directly, the relatively long time series of salmon passage, water depth recordings, and temperature measurements at the Long Lake weir site would continue to provide useful information to assess management performance, suggest changes in management strategies, and monitor effects of climate change. Recent use of video technology has allowed visual records of salmon escapement to be saved, has reduced operating costs, and has allowed salmon to pass the weir at all times of the day, thereby reducing bear predation and other problems caused by concentrating salmon below the weir. This project functions at a modest cost and has a significant match.

14-503 Abundance and Run Timing of Salmon in Tanada Creek. This four-year project would continue operation of the Tanada Creek weir, operational since 2000, to provide escapement estimates for Chinook and sockeye salmon, along with age, sex and length information. The escapement information is important for post-season management assessment for Chinook and sockeye salmon. The weir has both practical and historical importance. The project site is used as an educational tool for local culture camps. While the capacity building component could improve no local organization appears willing or able to assume a role in operating this project. Partnership efforts have been very good. This project addresses one of the 2014 priority information needs.

14-505 Estimate the Inriver Abundance of Copper River Chinook Salmon. This four-year project would continue operation of four fish wheels on the Copper River two in Baird Canyon and two near Canyon Creek to monitor and obtain reliable estimates of salmon escapement. The project, operated and administered by an Alaska Native organization, provides one of the best examples of capacity building within the Fisheries Resource Monitoring Program. The project is well established. The objectives are quantifiable and measurable, the study design is sound, and the investigators are well qualified and have the resources to conduct and administer the proposed work. The proposed project continues work begun in 2001 that is important to Federal and State agencies in managing Copper River Chinook salmon fisheries and sustaining the Chinook salmon resource. While Chinook salmon continues to be an important resource to many user groups, the principle investigator has not been able to acquire matching funds. As operating costs continue to increase the Monitoring Program cannot continue to support the project at the increasing level of funding. This proposed project addresses a 2014 priority information need.

**Summaries of Projects Not Recommended for Funding
by the Technical Review Committee**

14-502 Copper River Chinook and Sockeye Salmon Management This project does not directly address a 2014 priority information need. While Chinook salmon populations continue to be a priority to both Federal and State managers, the 2014 funding opportunity focused on escapement estimates, run timing and spawning distribution. The project focuses on compiling historic information to address changes in fishery participation and escapement monitoring methods over time in the Copper River. The project culminates in a gap analysis of the data and management information and a risk assessment. While historic information would provide a retrospective view of the Copper River Chinook salmon population, it is unclear if historic information can be attained in a form that would allow the investigator to standardize it for comparison with current Chinook salmon escapement estimates. It is further unclear how any results would be tied to future management practices beyond current applications. Finally, there is no mention of how this project would complement the State's ongoing efforts to address the statewide Chinook salmon declines. The Technical Review Committee recommended not funding this project.

14-504 Abundance and Run Timing of Salmon in Ahtell Creek. This project proposes to put into operation a second Chinook salmon weir in the upper Copper River on Ahtell Creek (in conjunction with the salmon weir on Tanada Creek). Additional funds would be required for Year 1 set up and operation. Subsequent years would require minimal funding for operation of the Ahtell Weir, as the local hire crew of the Tanada Creek weir project would be utilized to operate the Ahtell Weir. While this project would address one of the 2014 priority information needs, the Technical Review Committee found that the addition of a second weir in the upper Copper River was not needed, as it would not provide much additional useful information to assist fishery managers. In addition, details of the weir installation and operation are lacking in the investigation plan and hard to fully evaluate.

14-506 Long-Term Trends in Distribution and Stock-Specific Run Timing of Copper River Chinook Salmon Using Streambed RFID Reader Detection Systems. This project would expand the use of radio frequency identification readers (RFID) to monitor escapement of Chinook salmon into Copper River tributaries. Efforts would piggyback on Monitoring Program Project 12-505, which estimates drainage-wide Chinook salmon abundance through mark-recapture methods using passive integrated transponders inserted into external T-bar tags. Marked Chinook salmon comprise up to 5% of the estimated drainage-wide Chinook salmon escapement each year. The goal of this project would be to install four complete RFID readers in the spawning tributaries to monitor Chinook salmon escapement and to develop the Native Village of Eyak's (NVE) in-house capacity to design build, install and maintain the RFID systems. While initial application of RFID in the Gulkana has proven successful, the application needs further evaluation before expanding to new locations. Currently, the technology is utilized to monitor only one of two channels of the Gulkana River. To fully evaluate Chinook salmon passage, both channels would need to be monitored. Until the current application is fully functional, it is premature to expand to additional tributaries of the Copper River or develop NVE's internal capacity to design, build and maintain these systems.

14-507 Develop and Test a Portable Graduated Field Barrier as a Tool to Guide and Monitor Salmon Escapements. This project is developmental in nature and its overall success is hard to evaluate. The investigators propose using a GEFFB to move fish through a video system and enumerate coho salmon passage. The GEFFB will use low power pulsed DC waves to redirect coho salmon to one side of the river channel. The coho salmon will then migrate through

a small corridor affixed with an underwater video. Fish behavior will be observed visually when visibility permits and with a DIDSION hydro acoustic unit. Counts from the GEFFB system will be compared with the Funny River Weir counts for accuracy. Since Federal subsistence users have not harvested coho salmon from the Funny River, its immediate link to Federal subsistence management is weak. The proposed two months development period may not be sufficient to fully develop and evaluate the system. If successful, the investigators propose relocating the system to a remote field location, but there is no guarantee that the technology will be easily transported to a different salmon species or a new system. The Technical Review Committee recommended not funding this project.

14-508 Predicting the Effects of Climate Change on Alaska Blackfish: An Integrative Approach. Historically, Alaska blackfish were a very important subsistence food resource for Alaska Natives and for nourishing sled dog teams. However, the importance of the Alaska blackfish as a subsistence resource varies considerably by region, community, and by family. In 2011, a household subsistence harvest survey was conducted in eight communities along the Yukon and four of the eight communities in the survey reported the harvest and use of blackfish. The percent of households harvesting ranged from 5% to 23%, while 5% to 43% of households reported using blackfish. The total estimated harvest of blackfish per community ranged from 320 to 1,615 pounds. Blackfish are not listed as a strategic priority for the Southcentral region. Harvest rates for blackfish are sporadic and relatively small, so the risk of overharvest is low. Due to a low harvest there are currently no regulations on the harvest of blackfish.

It is recommended that the investigator provide more explicit details on the study design for the field component of this research proposal, in particular, information on intended field study locations. The proposal could benefit by integrating with the standardized air and water temperature monitoring program through the Fisheries Resource Monitoring Program. Further clarification on how this study relates to potential climate change impacts on the abundance, availability, and use of Alaska blackfish as a subsistence resource should also be provided. The incorporation of information pertaining to the distribution and abundance of blackfish in the proposed study area could prove very useful in the longer-term understanding of climate change impacts to Alaska blackfish in their native habitats. Lastly, letters of commitment from administrators, staff and teachers of the Lower Kuskokwim School District, or other potential collaborators, would improve the partnership and capacity building component of this study.

14-551 Kenai Peninsula Subsistence Use Areas for Salmon and Nonsalmon Fish. The goal of this three-year project is to understand the effects of changing demographic, socio-cultural, and environmental factors on subsistence fish use patterns on the Kenai Peninsula. Using mapping methodologies, investigators propose to document fish use patterns of the residents of Ninilchik, Hope, and Cooper Landing. While investigators describe broad categories of investigation into factors affecting the use patterns of all species of fish by residents of the study communities, specificity and detail are lacking in the plan. Investigators do not specify which mapping methods will be used and the information that will be obtained using each method. It is not clear that quantitative information will be collected or what temporal framework will be used to describe results. The project addresses one of the 2014 priority information needs. However, it is unlikely the project's stated objectives can be achieved with the proposed technical design, project plan, and budget.

14-552 Harvest and Use of Subsistence Fishery Resources and Related Ecological Knowledge, Hope, Ninilchik, and Cooper Land in Southeast Alaska. This proposed study does have a strong link to federal public lands and is focused on subsistence uses of salmon and other subsistence foods in three national wildlife refuges. This proposed work would help close

numerous data gaps in the region. Information and insights from this proposed study would situate salmon in a larger subsistence context and provide data on salmon availability and importance in relation to other subsistence foods. While this project has potential to integrate past studies and provide a comprehensive subsistence and socioeconomic analysis of the Aleutian and Alaska Peninsula areas, it is not recommended for funding at this time. Not all members of the Technical Review Committee provided an assessment of 14-452. A majority of the technical reviewers who did provide an assessment of this proposal do not feel justified funding this study because they feel that the investigation plan failed to provide clear and direct implications for subsistence management in southwestern Alaska. In addition, the proposed study does not address social network analysis in the Bristol Bay/Chignik Area, which was a priority information need for the Southwest Alaska Region. The reviewers highly encourage the Principal Investigator to revise this investigation plan and resubmit for further consideration during the next funding cycle. The revision would require collaboration with the affected federal refuge managers and social scientists at the Alaska Department of Fish and Game, Subsistence Division.

Table 1. Summary of completed projects under the Fisheries Resource Monitoring Program in Southcentral Alaska since 2000. Abbreviations: ADFG=Alaska Department of Fish and Game, CNTC=Cheesh'na Tribal Council, CRNA=Copper River Native Association, CRRC=Chugach Regional Resources Commission, CRWP=Copper River Watershed Project, ECO=Ecotrust, FS=USDA Forest Service, Karie=Dr. Karie, LGL=LGL Ltd, MTC=Mentasta Tribal Council, NPS=National Park Service, NVE=Native Village of Eyak, PWSSC=Prince William Sound Science Center, and USFWS=U.S. Fish and Wildlife Service.

Project Number	Project Title	Investigators
<i>Copper River Salmon</i>		
00-013	Tanada Creek Salmon Escapement	NPS
00-034	Miles Lake Sonar Improvement	FS, ADFG
00-040	Copper River Salmon Subsistence Fishery Evaluation	ADFG, CRNA
01-020	Copper River Chinook Salmon Feasibility of Abundance Estimate	NVE, LGL
01-021	Lower Copper River In-season Abundance Estimate	NVE, LGL, ADFG
01-217	Copper River Groups Capacity Building Workshop	CRNA, LGL
02-015	Copper River Chinook Salmon Radio Telemetry	ADFG, NVE
03-010	Upper Copper River C&T Subsistence Fish Harvests GIS Atlas	CRNA, LGL
04-501	Long Lake Sockeye Salmon Escapement	NPS, CRWP
04-502	Tanada Creek Salmon Escapement	NPS
04-503	Copper River Chinook Salmon Abundance Estimate	NVE, LGL
04-506	Lower Copper River In-season Abundance Estimate	NVE, LGL, ADFG
04-507	Copper River Chinook Salmon Genetics	ADFG, NVE, NPS
04-553	Copper River Salmon Runs Traditional Knowledge of Long Term	ADFG, NVE
05-501	Copper River Sockeye Salmon Spawning Distribution	NVE, ADFG
06-502	Copper River Sockeye Salmon Inriver Abundance	NVE, ADFG
07-502	Tanada Creek Salmon Weir	NPS
07-503	Copper River Chinook and Sockeye Salmon Abundance	NVE
07-505	Long Lake Salmon Weir	NPS, PWSSC
08-501	Copper River Sockeye Salmon Abundance	NVE
10-502	Tanda Creek Salmon Assessment ^a	NPS
10-503	Copper River Chinook Salmon Assessment ^a	NPS
10-505	Long Lake Salmon Assessment ^a	NPS
10-552	Copper River Subsistence Harvest Validation ^a	HDR, ECO, ADF&G
12-500	Copper River Chinook Salmon RFID Feasibility	NVE
12-550	Upper Copper R. Changing Environments & Subsistence ^a	ECO
<i>Copper River Steelhead</i>		
01-148	Copper River Steelhead Stock Status	ADFG, CRNA, USFWS
01-035	Copper River Steelhead Harvest Monitoring	NPS, CRNA
03-001	Cooper River Steelhead Population Biology	ADFG
05-502	Copper River Steelhead Abundance	ADFG, NVE
<i>Copper River Freshwater Species</i>		
01-110	Copper River Non-Salmon Species Harvest and Use	CRNA, ADFG, CHVC,
02-077	Upper Copper River Increasing GIS Capabilities	CRNA
07-501	Tanada and Copper Lakes Burbot Abundance	NPS, ADFG, MTC

Table 1. Continued

Project Number	Project Title	Investigators
<i>Copper River Eulachon</i>		
02-075	Eulachon Subsistence Harvest Opportunities	NVE, FS, ADFG
<i>Prince William Sound Salmon</i>		
00-035	Coghill Coho Salmon Weir	ADFG, FS
02-028	Chugach Region TEK Mapping	CRRC
03-033	Billy's Hole, PWS Salmon Stock Assessment	ADFG, CRRC, FS
<i>Cook Inlet</i>		
00-038	Cooper Creek Dolly Varden Assessment	ADFG
00-041	Turnagain Arm Eulachon Subsistence Use & Assessment	FS
03-045	Cook Inlet Subsistence Fisheries Harvest Assessment	ADFG
07-506	Tustumena Lake Coho Salmon Spawning Assessment	USFWS
07-507	Kasilof Watershed Coho Salmon Radio Telemetry	USFWS
07-509	Kasilof Watershed Steelhead Trout Radio Telemetry	USFWS
08-502	Tustumena Lake Coho Salmon Assessment	USFWS
08-503	Kasilof River Steelhead Radio Telemetry	USFWS
08-504	Crooked and Nikoli Creeks Steelhead Weirs	USFWS
^a Final Report Preparation		

Table 2. Southcentral 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 (\$000s)			
		Alaska Native	State	Federal	Other
<i>Stock Status and Trends Projects</i>					
14-501	Long Lake Adult Salmon Abundance and Run Timing			\$13.7	
14-502	Copper River Chinook and Sockeye Salmon Management				\$56.8
14-503	Tanada Creek Adult Salmon Abundance and Run Timing			\$75.3	
14-504	Tanana Creek and Ahtell Creek Salmon Abundance and Run Timing			\$88.5	
14-505	Copper River Chinook Salmon Estimate of Inriver Abundance	\$399.7			
14-506	Copper River Chinook Salmon RFID	\$149.9			
14-507	Funny R Salmon Escapements GFFB Tool			\$185.1	
14-508	Predicting the effects of climate change on Alaska blackfish (<i>Dallia pectoralis</i>): An integrative approach				\$128.9
<i>Harvest Monitoring and Traditional Ecological Knowledge Projects</i>					
14-551	Kenai P Salmon and Non-salmon Subsistence Use		\$47.0		
14-552	SC Area Subsistence Fishery Harvest and Use				\$58.3

Table 3. Southcentral Alaska local hire and matching funds for investigation plans submitted to the Fisheries Resource Monitoring Program for funding consideration in 2014. Abbreviations used are: CRITR=Copper River-Ahtna Inter-Tribal Resource Conservation District, ECO=Ecotrust, NVE=Native Village of Eyak, UAA=University of Alaska Anchorage, and USFWS=U.S. Fish and Wildlife Service.

Project Number	Lead Organization	Title	Funding (\$000s)	
			Local	Matching
<i>Stock Status and Trends Projects</i>				
14-501	USFS	Long Lake Adult Salmon Abundance and Run Timing	\$6.5	\$16.0
14-502	CRITR	Copper River Chinook and Sockeye Salmon Management	\$26.3	\$16.7
14-503	USFS	Tanada Creek Adult Salmon Abundance and Run Timing	\$45.7	\$72.0
14-504	USFS	Tanana Creek and Ahtell Creek Salmon Abundance and Run Timing	\$48.2	\$72.0
14-505	NVE	Copper River Chinook Salmon Estimate of Inriver Abundance	\$44.6	\$0.0
14-506	NVE	Copper River Chinook Salmon RFID	\$7.8	\$0.0
14-507	USFWS	Funny R Salmon Escapements GFFB	\$0.0	\$62.0
14-508	UAA	Predicting the effects of climate change on Alaska blackfish (<i>Dallia pectoralis</i>): An integrative approach	\$0.0	\$0.0
<i>Harvest Monitoring and Traditional Ecological Knowledge Projects</i>				
14-551		Kenai P Salmon and Non-salmon Subsistence Use Area	\$0.0	\$10.6
14-552		SC Area Subsistence Fishery Harvest and Use	\$9.6	\$0.0

Table 4. Funding recommendations by the Technical Review Committee (TRC) for Southcentral Alaska, 2014 Fisheries Resource Monitoring Program.						
Project Number	Title	TRC	Requested Budget (\$000)			
			2014	2015	2016	2017
<i>Stock Status and Trends Projects</i>						
14-501	Long Lake Adult Salmon Abundance and Run Timing	Yes	\$13.7	\$13.8	\$13.9	\$14.0
14-502	Copper River Chinook and Sockeye Salmon Management	No				
14-503	Tanada Creek Adult Salmon Abundance and Run Timing	Yes	\$75.3	\$77.2	\$79.2	\$81.2
14-504	Tanana Creek and Ahtell Creek Salmon Abundance and Run Timing	No				
14-505	Copper River Chinook Salmon Estimate of Inriver Abundance	Yes	\$399.7	\$403.9	\$408.3	\$414.7
14-506	Copper River Chinook Salmon RFID	No				
14-507	Funny R Salmon Escapements GFFB Tool	No				
14-508	Predicting the effects of climate change on Alaska blackfish (<i>Dallia pectoralis</i>): An integrative approach	No				
<i>Harvest Monitoring and Traditional Ecological Knowledge Projects</i>						
14-551	Kenai P Salmon and Non-salmon Subsistence Use Area	No				
14-552	SC Area Subsistence Fishery Harvest	No				
		Total	\$488.7	\$494.9	\$501.4	\$509.9
		Guideline	\$640.0			
		TRC Recommendation	\$488.7	\$494.9	\$501.4	\$509.9

14-501 - Abundance and Run Timing of Adult Salmon in Long Lake

Project Number: 14-501
Title: Abundance and Run Timing of Adult Salmon in Long Lake
Geographic Area: Cook Inlet/Gulf of Alaska
Information Type: Fish stock status and trends
Principal Investigator: Molly McCormick, Wrangell-St. Elias National Park/Preserve

Project Cost:

2014	2015	2016	2017
\$13,704	\$13,807	\$13,909	\$14,015

Total Cost: \$55,435

Issue: Accurate assessment of yearly run strength and migratory timing in tributaries to the Copper River is essential to the development of a management strategy that provides for natural and healthy populations as mandated by the Alaska National Interest Lands Conservation Act (ANILCA). The Upper Copper River sockeye salmon populations are of particular importance to both federally qualified and state subsistence users. The sockeye salmon stock that spawns within Long Lake is the largest salmon stock within the Chitina River drainage. The Chitina River drainage, approximately 5 million acres in size, is the largest anadromous drainage contained in its entirety, within WRST. In addition, the Long Lake population has the longest known annual spawning duration of any sockeye salmon population in North America (Ken Roberson, personal communication). Therefore, this system is an excellent candidate for a long term monitoring site. Weir counts of salmon are a simple and basic dataset and therefore likely to provide valuable data far beyond the foreseeable future. Thirty-nine years of weir show annual variations in abundance of Long Lake runs ranging from 631 to over 49,000 sockeye. This is the longest running data set of weir counts of salmon in the Copper River drainage.

Subsistence use of Copper River salmon occurs downstream of the Chitina River drainage in the Chitina Subdistrict of the Upper Copper River District. Federal subsistence users harvested 865 salmon here in 2012 using dipnets. This harvest number was down from a high of 2,061 in 2010. Harvest by as many as 10,000 households occurs in a state managed fishery that has been both a subsistence and personal use fishery harvesting as many as 125,000 salmon annually some years. These fisheries undoubtedly harvest some salmon returning to Long Lake.

Objectives:

To enumerate adult sockeye salmon migrating past a weir from late July until mid October by using video equipment to count all individuals entering Long Lake.

1. To estimate the age, sex, length composition of the sockeye salmon escapement from otolith interpretation, such that the estimates are within 5% of the true proportion 90% of the time.

Methods: The project will use a weir, underwater video camera and recording system to enumerate the number of salmon migrating into Long Lake and to sample age, sex and length of a portion of the salmon migrating through the weir. The weir, sampling box, camera and recording system will be put in place in mid July. The weir will be checked and the video recording will be reviewed on a daily basis from late July to around October 15 and all adult salmon passing through it will be enumerated. A passage gate will be closed during periods of video review or maintenance; the video will be recording at all times that the gate is open to provide a means of

obtaining the count. A portion of the sockeye salmon will be sampled for age, sex and length. Scale and otolith samples will be sent to ADFG for analysis. The pickets will be removed from the weir in mid-October. Data analysis and the performance reports, annual reports and final report will take place during the winter months.

Partnerships/Capacity Building Several local groups/organizations are interested in the Copper River watershed including: the Copper River Watershed Project, The Wrangell Institute for Science and the Environment (WISE), Ahtna and Chitina Traditional Councils, and the Prince William Sound Science Center. This project provides an opportunity to collaborate with local students, nonprofits, and agencies to partner in the data collecting process. Stream and air temperature data is collected at the weir as part of an ongoing Fisheries Monitoring Program with USFWS. Biotechnician positions are currently filled under local hire designation. The Park has and will continue to collaborate with the ADFG in conducting salmonid research in the Copper River.

**14-502 - Copper River Chinook and Sockeye Salmon Management Data
Compendium and Review**

Project Number: 14-502
Title: Copper River Chinook and Sockeye Salmon Management Data
Compendium and Review.
Geographic Region: South-Central (Copper River)
Data Type: Stock Status and Trends
Principal Investigator: Bruce Cain, Executive Director CRITR.
Co-Investigator(s): Keith van den Broek, Senior Fisheries Ecologist, Terraqua Inc.

Project Cost:

2014	2015	2016	2017
\$56,816	\$0	\$0	\$0

Total: \$56,816

Issue: Chinook Salmon populations have declined throughout Alaska in recent years. This project would produce a comprehensive management and data report from the late 1800s to current day including recommendations to address data gaps and resource risks to Chinook Salmon in the Copper River.

Objectives: The objectives of this project are as follow:

1. Prepare a compilation of the Chinook and Sockeye salmon management data on the Copper River for the past 120 years.
2. Complete a gap analysis and resource risk assessment.
3. Prepare recommendations to address the data gaps and resource risks.

Methods: The methods used

1. Gather and review prior management reports and summary reports.
2. Gather and review run timing and escapement data
3. Compile comprehensive management and data report from late 1800s' to date.
4. Conduct gap analysis of data and management information and methodology
5. Conduct risk assessment for run abundance taking into consideration long term trends and adequacy of data, and current management plan.
6. Write overview, summary, analysis, recommendations and bibliography.

Partnerships/Capacity Building: CRITR is an inter-tribal resource conservation district. Our membership includes 7 federally recognized Tribes on the Copper River and two Alaska Native Corporations on the Copper River. Our organization is just in its infancy. Our mission is to manage subsistence resources in a culturally appropriate manner. This project will provide a good baseline of data to build capacity for CRITR as well as all managers and user groups on the Copper River. The project will build relationships between agencies that collect and analyze data and help with sharing information between agencies. Recommendations from this study can be used to target additional research that will address long term data gaps and will allow for better understanding and management decisions.

14-503 - Abundance and Run Timing of Adult Salmon in Tanada Creek

Project Number: 14-503
Title: Abundance and Run Timing of Adult Salmon in Tanada Creek
Geographic Region: Southcentral Region
Data Type: Stock Status and Trends
Principal Investigator: Dave Sarafin, Wrangell-St.Elias National Park/Preserve

Project Cost:

2014	2015	2016	2017
\$75,310	\$77,206	\$79,159	\$81,169

Total Cost: \$312,844

Issue: Accurate assessment of yearly run strength and migratory timing of salmon stocks in tributaries to the Copper River provides key information in support of a management strategy that meets the mandates of the Alaska National Interest Lands Conservation Act (ANILCA). Upper Copper River sockeye salmon populations are of particular importance to both federally qualified and state subsistence users. Tanada Lake sockeye are one of the uppermost runs of sockeye in the Copper River and support subsistence salmon fisheries in both the Copper River and Tanada Creek.

Conservation concerns for Chinook salmon stocks exist throughout many regions of Alaska. In recent years, the Board of Fisheries (BOF) has restricted the Copper River District commercial Chinook salmon harvest in response to the concerns for Upper Copper River stocks. Obtaining information of Chinook, as well as sockeye salmon returns in the Copper River area was identified by OSM in the 2014 Priority Information Needs (December 2012). This project directly addresses these needs, as it will use a weir to obtain reliable estimates of sockeye and Chinook salmon escapement in an important Upper Copper River tributary, add to a long-term database providing information of spawning distribution and stock specific run timing, and add to a long-term database of water/air temperature recordings by assisting with the temperature monitoring program.

In January 2006, the Federal Subsistence Board adopted a proposal to allow the use of a fyke net to harvest salmon in Tanada Creek upstream of the weir. This new gear type has not been used yet, but allowing its use by the Board was based on the assumption that the in-season managers would have accurate knowledge of the seasonal sockeye escapement in the creek. To do this, the Tanada Creek weir would be a crucial in-season management tool

Objectives:

1. To count by day, the number of adult sockeye and Chinook salmon migrating past a weir operated in Tanada Creek during the period of early-June through mid-September.
2. To estimate the age, sex, length composition of the Tanada Lake sockeye salmon escapement from otolith interpretation, such that the estimates are within 5% of the true proportion 90% of the time.

Methods: From late-May through mid-September, investigators will install a floating resistance board weir equipped with an underwater video camera and recording system as a means to count migrating adult salmon. Underwater lighting will permit viewable conditions during the nighttime and periods of low ambient light. Each day, the entire recorded video footage will be

reviewed for salmon identification and enumeration and the weir will be checked to ensure fish tight integrity. The video will record continuously throughout the entire season. A fish passage gate will be closed during periods of video review or maintenance and during any conditions that render the visibility of the camera view area as unviewable.

Otoliths will be collected from carcasses in Tanada Lake during late-August thru September and sent to the Alaska Department of Fish and Game (ADFG) for age-class interpretation. This project assist with the deployment and retrieval of water and air temperature recorders for the temperature monitoring program.

Partnerships/Capacity Building: Several local groups are interested in the Copper River watershed. This project provides an opportunity to collaborate with local students, tribes and culture camps, nonprofits, and agencies to partner in the data collecting process. Biological Technician and Aid positions are currently filled under local hire designation. The Batzulnetas culture camp occurs the third week in June. Camp attendees participate in an interpretive visit to the weir site to learn about subsistence fisheries management. The Park has and will continue to collaborate with the ADFG in conducting salmonid research in the Copper River.

14-504 - Abundance and Run Timing of Adult Salmon in Tanada Creek and Ahtell Creek

Project Number: 14-504
Title: Abundance and Run Timing of Adult Salmon in Tanada Creek and Ahtell Creek
Geographic Region: Southcentral Region
Data Type: Stock Status and Trends
Principal Investigator: Dave Sarafin, Wrangell-St.Elias National Park/Preserve

Project Cost:

2014	2015	2016	2017
\$88,481	\$80,255	\$82,287	\$84,379

Total Cost: \$355,402

***NOTE:** This project IP combines a second Chinook salmon weir on Ahtell Creek along with the salmon weir on Tanada Creek. Additional funds would be required for Year 1 set up and operation. Subsequent years would require minimal funding for operation of the Ahtell Weir, as the Local Hire crew of the Tanada Weir project would be utilized to operate the Ahtell Weir.*

Issue: Accurate assessment of yearly run strength and migratory timing of salmon stocks in tributaries to the Copper River provides key information in support of a management strategy that meets the mandates of the Alaska National Interest Lands Conservation Act (ANILCA). Upper Copper River sockeye salmon populations are of particular importance to both federally qualified and state subsistence users. Tanada Lake sockeye are one of the uppermost runs of sockeye in the Copper River and support subsistence salmon fisheries in both the Copper River and Tanada Creek.

Conservation concerns for Chinook salmon stocks exist throughout many regions of Alaska. In recent years, the Board of Fisheries (BOF) has restricted the Copper River District commercial Chinook salmon harvest in response to the concerns for Upper Copper River stocks. Obtaining information of Chinook, as well as sockeye salmon returns in the Copper River area was identified by OSM in the 2014 Priority Information Needs (December 2012). This project directly addresses these needs, as it will use a weir to obtain reliable estimates of sockeye and Chinook salmon escapement in an important Upper Copper River tributary, add to a long-term database providing information of spawning distribution and stock specific run timing, and add to a long-term database of water/air temperature recordings by assisting with the temperature monitoring program.

In January 2006, the Federal Subsistence Board adopted a proposal to allow the use of a fyke net to harvest salmon in Tanada Creek upstream of the weir. This new gear type has not been used yet, but allowing its use by the Board was based on the assumption that the in-season managers would have accurate knowledge of the seasonal sockeye escapement in the creek. To do this, the Tanada Creek weir would be a crucial in-season management tool.

A fish weir on Ahtell Creek would initiate a stock specific database of abundance and run timing of Chinook salmon in this Upper Copper River tributary. Ahtell Creek flows into the Slana River just upstream of the bridge of the Nabesna Road and supports a small run of Chinook salmon. Aerial surveys are not presently flown on Ahtell Creek, however, past aerial surveys conducted

by ADFG, have observed up to 33 Chinook salmon present (Somerville, personal communication). Ahtell Chinook salmon may not be a large component of the overall Copper River return, however, this site could be monitored in a very cost effective manner by existing project staff.

Objectives:

1. To count by day, the number of adult sockeye and Chinook salmon migrating past a weir operated in Tanada Creek during the period of early-June through mid-September and in Ahtell Creek from early-June through late-July.
2. To estimate the age, sex, length composition of the Tanada Lake sockeye salmon escapement from otolith interpretation, such that the estimates are within 5% of the true proportion 90% of the time.

Methods: From late-May through mid-September, investigators will install a floating resistance board weir equipped with an underwater video camera and recording system as a means to count migrating adult salmon in Tanada Creek. Underwater lighting will permit viewable conditions during the nighttime and periods of low ambient light. Each day, the entire recorded video footage will be reviewed for salmon identification and enumeration and the weir will be checked to ensure fish tight integrity. The video will record continuously throughout the entire season. A fish passage gate will be closed during periods of video review or maintenance and during any conditions that render the visibility of the camera view area as unviewable.

In Ahtell Creek, a rigid picket weir will be installed. An underwater video recording system will be installed and operated in the same manner as for the Tanada Creek weir. Daily weir checks, video review, and fish counts will be performed by the Tanada crew as they drive by the Ahtell Creek site each day, enroute to/from the Batzulnetas trailhead.

Otoliths will be collected from carcasses in Tanada Lake during late-August thru September and sent to the Alaska Department of Fish and Game (ADFG) for age-class interpretation. This project assist with the deployment and retrieval of water and air temperature recorders for the temperature monitoring program.

Partnership/Capacity Building: Several local groups are interested in the Copper River watershed. This project provides an opportunity to collaborate with local students, tribes and culture camps, nonprofits, and agencies to partner in the data collecting process. Biological Technician and Aid positions are currently filled under local hire designation. The Batzulnetas culture camp occurs the third week in June. Camp attendees participate in an interpretive visit to the weir site to learn about subsistence fisheries management. The Park has and will continue to collaborate with the ADFG in conducting salmonid research in the Copper River.

14-505 - Estimate the Inriver Abundance of Copper River Chinook Salmon

Project Number: 14-505
Title: Estimate the Inriver Abundance of Copper River Chinook Salmon
Geographic Region: Southcentral
Data Type: Stock Status and Trends (SST)
Principal Investigator: Vija Pelekis, Native Village of Eyak

Project Cost:

2014	2015	2016	2017
\$399,721	\$403,895	\$408,257	\$414,737

Total: \$1,626,610

Issue: The importance of Copper River salmon to subsistence users has focused attention on the lack of information about escapement levels and distribution among tributaries. Despite the importance of this fishery, fishery managers have found it difficult to obtain annual estimates of salmon escapement to the drainage. Many stakeholders believe that escapement indices generated by conventional methods (sonar, aerial surveys and weirs on selected streams) have not adequately assessed the abundance of Copper River Chinook salmon stocks. The purpose of this project is to continue to estimate the annual system-wide escapement and run timing of Chinook salmon in the Copper River. The Native Village of Eyak (NVE) has successfully derived an inriver abundance estimate annually using identical methods to those proposed here since 2003 (Link et al. 2001; Smith et al. 2003; Smith 2004; Smith et al. 2005; Smith and van den Broek 2005, 2006; Smith et al. 2007; van den Broek et al. 2008; van den Broek et al. 2009, van den Broek et al. 2010, van den Broek et al. 2011, van den Broek et al. 2012).

This project is a continuation of FIS 10-503, and specifically addresses one of the priority information needs identified by the Office of Subsistence Management (OSM) in the FY14 Notice of Funding (“*Obtain reliable estimates of Chinook salmon escapement into Copper River and Kasilof River*”).

Objective: To estimate the annual inriver abundance of Chinook salmon returning to the Copper River from 2014 to 2017 such that the estimates are within 25% of the true value 95% of the time.

Methods: This project will estimate the annual inriver abundance of Copper River Chinook salmon at Baird Canyon using two-sample mark-recapture methods. A total of four large, live-capture fishwheels will be operated in the Copper River from May to August each year. Two fishwheels will be placed at Baird Canyon (rkm 69) and two near Canyon Creek (rkm 157). Escape panels will be used on the live tanks to minimize crowding by allowing sockeye salmon and other non-target species to escape. At each location, a minimum of three times a day (e.g., 0800, 1400, 2200 hours), depending on catches, crews will visit the fishwheels and remove all fish in the live tanks. Using a dip net, all healthy adult Chinook salmon measuring > 500 mm FL will be transferred from the live tanks to specially designed sampling troughs that minimize stress to fish for sampling (species, fork length, sex). At Baird Canyon, all Chinook salmon, historically around 2,500-5,000 per season, will be tagged, up to a maximum of 150/day, using uniquely coded dorsal TBA-PIT tags and a secondary operculum punch. At Canyon Creek, all fish will be examined for presence/absence of a tag and/or operculum punch.

Data will be collected at both sample events using ruggedized handheld Trimble-Nomad ® Personal Digital Assistants with integrated RFID scanners (SDiD). At the conclusion of each sample session, the data will be verified by camp leads and fisheries technicians and then wirelessly backed-up from the handheld device to a secure cloud database hosted at an offsite data center. Managers and stakeholders can log in to the online site to view the details of the collected data and export a summary report (<http://eyak.fishscan.com/>). Project investigators and fishery managers will also receive regular updates through email or on the NVE website. A rigorous quality assurance and quality control process will be in place to ensure the data are collected, recorded and verified as accurately as possible in-season.

Inriver abundance of Chinook salmon above Baird Canyon in each year of the study will be estimated using two-event mark-recapture methods (Ricker 1975; Seber 1982). Assumptions of this method require that: (1) handling will not make fish more or less vulnerable to recapture than unhandled fish; (2) tagged fish do not lose their tags and there is no mortality of tagged fish between events; (3) marked fish will mix completely with unmarked fish across the river; (4) fish will have equal probabilities of being marked or equal probabilities of being recaptured regardless of size or sex; and (5) fish will have equal probabilities of being marked or equal probabilities of being recaptured, regardless of time. Each of these assumptions will be addressed to the extent possible.

Results from previous seasons indicated that capture probabilities at the fishwheels during both events varied with time. To test for this, period-specific mark and recapture rates for Chinook salmon will be compared using contingency table analysis. If necessary, we will apply an appropriate level of stratification to our samples and use a temporally stratified Darroch estimator (Darroch 1961) to generate an unbiased abundance estimate. The computer program SPAS (Arnason et al. 1996) will be used to calculate the abundance estimate and standard error.

Partnerships and Capacity Building: This project has and will continue to provide NVE an opportunity for meaningful inclusion in the research and long-term management of Copper River salmon. NVE will oversee all aspects of the project and provide critical logistical, technical and field assistance, thereby acquiring the array of skills needed to carry out major fisheries resource monitoring projects. Further, the overall study design will engage Tribal organizations from different regions of the Copper River drainage in discussions on the project and promote interactions amongst subsistence users. NVE seasonal fishery technicians will acquire the necessary skills and experience required for this and other fisheries research jobs. This project will allow NVE to further develop the skills of Tribal members via local training, and hiring for key positions in future fisheries assessment projects. Ultimately, involvement with this program will likely encourage young people to get an education in fisheries and natural resource management.

This project will continue to promote interaction and maintain a collaborative and cooperative relationship between a major subsistence group (NVE) and fisheries management agencies (i.e. ADF&G and OSM). NVE and ADF&G have been coordinating age-sex-size and genetic sampling of Chinook salmon to be collected at Canyon Creek for the 2013 field season. This information has been identified as a critical information gap for the Copper River Chinook salmon stock (ADF&G Chinook Salmon Research Team 2013). NVE will conduct sampling in conjunction with the Chinook Escapement Monitoring program and ADF&G has agreed to process the age (scale) and genetic samples (fin tissue) and share this data with NVE. If successful, NVE will continue to collect these samples for ADF&G in future field seasons.

NVE will continue to work with the Tribal Council, staff, consultants and government agencies to identify key personnel to help carry on a long-term program. NVE will also actively participate in public meetings throughout the year to disseminate project results to the public and resource managers, review the project and discuss future refinements. These consultations will continue to strengthen the credibility of NVE's fisheries resource monitoring programs and will drive the long-term viability of this critical Copper River monitoring program.

14-506 - Long-term trends in distribution and stock-specific run timing of Copper River Chinook salmon, using streambed RFID detection systems

Project Number: 14-506
Title: Long-term trends in distribution and stock-specific run timing of Copper River Chinook salmon, using streambed RFID detection systems.
Geographic Region: Cook Inlet-Gulf of Alaska (Southcentral)
Data Type: Stock Status and Trends (SST)
Principal Investigator: Vija Pelekis. Native Village of Eyak

Project Cost:

2014	2015	2016	2017
\$149,893	\$110,839	\$111,398	\$122,337

Total Cost: \$494,467

Issue: Management of Copper River salmon is complex due to inter-annual variation in the size and timing of stocks, fisheries that target a mixture of species and intra-specific stocks, and difficulties in estimating abundance due to the physical characteristics of the drainage. Historical radio telemetry studies and management aerial surveys have been successful in providing a baseline of previously unknown information, but have also highlighted a substantial level of variability in these parameters between years. It is unclear how much these populations will change over time, particularly in the context of climate change. Much longer-term or follow-up studies are warranted, but unfortunately high costs and technical challenges can be prohibitive.

Through FIS10-503, up to 5% of the total Chinook salmon run are already being marked using passive radio frequency identification (RFID) technology (TBA-PIT tags). These tagged fish can be detected by RFID reader arrays installed in remote stream and river systems. This provides an exciting opportunity to concurrently monitor fish passage at any tributary for a small investment in infrastructure and a very low recurring incremental cost for long-term operation and maintenance.

The proposed program builds upon feasibility testing implemented through FIS 12-500, with the continued operation of the first array and addition of a second array at the Gulkana site to provide 100% channel coverage. Concurrently, NVE will establish the capacity to reduce costs of basin-wide array coverage through in-house array design, construction and installation, assess and prioritize future installation sites, and complete installation of new arrays to represent an additional three spawning sub-basins of highest priority.

This project leverages the tagging efforts inherent to FIS 10-503 and its proposed continuation through the FRMP. It serves to update and expand into a long-term comprehensive monitoring program previous research supported by the FRMP (FIS 02-015, FIS 05-502, FIS 05-501, FIS 12-500), and addresses a Southcentral Alaska Region Priority Information Need identified in the FY14 Notice of Funding (“*Information related to spawning distribution and stock-specific run timing of Chinook and sockeye salmon that can be used to identify long-term stock trends in the context of climate change.*”).

Objectives

1. Develop a comprehensive strategy for expansion of remote PIT tag interrogation arrays to best represent Chinook salmon spawning distribution in the Copper River
2. Install four complete PIT tag interrogation array systems at key representative spawning tributaries of the Copper River
3. Develop the internal capacity of a federally recognized Tribe to design, construct, install and maintain PIT tag interrogation systems as the foundation of a basin-wide long-term monitoring program.

Methods: Through a comprehensive literature/data review and collaboration with traditional experts and fishery managers, a list of potential installation sites will be developed and prioritized using fishery and fluvial data, aerial imagery, and ground-based site surveys. Installations will then be completed one per year for the four years of the proposed monitoring program. For the first year, in-house remote RFID streambed readers will be installed to complete 100% channel coverage at the ADF&G counting tower site on the Gulkana River (62°35'52"N, 145°36'55"W). Subsequent installation sites will be determined through site surveys completed in the first year. A comprehensive plan for future streambed reader installation locations would efficiently and effectively guide future installation efforts by any sponsor to provide the most management-relevant information. NVE biologists will complete the construction of all antenna panels in-house, and incorporate these into an overall interrogation system design using a range of the best available electronics components (transceiver/reader, datalogger, multiplexor, data transmission, power supply, etc.) at the time of construction. One complete interrogation system will be installed at a different site in each of the four project years, and each array will be configured to continuously monitor for the presence of PIT tags throughout the duration of the Chinook salmon migration (~June-Sept). Each tag passing the array will be thereby detected, decoded and logged by the transceiver. Data analyses will provide insight on temporal and spatial changes in spawning distribution and stock specific run timing of Chinook salmon, as well as guiding future development of monitoring infrastructure basin-wide.

Partnerships/Capacity Building: This project has been discussed with representatives from the U.S. Fish and Wildlife Service, U.S. Forest Service (USFS), Alaska Department of Fish and Game (ADF&G), Native Village of Eyak (NVE), Copper River Intertribal Resource Conservation District (CRITR) and Ahtna, Inc. ADF&G has offered support in allowing the continuation and expansion of the interrogation system at the Gulkana Counting Tower site. All plans and resulting information will be shared with the Ahtna Tene Nene C&T Committee and Gulkana Village Council, and other interested stakeholders. BLM will also be consulted as landowner and co-manager of the counting tower site. Various private and public landowners will be consulted as relevant to chosen installation sites. Through the proposed program, NVE will receive training and develop expertise to design, construct, install and maintain cutting edge streambed RFID interrogation systems. This capacity will reduce future program costs on the Copper River, and provide a more convenient pathway for other Alaskan organizations to develop this technology. NVE intends to partner closely with CRITR throughout the comprehensive planning phase of this program, to both receive and share knowledge and information. Ultimately, NVE hopes to help guide and develop the capacity of upriver Tribes to meaningful participate in Copper River subsistence fishery management through installation and maintenance of their own monitoring arrays within a broader reaching network. NVE and ADF&G will provide technical review of data post-processing and statistical analyses. Hiring preference will be given to Alaska Natives and local residents. This project will continue to build upon NVE's ability to conduct fisheries research and management activities on the Copper River. NVE's Copper River Chinook

escapement monitoring program, FIS 10-503, and RFID Feasibility Study, FIS 12-500, are currently funded through FY13.

**14-507 - Develop and Test a Portable Graduated Field Fish Barrier
as a Tool to Monitor Salmon Escapements**

Project Number: 14-507
Title: Develop and test a portable Graduated Field Fish Barrier as a tool to monitor salmon escapements
Geographic Area: Kenai NWR/ Kuskokwim
Data Type: Stock Status and Trends
Principal Investigator(s): Steve J. Miller, U.S. Fish and Wildlife Service, Kenai Fish and Wildlife Field Office
Co-Investigator(s): Ken Harper, U.S. Fish and Wildlife Service, Kenai Fish and Wildlife Field Office
Kenneth Gates, U.S. Fish and Wildlife Service, Kenai Fish and Wildlife Field Office
Carl Burger Senior Scientist, Smith-Root Inc.

Project Costs:

2014	2015	2016	2017
\$185,140	\$23,204	\$0	\$0

Total: \$208,344

Issue Addressed: The Enumeration of salmon escapements is critical for managing subsistence fisheries. In fact, the Federal Subsistence Fisheries 2012 Fishery Resource Program has identified a priority information need of reliable estimates of salmon escapements for four of the five regional areas. However, accurate counts can often be thwarted due to high or flood waters, turbid conditions, and excessive substrate deposition. Statewide, floating resistance-board weirs are used to gather escapement data. Although these are an advance over fixed picket weirs in their ability to operate in debris laden waters, their operating tolerances are often exceeded (4 of the last 13 on the Kwethluk River) on river systems in which accurate salmon counts are vital. One promising Technology that is currently available that may address current limitations is the use of Graduated Electric Field Fish Barrier (GEFFB) technology. The pulsed DC waveforms used in GEFFB's have been used safely and effectively worldwide to manipulate the swimming and migratory behavior of a variety of species. The deployment of A GEFFB to enumerate salmon escapement has the potential to be both more reliable and cost-effective than traditional weir projects. This proposal will fund the incorporation of a Graduated Electric Field Fish Barrier (GEFFB) with an existing weir escapement project to test the feasibility of using an electronic guidance array to pass migrating adult salmon upstream through a fish trap and video counting chute.

Objectives:

1. Design and operate a portable GEFFB to estimate salmon escapements
 - a. Assess the accuracy of the GEFFB.
 - b. Determine the feasibility of relocating the GEFFB to remote field locations (e.g. tributaries in the lower Kuskokwim River).

Methods: A pulsed DC electrical array will be installed upstream of the existing Funny River resistance board weir (FIS 10-306) and operated simultaneously to obtain paired coho salmon escapement counts during August and September 2014. The GEFFB will be used to redirect coho salmon to one side of the river channel with very low power pulsed DC waveforms where they

will travel unimpeded through a smaller and more manageable corridor affixed with an underwater video system. During set up and calibration to determine the optimal power settings fish may pass upstream undetected by the GEFFB video system. To account for missed fish, movement will be assessed visually when water clarity permits and a DIDSON hydro acoustic unit. The DIDSON video unit will be supplied by the Alaska Department of Fish and Game and used to monitor fish behavior 24 hours per day as they approach the GEFFB. The DIDSON will allow for monitoring when visual observations are curtailed due to highwater, turbidity, and or daylight hours. Setup and design of the video systems will be similar to that used by Boersma and Gates 2013; Gates et al. (2010) in Crooked and Nikolai creeks, and Miller and Harper (2012) in the Tuluksak and Kwethluk Rivers. Both video systems will consist of one underwater video camera located inside a sealed video box attached to the fish passage chute upstream of a fish trap. Fish will be passed through both GEFFB weir and resistance board weir and video camera chutes twenty-four hours seven days a week. All fish passing upstream will be counted and identified to species. All video images will be recorded on an external hard drives using a computer-based digital video recorder (DVR) 24 hours each day.

Efficiency of the GEFFB will be determined by the comparison of passage once the unit is calibrated and adjusted to account for water conductivity, depth, and electrode and trap and passage placement. Feasibility of moving the system to a remote location will be determined by costs associated with powering the system in a remote location. Costs will be calculated based upon daily usage of a portable generator during testing. Three to five days of continuously powering the system using portable generators will be used to calculate the fuel consumption necessary to power the unit in a remote site.

Partnerships and Capacity Building: Dependent upon Objective 1, the project would be moved to the Kwethluk River on the Yukon Kuskokwim Delta National Wildlife Refuge where it would be used to replace the Kwethluk resistance board weir. OVK is a co-investigator with the Kwethluk River weir project (2000–2013). Tribal members from Kwethluk comprise the majority of staff operating the Kwethluk River weir where the GEFFB would be placed. OVK members are trained in biological techniques, computer skills, and safety (e.g. bear and firearms, watercraft, aircraft). Administrative support for the weir project is also provided by OVK. Village council members are encouraged to visit project sites. OVK and TNC technicians have been exchanged intermittently between weir projects during the season and have been incorporated into other Kuskokwim River projects to expand the understanding of fisheries projects in the drainage. KFWFO continues to mentor and train residents hired by the villages to work at the weirs and other project operations.

This project has been supported by the Kuskokwim Fisheries Resource Coalition (KFRC) and the Kuskokwim River Salmon Management Working Group (Working Group). The KFRC is an organization consisting of representatives from the Service, Orutsarmuit Native Council (ONC), Kuskokwim Native Association (KNA), the Association of Village Council Presidents (AVCP), Takotna Tribal Council, McGrath Native Village Council, and ADF&G. The Kuskokwim River Salmon Management Working Group. Group members are comprised of Village elders, subsistence users, representatives from sport and commercial interests and ADF&G. Working group is funded by OSM.

14-508 - Predicting the effects of climate change on Alaska blackfish (*Dallia pectoralis*): An integrative approach

Project Number: 14-508
Project Title: Predicting the effects of climate change on Alaska blackfish (*Dallia pectoralis*): An integrative approach.
Geographic Region: Southcentral Alaska
Data Type: Stock Status and Trends
Principle Investigator: Jonathan Stecyk, University of Alaska Anchorage, Department of Biological Sciences
Co-Investigator: Jeff Melegari, U.S. Fish and Wildlife Service, 101 12th Ave., Room 110, Fairbanks Alaska, 99701, phone: (907)-456-1853, email: jeff_melegari@fws.gov.

Project Costs:

2014	2015	2016
\$128,891	\$134,103	\$137,006

Total: \$400,000

Issue: The project will investigate through the combination of: 1) multifaceted physiological laboratory studies; and 2) field data collected by local fishers, students and villagers, the effect climate change, namely increased temperature, will have on Alaska blackfish (*Dallia pectoralis*). Historically, the Alaska blackfish has been an important subsistence food resource for Alaska Natives. The fish was especially important for nourishing sled dog teams. Presently, despite changing technologies (i.e., the arrival of snow machines), the Alaska blackfish is still utilized as a subsistence resource by a number of village households (Alaska Department of Fish and Game Community Subsistence Information System data) and remains a popular food among village elders. However, temperatures in Alaska are increasing at a rate double the national average and are predicted to continue increasing in the immediate future. Rapidly increasing temperature maybe detrimental to the Alaska blackfish since it is adapted to survive at cold temperatures. In general, species living at high latitudes typically display a narrow thermal tolerance range and have less capacity for thermal acclimation than populations from more thermally variable temperate latitudes. High latitude species may thus be particularly sensitive to climate change. Indeed, past research has documented that the Alaska blackfish is unable to survive even brief periods of time at room temperature (25°C). However, it remains unknown how the blackfish will respond to the more moderate increases in temperature predicted to occur in Alaska over the next century. A depletion of Alaska blackfish stocks due to increased temperature could have stark consequences for the importance of the fish as a sustainable subsistence resource. It is thus important to gain a comprehensive and mechanistic understanding of how the physiology of blackfish is adapted to its current environment and how the physiology of Alaska blackfish will be affected by exposure to increased temperature. In this regard, the proposed experiments promise to provide relevant information for the management of the Alaska blackfish subsistence fishery.

Objectives: The proposed research will aim to understand the physiology of the Alaska blackfish as a tool to predict the effects climate change (i.e., increased temperature) will have on the species. The overarching research goals of the proposed research are three-fold. They are to:

1. Gain a comprehensive and mechanistic understanding of how the Alaska blackfish survives in its current day summer and winter environment via laboratory experiments.
2. Understand at the physiological level how the Alaska blackfish will respond to increased temperatures via laboratory experiments.
3. Obtain seasonal data on the temperature and oxygenation level of the natural waters in which blackfish reside over the term of the project. The integration of the data gathered from the laboratory physiological experiments with that of long-term environmental measurements has the potential to aid the development of specific socio environmental resource decisions pertaining to management of the Alaska blackfish subsistence fishery.

Methods: In order to gain a mechanistic understanding of how the Alaska blackfish survives overwintering, as well as its capacity to survive and adapt to increased temperature, an integrative experimental approach will be employed. The proposed research will incorporate a number of laboratory experiments that will span many levels of biological organization. In particular, the proposed research will utilize a multifaceted and multidisciplinary approach to discern at the level of the whole-animal (by respirometry and cardiovascular measurements), tissue (by examining the properties of isolated heart chambers), cell (via electrophysiological measures of ionic currents in isolated cardiomyocytes) and transcript (through real-time RT-PCR measures of gene expression) the physiological mechanisms that enable the fish to survive the harsh Alaskan winters and therefore gain a detailed understanding of the “normal” physiology of the fish. Likewise, the same techniques will be utilized to understand how the fish will respond to increased temperature and if it has the capability to acclimate to high temperatures. The laboratory physiological experiments will be complimented by the collection of seasonal field data of the water temperature and oxygenation level of waters blackfish reside by local fishers, students and villagers.

Partnerships/Capacity Building: The proposed research promises to discover important physiological information pertaining to a subsistence fish species that has been and continues to be of high importance to Alaska Native populations. The proposed research is thus well suited to pique the interest of Native and rural Alaskans, especially high school students, in scientific research and provide experience and training in science for school students of all ages. A key aspect of the proposed research is the incorporation of villagers and/or school students from communities that utilize Alaska blackfish for subsistence into the research project. It is hoped that local citizens and students will participate in monitoring seasonal changes in temperature and oxygen content of their local ponds and waterways where blackfish reside. The incorporation of school students into the research project will introduce them to the rigors of scientific investigation and joys of scientific discovery. Ideally, the collaborative research effort between the PI and school districts could lead towards the establishment of a high school mentoring program. The PI has contacted administrators, school staff and teachers of the Lower Kuskokwim School District to inquire about their potential interest in forging a collaborative effort in the context of the proposed research. Additionally, the PI has established a professional working relationship with Doug Hill, the Habitat Biologist for the Palmer Hay Flats State Game Refuge. Mr. Hill has offered to be of assistance to the proposed research by facilitating the forging of partnerships between the PI and members of rural school boards and governance councils. Mr. Hill spent a number of years working in the Yukon River area, during which time he established many friendships and acquaintances with the people of the region.

**14-551 - Kenai Peninsula Subsistence Use Areas for Salmon and Nonsalmon Fish Species:
Current and lifetime use areas of residents of Cooper Landing, Hope, and Ninilchik**

Project Number: 14-551
Title: Kenai Peninsula Subsistence Use Areas for Salmon and Nonsalmon Fish Species: Current and lifetime use areas of residents of Cooper Landing, Hope, and Ninilchik
Geographic Region: Southcentral
Data Type: Harvest Monitoring/Traditional Ecological Knowledge
Principal Investigator: Davin Holen, Division of Subsistence, Department of Fish and Game, Anchorage.
Co-Investigators: Bronwyn Jones, Division of Subsistence, Department of Fish and Game,
Malla Kukkonen, Division of Subsistence, Alaska Department of Fish and Game

Project Cost:

2014	2015	2016	2017
\$47,049	\$107,141	\$36,490	\$0

Total: \$190,680

Issue: The noncommercial use of five Pacific salmon and a variety of marine and freshwater non-salmon fish species for subsistence/personal use has a long history on the Kenai Peninsula area predating the Euro-American colonization of Alaska. Changes in fishing regulations, fisheries management agencies, demographics, transportation technology, socio-cultural, economic, and environmental factors have shaped salmon and nonsalmon fish species harvest efforts over time. This project responds to the Southcentral Alaska Region Priority Information Need identified by the Office of Subsistence Management to map “lifetime and current subsistence use areas for harvest of salmon and nonsalmon fish species by residents of Ninilchik, Hope, and Cooper Landing.” The three communities are presently considered rural by the Federal Subsistence Board and under current Federal subsistence fisheries regulations residents of these communities are eligible to participate in Federal subsistence fisheries in the Cook Inlet Area. The focus of this research is to map and document past and present fishing locations, methods of access to harvest locations, seasonality of fish harvest, type of gear used to harvest, and impacts of climate change on study community residents’ fishing locations preferences. Understanding the causes and extent of potential changes in fish harvest locations will aid in the management of Southcentral salmon and nonsalmon fish stocks.

Objectives:

1. Map current and lifetime subsistence use areas and the intensity of area use for salmon and nonsalmon fish species in the Kenai Peninsula area by residents of Ninilchik, Hope and Cooper Landing.
2. Describe changes in harvest locations of salmon and nonsalmon fish species in the context of past and on-going shifts in socio-cultural, economic, and climate change induced factors.
3. Document how fishing regulations have impacted residents’ choices of fishing locations during their lifetime.

Methods: This research will employ three integrated social science data gathering methods: (1) public community mapping meetings, (2) individual map biographies with key respondents, and (3) group mapping sessions with individual map biographers. The public community mapping meetings are designed to provide researchers with the opportunity to interview a variety of fish harvesters by asking them to document their current and lifetime fish harvest locations on an Ipad with a mapping application. Researchers will ask participants a short standard set of questions about their salmon and nonsalmon fish species harvest patterns, harvest locations and intensity of area use, methods of access to harvest locations, as well as the impacts of regulations on their harvest locations. Key respondent interviews will be transcribed and the transcripts will be coded in Atlas Ti and organized to answer the research questions. Coded and organized key respondent interviews map data will be digitized and analyzed for spatial references. A map biography will consist of a recorded interview and a mapping component guided by a semi-structured interview protocol. Researcher will ask key respondents about their current and lifetime salmon and nonsalmon fish species harvest locations and reasons for harvest location choices. The group mapping session with individual key respondents are designed to ensure data accuracy. These sessions will warrant that the previously collected spatial map data and contextual qualitative information comprehensively represents the study communities salmon and nonsalmon fish species harvest locations. All of the collected qualitative and spatial information will be available for review as preliminary findings presented to each study community in the summer of 2016.

Partnerships/Capacity Building: Investigators will work closely with local organizations and/or tribal government of the study communities including engaging residents in designing the information gathering process, and discussing the possible ways of collecting subsistence fishing location data before the final research design is developed. This will result in increased organizational capacity and local expertise of community specific, as well as regional knowledge of current and past salmon and nonsalmon fish species harvest locations. The information will assist organizations and/or tribal government as well as interested community members in participating in federal and state subsistence fisheries management. Copies of the report will be sent to all residents who participate in the project. Additional opportunities for capacity building will be sought throughout the duration of the project.

14-552 - Harvest and Use of Subsistence Fishery Resources and Related Ecological Knowledge among Residents of Hope, Ninilchik, and Cooper Landing in Southcentral Alaska

Project Number: 14-552
Project Title: Harvest and Use of Subsistence Fishery Resources and Related Ecological Knowledge among Residents of Hope, Ninilchik, and Cooper Landing in Southcentral Alaska
Geographic Region: Southcentral Alaska
Data Type: Harvest Monitoring/Traditional Ecological Knowledge
Principal Investigator: Edward W. Glazier, Ph.D., Impact Assessment, Inc.

Project Cost:

2014	2015	2016	2017
\$58,267	\$96,144	\$0	\$0

Total: \$154,411

Issue: The project described in this proposal is designed to assist the Office of Subsistence Management support decision-making processes undertaken by the Federal Subsistence Board and the Federal Subsistence Regional Advisory Councils by providing the them with valid information regarding human-ecological aspects of subsistence fisheries occurring on federal lands in the Cook Inlet Fisheries Management Area. More specifically, the proposed research will: (a) build on the base of existing knowledge regarding harvest and use of federal subsistence fishery resources by residents of Hope, Ninilchik, and Cooper Landing along the Kenai Peninsula in Southcentral Alaska, (b) undertake systematic resource use mapping exercises and in-depth interview research with samples of seasoned and knowledgeable subsistence fishery participants in each community, and (c) conduct various analyses to enable testing of the research hypothesis that spatial patterns in the harvest and use of federal subsistence fishery resources vary in relation to differing social conditions in, and attributes of, the study communities, with implications for how each community might be considered in any future state or federal resource management decision-making processes. The overarching goal of the proposed research is to work collaboratively with fishery participants in the study communities of Hope, Ninilchik, and Cooper Landing to improve understanding of subsistence fisheries and the human-ecological factors that constrain and enable subsistence fisheries on federal lands in the study region. The related intent is to leave the fishery participants and communities with a viable mechanism for documenting their own subsistence activities and related ecological changes over time.

Objectives:

1. Conduct preliminary, reconnaissance-type fieldwork;
2. Develop a Guide to Field Investigations to assist field studies;
3. Conduct in-depth fieldwork in a manner that facilitates collaborative working relationships with study communities and organizations;
4. Systematically identify networks of persons involved in the harvest and distribution of fish harvested from federal lands in the study region, and identify particularly seasoned and knowledgeable persons currently and formerly involved in the fisheries;
5. Conduct increasingly exacting in-depth interviews and mapping exercises with seasoned and knowledgeable harvesters;

6. Compile, review, and analyze archival data regarding socioeconomic and demographic conditions in and between the study communities, and site-specific and regional patterns of subsistence-oriented use of marine and aquatic ecosystems along the Kenai Peninsula;
7. Characterize the harvest and use of the subject subsistence fishery resources among the study communities, with specific analysis of spatial patterns of harvest and distribution of subsistence fishery resources from federal lands;
8. Characterize informant-reported experiences and observations regarding changes in pertinent elements of marine, terrestrial, and aquatic ecosystems in the study region, with directed focus on the potential effects of climate change on subsistence fishery resources on federal lands;
9. Conduct workshops to engage subsistence fishery participants in developing systematic means for long-term self-documentation of harvest and distribution of subsistence fishery resources and perceived changes in the supporting ecosystems;
10. Generate and disseminate full and summary draft and final project reports.

Methods:

1. In-depth interviews with local officials, elders, and fishery participants;
2. Unobtrusive ethnographic observation and documentation of pertinent aspects of local lifeways;
3. Participant observation;
4. Purposive social network sampling;
5. Systematic mapping exercises with seasoned and knowledgeable harvesters;
6. Cultural consensus modeling;
7. Focus group meetings;
8. Technical workshops;
9. Quantitative, qualitative, and spatial analysis.

Partnerships/Capacity Building: The proposed effort is designed to deepen understanding of the nature and extent of subsistence fishing activities occur on federal lands in Southcentral Alaska. The project emphasizes documentation of the spatial parameters of subsistence fishing effort, and social-spatial patterns of distribution of fish resources resulting from that effort. The proposed work will involve a focused effort to engage fishery participants in the process of documenting their own harvest activities, fish sharing practices, and observations of ecological change over time. The intent of each portion of the project is to enhance the potential for effective and equitable management of vitally important fishery resources for the benefit for the study communities, and to aid in strengthening the capacity of community stakeholders to better understand and effectively manage their own valued sociocultural practices and subsistence food resources.

SOUTHEAST REGION OVERVIEW

Issues and Information Needs

The 2014 Funding Opportunity for the Southeast Alaska Region identified three priority information needs:

Eulachon

- Provide an index of escapement for Unuk River and Yakutat Forelands eulachon.

Sockeye Salmon

- Obtain reliable estimates of sockeye salmon escapement. Stocks of interest include: Hetta, Karta, Sarkar, Hatchery Creek, Gut Bay, Falls, Kah Sheets, Salmon Bay, Klage, Kanalku, and Hoktaheen.
- Document in-season subsistence harvest assessment of sockeye salmon. Stocks of interest include: Hetta, Hatchery Creek, Gut Bay, Falls, Kah Sheets, Salmon Bay, Klag, Kanalku, and Hoktaheen.

Projects Funded Under the Fisheries Resource Monitoring Program

Since the inception of the Monitoring Program in 2000, 59 projects have been funded in the Southeast Alaska Region. None will be operating during 2012 (**Tables 1**).

Projects Forwarded for Investigation Plan Development

Twelve investigation plans for research in the Southeast Alaska 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 eleven 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 2 and 3**).

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 review and evaluation, the Technical Review Committee, Regional Advisory Councils, Interagency Staff Committee and Federal Subsistence Board have the opportunity to address the highest priority projects across regions. For 2014, approximately \$875,000 is available for funding new projects in the Southeast Alaska Region (**Table 4**).

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 twelve investigation plans, the Technical Review Committee recommended funding all eleven of the proposed projects and prioritized them in the following descending order:

14-607 Unuk River District 1 Hooligan Monitoring	\$ 60,215
14-608 Kanalku Lake Subsistence Sockeye Salmon Stock Assessment	\$160,066
14-602 Falls Lake Sockeye Salmon Stock and Harvest Assessment	\$121,650
14-605 Hatchery Creek Sockeye Salmon Stock Assessment	\$144,264
14-610 Kook Lake Sockeye Salmon Stock Assessment	\$169,794
14-611 Sitkoh Lake Sockeye Salmon Stock Assessment	\$ 97,025
14-603 Hetta Lake Sockeye Salmon Stock Assessment	\$173,405
14-609 Klag Lake Sockeye Salmon Stock Assessment	\$120,473
14-612 Neva Lake Sockeye Salmon Stock Assessment	\$145,942
14-606 Klawock Lake Sockeye Salmon Stock Assessment	\$ 27,594
14-601 Redoubt Lake Sockeye Salmon Stock Assessment	<u>\$ 26,575</u>
TOTAL	\$1,247,003

The eleven 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. Each project submitted for funding in the Southeast Alaska Region in 2014 is summarized below (see Executive Summaries for more details on all projects).

**Summaries of Projects Recommended for Funding
by the Technical Review Committee**

14-601 Redoubt Lake Sockeye Salmon Stock Assessment. Fund. This project would validate the ongoing annual escapement estimates of sockeye salmon into Redoubt Lake. Obtaining reliable estimates of sockeye salmon escapement into Redoubt Lake is listed as a priority information need in the 2014 Notice of Funding. Managers implementing the Redoubt Lake Sockeye Salmon Management Plan are dependent upon reliable estimates of escapement to maximize subsistence opportunity and to conserve the run in years of poor escapement. Sockeye returns will be estimated using proven weir and mark/recapture methods. The project will build on the escapement information previously collected at Redoubt Lake. Technical merit is high with clear, measurable and achievable objectives. The requested amount of approximately \$27,000 in annual funding would provide for the additional cost of mark recapture techniques to validate the existing weir. This budget is very reasonable due to efficiencies of combining this project with the ongoing fertilization and weir efforts. The Forest Service has successfully operated this project for many years.

14-602 Falls Lake Sockeye Salmon Stock and Harvest Assessment. Fund. This project will support continued operation of the Falls Lake sockeye stock assessment project to estimate the subsistence harvest of sockeye salmon near Falls Lake and the escapement and age, sex, and length composition of sockeye salmon into Falls Lake. This project has been supported with FRMP funds since it began in 2001. Due to the close proximity to significant commercial fisheries, the potential for competing harvest is high. In addition, subsistence exploitation is potentially high. This project represents good collaboration between the Forest Service and the Organized Village of Kake and a reasonable allocation of responsibilities and funding, as desired by the Village of Kake, between these two entities. This project is of high strategic importance. This project has received significant co-funding through the Southeast Sustainable Salmon Fund in the past. The annual project budget is similar to the funded amounts for previous years.

14-603 Hetta Lake Sockeye Salmon Stock Assessment. Fund. Hetta Lake supports one of the larger subsistence sockeye harvests in the region and the most important to residents of Hydaburg. The potential for significant competing harvest of this resource is high, subsistence

exploitation is high, and there is evidence of recent low escapements that could limit future returns. To date, this project has allowed for estimation of the Hetta Lake sockeye escapement using weir and mark-recapture and has estimated the subsistence sockeye harvest by Hydaburg residents using completed-trip interviews. Continuing this project will allow Hydaburg Cooperative Association to take a longer term data set and begin making predictive models to determine future sockeye salmon returns to Hetta Lake.

14-605 Hatchery Creek Sockeye Salmon Stock Assessment. Fund. This project will support continued operation of the Hatchery Creek weir to estimate the escapement and age, sex, and length composition of sockeye salmon. This is a high priority project in the Southeast Alaska region given the uncertain escapement levels and high potential harvest by the rural residents of Prince of Wales Island. Management actions have been taken the past six years to restrict or close sport, personal use, or federal subsistence fishing for sockeye salmon in Hatchery Creek. This project promotes good collaboration among the Organized Village of Kasaan and the U.S. Forest Service. The principal investigator would be a Forest Service biologist and the weir personnel will be hired by the Organized Village of Kasaan.

14-606 Klawock Lake Sockeye Salmon Stock Assessment. Fund. This project would be a partial continuation of the monitoring program funded Klawock Lake sockeye stock assessments that began in 2000. Past projects at this location have successfully estimated the Klawock Lake sockeye escapement using weir and mark-recapture and estimated the subsistence sockeye harvest from on-site interviews. Klawock Lake supports one of the largest subsistence sockeye harvests in the region and the most important to residents of Klawock. This system is in close proximity to other competing resource uses and subsistence exploitation is high. Although not currently identified as a priority study location, this low cost proposal is designed to provide managers more reflective information of the returns during the subsistence fishery and after. This project promotes good cooperation among, Klawock Cooperative Association, Prince of Wales Hatchery Association, and the US Forest Service in the stock assessment and management of the Klawock sockeye resource. US Forest Service will employ the principal investigators and the Klawock Cooperative Association will be directly funded to employ the field personnel.

14-607 Unuk River District 1 Hooligan Monitoring. Fund. This project addresses a 2014 information need and a conservation issue. The project has high strategic value since eulachon returns to the Unuk River have been dismal in recent years. The Unuk River eulachon stock is important to the local area harvesters. Subsistence harvest of eulachon in the Unuk River takes place in waters under Federal jurisdiction. From 2005-2010, virtually no eulachon returned, resulting in a closure to all harvest beginning in 2006. In 2011 and 2012 low numbers of Eulachon returned to the Unuk River, but Federal subsistence managers currently believe that it will be some time before there is a harvestable surplus. The investigators will use satellite internet video equipment and trail cameras to provide managers with daily conditions on the Unuk River. The presences of eulachon returning to the rivers can be detected by predator activity via satellite. When returns are noted monitoring will occur through boat or foot surveys. The information will be used for continued evaluate the stock characteristics and status.

14-608 Kanalku Lake Subsistence Sockeye Salmon Stock Assessment. Fund. Federally qualified subsistence users are the primary harvesters of sockeye salmon from Kanalku Lake. Kanalku Lake was listed as a strategic priority in 2014 for the Southeast region. Recently, low returns prompted regulatory measures and subsistence closures forcing Angoon residents to obtain their sockeye salmon from Kook and Sitkoh Lakes across Chatham Strait. The investigators have the education, training, and administrative processes to ensure successful completion of this project. The investigator stated that additional funding was obtained in 2012

from the Alaska Sustainable Salmon Fund for the placement of two weirs below Kanalku Falls, one video weir and one picket weir. This project coupled with the spawning escapement estimates provided by this investigation plan would be used to provide an estimate of the natural mortality rate of sockeye salmon at Kanalku Falls.

14-609 Klag Lake Sockeye Salmon Stock Assessment. Fund. The Klag Lake weir is an established project operated by the Sitka Tribe of Alaska. This project will address a priority information need in the 2014 Notice of Funding by Klag sockeye escapement and in-season harvest information was listed as a priority information need in the 2014 Notice of Funding. The Klag Lake system is within the boundaries of the Tongass National Forest and federally qualified federal subsistence users harvest this stock. The subsistence effort and harvest of sockeye salmon at Klag Lake increases when Redoubt Lake sockeye salmon escapements are depressed and when subsistence fishing closures occur. Reliable estimates of escapement into Klag Lake will increase our knowledge on the stock which will assist in better management decisions.

14-610 Kook Lake Sockeye Salmon Assessment. Fund. Technical merit is high and the project addresses a priority information need in the 2014 Notice of Funding. Sockeye returns will be estimated using proven weir and mark/recapture methods for this system. Kook Lake sockeye salmon are an important subsistence resource for Angoon residence and with sockeye salmon returns decreasing throughout the Chatham Strait area it is important to get a good solid baseline of information to assist with management decisions during times of low salmon runs. Due to the close proximity of Kook and Sitkoh Lake, another Monitoring Program project under review, both projects can be monitored simultaneously and operated at relatively low costs by personnel stationed at Kook Lake. Escapement projects at Kook Lake have been sporadic and currently lack a long enough time series to assess any possible trends in production. This project will build on the escapement information previously collected at Kook Lake in 2010, 2011, 2012, and 2013. By funding this project there will be eight years of consistent data collection and escapement estimates which would give managers a better idea of how this system is functioning and make more informed management decisions.

14-611 Sitkoh Lake Sockeye Salmon Assessment. Fund. Sockeye salmon returns to Sitkoh Lake have long been an important subsistence resource for residents of the Angoon area, especially in recent years when runs to neighboring sockeye streams have decreased. Technical merit is high on this project is high and the project addresses a priority information need in the 2014 Notice of Funding. The project methodology has been proven to work at this location and the project will build on the escapement information previously collected at Sitkoh Lake. Due to the close proximity of Sitkoh Lake and Kook Lake, another Monitoring Program project under review, this project can be monitored simultaneously and operated at relatively low costs. Both investigators have successfully completed projects funded by the Fisheries Resource Monitoring Program. This project would increase the information on both spawning escapements of sockeye salmon stocks in the Northern Chatham Strait area. The simple Peterson estimate, variance, and coefficient of variation listed under the *Escapement Indexing Section* of the IP should use the standard statistical notation and not the converted notation of Ricker.

14-612 Neva Lake Sockeye Salmon Assessment. Fund. Technical merit is high and the project addresses a priority information need in the 2014 Notice of Funding. Sockeye returns will be estimated using proven weir and mark-recapture methods for this system. The project will build on the escapement information previously collected at Neva Lake since 2002. Sockeye salmon returns to Neva Lake have long been an important subsistence resource for residents of the Hoonah area because of its close proximity and it's "a good run of sockeye". The investigators have successfully completed projects funded by the Fisheries Resource Monitoring Program in

the past and this project is has a reasonable budget compared to similar projects throughout the region and state.

**Summaries of Projects Not Recommended for Funding
by the Technical Review Committee**

14-604 Eek Lake Subsistence Sockeye Salmon Stock Assessment. Do Not Fund. This proposal would provide funding to assess age, sex and length composition and total escapement of sockeye into Eek Lake and has a strong capacity building component for the Hydaburg Cooperative Association who has been continually building their fisheries program since 2001 and now serves as principal investigator for the Hetta Lake Subsistence Sockeye Salmon Project. Hetta Lake and Eek Lake, respectively, are reported to be the first and second most important subsistence fisheries for the community of Hydaburg. As the secondary fishery behind Hetta Lake, this project is of lower strategic importance than Hetta Lake. The recommendation of “do not fund” comes as a result of this lower strategic importance and lower level of available funds than past years. If higher levels of funds become available in the future, this project may be reconsidered for funding.

Table 1. Summary of Fisheries Resource Monitoring Program projects completed in Southeast Alaska since 2000. Abbreviations used are: ACA=Angoon Community Association, ADFG=Alaska Department of Fish and Game, CCTHITA=Central Council of Tlingit & Haida Indian Tribes of Alaska, HCA=Hydaburg Cooperative Association, HIA=Hoonah Indian Association, KCA=Klawock Cooperative Association, OVK=Organized Village of Kake, STA=Sitka Tribe of Alaska, TST=Third Sector Technologies, USFS=USDA Forest Service, WCA=Wrangell Cooperative Association, and YTT=Yakutat Tlingit Tribe.

Project Number	Project Title	Investigators
<i>Estimation of Sockeye Salmon Escapement</i>		
00-043	Klawock Lake Sockeye Salmon Assessment	ADFG, KCA
00-044	Falls Lake Sockeye Salmon Stock Assessment	ADFG, OVK
01-125	Gut Bay, Kook, and Hoktaheen L Sockeye Salmon Escapement Index	ADFG, OVK
01-126	Kanalku, Hasselborg and Sitkoh Lakes Sockeye Stock Assesment	ADFG
01-127	Thoms, Salmon Bay, Luck Lakes Sockeye Salmon Esc Index	ADFG, WCA
01-128	Klag Bay Sockeye Salmon Stock Assessment	ADFG, STA, USFS
01-130	Hetta Lake Sockeye Salmon Stock Assessment	ADFG, HCA
01-175	Salmon Lake Sockeye and Coho Salmon Stock Assessment	ADFG, STA, NSRAA, USFS
01-179	Virginia Lake Sockeye Salmon Assessment	USFS
02-012	Neva and Pavlof Sockeye Salmon Stock Assessment	USFS, HIA
02-017	Redfish Bay Sockeye Salmon Stock Assessment	STA, ADFG, USFS
03-007	Eek Lake Sockeye Salmon Stock Assessment	HCA, ADFG
04-604	Klawock Lake Sockeye Salmon Assessment	ADFG, KCA
04-605	Kanalku, Sitkoh Lakes Sockeye Salmon Stock Assessment	ADFG, ACA
04-606	Hetta Lake Sockeye Salmon Stock Assessment	ADFG, HCA
04-607	Falls, Gut, Kutlaku Subsistence Sockeye Stock Assessment	ADFG, OVK
04-608	Salmon Lake Sockeye Salmon Stock Assessment	STA
04-609	Klag Bay Sockeye Salmon Stock Assessment	STA, ADFG, USFS
05-601	Kook Lake Sockeye Salmon Assessment	ADFG, ACA, USFS
05-603	Klawock Lake Sockeye Salmon Assessment	ADFG, USFS
06-601	Neva Lake Sockeye Salmon Assessment	USFS
06-602	Kutlaku Lake Sockeye Salmon Assessment	ADFG, OVK
07-601	Hatchery Creek Sockeye Salmon Assessment ^a	OVK, USFS
07-604	Klag Bay Sockeye Salmon Assessment	STA
07-606	Hetta Lake Sockeye Salmon Assessment	ADFG
07-607	Kanalku Lake Sockeye Salmon Assessment	ADFG, ACA
07-608	Klawock Lake Sockeye Salmon Assessment	ADFG, KCA
07-609	Falls Lake Sockeye Salmon Assessment	ADFG, OVK
08-600	Karta River Sockeye Salmon Assessment ^a	OVKa
10-600	Karta River Sockeye Salmon Assessment ^a	OVK
10-601	Hatchery Creek Sockeye Salmon Assessment ^a	USFS
10-603	Yakutat Eulachon Surveys ^a	USFS
10-604	Klag Lake Sockeye Salmon Assessment ^a	STA
10-605	Sitkoh Lake Sockeye Salmon Assessment ^a	USFS
10-606	Hetta Lake Sockeye Salmon Assessment ^a	HCA
10-607	Kanalku Lake Sockeye Salmon Assessment ^a	ADFG
10-609	Falls Lake Sockeye Salmon Assessment ^a	ADFG
10-610	Kook Lake Sockeye Salmon Assessment ^a	USFS
10-611	Redoubt Lake Sockeye Salmon Assessment ^a	USFS
10-612	Neva Lake Sockeye Salmon Salmon Assessment ^a	USFS

<i>Table 1. Continued</i>		
Project Number	Project Title	Investigators
<i>Documentation of Subsistence Use Patterns for Salmon</i>		
00-015	SE Alaska Subsistence Fisheries Database Development	ADFG
00-045	SE Tribes Traditional Subsistence Territory Mapping	USFS, OVK, ACA, HIA
01-091	East Alsek River Salmon Historical Use and TEK	YTT
01-103	SE Subsistence Fisheries GIS Database	ADFG
01-104	Kake Sockeye Salmon Subsistence Harvest Use Pattern	ADFG, OVK
01-105	Klawock River and Sarkar L Sockeye Salmon Harvest Use Patterns	ADFG, KCA
02-038	SE Subsistence Fisheries GIS Database Development	ADFG, CCTHITA, TST
02-049	Wrangell Salmon Subsistence Harvest Use Pattern	ADFG, WCA, USFS
02-104	Hoonah and Klawock Salmon Survey	ADFG, CCTHITA, TST
04-651	SE Alaska Salmon TEK and Subsistence Monitoring ^a	STA, ADFG
04-652	Subsistence TEK Database	ADFG, STA
06-651	Southeast Alaska Survey of Customary Trade in Seafood ^a	CCTHITA
07-651	Hydaburg Sockeye Salmon Customary and Traditional System	HCA, PVT
08-651	Maknahti Island Subsistence Herring Fishery Assessment	STA
<i>Prince of Wales Island Steelhead</i>		
01-105	POW Island Steelhead/Rainbow Trout Harvest Use Pattern	ADFG
05-604	Prince of Wales Steelhead Assessment	ADFG, OVKa
08-650	POW Island Steelhead Trout Subsistence Harvest Survey	OVKa, HCA
<i>Estimation of Non-salmon Species</i>		
07-610	Behm Canal Eulachon Genetics	USFWS
08-607	Unuk River Eulachon Assessment	USFS

^a Final Report in preparation.

Table 2. Southeast 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	Requested Budget (\$000)			
		Alaska Native	State	Federal	Other
<i>Stock Status and Trends Projects</i>					
14-601	Redoubt Lake Sockeye Salmon Stock Assessment			\$26.6	
14-602	Falls Lake Subsistence Sockeye Salmon Stock and Harvest Assessment	\$51.8		\$69.9	
14-603	Hetta Lake Subsistence Sockeye Salmon Stock Assessment	\$173.4			
14-604	Eek Lake Subsistence Sockeye Salmon Stock Assessment Project	\$80.7			
14-605	Hatchery Creek Sockeye Salmon Assessment	\$99.6		\$44.7	
14-606	Klawock Lake Sockeye Salmon Assessment	\$11.8		\$15.8	
14-607	Unik R District 1 Hooligan Monitoring			\$60.2	
14-608	Kanalku L Subsistence Sockeye Salmon Assessment	\$54.9	\$105.2		
14-609	Klag Lake Sockeye Salmon Assessment	\$120.5			
14-610	Kook Lake Sockeye Salmon Stock Assessment	\$88.7	\$2.5	\$78.6	
14-611	Sitkoh Lake Sockeye Salmon Stock Assessment	\$21.2	\$2.5	\$73.4	
14-612	Neva Lake Sockeye Salmon Stock Assessment	\$79.4	\$2.5	\$64.1	

Table 3. Southeast 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, HCA=Hydaburg Cooperative Association, STA=Sita Tribe of Alaska, and USFS=U.S. Forest Service.

Project Number	Lead Organization	Title	Funding (\$000s)	
			Local	Matching
<i>Stock Status and Trends Projects</i>				
14-601	USFS	Redoubt Lake Sockeye Salmon Stock Assessment		\$73.9
14-602	USFS	Falls Lake Subsistence Sockeye Salmon Stock and Harvest Assessment	\$19.9	
14-603	HCA	Hetta Lake Subsistence Sockeye Salmon Stock Assessment	\$78.8	
14-604	HCA	Eek Lake Subsistence Sockeye Salmon Stock Assessment Project	\$27.0	
14-605	USFS	Hatchery Creek Sockeye Salmon Assessment		\$16.3
14-606	USFS	Klawock Lake Sockeye Salmon Assessment		\$10.5
14-607	USFS	Unik R District 1 Hooligan Monitoring		
14-608	ADFG	Kanalku L Subsistence Sockeye Salmon Assessment	\$35.8	\$25.6
14-609	STA	Klag Lake Sockeye Salmon Assessment	\$10.3	
14-610	USFS	Kook Lake Sockeye Salmon Stock	\$72.7	
14-611	USFS	Sitkoh Lake Sockeye Salmon Stock Assessment	\$28.1	
14-612	USFS	Neva Lake Sockeye Salmon Stock	\$63.0	

Table 4. Southeast Alaska funding recommendations by the Technical Review Committee (TRC) for the 2014 Fisheries Resource Monitoring Program.							
Project Number	Title	TRC	Requested Budget (\$000)				
			2014	2015	2016	2017	
<i>Stock Status and Trends</i>							
14-601	Redoubt Lake Sockeye Salmon Stock Assessment	Yes	\$26.6	\$27.1	\$27.8	\$28.6	
14-602	Falls Lake Subsistence Sockeye Salmon Stock and Harvest Assessment	Yes	\$121.7	\$123.9	\$127.8	\$130.7	
14-603	Hetta Lake Subsistence Sockeye Salmon Stock Assessment	Yes	\$173.4	\$185.6	\$172.4	\$173.8	
14-604	Eek Lake Subsistence Sockeye Salmon Stock Assessment	No	\$80.7	\$63.0	\$63.5	\$64.0	
14-605	Hatchery Creek Sockeye Salmon	Yes	\$144.3	\$146.1	\$148.1	\$150.2	
14-606	Klawock Lake Sockeye Salmon	Yes	\$27.6	\$28.3	\$29.1	\$29.8	
14-607	Unik R District 1 Hooligan Monitoring	Yes	\$60.2	\$64.2	\$63.3	\$64.9	
14-608	Kanalku L Subsistence Sockeye Salmon Assessment	Yes	\$160.1	\$167.0	\$174.7	\$196.9	
14-609	Klag Lake Sockeye Salmon Assessment	Yes	\$120.5	\$122.4	\$126.0	\$129.7	
14-610	Kook Lake Sockeye Salmon Stock Assessment	Yes	\$169.8	\$171.6	\$174.1	\$176.7	
14-611	Sitkoh Lake Sockeye Salmon Stock Assessment	Yes	\$97.0	\$95.8	\$97.2	\$98.6	
14-612	Neva Lake Sockeye Salmon Stock Assessment	Yes	\$145.9	\$148.1	\$150.3	\$152.6	
* = Yes with modification		Total	\$1,327.8	\$1,343.1	\$1,354.3	\$1,396.5	
		Guideline	\$875.0				
		TRC Recommendation	\$1,247.1	\$1,280.1	\$1,290.8	\$1,332.5	

14-601 - Redoubt Lake Sockeye Salmon Stock Assessment

Project Number: 14-601
Title: Redoubt Lake sockeye salmon stock assessment
Geographic Region: Southeast Alaska
Information Type: Stock status and trends (SST)
Principal Investigator: Chris Leeseberg, USDA Forest Service Tongass National Forest
Co-Investigator: Joseph Serio, USDA Forest Service Tongass National Forest
 Ben VanAlen, USDA Forest Service Tongass National Forest
 Justin Koller, USDA Forest Service Tongass National Forest
 Dave Gordon, Alaska Department of Fish and Game
 Eric Coonrad, Alaska Department of Fish and Game

Project Cost:

2014	2015	2016	2017
\$26,575	\$27,093	\$27,820	\$28,571

Total: \$110,059

Issue: This project will use weir counts and mark-recapture methods to estimate the annual escapements of sockeye salmon (*Oncorhynchus nerka*) into Redoubt Lake, located 12 miles south of Sitka, in the Tongass National Forest. Redoubt Lake is the most important source of subsistence salmon for residents in the Sitka area, with up to 14,000 sockeye per year being harvested from Redoubt Lake. Redoubt Lake escapements are highly variable, ranging from 400 to over 100,000 sockeye. Managers implementing the Redoubt Lake Sockeye Salmon Management Plan (ADF&G 2003) are dependent upon reliable estimates of daily escapement to either conserve the run in years of scarcity or maximize subsistence opportunity in years of abundance. Since 1992, sockeye weir counts have been low enough to close the subsistence fishery six years, and high enough to increase the subsistence take seven years.

Objectives:

1. Estimate the total escapement of sockeye salmon into Redoubt Lake with a coefficient of variation less than 15%.
2. Estimate the age, length, weight, and sex composition of the Redoubt Lake sockeye escapement so that the estimated coefficient of variation is less than 5% for each age class.

Methods: The annual escapement of sockeye into Redoubt Lake will be estimated using simple mark-recapture techniques. Sockeye will be marked at a rate of ten percent at the trap and released below a net weir equipped with motion activated underwater video cameras. The video will be reviewed to sample sockeye for marks and an estimate will be generated using the simple Peterson two-sample model. In the event of equipment failure or suspected bias sockeye will be sampled for marks on the spawning grounds.

Sockeye will be sampled at the trap for sex, length, weight and scales to describe the biological structure of the escapement. A minimum of 680 sockeye will be sampled to meet the precision goal and fish will be sampled in proportion to the run to minimize potential bias. Morphology of the head and jaw will be examined to determine sex. Length will be measured from mid-eye to tail fork to the nearest millimeter and weight will be measured to the nearest tenth kilogram.

Three scales will be taken from the preferred area and sent to the Alaska Department of Fish and Game for age analysis.

Partnerships/Capacity Building: The US Forest Service has the lead role in implementing this project with assistance from ADF&G. Collaboration between the USFS and ADF&G is essential in making this project successful. The USFS, Sitka Ranger District will oversee the field operations, collect data, report progress and write annual reports, and manage budgets. The ADF&G commercial fisheries division will provide assistance with field operations and technical support. Daily monitoring and sampling operations in the field will be performed by USFS technicians, and Student Conservation Association (SCA) interns. Pre-season and on-the-job training provided by the forest service serves to promote safety in the field and enhance the job skills of seasonal personnel. It is anticipated that some of those hired could advance to crew leader or biologist positions.

There is no direct local community group or tribal involvement although the Sitka Tribe of Alaska and the Sitka Conservation Society have written letters of support for the project

14-602 - Falls Lake Subsistence Sockeye Salmon Stock and Harvest Assessment

Project Number: 14-602

Title: Falls Lake Subsistence Sockeye Salmon Stock and Harvest Assessment

Geographic Region: Southeast Alaska

Information Type: Stock status and trends (SST) and harvest monitoring (HM)

Principal Investigator: Justin Koller, USDA Forest Service Tongass National Forest

Co-Investigator: Dawn Jackson, Organized Village of Kake (OVK)

Project Cost:

2014	2015	2016	2017
\$121,650	\$123,897	\$127,785	\$130,695

Total: \$504,027

Issue: Sockeye salmon returning to the marine terminal area at Falls Lake are heavily utilized by residents of Kake, Alaska in a subsistence fishery occurring as early as mid-June through August. In the years 2001-2012 an estimated 1,745-10,307 sockeye salmon returned to the marine terminal area and approximately 15-70% of these fish were harvested in the subsistence fishery. In the same period, an estimated 750-8,800 sockeye salmon migrated into Falls Lake to spawn. Annual stock assessments are essential due to the high variability of annual terminal abundance coupled with the potential for high exploitation. Data generated by the monitoring project supports management decisions and the in-season assessments allow managers to optimize subsistence uses of sockeye salmon. Without an in-season assessment of sockeye salmon abundance and subsistence harvest, managers would be forced to manage the fishery more conservatively (i.e., lower harvest limits and a shorter season), which could result in lost harvest opportunity for users.

Objectives:

1. Estimate the escapement of sockeye salmon into Falls Lake so the coefficient of variation is less than 15%.
2. Estimate the age, sex and length distribution of sockeye in the Falls Lake escapement with a coefficient of variation less than 10% for each age class estimate.
3. Estimate the subsistence harvest of sockeye salmon in the marine area around Falls Lake Creek with a coefficient of variation less than 15%.

Methods: The annual escapement of sockeye into Falls Lake will be estimated using simple mark-recapture techniques. Sockeye will be marked at the top of the fishpass and released below two net weirs equipped with motion activated underwater video cameras. The video will be reviewed to sample sockeye for marks and an estimate will be generated using the simple Peterson two-sample model. In the event of equipment failure or suspected bias sockeye will be sampled for marks on the spawning grounds.

Sockeye will be sampled at the trap for sex, length and scales to describe the biological structure of the escapement. A minimum of 171 sockeye will be sampled to meet the precision goal and fish will be sampled in proportion to the run to minimize potential bias. Morphology of the head and jaw will be examined to determine sex and length will be measured from mid-eye to tail fork to the nearest millimeter. Three scales will be taken from the preferred area and sent to the Alaska Department of Fish and Game for age analysis.

The marine terminal area of Falls Lake creek will be monitored to assess the sockeye harvest. The area will be monitored daily throughout the season in an attempt to interview all harvesters resulting in a census of the harvest. In the event that interviews were missed the total harvest will be estimated using direct expansion techniques.

Partnerships/Capacity Building: Dialog between OVK leaders, USFS and ADF&G fisheries management biologists has contributed to proactive management of the Falls Lake fishery. The principal investigator will provide general project oversight, sample design and analysis, reporting, budgets, and proposal development. OVK will to provide input on community issues, natural resource issues, and future direction of the project, employ field technicians, provide the camp and manage a budget for personnel, supplies, and services such as transport.

14-603 - Hetta Lake Subsistence Sockeye Salmon Stock Assessment Project

Project Number: 14-603
Title: Hetta Lake Subsistence Sockeye Salmon Stock Assessment Project
Geographic Region: Southeast Alaska
Information Type: Stock Status Trends (SST)
Principle Investigator: Anthony Christianson, Hydaburg Cooperative Association
Co-Investigator: Cathy Needham, Kai Environmental Consulting Services

Project Cost:

2014	2015	2016	2017
\$173,405	\$185,606	\$172,440	\$173,762

Total: \$705,213

Issue: HCA is proposing to continue work on assessing the subsistence harvest and escapement of sockeye salmon into Hydaburg's most important subsistence system, Hetta Lakes. This information will continue to allow HCA and resource management agencies to monitor actual harvest in Hetta, and compare the percentage of harvest back to escapement estimates in order to manage the system more accurately. This proposal address priorities set forth in the 2014 Notice of Funding and the Strategic Plan for the Subsistence Fisheries Resource Monitoring Program (2006) by addressing the highest priority species (sockeye salmon) and information need (estimate of current escapement).

Objectives:

1. Census the sockeye salmon harvest by subsistence fishers in the terminal areas of Hetta, Eek, Kasook, and Hunter Bay using completed-trip interviews of all fishers on the fishing grounds or immediately upon returning to Hydaburg from the fishing grounds.
2. Count the number of sockeye salmon and other salmon species returning to Hetta Lake through a bipod weir.
3. Estimate the age composition of the sockeye escapement so that the coefficient of variation is 10% or less for the two major age classes and describe the size distribution of each age class by sex.
4. Document the sockeye salmon spawning grounds each season through adult foot counts and aerial surveys.

Methods: Each year, crew members will monitor the subsistence grounds, and interview all fishers once their harvest for the day is complete. Information collected during each interview will include date, area fished, interview location, time of interview, gear used, number of hours fished, number of net sets, catch by species, and comments. A channel spanning bipod weir will be constructed on the outlet stream of Hetta Lake, with a trap constructed to capture fish migrating upstream to spawn. The weir will operate from June through September of each year, and all fish crossing the weir will be identified and counted. Approximately 600 fish will be sampled for age, sex and length data. Fish will be measured and sexed on site. Scales will be removed and sent to ADFG to be read to determine age. Data will be analyzed to estimate the spawning population of sockeye. Adult foot counts in stream spawning areas will document spawning areas and numbers of sockeye using stream systems. An aerial survey will be conducted to document where along the lakeshore sockeye salmon are spawning and crews will estimate the numbers of fish using these areas. Weekly in-season reports of harvest and weir counts will be shared with state and federal agencies. Annual reports will be produced after each

field season, and a final report including all four seasons will be produced at the end of the project.

Partnership/Capacity Building: From 2001-2009, HCA worked with Alaska Department of Fish and Game to build capacity on Fisheries Resource Monitoring Program projects with a goal of taking over operations in their entirety by the 2010 field season. HCA has been effectively operating the program on their own since 2010. The success of the program has led to other fisheries based projects and partnering with organizations such as the The Nature Conservancy. ADFG will still offer scale reading services to the project and remain involved through permitting of the project, as well as using in-season data for managing a commercial fishery in Hetta Inlet. The USFS continues to offer technical assistance to HCA's fisheries program.

14-604 - Eek Lake Subsistence Sockeye Salmon Stock Assessment Project

Project Number: 14-604
Title: Eek Lake Subsistence Sockeye Salmon Stock Assessment Project
Geographic Region: Southeast Alaska
Data Type: Stock Status Trends (SST)
Principle Investigator: Anthony Christianson, Hydaburg Cooperative Association
Co-Investigator: Cathy Needham, Kai Environmental Consulting Services

Project Cost:

2014	2015	2016	2017
\$80,657	\$63,028	\$63,501	\$63,979

Total: \$271,165

Issue: Hydaburg Cooperative Association (HCA) is proposing to conduct a stock assessment on sockeye salmon returning to Eek Lake, an important subsistence system to the community of Hydaburg. The information will allow HCA and state and federal resource management agencies to more accurately manage sockeye salmon returning to Hetta and Eek Lakes through Hetta Inlet. This project address’ the Strategic Plan for the Subsistence Fisheries Resource Monitoring Program (2006) by addressing the highest priority species (sockeye salmon) and information need (estimate of current escapement). Over the past few years, HCA has been managing Hydaburg’s subsistence harvest in-season, and in many cases they divert harvest to Eek Lake when sockeye salmon returns at Hetta Lake are low or delayed. Given there have not been recently stock assessments projects at Eek Lake, this proposed project fills an important data gap for Hydaburg’s management of their subsistence sockeye fishery.

Objectives:

1. Estimate escapement of sockeye salmon adults into Eek Lake using a two net weir, four camera system.
2. Estimate the age, sex and length composition of the sockeye salmon spawning in Eek Lake with a coefficient of variation less than 20% for the principle age class.

** Note that a concurrent objective of estimating the annual harvest of sockeye salmon from Eek Lake is covered in a project proposal for the continuation of the Hetta Lake Subsistence Sockeye Salmon Assessment Project*

Methods: Sockeye salmon escapement into Eek Lake will be estimated through use of a double redundant video lake net weir system. Two lake net weirs will be installed at the outlet creek at Eek Lake each season and an underwater video camera system will record returning sockeye salmon from mid-June through mid-August. The field crew will review video footage to count all species of fish that pass through the system. Approximately 600 fish will be captured in a floating trap attached the lower net weir, and will be sampled for age, sex and length data. Fish will be measured and sexed on site. Scales will be removed and sent to Alaska Department of Fish and Game to be read to determine age. Weekly in-season reports for weir counts will be shared with federal and state agencies. Annual reports will be produced after each field season, and a final report including all four seasons will be produced at the end of the project.

Partnership/Capacity Building: HCA has been building their capacity to manage and operate a fisheries program under the Fisheries Resource Management Program since 2001. They have

successfully become the principle investigator on the Hetta Lake Subsistence Sockeye Assessment project, starting in 2010. The success of the program has lead to other fisheries projects important to understanding and managing subsistence resources on behalf of the Hydaburg community. This proposed project will produce significant cost savings by using field equipment already owned by HCA, but using the Hetta Lake project's contracted biologist, and by having the Hetta Lake crew available and close to lend logistical support. HCA's ability to operate this proposed project relies on the partnering support of the U.S. Forest Service, who will assist in modifying a double redundant video lake net weir system design for Eek Lake, who will assist in training a new fish crew on these new methods, and who will give technical assistance in season as needed. In addition, ADFG will continue to support the project by providing scale reading services and working with HCA on habitat and fish handling permits.

14-605 - Hatchery Creek Sockeye Salmon Population Assessment

Project Number: 14-605
Project Title: Hatchery Creek Sockeye Salmon Population Assessment
Geographic Area: Southeast Alaska
Principal Investigator: Jeff Reeves, Craig Ranger District, US Forest Service (USFS)
Co-Investigators: Ben VanAlen, Juneau Ranger District, (USFS)
 Jeff Bell and Paula Peterson, Organized Village of Kasaan (OVK)

Project Cost:

2014	2015	2016	2017
\$144,264	\$146,134	\$148,093	\$150,184

Total: \$588,675

Issue: Sockeye salmon (*Oncorhynchus nerka*) comprise the most important subsistence fishery resource for rural residents in the Southeast Alaska region. The Hatchery Creek drainage on Prince of Wales Island (PWI) has supported extensive subsistence and sport harvests by both Alaska resident and non-resident anglers. This proposed project addresses a critical Southeast Alaska subsistence fishery concern that has been repeatedly identified as a monitoring need by the Southeast Federal Subsistence Regional Advisory Council (SERAC) and the Southeast Alaska Fisheries Information Service Strategic Plan. Both the USFS and the Alaska Department of Fish and Game also consider the management of the Hatchery Creek sockeye salmon population to be a key subsistence issue for Prince of Wales Island due to the early run timing and uniqueness of this sockeye population.

Objectives:

1. Estimate the total escapement of adult and jack sockeye salmon that pass above the upper falls on Hatchery Creek with a weir/mark-recapture project such that the estimated coefficient of variation is less than 15%.
2. Estimate the age, length, and sex composition of the Hatchery Creek system sockeye escapement so that the estimated coefficient of variation for the dominant age class is less than 10%.

Methods: A channel-spanning aluminum and steel bipod weir will be employed to census the early run sockeye populations in Hatchery Creek. The weir will be installed at a location above the falls, and will be operated continuously from the 1st of June until August 30th during each of the study years. Sockeye will be adipose-clipped at the picket weir and examined for adipose clips as they swim upstream through a “net weir” past video cameras and, if needed, in the main inlet streams and beach spawning areas using dip net and seine gear. A running average of 50% of the sockeye salmon counted through the picket weir each day will be marked with an adipose fin clip

The age, sex, and length (ASL) composition of the early run Hatchery Creek sockeye salmon sub-population will be assessed from *in-situ* sampling of returning adult fish captured at the weir. ASL information will be collected during each year of the proposed study. Individuals will be sampled at systematic intervals, corresponding to frequencies that are designed to obtain a minimum total annual *N* of 400.

Products: Results of the study will be available as annual progress and final reports submitted to FIS-OSM; via papers submitted for publication through scientific fisheries journals and ADF&G Technical Reports; and as formal presentations provided at SERAC, Federal/State agency, and professional society meetings.

Investigators Ability and Resources: Jeff Reeves, Subsistence Fisheries Biologist will be responsible for overall project administration, coordination with OSM/FIS staff, development of the study design and operation plan, on-site technical assistance to tribal and state/federal agency staff, data analysis/interpretation, and editing/delivery of progress and final reports. Ben VanAlen will provide technical expertise for weir operations, deployment of the "net weir" in lakes and streams, and use of a low cost/reliable mini-DVR fish video counting system. Jeff Bell, Fisheries Coordinator for OVK, responsibilities will include hiring and supervision of the project's field technicians, acquisition and management of all field research equipment, coordination with OSM/FIS staff, development of the study design and operation plan, on-site technical assistance to tribal and state/federal agency staff, data analysis/interpretation, and editing/delivery of progress and final reports. Paula Peterson is the Tribal Administrator of OVK having extensive expertise and experience in administering grants and contracts with Native organizations, private entities, and the federal government.

Partnership and Capacity Building: This proposed project has substantial capacity development aspects associated with it. Both the USFS and OVK will be provided funds to compensate the lead field fisheries biologist and hire the field technicians needed for this study; local hiring priority will be given to qualified personnel from the PWI Native organizations and Island's rural communities to fill these positions. This proposal represents the results of extensive interagency cooperation between fisheries and subsistence program personnel from the OVK and the USFS. Sharing of data among all of the agencies involved in this subsistence fishery will provide better information to improve management of Hatchery Creek sockeye salmon for all users.

14-606 - Klawock Lake Sockeye Salmon Population Assessment

Project Number: 14-606
Project Title: Klawock Lake Sockeye Salmon Population Assessment
Geographic Area: Southeast Alaska
Principal Investigator: Jeff Reeves, Craig Ranger District, US Forest Service (USFS); Ben VanAlen, Juneau Ranger District, USFS
Co-Investigators: Klawock Cooperative Association (KCA) Dan Goodness, Prince of Wales Hatchery Association (POWHA)

Project Cost:

2014	2015	2016	2017
\$27,594	\$28,338	\$29,061	\$29,838

Total: \$114,831

Recommendation: Fund

Issue: Sockeye salmon (*Oncorhynchus nerka*) comprise the most important subsistence fishery resource for rural residents in the Southeast Alaska region. The Klawock Lake drainage on Prince of Wales Island (PWI) has supported extensive subsistence and sport harvests by both Alaska resident and non-resident anglers. This proposed project addresses a critical Southeast Alaska subsistence fishery concern that has been repeatedly identified as a monitoring need by the Southeast Federal Subsistence Regional Advisory Council (SERAC) and the Southeast Alaska Fisheries Information Service Strategic Plan. Both the USFS and the Alaska Department of Fish and Game consider the management of the Klawock Lake sockeye salmon population to be a key subsistence issue for Prince of Wales Island due to the popularity and importance of this subsistence fishery.

Objectives:

1. Estimate the minimum escapement of adult and jack sockeye salmon that pass into Klawock Lake with a weir from July 1 to September 30.
2. Estimate the age, length, and sex composition of the Hatchery Creek system sockeye escapement so that the estimated coefficient of variation for the dominant age class is less than 10%.

Methods: A channel-spanning aluminum and steel bipod weir will be employed to census the sockeye population returning to Klawock Lake. The POWHA weir will be operated continuously from the 1st of July until September 30th during each of the study years. This time frame covers typically over 90 percent of the Klawock Lake sockeye returns. Sockeye will be counted and released.

The age, sex, and length (ASL) composition of the Klawock Lake sockeye salmon sub-population will be assessed from *in-situ* sampling of returning adult fish captured at the weir. ASL information will be collected during each year of the proposed study. Individuals will be sampled at systematic intervals, corresponding to frequencies that are designed to obtain a minimum total annual *N* of 400.

Products: Results of the study will be available as annual progress and final reports submitted to FIS-OSM; via papers submitted for publication through scientific fisheries journals and ADF&G

Technical Reports; and as formal presentations provided at SERAC, Federal/State agency, and professional society meetings.

Investigators Ability and Resources: Jeff Reeves and Ben VanAlen, Subsistence Fisheries Biologists, will be responsible for overall project administration, coordination with OSM/FIS staff, development of the study design and operation plan, on-site technical assistance to tribal and state/federal agency staff, data analysis/interpretation, and editing/delivery of progress and final reports. KCA's responsibilities will include hiring and supervision of the project's field technician. Dan Goodness is the Hatchery Manager for POWHA. Mr. Goodness' responsibilities will include oversight of proper weir and raceway operation at the site and will supervise additional POWHA personnel that may be involved in the project.

Partnership and Capacity Building: This proposed project has substantial capacity development aspects associated with it. Both the USFS and KCA will be provided funds to compensate the lead field fisheries biologist and hire the field technicians needed for this study; local hiring priority will be given to qualified personnel from the PWI Native organizations and Island's rural communities to fill these positions. This proposal represents the results of extensive interagency cooperation between fisheries and subsistence program personnel from the KCA, POWHA and the USFS. Sharing of data among all of the agencies involved in this subsistence fishery will provide better information to improve management of Klawock Lake sockeye salmon for all users.

14-607 - District 1 Eulachon Population Assessment

Project Number: 14-607
Project Title: District 1 Eulachon Population Assessment
Geographic Area: Southeast Alaska
Data Type: Stock Status and Trends (SST)
Principal Investigator: Jeff Reeves, Craig Ranger District, US Forest Service (USFS);
Jessica Davila, Peter Roginski and Will Young, Ketchikan/Misty
Fjords Ranger District, USFS

Project Cost:

2014	2015	2016	2017
\$60,215	\$64,215	\$63,289	\$64,940

Total: \$252,659

Issue: Eulachon systems are typically large glacial rivers located on the mainland in Southeast Alaska in Tongass National Forest. The Unuk River has been the primary commercial/subsistence fishing location for eulachon. The Unuk River, which drains into Burroughs Bay in Behm Canal, is located approximately 55 nautical miles northeast of Ketchikan. Other drainages in the Ketchikan area where eulachon have been noted and harvested include: Klahini River, Chickamin River, Wilson & Blossom Rivers, and Carroll Inlet/Creek.

The Unuk has been fished for subsistence, personal use and commercial harvest for many years. Besides providing food for marine mammals, fish and birds, eulachon provide the first subsistence opportunity of the year for people living near these systems. The first documented commercial harvest occurred in 1940 on the Unuk River and continued sporadically on this system until 2001 when the State managed commercial fishery was shut down. The fishery resumed until 2005 under Federal subsistence management. Since 2005, the fishery has been shut down yearly by both State and Federal managers due to poor eulachon returns.

The majority of the harvest in Behm Canal has occurred in the lower stretches of the Unuk River with very little documentation of harvest from the other listed locations. Although prior to 2001, historical eulachon harvest had taken place under commercial regulations, the subsistence fishery under Federal management is just as important in the eyes of the subsistence user as provisions allow for customary trade of the resource. The primary purpose of this harvest has been to distribute eulachon to the communities of Saxman, Metlakatla, Ketchikan and other outlying areas. Due to the great distance of the Unuk River from these communities, local users depended on the commercial harvesters for their yearly eulachon. The ADFG division of subsistence documented in 1987 that 27% of residents in the rural community of Metlakatla utilize eulachon.

Objectives:

1. Document daily predator activity through satellite internet video or still photos to reveal for presence/absence of eulachon.
2. Document biomass and spawning locations of eulachon in the Unuk River, Chickamin, Klahini, Wilson, Blossom Rivers and in Carroll Inlet/Carroll Creek.
3. Conduct age-weight-length (AWL) measurements along with sex and genetic analysis of collected samples.
4. Document harvest methods, harvest levels, and run timing by on-site observations.

5. Summarize yearly stock characteristics and harvests at the various locations in District 1. Review eulachon stocks in Alaska and the Pacific Northwest and continue to expand collaboration with Canada on eulachon related research. Investigators will travel to eulachon research council meetings to share and obtain new information.

Methods: (1) Satellite internet video equipment will be used to provide managers a “desk top” update of the daily conditions at identified locations of eulachon returns. If video is not possible due to the remoteness of the Unuk, a daily series of still photographs would be utilized. (2) Estimates of biomass will be obtained through on the ground and aerial surveys. (3) Length, sex and genetic samples will be taken from eulachon returns for analysis. (4) Harvest estimates will be gathered if fishery is not closed. (5) Yearly activity summarized and compared with Canadian eulachon activity.

Products: Results of the study will be available as annual progress and final reports submitted to FIS-OSM; via papers submitted for publication through scientific fisheries journals and ADF&G Technical Reports; and as formal presentations provided at SERAC, Federal/State agency, and professional society meetings.

Investigators Ability and Resources: Jeff Reeves, Subsistence Fisheries Biologist, Jessica Davila and Peter Roginski, Fisheries Technicians, and Will Young, Fish & Wildlife Staff, will be responsible for overall project administration, coordination with OSM/FIS staff, development of the study design and operation plan, on-site technical assistance to tribal and state/federal agency staff, data analysis/interpretation, and editing/delivery of progress and final reports.

Partnership and Capacity Building: This proposed project has substantial capacity development aspects associated with it. The USFS will be provided funds to compensate the field fisheries biologists and fisheries technicians needed for this study. Members of the Metlakatla Indian Community, Organized Village of Saxman, and the Ketchikan Indian Community will be consulted to provide valuable traditional ecological knowledge regarding eulachon in the area. Sharing of data among all of the agencies involved in this subsistence fishery will provide better information to improve management of eulachon for all users.

14-608 - Kanalku Lake Subsistence Sockeye Salmon Stock Assessment Project

Project Number: 14-608
Title: analku Lake Subsistence Sockeye Salmon Stock Assessment Project
Geographic Area: Southeast Alaska
Information Type: Stock status and trends (SST)
Principal Investigator: Julie Bednarski, Alaska Department of Fish and Game (ADF&G), Division of Commercial Fisheries, P.O. Box 110024, Juneau, AK 99811-0024, phone 907-465-4207
Co-Investigators: Wally Frank, Angoon Community Association (ACA); Ben Van Alen, USDA Forest Service (USFS), Juneau Ranger District

Project Cost:

2014	2015	2016	2017
\$160,066	\$167,043	\$174,702	\$196,853

Total: \$698,664

Issue: Kanalku Lake, located on the west side of Admiralty Island, provides the primary sockeye salmon (*Oncorhynchus nerka*) subsistence resource for the federally qualified subsistence users of Angoon. Kanalku Lake is recognized as a federal subsistence area under “customary and traditional uses” for residents of Angoon and is located in the Admiralty Island National Monument, a federal conservation system unit. The need of precise estimates of the Kanalku Lake sockeye salmon escapement has been repeatedly identified as a regional priority by the Southeast Federal Subsistence Regional Advisory Council and the Southeast Alaska Fisheries Information Service Strategic Plan (FRMP).

Subsistence users travel by skiff, approximately 20 km from Angoon, through the protected waters of Kootznahoo Inlet and Mitchell Bay to access the fishing area. The majority of the subsistence harvest occurs in saltwater at the head of Kanalku Bay, where the fishery is under state management by the Juneau area office of the Alaska Department of Fish and Game (ADF&G), Division of Commercial Fisheries. Subsistence harvest also occurs in freshwater, under federal jurisdiction, where people use dip nets to harvest fish mostly from pools below a 10-m high partial barrier falls (located 0.9 km upstream from saltwater). The area around Kootznahoo Inlet, and Kanalku and Mitchell bays, is also a popular destination for recreational users, including many participating in sport or guided charter fishing. Thus, the salmon fisheries in the Kanalku system involve management by a complex combination of federal and state, and subsistence, sport, and recreational guide programs.

Since 2001, ADF&G and the Angoon Community Association (ACA) have worked together on a sockeye salmon stock assessment program at Kanalku Lake to address concerns regarding increased harvest, declining run size, and lack of information about escapement (Conitz and Cartwright 2003). Sockeye salmon spawning escapements (2001–2011) at Kanalku Lake ranged from 300 (2001, 2003) to 3,000 (2010) fish, and averaged only 1,270 fish (Vinzant et al. 2011). These low sockeye salmon runs severely reduced harvest opportunities, and lead to a voluntary subsistence harvest closure instituted by the community of Angoon and ADF&G from 2002 to 2005 (Conitz and Burrell 2008).

The purpose of this project is to provide four additional years of precise estimates of sockeye salmon *spawning* escapement at Kanalku Lake and the mortality rate at the Kanalku Falls. This information is pivotal to comprehensive work that is being conducted by ADF&G to improve stock assessment information on Kanalku and other small sockeye salmon stocks in the Chatham Strait corridor. These other projects include estimating the *total* escapement of sockeye salmon into the Kanalku system and estimating the mortality rate at the Kanalku Falls (in conjunction with this FRMP proposal), estimating potential commercial harvest of Kanalku sockeye salmon in Chatham Strait commercial purse seine fisheries, and conducting a study to update subsistence harvest information for the Chatham and Icy strait areas. These ancillary projects, in combination with the current FRMP proposal to estimate spawning escapement, will provide for improved management of this important resource. In order to be effective, however, management plans for the Kanalku subsistence fishery must be supported with accurate information about the size and timing of the sockeye salmon spawning escapement. The small run size and its importance to the people of Angoon indicate that the escapement should continue to be closely monitored.

Objectives:

1. Count all salmon species passed through the weir to Kanalku Lake for the duration of the sockeye salmon run.
2. Validate the picket weir escapement estimate with an upstream camera net-weir or mark-recapture study so the estimated coefficient of variation is less than 15% of the point estimate.
3. Estimate the age, length, and sex composition of the Kanalku Lake sockeye salmon escapement to within 5% of the true proportion 95% of the time.
4. Estimate the sockeye salmon mortality rate at the Kanalku Falls.

We will continue to use a standard picket weir to estimate the spawning escapement of sockeye salmon into Kanalku Lake. In 2013, prior to the period covered in this proposal, we will test the application of a camera net-weir in the outlet of the lake. The camera-net weir will be used to count fish into the lake, validate the picket weir count, and serve as the recapture location for a back-up mark-recapture study. Combination camera net-weirs have been used successfully to estimate escapements of several other important sockeye salmon runs in Southeast Alaska. Successful application of a camera net-weir system at Kanalku Lake will result in a reduction in both the handling of live fish and the overall cost of the project from previous years by eliminating a month of mark-recapture work that was conducted on the spawning grounds in September. We include a mark-recapture study in our project design using the camera net-weir as the recovery location; however, we expect that improvements to the project will result in elimination of the mark-recapture portion of the study completely—further reducing the need to handle fish during the season. Additionally, the number of sockeye salmon that successfully ascends the falls (the *spawning* population) will be estimated through this FRMP project (Objectives 1 and 2). The *total* sockeye salmon escapement into the Kanalku system below Kanalku Falls will be estimated through an ongoing project funded by the Alaska Sustainable Salmon Fund. Sockeye salmon estimates from the two projects will be directly compared to provide an estimate of the mortality rate at Kanalku Falls.

Length, sex, and scale samples will be collected from 425 adult sockeye salmon sampled at the weir on the outlet of Kanalku Lake to estimate the size and age structure of the population, by sex. Fish will be sampled for scales, sex, and length at the weir.

Partnerships/Capacity Building: ACA has successfully managed hiring, personnel issues, payroll, budgeting, and procurement of supplies and services over the past five years as a cooperator in fisheries research projects. ACA fisheries technicians will refresh or learn scale,

age, and length sampling techniques, methods and rationale for ageing sockeye salmon, mark-recapture sampling techniques and theory, salmon life history, lake ecology, and limnology sampling techniques. Crew members will also have an opportunity to learn or enhance computer skills and work with digital video technology. In addition, all ACA, ADF&G, and USFS field staff will receive safety training including wilderness first aid and CPR, wilderness survival, safety around bears, water and boating safety, safe travel in aircraft, and remote radio and phone communications. All pre-season and on-the-job training serves to promote safety in the field, enhance the job skills of seasonal workers, and contribute to interest in and capacity for fisheries research in rural subsistence communities.

14-609 - Klag Lake Sockeye Salmon Stock Assessment

Project Number: 14-609
Title: Klag Lake Sockeye Salmon Stock Assessment
Geographic Region: Southeast Alaska
Data Type: Stock Status and Trends, Harvest Monitoring
Principal Investigator: Jessica Gill, Stika Tribe of Alaska

Project Cost:

2014	2015	2016	2017
\$120,473	\$122,397	\$125,998	\$129,709

Total: \$498,577

Issue: Sockeye salmon (*Oncorhynchus nerka*) are an important subsistence resource for the community of Sitka, Alaska, and Klag Bay has customary and traditional use designation for sockeye and other resources for Sitka residents. Klag Bay is the third most important producer of sockeye salmon for subsistence users, behind Redoubt and Necker Bays. During low escapement and/or high exploitation years at Redoubt and Necker, Klag Bay subsistence harvest becomes a higher priority and is subject to higher exploitation. Escapement levels in Klag Bay were at an eight-year low in 2008, and in 2012 the second lowest escapement was recorded. Currently, escapement numbers seem to be declining, while harvest numbers are increasing. If this trend continues, then the population could be overharvested and become unsustainable. Daily weir counts and in-season harvest monitoring will provide the data needed for effective in-season management and is critical for sustaining the Klag system sockeye population.

Objectives:

1. Enumerate the escapement of sockeye salmon at Klag Bay.
2. Describe the run timing, or proportional daily passage, of sockeye salmon through the weir.
3. Estimate the sex and age composition of sockeye salmon such that the coefficient of variation is 7.5% or less.
4. Estimate harvest by subsistence and sport fishermen at Klag Bay so that the coefficient of variation is 15% or less.

Methods: A rigid weir will be installed in the outlet stream of Klag Lake, and all salmonids entering the lake will be passed through a trap and counted by the field crew. Counts will be recorded by species, and a sample goal of 462 sockeye will be collected based on the average weekly run size. The sockeye collected will be sampled for sex (male or female), length to the nearest five millimeters, and weight (grams) to describe the run-timing and age structure of the population. Approximately 20% of the sockeye salmon will be fin-clipped for a mark-recapture survey as they pass through the weir. Recovery events for the mark-recapture study will occur on the spawning grounds once the fish have reached the area to spawn. To avoid stressing the spawning fish, only the dead and spawned out fish will be sampled. A minimum of two recovery events will be conducted. Recaptured fish will receive an additional mark to ensure sampling is conducted without replacement. The total number of fish sampled and the number marked fish will be recorded. If the ratio of marked-to-unmarked fish in the recapture sample is significantly different than the ratio of marked-to-unmarked fish sampled at the weir, the mark-recapture survey will be used to estimate overall sockeye escapement into Klag Lake. If the

ratios are consistent the weir count will be used as the escapement estimate. Creel surveys will be conducted on-site throughout the season (June 1-August 15) to estimate the harvest of the sockeye in Klag Bay. Escapement, harvest data, and water levels will be reported to Justin Koller (USFS Sitka Ranger District Subsistence Biologist) daily via the Forest Service Radio Network for in-season management of the sport and subsistence fishery. In addition to the above, weekly reports will be submitted to Dave Gordon (ADF&G Sitka Area Management Biologist) and Troy Tydingco (ADF&G Sitka Area Sportfish Management Biologist).

Partnerships/Capacity Building: The Sitka Tribe of Alaska will take the lead role in project design, field operations, daily data collection, analysis, and report writing. The Tribe will also collaborate with, and report data to the U.S. Forest Service, Alaska Department of Fish and Game, and the Office of Subsistence Management. Justin Koller (USFS) will work closely with the Principal Investigator to ensure accurate and reliable data collection, that operations are completed successfully, and that this project is in line with other sockeye stock assessment projects throughout Southeast Alaska. Local residents and non-locals will be hired to operate the weir and collect escapement data, conduct the mark-recapture survey, and collect harvest and biological data. An effort is being made to hire local residents with a desire to work in an environmental field and provide them with experience and skills that will enhance their ability to be successful in the future. Technicians will work under a crew leader that will be chosen from a list of applicants with an educational background in natural resources. This will provide technicians with access to knowledge and training on a day-to-day basis throughout the field season while assuring accurate and reliable data is collected.

14-610 - Kook Lake Sockeye Salmon Stock Assessment

Project Number: 14-610
Title: Kook Lake Sockeye Salmon Stock Assessment
Geographic Region: Southeastern Alaska
Data type: Stock Status and Trends
Principal Investigator: Ben Van Alen, U.S. Forest Service
Co-Investigators: Raynelle Jack, Angoon Community Association
Alaska Department of Fish and Game (ADF&G)

Project Cost:

2014	2015	2016	2017
\$169,794	\$171,591	\$174,122	\$176,659

Total: \$692,166

Issue: Sockeye salmon returns to Kook Lake have long been an important subsistence resource for Tlingit families living in the Angoon area. The Alaska Department of Fish and Game and the US Forest Service have funded weir projects to estimate the Kook Lake sockeye salmon escapement in 1994, 1995, 2005 to 2007, and 2010 to 2012. The annual escapements and age compositions of early-run inlet stream spawners and later-run lake spawners have been highly variable (2,000 to 10,000 fish) and apparently associated with parent year escapement levels and the annual commercial seine effort. This project is important to assure that escapements are adequate to provide sustainable subsistence opportunity given the relative intensity of commercial and subsistence fishing on this stock and the history of road building and timber harvesting in the watershed. Managing for the conservation and subsistence priority of Kook Lake sockeye salmon, and other salmon stocks in the Angoon-area, is a controversial subject currently before Federal and State managers and the Secretaries' of Agriculture and Interior.

Objectives:

1. Count (census) the annual escapement of adult and jack sockeye salmon into Kook Lake using double-redundant video weirs.
2. Estimate the age, sex, and length composition of the sockeye escapement into Kook Lake with a precision of $\pm 10\%$, 95% of the time.

Methods: Project personnel will count and validate the daily and annual escapement of sockeye salmon into the lake using double-redundant lake net weirs and underwater video cameras. Both lake net weirs will be fished between the shore and the north side of the small island at the outlet of the lake, and two barrier net weirs will also be used to keep fish from migrating into the lake on the south side of the island. Project personnel will review the video files each day and record the fish counts by hour for each camera in a bound data notebook and computer database. These weirs and video/mini-DVRs (digital video recorders) will be operated continuously from late-June through mid-September in 2014, 2015, 2016, and 2017.

Upstream migrating fish will not be stopped at the video weirs and will be able to migrate freely into the lake at any time. The only fish that need to be handled are the ones sampled for age, sex, length, and genetic data, and those fish will be caught with beach seines off the mouth of the main inlet stream in August and on the beach spawning areas in September.

The four person Angoon Community Association crew will be divided into two, two person teams. Each team will work 10-days-on and 10-days-off, and they will live on-site in a floating wall tent fitted with propane appliances.

Partnerships/Capacity Building: The Angoon Community Association (ACA), ADF&G, and USDA Forest Service have been cooperating on the stock assessment of Kook Lake sockeye salmon for many years. This project will provide June through September employment for ACA employees who could also work into October on the Sitkoh sockeye stock assessment project. The Angoon Community Association has successfully filled past crew positions with local hires and will likely hire locally for this project as well. The USFS will seek to fill the project biologist position with a local hire. Field personnel participate in USFS safety training

14-611 - Sitkoh Lake Sockeye Salmon Stock Assessment

Project Number: 14-611
Title: Sitkoh Lake Sockeye Salmon Stock Assessment
Geographic Region: Southeastern Alaska
Data type: Stock Status and Trends
Principal Investigator: Ben Van Alen, U.S. Forest Service
Co-Investigators: Raynelle Jack, Angoon Community Association
Alaska Department of Fish and Game (ADF&G), (907) 465-4250

Project Cost:

2014	2015	2016	2017
\$97,025	\$95,793	\$97,206	\$98,623

Total: \$388,647

Issue: Sockeye salmon returns to Sitkoh Lake have long been an important subsistence resource for Tlingit families living in the Angoon area. The Alaska Department of Fish and Game, USDA Forest Service, and Office of Subsistence Management have funded weir projects to estimate the Sitkoh sockeye escapement in 1982 and 1996 and index the annual escapement into the lake from 1996 through 2006 and 2010 to 2012. These spawning area mark-recapture estimates have allowed managers and interested parties to monitor the annual escapements, and findings have shown the escapements to be variable and affected by the commercial purse seine effort in Icy and Chatham Strait. This project is important to assure that escapements are adequate to provide sustainable subsistence opportunity given the relative intensity of commercial and subsistence fishing on this stock and the history of road building and timber harvesting in the watershed. Managing for the conservation and subsistence priority of Sitkoh Lake sockeye salmon, and other salmon stocks in the Angoon-area, is a controversial subject currently before Federal and State managers and the Secretaries' of Agriculture and Interior.

Objectives:

1. In 2014 and 2015, index the annual escapement of sockeye salmon to the Sitkoh Lake "study area" using mark-recapture methods so that the estimated coefficient of variation is less than 10%.
2. Count (census) the annual escapement of adult and jack sockeye salmon into Sitkoh Lake using double-redundant video weirs.
3. Estimate the age, sex, and length composition of the sockeye salmon escapement into Sitkoh Lake with a precision of $\pm 10\%$, 95% of the time.

Methods: Project personnel will estimate the annual escapement of sockeye salmon into Sitkoh Lake by counting fish as they pass through a pair of video net weirs, with video chutes designed to allow the upstream and downstream passage of fish, set at the outlet of the lake. The Angoon Community Association employees who also work on the Kook Lake double-redundant video weir project will service the video net weirs and exchange the SD memory cards from each mini-DVR on their crew exchange flights out of Angoon. Kook and Sitkoh Lakes are relatively close and personnel will have the time to review the Sitkoh video while they are on the job at Kook Lake. When the video net weirs are left unattended, we will remotely monitor the project site using IP cameras linked to the cellular network to make sure that the weirs are as we left them and not blocking fish passage in any way. These weirs and video/mini-DVRs (digital video recorders) will be remotely operated from July through mid-September in 2014, 2015, 2016, and 2017.

In 2014 and 2015, project personnel will continue using mark-recapture methods to index the abundance of sockeye spawning in the “study area” adjacent to the U.S. Forest Service’s West Cabin. In these years, four two-day, mark-recapture sampling trips will be made into Sitkoh Lake when approximately 20%, 40%, 60%, and 80% of the sockeye salmon have been observed in the study area in past years, which typically occurs around September 4-5, September 18-19, October 2-3, and October 16-17. The three years, 2013 to 2015, of data will be enough to calibrate historical indices with actual escapements.

Each September, 180 sockeye salmon will be sampled from the index area for scale (age), sex, and length data using standard ADF&G methods. Scales will be aged at the ADF&G, Commercial Fisheries Division, Aging Lab in Juneau.

Partnerships/Capacity Building: The Angoon Community Association (ACA), ADF&G, and USDA Forest Service have been cooperating on the stock assessment of Sitkoh Lake sockeye salmon for many years. This project will provide additional employment time for ACA employees who also work on the Kook Lake sockeye stock assessment project. The Angoon Community Association has successfully filled past crew positions with local hires and will likely hire locally for this project as well. The USFS will seek to fill the project biologist position with a local hire. Field personnel will participate in USFS safety training

14-612 - Neva Lake Sockeye Salmon Stock Assessment

Project Number: 14-612
Title: Neva Lake Sockeye Salmon Stock Assessment
Geographic Region: Southeastern Alaska
Information type: Stock Status and Trends
Principal Investigator: Ben Van Alen, U.S. Forest
Co-Investigators: Robert Starbard, Hoonah Indian Association
Alaska Department of Fish and Game (ADF&G)

Project Cost:

2014	2015	2016	2017
\$145,942	\$145,942	\$150,340	\$152,567

Total: \$596,980

Issue: Sockeye salmon returns to Neva Lake have long been an important subsistence resource for Tlingit families living in Excursion Inlet, Hoonah, and other areas of northern Southeast Alaska. The USDA Forest Service, through the USFWS Office of Subsistence Management, has funded weir projects to estimate the Neva Lake sockeye salmon escapement from 2002 to 2012, and the annual escapements have ranged from 2,800 to 11,000 fish. Project results have helped in raising the subsistence harvest limits from 10 sockeye per household per year to 25 fish in 2003 and 40 fish in 2004. Beginning in 2004, the subsistence season was also extended from the end of July to mid-August once it was learned that the run extended through September. The escapement estimates obtained by this project will be critically important to State and Federal biologists in setting sustained escapement thresholds and sustainable escapement goal ranges for sockeye salmon into Neva Lake.

Objectives:

1. Count (census) the annual escapement of adult and jack sockeye salmon into Neva Lake using double-redundant video weirs.
2. Count (census) the annual escapement of adult and jack sockeye salmon into Neva Lake's main inlet stream using a redundant video weir.
3. Estimate the age, length, and sex composition of the sockeye escapement into Neva Lake with a precision of $\pm 10\%$, 95% of the time.

Methods: Project personnel will count and validate the daily and annual escapement of sockeye salmon into the lake using double-redundant (two weirs, two cameras at each weir) "V"-shaped video weirs placed at the outlet of the lake. There will also be a single-redundant (one weir, two cameras) upstream/downstream video weir in the lower part of the main inlet stream to count the stream spawners and directly estimate that proportion of the run. Project personnel will review the video files each day and record the fish counts by hour for each camera in a bound data notebook and computer database. These weirs and video/mini-DVRs (digital video recorders) will be operated continuously from late-June through mid-September in 2014, 2015, 2016, and 2017.

Upstream migrating fish will not be stopped at the video weirs and will be able to migrate freely into the lake at any time. The only fish that need to be handled are the 180 that will be sampled for age, sex, length, and genetic data, and those fish will be caught with beach seines off the mouth of the main inlet stream in August and on the beach spawning areas in September.

To help monitor for annual changes in zooplankton composition, a pair of vertical plankton tows will be taken each year in the last week of August. Specimens will be preserved and analyzed by a laboratory that reports the density and mean wet length of the Cyclops, Bosmina, and Daphnia.

The four person Hoonah Indian Association crew will be divided into two, two person teams. Each team will work 14-days-on and 14-days-off, and they will live on-site in a floating wall tent fitted with propane appliances.

Partnerships/Capacity Building: The Hoonah Indian Association (HIA) and USDA Forest Service have been cooperating on the stock assessment of Neva Lake sockeye salmon for many years. This project will provide June through September employment for HIA employees who. The Hoonah Indian Association has successfully filled past crew positions with local hires and will likely hire locally for this project as well. The USFS will seek to fill the project biologist position with a local hire. Field personnel participate in USFS safety training