

2010 FISHERIES RESOURCE MONITORING PLAN



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OVERVIEW

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

Although all proposals addressing subsistence fisheries on Federal lands are given due consideration, the 2010 Request for Proposals 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 Council members and other stakeholders for three of the six regions: Southeast, Southcentral (excluding Cook Inlet Area), and Southwest Alaska. These plans identify prioritized information needs for each major subsistence fishery and can be viewed on or downloaded from the Office of Subsistence Management's website: <http://alaska.fws.gov/asm/index.cfm>. Independent strategic plans were completed for the Yukon and Kuskokwim regions for salmon in 2005. For the Northern Region and the Cook Inlet Area, assessments of priority information needs were developed from the expert opinions of the Regional Advisory Councils, the Technical Review Committee, Federal and State managers and staff from the Office of Subsistence Management.

Cumulative effects of climate change will likely fundamentally affect subsistence fishery resources, their uses, and how they 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 provides 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 proposals that would focus on effects of climate change on subsistence fishery resources and uses, and that would describe management implications.

The mission of the Monitoring Program is to identify and provide information needed to sustain subsistence fisheries on Federal public lands, for rural Alaskans, through a multidisciplinary, collaborative program. To implement the Monitoring Program, a collaborative approach is utilized in which five Federal agencies (Fish and Wildlife Service, Bureau of Land Management, National Park Service, Bureau of Indian Affairs, and U.S. Forest Service) work with the Alaska Department of Fish and Game, Regional Advisory Councils, Alaska Native organizations, and other organizations. An interagency Technical Review Committee provides scientific evaluation of proposals and investigation plans, and makes recommendations. 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 proposals, and subsequently full investigation plans, and makes recommendations for funding. The committee is chaired by the Fisheries Division Chief of the Office of Subsistence Management, and is composed of representatives from each of the five Federal agencies and three representatives from the Alaska Department of Fish and Game. Fisheries and Anthropology staff from the Office of Subsistence Management provide support for the committee.

Four factors are used to evaluate studies:

1. Strategic Priority

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

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

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

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

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

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

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

2. Technical-Scientific Merit

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

3. Investigator Ability and Resources

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

studies; and considering resources in terms of office and laboratory (if relevant) facilities, technical and logistic support, and personnel and budget administration.

4. Partnership-Capacity Building

Partnerships and capacity building are priorities of the Monitoring Program. ANILCA mandates that the Federal government provide rural residents a meaningful role in the management of subsistence fisheries, and the Monitoring Program offers substantial 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.

- Proposals of up to four years duration may be considered.
- Studies must be non-duplicative with existing projects. Most Monitoring Program funding is awarded to non-Federal recipients.
- 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.

Budget Sources and Guidelines

The Monitoring Program was initiated in 2000 with an allocation of \$5 million. From 2001 through 2009, up to \$6.25 million was allocated annually for the Monitoring Program. The Department of the Interior, through the U.S. Fish and Wildlife Service, provided up to \$4.25 million annually. The Department of Agriculture, through the U.S. Forest Service, provided up to \$2.0 million annually. This budget funds continuation of existing studies (year-2, -3 or -4 of multi-year studies) and new studies. Additional funding is allocated to support the Partners for Fisheries Monitoring Program. The Office of Subsistence Management issued requests for proposals on an annual basis until 2008, and then shifted to a biennial basis. Therefore, the next call after the 2010 request will be for 2012 proposals. For 2010, it is anticipated that \$6.54 million will be available for new studies; 2010 costs for existing studies were forward funded with prior allocations.

Budget guidelines are established by geographic region and data type. Proposals are solicited according to the following two data types:

Stock status and trends studies (SST) 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) studies address assessment of subsistence fisheries including quantification of harvest and effort, and description and assessment of fishing and use patterns. The budget guideline for this category is one-third of available funding.

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For 2010, 41 of the 44 investigation plans under consideration were recommended for funding by the Technical Review Committee. It was anticipated that funding available for new projects would total \$6.5 million, of which \$1.8 million would be contributed by the Department of Agriculture, and the remainder by the Department of the Interior. The proposed cost of funding the first year of all 41 recommended projects was \$5.5 million. In making their recommendations, the Technical Review Committee weighed the importance of funding new projects in 2010 with the knowledge that the next request for proposals will be issued in 2012. As in the past, any unallocated Monitoring Program funds from the current year can be used to forward fund subsequent year costs in the plan, thereby freeing future funding to provide greater support for the request for proposals in the next cycle.

The relevant portion of the draft 2010 Monitoring Plan was presented to nine of the ten Subsistence Regional Advisory Councils at their Fall 2009 meetings. The Kodiak/Aleutians Regional Advisory Council was unable to gather a quorum to take action on the draft Monitoring Plan. Overall, Council recommendations were in agreement with the recommendations of the Technical Review Committee in all cases except for project 10-209 Yukon Delta Bering Cisco Mixed Stock Analysis, for which one of the three relevant Councils recommended that funding instead be provided by the commercial fishing industry. The Interagency Staff Committee met on November 13, 2009, and concurred with the recommendations of the Technical Review Committee, resulting in no additional non-consensus items.

The Federal Subsistence Board met on January 12, 2010, and selected the 41 projects recommended by the Technical Review Committee for the 2010 Monitoring Plan, resolving the non-consensus item in favor of support. In making its selections, it was noted at the Federal Subsistence Board meeting that the status of a budget reduction in the Department of Agriculture left some uncertainty regarding the ability to fund all selected projects. Unfortunately, that budget reduction could not subsequently be fully overcome, which required implementing less than the full slate of selected projects in the Southeast Alaska study region. In order to operate within the available budget from the Department of Agriculture, Klawock Lake Subsistence Sockeye Salmon Project (10-608) will not be funded under the Fisheries Resource Monitoring Program for the 2010-2013 period under the 2010 Monitoring Plan.

The resulting 2010 Monitoring Plan includes 40 projects, of which 33 are SST projects and 7 are HM-TEK projects (Table 1), with a first year cost of \$5.3 million (Table 2). This Monitoring Plan provides 26% of the funding to State agencies, 28% to Federal agencies, and 46% to Alaska Native organizations, universities, and others. Projects and funding amounts by study region are presented in Tables 3-8. An executive summary of each funded project in the 2010 Monitoring Plan follows by study region.

Table 1. Number of projects funded for the 2010 Fisheries Resource Monitoring Plan. Projects include stock status and trends (SST) and harvest monitoring and traditional ecological knowledge (HMTEK).

Geographic Region	SST	HM-TEK	Total
Northern Alaska	3	2	5
Yukon	6	1	7
Kuskokwim	6	3	9
Southwest Alaska	4	0	4
Southcentral Alaska	3	1	4
Southeast Alaska	11	0	11
Total	33	7	40

Table 2. First year cost of projects funded for the 2010 Fisheries Resource Monitoring Plan. Projects include stock status and trends (SST) and harvest monitoring and traditional ecological knowledge (HM-TEK) projects.

Geographic Region	Cost (\$000)		Total
	SST	HM-TEK	
Northern Alaska	\$620	\$243	\$863
Yukon	\$556	\$78	\$634
Kuskokwim	\$962	\$184	\$1,145
Southwest Alaska	\$587	\$0	\$587
Southcentral Alaska	\$461	\$212	\$672
Southeast Alaska	\$1,427	\$0	\$1,427
Total	\$4,613	\$717	\$5,329

Table 3. Northern Alaska region projects funded in 2010.

Study #	Title	Approved Budget (\$000)			
		2010	2011	2012	2013
<u>Stock Status and Trends</u>					
10-100	Selawik Drainage Sheefish Winter Movement Patterns	\$316.7	\$253.1	\$0.0	\$0.0
10-102	Unalakleet River Chinook Salmon Assessment	\$302.2	\$91.8	\$94.7	\$96.7
10-104	Selawik Lake and Hotham Inlet Sheefish Genetic Analysis	\$1.4	\$128.1	\$115.3	\$83.8
<u>Harvest Monitoring and Traditional Ecological Knowledge</u>					
10-151	Bering Strait Non-salmon Fish Local Ecological Knowledge	\$169.0	\$188.0	\$159.6	\$58.6
10-152	Northwest Alaska Climate Change and Subsistence Fisheries	\$74.1	\$56.0	\$54.4	\$0.0
Total		\$863.4	\$717.0	\$424.0	\$239.1

Table 4. Yukon region projects funded in 2010.

		Approved Budget (\$000)			
Study #	Title	2010	2011	2012	2013
<u>Stock Status and Trends</u>					
10-200	Yukon River Chinook Salmon Run Reconstruction	\$80.9	\$62.7	\$6.9	\$0.0
10-202	East Fork Andreafsky River Salmon Assessment	\$145.5	\$148.0	\$156.1	\$149.6
10-205	Yukon River Chum Salmon Mixed-stock Analysis	\$124.8	\$124.8	\$124.8	\$124.8
10-206	Nulato River Salmon Assessment	\$15.0	\$0.0	\$0.0	\$0.0
10-207	Gisasa River Chinook and Summer Chum Salmon Assessment	\$120.1	\$141.2	\$135.1	\$141.9
10-209	Yukon Delta Bering Cisco Mixed-stock Analysis	\$69.4	\$39.6	\$22.2	\$13.9
<u>Harvest Monitoring and Traditional Ecological Knowledge</u>					
10-250	Yukon Climate Change Impacts on Subsistence Fisheries	\$78.3	\$59.6	\$31.9	\$0.0
Total		\$634.0	\$575.9	\$477.0	\$430.2

Table 5. Kuskokwim region projects funded in 2010.

Study #	Title	Approved Budget (\$000)			
		2010	2011	2012	2013
<u>Stock Status and Trends</u>					
10-300	Kanektok and Goodnews Rivers Salmon Assessment	\$187.6	\$171.5	\$184.1	\$145.9
10-303	Kuskokwim River Salmon Age Sex Length Assessment	\$108.7	\$112.7	\$117.0	\$121.4
10-304	Tatlawiksuk River Salmon Assessment	\$198.6	\$184.6	\$192.3	\$200.4
10-305	Kuskokwim River Sheefish Spawning, Distribution and Timing	\$54.2	\$52.5	\$0.0	\$0.0
10-306	Kwethluk River Salmon Assessment	\$207.1	\$226.8	\$221.3	\$224.3
10-307	Tuluksak River Salmon Assessment	\$205.4	\$150.5	\$167.2	\$157.8
<u>Harvest Monitoring and Traditional Ecological Knowledge</u>					
10-352	Kuskokwim Salmon Postseason Harvest Monitoring	\$100.9	\$87.8	\$91.2	\$82.3
10-353	Kuskokwim Salmon Working Group Support	\$45.0	\$45.2	\$46.7	\$45.3
10-354	Kuskokwim Salmon Inseason Harvest Monitoring	\$37.6	\$30.1	\$31.4	\$21.5
Total		\$1,145.1	\$1,061.7	\$1,051.2	\$998.9

Table 6. Southwest Alaska region projects funded in 2010.

Study #	Title	Requested Budget (\$000)			
		2010	2011	2012	2013
<u>Stock Status and Trends</u>					
10-401	Afognak Lake Sockeye Salmon Smolt and Adult Assessment	\$139.5	\$141.6	\$147.0	\$150.9
10-402	Togiak River Chinook Salmon Assessment	\$241.3	\$203.7	\$210.1	\$0.0
10-403	Buskin River Sockeye Salmon Adult Assessment	\$90.6	\$93.0	\$95.0	\$96.8
10-404	Buskin River Sockeye Salmon Smolt Assessment	\$115.7	\$81.1	\$0.0	\$0.0
Total		\$587.1	\$519.4	\$452.1	\$247.7

Table 7. Southcentral Alaska region projects funded in 2010.

		Approved Budget (\$000)			
Study #	Title	2010	2011	2012	2013
<u>Stock Status and Trends</u>					
10-502	Tanada Creek Salmon Assessment	\$64.6	\$65.8	\$67.4	\$69.5
10-503	Copper River Chinook Salmon Assessment	\$373.0	\$373.0	\$373.0	\$373.0
10-505	Long Lake Salmon Assessment	\$23.1	\$11.8	\$12.0	\$12.7
<u>Harvest Monitoring and Traditional Ecological Knowledge</u>					
10-552	Copper River Subsistence Salmon Harvest Validation	\$211.6	\$194.8	\$42.9	\$0.0
Total		\$672.3	\$645.4	\$495.3	\$455.2

Table 8. Southeast Alaska region projects funded in 2010.

Study #	Title	Approved Budget (\$000)			
		2010	2011	2012	2013
<u>Stock Status and Trends</u>					
10-600	Karta River Sockeye Salmon Assessment	\$157.5	\$142.1	\$152.2	\$161.4
10-601	Hatchery Creek Sockeye Salmon Assessment	\$182.8	\$164.6	\$175.2	\$173.8
10-603	Yakutat Eulachon Surveys	\$27.5	\$27.9	\$29.9	\$31.6
10-604	Klag Lake Sockeye Salmon Assessment	\$128.2	\$128.1	\$134.5	\$141.2
10-605	Sitkoh Lake Sockeye Salmon Assessment	\$71.4	\$68.8	\$70.8	\$72.8
10-606	Hetta Lake Sockeye Salmon Assessment	\$181.3	\$165.4	\$171.9	\$169.1
10-607	Kanalku Lake Sockeye Salmon Assessment	\$178.8	\$187.7	\$197.1	\$207.0
10-609	Falls Lake Sockeye Salmon Assessment	\$118.7	\$118.0	\$123.4	\$129.9
10-610	Kook Lake Sockeye Salmon Assessment	\$198.4	\$189.8	\$187.3	\$190.9
10-611	Redoubt Lake Sockeye Salmon Assessment	\$25.0	\$25.0	\$25.0	\$25.0
10-612	Neva Lake Sockeye Salmon Salmon Assessment	\$157.7	\$144.8	\$149.0	\$153.1
Total		\$1,427.3	\$1,362.2	\$1,416.3	\$1,455.8

Project Number: 10-100

Project Title: Selawik Drainage Inconnu Winter Movement Patterns

Geographic Region: Northern Alaska

Information Type: Stock Status and Trends

Principal Investigator: Trent Sutton, University of Alaska Fairbanks

Co-Investigator(s): Christian Zimmerman, USGS, Alaska Science Center
Raymond Hander, USFWS, Fairbanks Fish and Wildlife Field Office
Christine Moran, USFWS, Selawik National Wildlife Refuge
Alex Whiting, Native Village of Kotzebue

Cost: **2010:** \$316,748 **2011:** \$253,070

Recommendation: Fund

Issue

Whitefishes support important subsistence fisheries in the Selawik and Kobuk river drainages (including the Selawik National Wildlife Refuge), with an annual harvest that exceeds all other fishes in the region. Given the importance of whitefish in the drainage, it is important to understand the life history, stock structure and dynamics, and habitat availability and use. Inconnu *Stenodus leucichthys*, a large, long-lived piscivorous whitefish, is one of the most important fishes harvested in the Selawik River drainage. Trends in spawning abundance, biological attributes, and spawning biology have been examined in the drainage. However, winter habitat use was not defined due to sampling constraints and telemetry restrictions. Because winter habitats can be limiting in Arctic waters, a better understanding of the distribution, movement patterns, and habitat requirements of inconnu is necessary in the Selawik and Kobuk river drainages. In particular, there is a need to understand the role of water depth, temperature, and salinity on habitat availability and use for this species. Recently, an application for the development of an ice road in this area has been approved; ice-road development requires water drawdowns to strengthen road integrity, which may negatively impact the availability and quality of winter habitat for inconnu. Climate-induced changes resulting from altered hydrological regimes may also impact habitat integrity during winter. Therefore, there is a need to better understand the winter habitat requirements, use, and availability for inconnu, an integral component of the subsistence harvest in the Selawik River drainage.

Objectives

1. Identify the late fall and winter distribution of inconnu in the Selawik and Kobuk river drainages.
2. Assess the importance of water depth, temperature, and salinity as determinants of winter habitat use of inconnu in the Selawik and Kobuk river drainages.

Methods

Inconnu will be collected using angling and seines during late July and August 2010 and 2011 in the Selawik and Kobuk rivers. All captured fish will be sexed and measured for fork length, and 80 fish

each year per river (320 fish total) will receive VEMCO-coded acoustic transmitters. This model of transmitter has a temperature and pressure (depth) sensor and an expected battery life of 268 d. All fish will also receive a coded t-bar anchor tag as a secondary mark. To track fish, twenty acoustic receiving stations, each with an affixed Star-Oddi archival tag to record temperature, depth, and salinity at that location, will be distributed at the mouths of the Selawik, Kobuk, and Noatak rivers, the inlet and outlet of Selawik Lake, and throughout Hotham Inlet. Receiving stations will be used to record transmitted temperature and depth data as fish with transmitters swim within 800 m of the receiver; these data will be downloaded after receiving station retrieval in June 2011 and 2012. The archival tags will allow for identification of environmental condition ranges utilized during winter. Coupling these data, with existing data collected previously on environmental conditions in the study area, will allow determination of the winter temperature, depth, and salinity preferences of inconnu. Using these data, winter movement patterns and home-range size of inconnu will be quantified and analyzed based on relocations and the mean movement distance of each fish. The mean and range in temperature, depth, and salinity will be examined to characterize habitat use. Movement and home-range data will be analyzed within the context of fish location and habitat-use data. Differences between habitat features will be examined for each year, between years, and among species to determine habitat preferences.

Partnerships and Capacity Building

This project represents a collaboration among the University of Alaska Fairbanks, the USGS Alaska Science Center, the USFWS Fairbanks Fish and Wildlife Field Office, the USFWS Selawik National Wildlife Refuge, the IRA Councils in the Native Village of Selawik and the Native Village of Kotzebue. University and agency personnel will work closely with IRA Council tribal members to coordinate through outreach activities the capture of tagged fish harvested by subsistence fishers. We will hire two to three village members from Selawik and/or Kotzebue to assist with collecting fish, implanting tags, and deploying acoustic receiver stations. Additional capacity building through field support will be provided each field season by the SNWR through a GS-7 level technician from the local area or a summer internship for a local high school student through the Alaska Native Science and Engineering Program. The UAF will offer pre-season and hands-on training in the field to all field assistants and any interested high school students in the area on sampling protocols, tag implantation, and data collection and analysis, as well as overall basic boater safety and First Aid training. The goal of this training is to better prepare these interested individuals for a potential career in fisheries science.

Justification

This research addresses important subsistence inconnu stocks associated with the Gates of the Arctic National Preserve, Selawik National Wildlife Refuge, Kobuk Valley Wilderness and Kobuk Valley National Park. Since Selawik River and Kobuk River inconnu are thought to share wintering habitat and because they are harvested together as a mixed-stock fishery, the research project was expanded to include both stocks. Information gathered will provide a better understanding of inconnu migration and distribution post-spawning and winter habitat requirements. Results from this project compliment past and ongoing inconnu research funded by the Monitoring Program in the Kobuk River (08-103 *Spawning location, run timing, and spawning frequency of Kobuk River sheefish*, 2008–2011) and the Selawik River (04-101 *Selawik Inconnu Abundance*, 2004–2005). It further builds on harvest monitoring information collected in 00-020 *Under Ice Gillnet Harvest of Sheefish in Hotham Inlet* 2000–2001.

Project Number: 10-102

Project Title: Unalakleet River Chinook Salmon Assessment

Geographic Region: Northern Alaska

Information Type: Stock Status and Trends

Principal Investigator: Scott M. Kent, ADF&G Division of Commercial Fisheries

Co-Investigators: Tim Sundlov, Bureau Land Management
Brendan Scanlon, ADF&G Division of Sport Fish
Wes Jones, Norton Sound Economic Development Corporation

Cost: **2010:** \$302,238 **2011:** \$91,816 **2012:** \$94,685 **2013:** \$96,656

Recommendation: Fund

Issue

This proposal directly addresses the 2010 FRMP specifically identified Priority Information Need to obtain reliable estimates of abundance and age, sex, and length (ASL) composition from the Unalakleet River Chinook salmon *Onchorhynchus tshawytscha* spawning escapement. This proposal seeks funding to purchase, build, and operate a 320 ft resistance board floating weir in order to monitor the magnitude and age structure of the Chinook salmon spawning escapement. This includes the collection of ASL data to determine spawning goals and examine trends in relation to environmental changes and harvest practices. ASL and escapement data from weirs are considered to be the least biased and most accurate.

The Chinook salmon run to the Unalakleet River supports the largest Chinook salmon subsistence fishery in Norton Sound. Radio telemetry studies revealed that approximately 60% of Chinook salmon that return to the Unalakleet River drainage spawn within the upper main stem of the Unalakleet River and its upper tributaries within the Wild and Scenic portion. However, Chinook salmon returns to the Unalakleet River have declined precipitously since 2000. The North River sustainable escapement goal (SEG) has only been reached once since 2003 despite an end to commercial fishing directed at Chinook salmon, severe restrictions to subsistence and sport fisheries, and early closures to the subsistence fishery in 5 of the previous 6 years. Unalakleet River Chinook salmon were designated a stock of yield concern in 2004 by the Alaska Board of Fisheries (BOF), and the BOF continued this designation in 2007. In January 2009, further action was also taken by the Federal Subsistence Board to protect Chinook salmon by closing the Wild and Scenic portion of the Unalakleet River to Chinook salmon fishing by all users.

One possible factor contributing to the diminished productivity of Unalakleet Chinook salmon over the past decade is a major change in the quality of the spawning escapement. Historical test fishery ASL data shows a trend toward fewer of the larger and potentially more fecund females, belonging to the older age classes being caught in the ADF&G Unalakleet River test fishery. Major reductions in the number of large female Chinook reaching spawning areas could seriously impair the capacity of this stock to return to levels of abundance necessary for providing customary levels of subsistence use. A floating weir

also will provide a way to examine how harvest practices (i.e., regional large-mesh gillnet fisheries) and environmental changes affect the size and quality of the spawning escapement.

Objectives

1. Estimate daily and total Chinook salmon escapement from June 15 to July 31.
2. Describe the timing of the Chinook salmon run.
3. Estimate the ASL composition of the annual Unalakleet River 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 purchase, build, and operate a 320 ft resistance board floating weir following methods described by Stewart (2002) and Tobin (1994). The proposed weir site (63°53.32'N, 160°29.41'W) is located approximately 22 rkm upstream from the mouth of the Unalakleet River. Weir operations will occur from mid-June until July 31 in order to count nearly 100% of the Unalakleet River Chinook salmon run. In addition to timely and accurate escapement counts, the floating weir and associated live trap will facilitate collection of large sample sizes ($n=230$) of unbiased ASL data from the Chinook salmon spawning escapement. Age class information representative of the entire Chinook run is an essential component of conducting recruits-per-spawner (R/S) analysis and developing 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 data sets compiled of escapement, age data, and harvest information will be used to reconstruct the total run and develop scientifically-defensible drainage-wide Chinook salmon escapement goals. This will lead to management of the Unalakleet River Chinook salmon subsistence fishery consistent with the State's Sustainable Salmon Policy.

Partnerships and Capacity Building

In this proposal, the requested funding is entirely for ADF&G. However, Bureau of Land Management (BLM) and the Norton Sound Economic Development Corporation (NSEDG) are providing matching funds in the form of biologist or technician time for weir fabrication (BLM), installation (BLM and NSEDG), and operations (BLM). NSEDG is also providing matching funds by operating the North River tower project during the month of July for the 2010–2013 field seasons. The local hire emphasis will promote involvement of resource users as active participants in the fisheries management process.

Justification

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. The results from this project would provide Chinook salmon inseason daily passage estimates and run timing. This information would aid Federal and State fishery managers in making timely decisions. In addition, the proposed work would provide managers with information to characterize spawner/recruit relationships and develop an escapement goal for Unalakleet River Chinook salmon. Currently, capacity building

consists of local hire but the investigators are encouraged to continue moving towards a more meaningful role for local organizations.

Project Number: 10-104
Project Title: Selawik Lake and Hotham Inlet Inconnu Genetic Analysis
Geographic Region: Northern Alaska
Information Type: Stock Status and Trends
Principal Investigator: Raymond Hander, U.S. Fish and Wildlife Service Fairbanks Field Office
Co-Investigators: Jeffrey Olsen, USFWS Fairbanks Field Officer
James Savereide, ADF&G Division of Sport Fish
Randy Brown, USFWS Fairbanks Field Office
John Wenburg, USFWS Conservation Genetics Laboratory
Alex Whiting, Native Village of Kotzebue

Cost: **2010:** \$1,350 **2011:** \$128,147 **2012:** \$115,278 **2013:** \$83,790

Recommendation: Fund

Issue

This project primarily addresses the need for “baseline harvest assessment and monitoring of subsistence fisheries...” identified as a priority for the Northern Region in the 2010 Fisheries Resource Monitoring Program. Secondly, this project addresses the priority information need to “identify and characterize critical factors affecting population dynamics of Selawik River inconnu”.

Inconnu are one of the most important food fishes in the Kotzebue region of Northwest Alaska. As a subsistence resource, inconnu are captured and used during all seasons of the year for human consumption and dog food. There are two known spawning populations (the Kobuk and Selawik River populations) of inconnu in Northwest Alaska but there is no information on the contribution of these populations to the area fisheries. The preliminary genetics work of Miller et al. (1998) suggested that genetic mixed-stock analysis (MSA) could be used to address this issue as well as clarify the geographic distribution of the two populations during migration. In this study we will conduct a genetic MSA of the winter subsistence gillnet fishery for inconnu in Hotham Inlet and Selawik Lake. The majority of the regional annual inconnu harvest comes from this fishery with no current means to determine individual stock contributions. This study will provide estimates of the contribution of each population to the winter fishery in 2010/2011 and 2011/2012. The results will help managers evaluate the extent to which the population composition in the fishery varies spatially and temporally and specifically assess the potential for overharvest of the numerically smaller Selawik River population. This information may reveal patterns of migration that influence the population dynamics and exposure to harvest of Selawik River inconnu. Monitoring the population contribution to the winter subsistence gillnet fishery may also inform managers of factors influencing trends in abundance.

The current state of knowledge regarding total annual harvest, total Kobuk or Selawik inconnu stock abundance and their exploitation rates, and spawning population size are in some cases lacking. Effort to routinely monitor harvest (MSA and numbers of fish), estimate spawner population abundance, and estimate spatial and temporal inconnu distribution could provide a coordinated set of tools that may aid fishery manager’s abilities to make more informed decisions about Kobuk and Selawik inconnu stocks.

Objectives

1. Estimate the proportional contributions of Kobuk and Selawik River inconnu stocks to spatial and temporal strata of the winter subsistence fishery.
2. Test the hypothesis that proportional contributions of Kobuk and Selawik River inconnu stocks from individual sample areas are equivalent and describe the spatial and temporal distribution of inconnu stocks.

Methods

We will collect inconnu fin clips (N=200) from each of four locations during the winter subsistence gillnet fishery in Hotham Inlet and Selawik Lake. Given the level of genetic differentiation between Kobuk and Selawik river inconnu, a sample size of 200 per collection is likely sufficient to accurately determine stock proportions using MSA. Collections will be made during the winters of 2010–2011 and 2011–2012 in both November and March for a total of 16 collections and 3,200 samples.

Sample collectors will be responsible for collecting samples from subsistence harvested inconnu and properly preserving them according to criteria from the USFWS Conservation Genetics Laboratory (CGL). An attempt will be made to collect an approximately equal number of genetic samples from all active fishers in each of the four sample areas. Sampling procedure and training will be provided to collection personnel before the collection process begins, including inspecting inconnu for prior scientific project's markings with fin clips, floy tags, and radio tags.

Genetic MSA analysis will be carried out by the USFWS Conservation Genetics Laboratory to estimate the proportion of Kobuk and Selawik River inconnu in each of the 16 subsistence fishery collections (N=200 per collection) using baseline data and a Bayesian mixture modeling method.

Partnerships and Capacity Building

Contract agreements will be made with Native Village of Kotzebue (NVOK) and the Selawik IRA Council to hire at least one person from each community to collect genetic samples. Specific training to address project specific sampling procedures and protocols will be conducted for individuals prior to initiating sampling. On the capacity building scale adapted from Berkes et al. (1991), this project will be at a level 5 collaboration where the research team utilizes local knowledge of fishing site distribution and employs/contracts individuals from the NVOK and the Selawik IRA Council for field sampling purposes.

Justification

Kobuk and Selawik River inconnu support an important winter subsistence fishery in Hotham Inlet. This under-ice fishery comprises the largest portion of total documented inconnu harvest in the Kotzebue region. Exploitation of inconnu is poorly understood, because of incomplete information on stock abundance, stock composition, and annual harvest. During this project, researchers will collect tissue samples from subsistence harvested inconnu to conduct genetic mixed-stock analysis. Information gathered will provide an estimate of the contribution of each stock to the gillnet fishery and help managers evaluate the potential harvest. This project will compliment past and ongoing inconnu research funded by the Monitoring Program in the Kobuk River (08-103 *Spawning location, run timing , and spawning frequency of Kobuk River sheefish*, 2008–2011) and the Selawik River (04-101 *Selawik Inconnu Abundance*, 2004–2005). It further builds on harvest monitoring information collected in 00-020 *Under Ice Gillnet Harvest of Sheefish in Hotham Inlet* 2000–2001.

Project Number: 10-151
Project Title: Bering Strait Non-salmon Fish Local Ecological Knowledge
Geographic area: Northern Alaska
Information Type: Harvest Monitoring/Traditional Ecological Knowledge
Principal Investigator: Julie Raymond-Yakoubian, Kawerak, Inc.

Cost: **2010:** \$168,962 **2011:** \$188,007 **2012:** \$159,621 **2013:** \$58,600

Recommendation: Fund

Issue

This project addresses a priority information need in the 2010 Fisheries Resource Monitoring Program Request for Proposals for the Northern Alaska Region regarding the subsistence harvest of fish. The project will document current levels of subsistence use of non-salmon fish by five Bering Strait region communities: Shishmaref, Wales, Stebbins, Teller and Brevig Mission. Some salmon stocks in the Bering Strait region have been declining for over a decade and based on resident reports and other preliminary observations, non-salmon species appear to also be experiencing changes in population size. This research attempts to document and quantify the use of non-salmon species by these five communities. In addition to documenting local knowledge regarding these species, the project will provide continuity in harvest data collection (following the surveys conducted by Ahmasuk and others in 2008), which included non-salmon species) for the five communities included in the investigation plan. Documenting past and present harvest patterns and trends will be accomplished, including the importance of non-salmon species in local subsistence economies.

The interview portion of this project also will address the Interregional 2010 Fisheries Resource Monitoring Program Request for Proposals priority information need on the effects of climate change on subsistence fisheries. Together with D. Andersen (Research North) and C. Brown's (Alaska Department of Fish and Game) proposed study exploring climate change implications in the Yukon-Kuskokwim River system (OSM Proposal No. 10-250), and C. Carothers (University of Alaska Fairbanks) study of local observations of climate change relevant to subsistence fisheries in Northwest Alaska (OSM proposal No. 10-152), this study begins to address the identified need for interregional comparisons of the effects of climate change on subsistence fisheries and the management implications of such effects.

Interviewees will be asked for their assessment of the river and shore ice, any changes that they have observed in the ice, and how those changes have affected fishing efforts during winter months. Climate changes also may be impacting parts of the fish life cycle such as migratory patterns and run timing. Any associations between climate changes and non-salmon species will be sought and patterns and trends will be highlighted.

Objectives

The following are the objectives of the project:

1. Estimate harvests of non-salmon fish species by community for the 2009–2010 harvest season;

2. Estimate and compare households' evaluation of this harvest compared to other recent years;
3. Document the percentage of households using, harvesting, receiving, trading and giving away non-salmon species
4. Document local ecological knowledge and information on non-salmon fish species utilized by residents of the four study communities.

Methods

In addition to background research and archival research at Kawerak's Eskimo Heritage Program archives, this project will rely on three major methods to record the information sought: household harvest surveys, local expert interviews, and use-area mapping. The communities of Shishmaref, Wales and Stebbins all have significant associations with Federal conservation units. While Teller's and Brevig Mission's association with Federal conservation units is less strong, they are communities representative of many others in the region in terms of size, Alaska Native residency numbers, and dependence on subsistence foods, particularly fish. The five communities also provide a fairly diverse geographical distribution across the Bering Strait Region.

Household surveys will be conducted with a sample of households in each participating community. Following the household surveys, a minimum of eight semi-structured interviews with local experts will be conducted in each community. Some of the topics to be discussed during interviews include (for each non-salmon species): taxonomy, changes in population numbers, species health and distribution, current/previous harvest methods and location, processing and storage methods, economic and cultural importance, non-salmon related place names, habitat preferences, spawning areas and changes in climate that may impact non-salmon fish and fishing areas. During interviews, maps will be used as prompts and relevant information will be mapped using USGS 1:250,000 maps with mylar overlays (e.g., locations of spawning areas, rearing habitat, traditional harvesting areas, fish camps, etc.).

Partnership/Capacity Building

Kawerak is the Alaska Native nonprofit organization for the Bering Strait region and has been operating since 1973 to provide a variety of services to the tribes in the region. The principal investigator is a Kawerak staff member and is responsible for all aspects this research. Kawerak will develop the household survey instrument and the interview protocol. Each of the five IRA councils will have the opportunity to review a draft interview protocol and to suggest changes. Kawerak will hire at least one local surveyor (to conduct harvest surveys) and one local assistant (to assist the principal investigator with interviews) from each participating village. A student intern will be hired and trained for the interview portion of the project as well. At least 40 local residents will be interviewed and have the opportunity to provide their input on the status and future of the non-salmon fisheries in the region.

Justification

The goal of this project is to estimate current levels of subsistence use and document local knowledge about non-salmon fish in the four Bering Strait communities of Shishmaref, Wales, Stebbins, Teller, and Brevig Mission. Some salmon stocks in the Bering Strait region have been declining for over a decade and anecdotal information indicates that non-salmon fish harvests may be increasing. In addition to conducting a household survey to attain harvest estimates, investigators will conduct a number of key informant interviews to provide contextual information on a variety of topics related to non-salmon fish species, as well as collecting some information on the effects of climate change on subsistence fisheries. Attaining reliable baseline harvest estimates, monitoring subsistence fisheries throughout the Northern Region, and documenting the effects of climate change on subsistence fisheries are high strategic priority

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information needs in the Fisheries Resources Monitoring Program 2010 Request for Proposals. The partnership component is high with a strong capacity building component between Kawerak and local communities, and the investigator is qualified to conduct the work.

Project Number: 10-152

Project Title: Northwest Alaska Climate Change and Subsistence Fisheries

Geographic Region: Northwest Alaska

Information Type: Harvest Monitoring and Traditional Ecological Knowledge

Principal Investigator: Dr. Courtney Carothers, University of Alaska Fairbanks

Co-Investigators: Dr. J. Andrés López, University of Alaska Fairbanks
Dr. Ellen D. S. López, University of Alaska Fairbanks

Cost: **2010:** \$74,082 **2011:** \$55,984 **2012:** \$54,413

Recommendation: Fund

Issue

This study will document local observations of climate change relevant to subsistence fisheries in three communities in Northwest Alaska: Noatak, Selawik, and Unalakleet. This project addresses a research priority identified in the 2010 Fisheries Resource Monitoring Program Request for Proposals to document effects of climate change on subsistence fishery resources and uses and describe management implications. Together with D. Andersen (Research North) and C. Brown's (Alaska Department of Fish and Game) proposed study exploring climate change implications in the Yukon-Kuskokwim River system (OSM Proposal No. 10-250), and J. Raymond-Yakoubian's (Kawerak, Inc) study of local ecological knowledge of non-salmon fish in the Bering Strait region (OSM proposal No. 10-151), this study begins to address the identified need for interregional comparisons of the effects of climate change on subsistence fisheries and the management implications of such effects. This study will systematically document traditional ecological knowledge of climate and related ecological changes that affect the harvest, processing, and practices of subsistence fisheries. This documentation, along with an analysis of the prevalence and perceived importance of such observations will inform adaptive subsistence management that can respond to changing environmental conditions.

Objectives

1. Document traditional and local ecological knowledge of climate changes in three study communities.
2. Analyze key similarities and differences between the three study communities of climate change observations.
3. Document the effects of climatic and related changes on subsistence fishing in the three study communities.
4. Analyze key similarities and differences in the effects of climate change and related changes on subsistence fisheries among the three study communities.
5. Contextualize climate-related changes to other environmental, social, economic, or cultural shifts that affect subsistence fisheries.

Identify emerging themes from interview and survey data pertinent to subsistence practices and adaptations and related implications for subsistence management.

Methods

A systematic review and synthesis will be conducted of literature, data, and archival sources that supply biological and traditional knowledge on the targeted subsistence fishery species in each community. Ethnographic research will be conducted to compare and contrast observations of change across a range of ecological zones. Three study communities have been selected—Noatak, Selawik, and Unalakleet—in distinct locations in the region. Semi-structured, ethnographic interviews with expert informants will be conducted. With the assistance of village IRA councils and the project Fisheries Steering Committee (see below), key informants (e.g., knowledgeable fishers, elders, and regional experts) will be identified to explore knowledge about climate and related ecological changes of concern for subsistence fishers. How subsistence harvesters may be adapting their harvest practices to respond to climate-related changes will be documented. Additionally, a short survey instrument will be used to systematically gather information on observed changes. This method, paired with cultural consensus analysis, will provide a systematic evaluation of how widely shared observations are among a set of users within and between communities (as well as potentially among users within different regions). Based on the 6–10 key informant interviews in each community, the questions on the survey will be developed. Respondents will be asked to confirm those observations based on their own experiences. Other survey questions will include a ranking of the perceived relative importance of observed changes. Open-ended questions exploring current and anticipated impacts on subsistence fisheries will provide a necessary context to evaluate these changes and their impacts. The survey results, along with the ethnographic context, will provide valuable data to inform recommendations for adaptive subsistence management.

Partnership and Capacity Building

The project places great emphasis on building partnership and capacity for enhancing subsistence fisheries-related research and management in Northwest Alaska. Specifically, the following will be accomplished:

1. Creating a fisheries steering committee comprised of regional and local experts who will share decision-making power in guiding all research activities.
2. Identifying and hiring a community advisor in each of the three target communities. Advisors will assist with developing culturally appropriate and feasible project materials and protocols for, and be trained in, data collection skills and ethics. Once trained, advisors will assist with data collection for this project, and fortify a research infrastructure that can be employed for future fisheries-related research.
3. Sharing all data with and disseminating findings generated from this project to participating communities. All audio-files and transcripts from interviews and surveys will be housed at the Eskimo Heritage Program. All findings will be reported back to community members via agreed upon, user-friendly methods.
4. Offering additional co-learning opportunities. The research team will offer and participate in presentations, workshops, and other knowledge-sharing events, with an emphasis placed on working with local schools and community-based organizations.

Justification

The goal of this project is to document local observations of climate change in three communities in Northwest Alaska—Noatak, Selawik, and Unalakleet—as well as to document the effects of these changes on subsistence fisheries and management. Three communities were selected based on proximity to Federal public waters as well as a range of ecological zones: the riverine community of Noatak, the coastal lagoon community of Selawik in the Northwest Arctic area, and the coastal community of Unalakleet in Norton Sound. The relevance of this project is strengthened by collaboration with OSM Projects 10-250 and 10-151. The project will accomplish its objectives through a literature review, key informant interviews, and a household survey. Community advisors will be hired in each community. The strategic priority of documenting the effects of climate change on subsistence fishery resources and uses and management implications of these changes is high, and the linkage to Federal management is strong. The capacity building is fairly strong, and the investigators are well qualified to do the work.

Project Number: 10-200
Project Title: Yukon River Chinook Salmon Run Reconstruction
Geographic Region: Yukon
Information Type: Stock Status and Trends
Principal Investigator: Brian G. Bue, Bue Consulting LLC
Co-Investigator: Toshihide Hamazaki, ADF&G Division of Commercial Fisheries

Cost: **2010:** \$80,826 **2011:** \$62,698 **2012:** \$6,883

Recommendation: Fund

Issue

Yukon River Chinook salmon populations support subsistence and commercial fisheries within the Yukon Delta National Wildlife Refuge as well as other federal conservation areas scattered throughout the Yukon River drainage. The status of these populations has been of concern in recent years largely due to low run abundance. While these declines are thought to be associated with climate change or anomalous ocean conditions, the specific cause is unknown. A reliable time series of run size, harvest, and escapement information combined with age composition data is essential to understand the production of Chinook salmon in the Yukon River drainage as well as to better understand the mechanisms that drive variation in abundance. This knowledge is the cornerstone of fisheries management in Alaska and is important for evaluating the consequences of past and future fishery management strategies and decisions; evaluations which ultimately moves fisheries management towards goals that maximize the likelihood of sustainable salmon fisheries in the future.

The uses for the basic information provided by this project are numerous and essential for researching a wide range of topics dealing with the Chinook salmon population in the Yukon River, Bering Sea, and North Pacific Ocean. Besides evaluating the stock recruitment relationship for the Yukon River stock, an evaluation of the exploitation rates by age and size for both the subsistence and commercial fisheries will be possible, as will an evaluation of the overall effect of interceptions in other fisheries such as the Bering Sea Pollock fishery. A long historical time series of Chinook salmon abundance when combined with information from other species, weather, and other environmental data may be useful for other researchers evaluating the long-term effects of climate change.

Objectives

1. Estimate total abundance and spawning escapement of Chinook salmon in the Yukon River from 1976 through 2011.
2. Describe the spawner-recruit relationship of Yukon River Chinook salmon to assess the influence of parental escapement on variations in return.

Methods

This project will estimate the historical total run size of Chinook salmon to the Yukon River from approximately 1976 thru 2011 using a statistical model that incorporates all available and relevant historical data (e.g., weir, tower, and aerial counts, subsistence and commercial harvest numbers, test-fishery information, mark-recapture estimates, sonar estimates, and stock composition information obtained from genetics. Historical escapements can then be estimated by subtracting the documented

catches from the estimated total runs. Available age composition information will be combined with the estimated total runs and escapements to build a brood table for the Yukon River Chinook salmon population and stock recruitment analysis will be used to explore the stock productivity relationships and provide information for assisting with setting escapement goals.

Partnerships and Capacity Building

This project will hire a seasonal Fish and wildlife technician for collection, compilation, and error checking of the available data. While selection of the technician must follow the established procedures of State of Alaska, every effort will be made to encourage students from rural areas to apply. The software developed for the run reconstruction model will be given to the ADF&G Yukon Area staff who will continue to update the input data files and make future run-reconstructions as needed. Hamazaki will assist with this transition.

Justification

This investigation plan addresses a high priority strategic data need for the Yukon region. The subsistence Chinook salmon fishery of the Yukon River is one of the largest and most important in the state. This fishery is conducted largely within the boundaries of the Yukon Delta National Wildlife Refuge in the lower river and six other conservation units located in the middle and upper portions of the drainage. Conservation concerns for these salmon stocks over the last decade have been addressed by the Board of Fisheries designation as a Stock of Yield Concern and specific regulatory measures designed to rebuild these stocks. The study design was adequately described and technically sound; the investigators have successfully applied the proposed methods for run reconstruction to salmon stocks in the Kuskokwim River. The investigation plan identifies specific data sources that will be available for developing the run reconstruction. A critical component of the run reconstruction is availability of a reliable estimate of the total run for at least some years. The methods proposed are effective for describing patterns or trends in run abundance, but require total run estimates to calibrate the model. The investigators identified a number of potential approaches for providing these estimates; thereby, greatly increasing the likelihood of producing useful estimates of historic abundance. The proposed work potentially could introduce innovative methodologies and management tools for the Yukon River Chinook salmon fisheries. The experience and training of the investigators is well suited to successfully accomplishing study objectives.

Project Number: 10-202
Project Title: East Fork Andreafsky River Salmon Assessment
Geographic Area: Yukon
Information Type: Stock Status and Trends
Principal Investigator: Gerald F. Maschmann, USFWS Fairbanks Field Office

Cost: **2010:** \$145,530 **2011:** \$148,003 **2012:** \$156,066 **2013:** \$149,617

Recommendation: Fund

Issue

Assessment of Yukon River salmon fisheries management actions is difficult due to the limited number of escapement estimates in the drainage. The abundance and run timing of spawning populations of salmon within the Yukon River drainage have been identified as priority information needs by the Regional Advisory Councils (RACs), the Yukon River Comprehensive Management Plan (YRCMP) for Alaska (Holder and Senecal-Albrecht 1998), and the Yukon River Joint Technical Committee Plan. The Andreafsky River system supports relatively large populations of Chinook *Oncorhynchus tshawytscha*, summer chum *O. keta* and coho salmon *O. kisutch*. The project's location in the lower river allows its escapement estimate to be used in-season by fishery managers. It is also the only tributary escapement monitoring project located downstream of the Pilot Station sonar and monitors stocks that would otherwise go unmonitored. Data from the project are useful for post-season evaluation of management practices and provide insights for future run projections. The East Fork Andreafsky River (EFAR) weir has operated since 1994 and provides one of the longer term databases on escapement in the entire Yukon River, meeting the priority information need of OSM's 2008 Fisheries Resource Monitoring Program to "maintain reliable estimates of Chinook and chum salmon escapement over time".

Objectives

1. Determine daily escapement numbers and run timing of Chinook and chum salmon into the East Fork Andreafsky River.
2. Estimate the age, sex, and length composition of adult Chinook and chum salmon in the East Fork Andreafsky River.
3. Determine the numbers of resident fish species passing the weir.

Methods

A resistance board weir will be installed and operated on the Andreafsky River from mid June through early August each year from 2010 to 2013. Weir picket spacing (4.8 cm) is designed to remain functional during high water flow, but allow some small pink salmon and resident fish to pass through the weir undetected. Visual inspection of the weir for holes and structural integrity will be conducted on a daily basis. During visual inspections, the weir will be cleaned of debris. One live trap and two passing chutes will allow salmon and resident species to migrate through the weir, where their passage will be enumerated daily. Fish will be sampled to collect biological information as they pass through the live trap.

A staff gauge will be installed upstream of the weir to measure daily water levels. Staff gauge measurements will be calibrated to correspond with the average water depth across the river channel at

the upstream edge of the weir. Water temperature will be collected once daily between 0730 and 0830 hours. Two passage chutes will be installed, one nearer the left bank and the other near the right bank. A fish trap will be installed on the left passage chute to facilitate efficient biological sampling during various river stage heights. The right passage chute will be for use during extreme low water levels or when excessive numbers of fish began building up below the weir. Final trap and chute placement will be decided based on 2010 river bottom topography to account for potential overwinter changes. The right passage chute was used intermittently in previous years. All fish, except whitefish (*Coregoninae*), will be enumerated by species as they pass through the live trap. Fish will be counted 24 hours per day and the numbers will be recorded hourly.

Partnerships and Capacity Building

Personnel from the FFWFO and the YDNWR continue to meet with local residents and government entities at village meetings. In recent years, the FFWFO has worked with tribal governments, St. Mary's School District, the Bering Sea Fishermen's Association (BSFA), AVCP, YDNWR, YRDFA to cooperatively host an environmental education camp at the Andreafsky River weir and to teach high school students about salmon life cycles and the fish weir operations. Other environmental education camp cooperators are and local schools and village councils. The FFWFO will work with the Fishery Information Service (FIS) Fisheries Resource Monitoring Program personnel to strengthen the capacity building component of this project. Consultation will occur with Yupiit-Andreafsky Tribal Council (YATC) leaders, and Algaaciq Tribal Government leaders, for hiring people from the local area, and David Herbert, St. Mary's School Principal, and Jay Hootch for coordination with the Science Camp. Consultation has occurred with Michael Reardon on obtaining an Alaska Natives in Science and Engineering Program participant from the lower Yukon River to work at the Andreafsky River weir for 2009. The FFWFO staff has established a positive rapport with villages, hired up to four local residents a year (two of these persons have worked a combined total of 17 seasons), participated in YRDFA meetings and seminars, and utilized the YDNWR for local logistical support and training. It is the intent of the FFWFO to incorporate the local tribal councils into the operation and maintenance of this project so they will have direct involvement and understanding of the FFWFO operating procedure for collecting salmon data for management use. FFWFO leases land at the weir site from Nerklikmute Native Corp. and also has a lease with Ciunerkiurvik Native Corp. for storage facilities. While in transit, personnel commonly domicile at local facilities, and supplemental field supplies and food will be purchased in St. Mary's.

Justification

The East Fork Andreafsky River weir is an established and successful monitoring project that provides escapement and run strength data used to ensure sustainability of subsistence fisheries and conserve fisheries stocks 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. This project participated in the OSM temperature monitoring initiative in 2008 and 2009. The investigator is encouraged to participate in habitat monitoring activities that may be initiated during this period of funding. Habitat evaluation studies of critical salmon spawning areas in the Yukon River where population monitoring occurs provide a unique opportunity to evaluate how salmon populations may respond to shifting habitat mosaics resulting from climate change. The project would provide a very cost effective research platform supporting future habitat assessment and monitoring.

Project Number: 10-205
Project Title: Yukon River Chum Salmon Mixed-stock Analysis
Geographic Area: Yukon
Information Type: Stock Status and Trends
Principal Investigator: Blair Flannery, USFWS Conservation Genetics Laboratory
Co-Investigator: John Wenburg, USFWS Conservation Genetics Laboratory

Costs: **2010:** \$124,758 **2011:** \$124,758 **2012:** \$124,758 **2013:** \$124,758

Recommendation: Fund

Issue

This project relates to the following priority information need identified in the 2010 Office of Subsistence Management Request for Proposals:

- *Estimate stock contributions and run-timing for Chinook and chum salmon, with an emphasis on lower Yukon River main-stem fisheries.*

This proposal is a continuation and expansion of Fisheries Resource Monitoring Program (FRMP) projects 04-228 and 06-205, which have provided in-season stock composition estimates of fall chum salmon to fishery managers within 24 to 48 hours of receiving samples from Pilot Station sonar test fisheries for the past five years. The scope of the project will expand to include stock composition estimation of summer chum salmon. The stock composition of the Yukon River summer chum run has been in flux over the last decade, prompting fishery managers to request in-season stock composition data. This expansion was specifically requested by the Alaska Department of Fish and Game (ADFG) for the 2008 season, and they would like to see the work continue.

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 70% 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 facilitates management. The USFWS, ADFG, and Department of Fisheries and Oceans Canada (DFOC) personnel responsible for fishery management have requested that this work be continued and expanded. 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–August 31).
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 – August 31, 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 200, 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 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.

Justification

This proposal would support continuation of inseason stock assessment of summer and fall races of Yukon River chum salmon. The study is a continuation of work based on a sound, relatively uncomplicated study design and is greatly benefitted by data inputs that are based on several decades of genetic stock biology and sonar enumeration research and application. Abundance by stock are calculated by combining sonar passage and stock composition estimates for variable time strata of 3-7 day intervals. A post-season analysis of escapement and harvest monitoring data is compared to stock specific abundance estimates to assess and adjust the study design. This work has proven to be important to the management of subsistence fisheries and conservation of chum salmon stocks. 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. The project also addresses important information needs identified in the 2010 request for proposals.

Project Number: 10-206
Project Title: Nulato River Salmon Assessment
Geographic Region: Yukon
Information Type: Stock Status and Trends
Principal Investigator: Brandy Berkbighler, Tanana Chiefs Conference (TCC)
Co-Investigator: Robyn George, Nulato Tribal Council (NTC)

Cost: 2010: \$14,990

Recommendation: Fund

Issue

Management of the Yukon River salmon fishery is complex, due to its mixed stock nature and salmon run size. Monitoring salmon escapement is considered the most essential information for salmon management and long term escapement monitoring data is thought to be the most valuable and hardest to maintain but it is necessary to ensure the continued viability of salmon stocks. The Nulato River is a very productive system for Chinook and chum salmon which contribute to the subsistence and commercial fisheries harvest occurring in the middle portion of the Yukon River drainage. Tower counts on the Nulato River have documented escapements of Chinook as high as 4,766 and chum salmon as high as 158,000. In the J. Eiler et.al tagging study 1.7% (2003) and 1.5% (2004), of the tagged Chinook salmon returned to the Nulato River compared to 1.1% for both years at the Tozitna River. An aerial based Chinook salmon Sustainable Escapement Goal was set for both forks of the Nulato River in 2001 (800 for the North and 500 for the South) and then combined and converted into a range of 940–1,900 in 2005. There has been increasing interest expressed from NTC to participate in salmon assessment projects by reestablishing the Nulato weir. The weir would provide managers and researchers reliable escapement counts and accurate escapement information for run reconstructions, which will assist in monitoring changes in salmon abundance and serve as an avenue for local education and meaningful involvement. This project will provide the feasibility information by assessing the remaining weir materials and possible weir site locations to reestablish a weir on the Nulato River.

Objectives

1. Consultation and outreach to the community on the project
2. Assess weir materials currently left at the site in 2003
3. Perform site evaluations for the weir

Methods

To meet the first objective Brandy Berkbighler (TCC) and Robyn George (NTC) will work together to host a community meeting prior to the summer season to introduce the project to community residents, document local concerns about salmon harvests, and answer questions about the project. The community education efforts will be focused on the role of Nulato residents in the management of important subsistence salmon resources. TCC will contract Rob Stewart (ADF&G) to assess weir materials currently left at the site in 2003 and perform a site evaluation of the previous weir site and identify a new weir site location if the river profile has changed. If findings from this feasibility project are favorable, the PI and co-investigator will be submitting a proposal in the next funding call for the installation and operation of a weir on the Nulato River.

Partnerships and Capacity Building

NTC expressed interest to TCC in becoming more involved in the monitoring and management of subsistence salmon resources by re-establishing the Nulato River weir abandoned in 2003. TCC partnered with NTC to conduct a feasibility study in assessing the remaining weir materials and conducting a weir site evaluation and provide community education and a look into involvement and employment opportunities in an escapement monitoring project for Chinook and summer chum salmon in the Nulato River. TCC with assistance from ADF&G will train NTC in the weir site feasibility and equipment essentials of conducting a weir project for monitoring escapement of locally utilized subsistence salmon resources. In addition NTC and TCC will promote community involvement through addressing local concerns with monitoring projects and management of subsistence resources. If findings from this feasibility project are favorable the PI and co-investigator will be submitting a proposal in the next funding call for the installation and operation of a weir on the Nulato River.

Justification

The proposed project would continue dialogue with Nulato community residents regarding the construction and operation of a salmon monitoring weir in the Nulato River. The location, logistics, operations, use of the data and opportunities for employment will be discussed with local residents. Weir materials and alternative sites will be assessed as preparation for development of a future proposal to install and operate a weir. The objectives of the proposal are clear and costs are reasonable. While the technical merits of operating a weir is what the proposed work will help determine, it is clear that monitoring data would be very useful for management and conservation of salmon resources that spawn in the Nulato River. The high level of capacity development supported by the proposal is also noteworthy.

Project Number: 10-207
Project Title: Gisasa River Chinook and Summer Chum Salmon Assessment
Geographic Region: Yukon
Information Type: Stock Status and Trends
Principle Investigator: Jeff Melegari, USFWS Fairbanks Field Office

Cost: **2010:** \$120,110 **2011:** \$141,169 **2012:** \$135,106 **2013:** \$141,862

Recommendation: Fund

Issue

Assessment of management actions for Yukon River salmon fisheries is difficult due to the limited number of escapement studies in the drainage. Within the Koyukuk River drainage, a major tributary in the middle-lower Yukon River, the Gisasa River weir is one of two projects (the other being Henshaw Creek weir) that provide inseason information to assess management actions as well as a postseason index of escapements within the Koyukuk River. Federal and state managers have consistently identified this project as an important source of information for fishery management. Also, the Yukon River Comprehensive Management Plan describes the need for escapement monitoring projects in the Koyukuk River region. Further, in November 2005 the Joint Technical Committee of the Yukon River Panel identified the Gisasa River weir as the second highest priority among lower river projects for Chinook salmon. The project was also identified as the third highest priority for summer chum salmon. The Gisasa River weir has operated for the past fifteen years and provides one of the longer term databases on escapement within the Yukon River.

Objectives

This project is proposed as a four year (2010-2013) 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;
3. Enumerate the daily passage of other fish species.

Methods

A resistance board weir will be installed in the Gisasa River approximately 4 km upstream from the mouth. The weir and passing chute will funnel fish into a live trap, where they can be held for sampling or passed through and counted. All fish passing through the weir will be identified to species and enumerated, with the exception of whitefish spp *Coregonus* and *Prosopium* spp. Non-salmon species will not be handled, so positive identification of whitefish to species will not be possible. Therefore all whitefish species will be grouped under the subfamily Coregoninae. Age-sex-length data will be collected from Chinook salmon and chum salmon. The goal will be to sample 160 salmon/species/week. Samples will be measured for length to the nearest 5 mm mid-eye to fork of tail, sex will be determined from external secondary characteristics, and scales will be collected for aging.

Partnership/Capacity Building

Fairbanks Fish and Wildlife Field Office (FFWFO) and the Refuge have strived for local involvement and capacity building with the project, and initial interest had been expressed by residents in the Galena area. However, the remoteness of the weir site reduces the attraction of the project, and subsequent interest has not developed. Nevertheless, both FFWFO and the Refuge are committed to continually promoting capacity building by describing project opportunities at Regional Advisory Council, Yukon River Drainage Fisheries Association, and Refuge coordination meetings. During the 2008 season a student in the Alaska Native Science & Engineering Program (ANSEP) working at the Koyukuk National Wildlife Refuge visited and assisted at the Gisasa weir for a short period of time and expressed interest in future employment. She has since been hired by our office for the 2009 field season. Alaska Department of Fish and Game has been consulted and will assist by ageing scales.

Justification

This project is supported by State and Federal fisheries managers and addresses an important data need identified in the request for proposals. The project is technically sound and supports one of the most comprehensive data set (14 consecutive years) 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 in 2008 and 2009. The investigators are encouraged to participate in habitat monitoring activities that may be initiated during this period of funding. Habitat evaluation studies of critical salmon spawning areas in the Yukon River where population monitoring occurs provide a unique opportunity to evaluate how salmon populations may respond to shifting habitat mosaics resulting from climate change. Capacity building would be improved, if investigators are successful in promoting local involvement with the project. The investigator is capable of successfully accomplishing the objectives of the project.

Project Number: 10-209
Project Title: Yukon Delta Bering Cisco Mixed-stock Analysis
Geographic Region: Yukon
Information Type: Stock Status and Trends
Principal Investigators: Randy J. Brown, UFWs Fairbanks Field Office
Jeffry Olsen, Ora Schlei and John Wenburg, USFWS, Conservation Genetics Lab
Co-Investigators: Larry DuBois, Alaska Department of Fish and Game (ADFG)
Kevin Schaberg, ADFG
Mike Thalhauser, Kuskokwim Native Association,
Richard Yanusz, ADFG
Stan Zuray, Rapids Research Station

Cost: 2010: \$69,361* 2011: \$39,589 2012: \$22,181 2013: \$13,871

*The budget for 2010 is dedicated almost entirely to obtaining stock-specific genetic samples and developing an effective baseline. If the genetic baseline does not provide enough resolution to discriminate among stocks, funds for 2011-2013 will not be necessary.

Recommendation: Fund

Issue

Bering cisco *Coregonus laurettae* are anadromous salmonids with known spawning populations only in the Yukon, Kuskokwim, and Susitna rivers in Alaska. Rearing Bering cisco are common in the coastal lagoons and estuaries of western Alaska, from Kuskokwim Bay to Prudhoe Bay, where they are actively harvested in subsistence fisheries, and are present in similar habitats in Cook Inlet and the south shore of the Alaska Peninsula. All coastal rearing Bering cisco are thought to be members of one of the three known populations. A commercial fishery for Bering cisco has been initiated in the lower Yukon River and the harvest is being marketed as a smoked fish product in New York City. The fishery is limited to an annual harvest of about 4,500 kg, which for Bering cisco amounts to approximately 10,000 fish. A much larger allocation has been requested, suggesting that the fishery would expand if permitted to do so. Yukon River Bering cisco appear to be quite abundant relative to other coregonid species, based on a mainstem index of relative abundance, and may be capable of sustaining substantial harvests. However, there are no similar data for Bering cisco in the Kuskokwim or Susitna River populations. If the Kuskokwim population is small and the commercial harvest is composed of a large fraction of Kuskokwim origin fish, which is possible, particularly for harvests taking place south of the Yukon River mouth, increasing the allowable harvest could be detrimental to that stock. We propose to develop a genetic baseline for Bering cisco, which would allow us to determine the relative contributions from Yukon, Kuskokwim, and Susitna River Bering cisco stocks in mixture samples, which may help us direct fishery efforts to minimize harvest of weak or unknown stocks and allocate stock assessment activities where they are most needed.

Objectives

- 1) Develop genetic markers for Bering cisco.

- 2) Develop a genetic baseline characterizing the Yukon, Kuskokwim, and Susitna spawning aggregations.
- 3) Use genetic mixed-stock analysis (MSA) to estimate the contributions of baseline populations to the Yukon Delta commercial harvest during 2010, 2011, and 2012.

Methods

Genetic tissue collections—Stock specific collections of Bering cisco genetic material will be collected from the Yukon, Kuskokwim, and Susitna rivers during 2010.

Commercial fishery collections—Genetic material will be collected from the commercial harvest during 2010 through 2012, providing three years of material for mixed stock analysis.

Genetics analyses—We will use the stock specific collections of Bering cisco genetic material to develop and test genetic baselines capable of discriminating among stocks. Assuming this is successful, we will then conduct mixed-stock analyses on the annual collections of genetic samples from the commercial fishery to estimate the proportional contributions of the known stocks.

Partnerships and Capacity Building

The baseline sampling in the Yukon and Kuskokwim rivers depends heavily on the efforts of rural residents and organizations. Stan Zuray, who runs the Rapids fishwheel sampling organization, will lead the sampling efforts on the Yukon River. Stan runs a fisheries education program for youth from Tanana each summer and will be involving these young people in the genetic sampling for Bering cisco at the site. Mike Thalhauser, the partner's biologist with Kuskokwim Native Organization, will be conducting the genetic sample collections from the Bering cisco spawning area on the Kuskokwim River. In his budget he has included funds for two local hires to assist him. Genetics projects require samples with very specific qualities and these individuals are capable of involving their respective communities and obtaining high quality samples for this project.

Justification

This proposal addresses information needs not included in the request for proposals. However, growing concerns regarding expanding commercial fisheries on a largely unstudied species and the potential for negative impacts on the fish stocks as well as subsistence fisheries provide a compelling justification for recommending funding. There is a clearly defined Federal subsistence linkage, the study design concept appears technically sound and the investigators are very capable. A logical progression of data collection and analysis is proposed leading to likelihood of a successful outcome. Investigators developed an investigation plan that (as recommended by the TRC) defined two phases for this study. During the first phase, genetic stock markers would be developed and tested using baseline genetic samples collected from spawning stocks in each of the three drainages that potentially could be contributing to the Yukon Delta commercial fisheries. The second phase would address the analysis of the mixed stock samples collected in 2010 as well as collection and analysis of mixed stock samples obtained in 2011 and 2012. If development of a stock identification model does not provide adequate resolution, funding for 2011-2013 will be withdrawn.

Project Number: 10-250
Project Title: Yukon Climate Change Impacts on Subsistence Fisheries
Geographic Region: Yukon
Information Type: Harvest Monitoring and Traditional Ecological Knowledge
Principal Investigator: David Andersen, Research North
Co-Investigator: Caroline Brown, ADF&G, Division of Subsistence

Cost: **2010:** \$78,291 **2011:** \$59,587 **2012:** \$31,945

Recommendation: Fund

Issue

Comments from Yukon River subsistence users are beginning to identify a suite of environmental changes attributed to climate change that impact fish, fish habitats, and fishing activities. Observations include the drying-up of wetland areas, lakes, and waterways, as well as changes in weather patterns, which in turn affect river levels and average dates of freeze-up and break-up. What is currently needed is a directed, systematic, drainage-wide effort to collect and understand these changes and their impacts. Traditional Ecological Knowledge (TEK) is particularly well suited for identifying environmental changes attributable to climate change at the local and regional level. Understanding the potential impacts of climate change on landscapes, wildlife, and subsistence users is important for Federal managers in order for them to carry out the mandates for which the various conservation units were established and to build flexibility into formal management structures to address a changing environment.

Objectives

1. Collect and catalogue TEK observations from local residents to produce a drainage-wide portrait of climate and environmental change, emphasizing those that are related to subsistence fisheries.
2. Synthesize existing data related to the relationships between climate/environmental change and subsistence fisheries in the Yukon River drainage, including existing reports, Regional Advisory Council minutes, and other archival sources.
3. Contribute to local capacity building by utilizing a framework of community involvement in research.
4. Provide recommendations on how or if these observed impacts may be mitigated or addressed through management scenarios.

Methods

Study communities include: Grayling, Nulato, Koyukuk, Allakaket, Fort Yukon, and Northway. Study communities have been selected for their proximity to Federal lands/waters, comments from previous studies indicating potential climate change impacts, and the presence of particularly knowledgeable key respondents known to the principal investigators. Similar data is also being collected by C. Brown in Emmonak under a separately funded project (Bering Sea Integrated Ecosystem Research Program) and results will be used to enhance the drainage-wide perspective of this project. The broad topic of climate change will be examined through a combination of archival sources, focused key respondent interviews with life-long residents of the Yukon River drainage, and a short climate change observation survey implemented with a larger sample of fishermen in each community.

Partnerships and Capacity Building

The principal investigators will build on earlier research efforts to contribute capacity building in study communities through research partnerships with local tribal or village councils in the identified study communities and will seek to hire local project assistants or community partners to help select key respondents, assist the principal investigator in all aspects of fieldwork, and administer the short observational survey. Investigators have also consulted with Dr. Carothers regarding her research proposal on the same topic in Northwest Alaska (OSM #10-125). Should both projects be funded, investigators from both projects will strive to work together in collecting comparable data sets for analysis that will facilitate inter-regional comparisons of climate change observations as they relate to subsistence fisheries.

Justification

This is a well written, thoughtful investigation plan that specifically addresses critical aspects of harvest monitoring/traditional ecological knowledge research: research topics directly from subsistence users and management applications relevant to addressing climate related changes in subsistence fisheries. The researchers' past record of thoughtful, well written, well researched and concise reports makes this a compelling proposal. Investigators have addressed issues raised in the proposal review.

Kuskokwim Region

Project Number: 10-300
Project Title: Kanektok and Goodnews Rivers Salmon Run Assessments
Geographic Area: Kuskokwim
Information Type: Stock Status and Trends
Principal Investigator: Jeff Estensen, ADF&G Division of Commercial Fisheries
Co-Investigators: Edward Mark, Native Village of Kwinhagak
Mark Lisac, USFWS Togiak National Wildlife Refuge

Cost: **2010:** \$187,593 **2011:** \$171,467 **2012:** \$184,113 **2013:** \$145,916

Recommendation: Fund

Issue

This proposal will fund the operations of two resistance-board weirs currently utilized on the Kanektok and Goodnews Rivers (funding here is requested to extend the operational period for the Goodnews River weir to better estimate coho salmon stocks). Both of these projects estimate all five species of salmon found in Alaska, as well as, Dolly Varden. Escapement information and biological data collected at these projects are valuable for setting escapement objectives, determining run timing, assessing the age structure of the returns, and enumerating adult salmon spawners.

Objectives

1. Estimate daily and annual total passage 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 Kanektok River Chinook, chum, sockeye, and coho salmon and Middle Fork Goodnews River coho salmon.
3. Estimate the sex, age, and length composition of Kanektok River Chinook, chum, sockeye, and coho salmon escapements and Middle Fork Goodnews River coho salmon escapement such that simultaneous 90% confidence intervals have maximum width of 0.20.
4. Monitor environmental variables at the project sites such as relative water level, discharge rate, and water temperature.

Methods

A resistance-board weir will be installed in the Kanektok and Goodnews Rivers to estimate passage of the five species of salmon found in Alaska and Dolly Varden. The projects will also act as a platform for the collection of biological samples (age-sex-length, genetics, scales, etc.). This information will be used to assess the returns to these systems.

Partnerships and Capacity Building

Goodnews weir will be staffed by two ADF&G Fish and Wildlife Technicians and one local hire USFWS Fisheries Technician. The Kanektok River weir is operated cooperatively by ADF&G, NVK, and USFWS, TNWR. Regular consultations between ADF&G, NVK, USFWS, CVRF and local stake holders will occur throughout the year to coordinate logistics, discuss results, and exchange ideas.

Justification

The Goodnews and Kanektok rivers salmon run assessment projects are well-established and successful monitoring projects that provide the primary escapement estimates and run strength data for Chinook, sockeye, chum and coho salmon in the Goodnews and Kanektok rivers; information utilized to ensure sustainability of Kuskokwim Bay subsistence fisheries and to conserve fisheries stocks. These projects also serve as important platforms for ongoing Dolly Varden char research conducted by staff of the Togiak NWR.

The investigators have the expertise and experience to conduct the proposed work and they have consistently met performance and other reporting requirements. There is a strong, cooperative partnership among the local, State and Federal implementing agencies.

Project Number: 10-303
Project Title: Kuskokwim Salmon Age-Sex-Length Assessment
Geographic Region: Kuskokwim
Information Type: Stock Status and Trends
Principle Investigator: Christopher A. Shelden, ADF&G Division of Commercial Fisheries
Co-Investigator: Douglas B. Molyneaux, ADF&G Division of Commercial Fisheries

Cost: **2010:** \$108,735 **2011:** \$112,724 **2012:** \$116,954 **2013:** \$121,380

Recommendation: Fund

Issue

The product of this project is an annual catalog of the age, sex, and length (ASL) composition of harvests and escapements of Kuskokwim Area Chinook, chum, sockeye, and coho salmon, which addresses one of the priority information needs identified in the 2010 Request for Proposals: to collect data leading to development of reliable estimates of abundance, run timing, stock structure, productivity, and carrying capacity of salmon stocks. Long-term ASL datasets are critical for developing tools and assessments that improve the certainty and effectiveness of fishery management decisions; e.g. brood year tables for assessment of annual salmon productivity and forecasting future run abundance, and detecting population trends such as changing proportions of male/female ratios, changes in age-sex class structure, changes in size-at-age, assessing effects of harvest selectivity and the general quality of escapements, and identifying conservation concerns.

This project currently supports seven OSM existing and proposed projects (Table 1) and several additional projects funded by other means. While these grants include sufficient funds for collecting samples, they do not generally include funding for processing, compiling, and analyzing samples.

Table 1. FRMP funded projects that are currently funded, or being proposed for continuation funds, that are integrated with the *Kuskokwim Salmon Age-Sex-Length Assessment* project 2010.

Project #	Project Title
07-304	Tatlawiksuk River weir salmon monitoring and assessment (requesting continuation in 2010)
07-305	Kanektok and Goodnews River weirs salmon monitoring and assessment (requesting continuation in 2010)
07-306	Kwethluk River Weir Salmon Monitoring and Assessment (requesting continuation in 2010)
07-307	Tuluksak River Weir Salmon Monitoring and Assessment (requesting continuation in 2010)
08-302	Age, sex, and length composition of lower Kuskokwim River subsistence Chinook salmon harvests
08-303	George River weir salmon monitoring and assessment
08-304	Takotna River weir salmon monitoring and assessment
08-351	Tuluksak Subsistence Chinook ASL

Objectives

Process, compile, and analyze salmon scale, sex, and length samples collected in 2010, 2011, 2012, and 2013 from Kuskokwim Region subsistence and commercial fisheries, escapement, and other projects.

Methods

Participants will deliver salmon ASL samples to the Principle Investigator. Samples will be taken from subsistence and commercial fisheries, and stock status and trends projects operated by various Federal, State, and Tribal groups. Salmon scales will be manually processed and aged, and ASL data will be compiled, digitized, and processed to provide summaries of harvests and escapements partitioned into age, sex, and length categories. A local hire Fish and Wildlife Technician will assist with ASL processing during the summer months. Summary information will be provided to project leaders, participating samplers, other investigators, and the public.

Partnership/Capacity Building

This project is integrated into several FIS funded projects (Table 1). Organizations that will directly benefit from the project include: ADF&G Commercial Fisheries Division, ADF&G Sport Fish Division, ADF&G Subsistence Division, Association of Village Council Presidents, Kuskokwim Native Association, Organized Village of Kwethluk Native Village of Kwinhagak, Orutsararmiut Native Council, Takotna Tribal Council, Tuluksak Traditional Council, ADF&G (Commercial Fisheries and Sport Fish divisions), and U.S. Fish and Wildlife Service (KFWRFO, Yukon Delta NWR, and Togiak NWR). Plans are also under development for Coastal Villages Seafood's (CVS) and ADF&G to partner starting in 2009 to provide ASL samples from Kuskokwim Area commercial fisheries. It is intended for CVS to fund and hire commercial samplers to work at their new seafood processing plant in Platinum. Samplers are to be hired locally and be trained by ADF&G staff.

Justification

The proposed work addresses an important research and monitoring priority by supporting standardization and quality control for the collection, analysis and documentation of salmon age, sex and length composition. This information is utilized to 1) monitor sex, age and size composition of commercial and subsistence fisheries harvests and escapement; 2) develop brood tables to assess management actions, 3) develop run strength outlooks, and 4) describe spawner recruit relationships. The investigators have the expertise and experience to conduct the proposed work. Reporting has been timely and complete.

Project Number: 10-304
Project Title: Tatlawiksuk River Salmon Assessment
Geographic Region: Kuskokwim
Information Type: Stock Status and Trends
Principle Investigator: Christopher A. Shelden, ADF&G Division of Commercial Fisheries
Co-Investigators: Michael Thalhauser, Kuskokwim Native Association,
Douglas B. Molyneaux, ADF&G Division of Commercial Fisheries

Cost: **2010:** \$198,589 **2011:** \$184,631 **2012:** \$192,326 **2013:** \$200,419

Recommendation: Fund

Issue

Tatlawiksuk River salmon contribute to subsistence, commercial, and recreational fisheries within the Yukon Delta National Wildlife Refuge. The Tatlawiksuk River run assessment project is one of several projects utilized 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). The project provides fundamental escapement information necessary to facilitate inseason management decisions and to assess trends in salmon populations. This project is also an essential platform for conducting several other projects. This project also incorporates substantial capacity building and outreach components.

Salmon escapements from this project have been monitored successfully 9 out of 11 years since 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. 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 (*Age, Sex, and Length Composition of Lower Kuskokwim River Subsistence Chinook Harvest*, FIS #08-302).

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 Tatlawiksuk River such that 95% confidence intervals of age composition will be no wider than $\pm 10\%$ ($\alpha=0.05$, $d=0.10$);
3. Serve as a platform to facilitate current and future fisheries research projects.

Methods

Investigators will install a resistance board weir on the lower 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 scales, and sex and length information; and for tag recovery for AYK SSI funded projects *Kuskokwim River coho salmon investigations*, and *Kuskokwim River Sockeye Salmon Investigations*. ASL data is processed post-season under *Kuskokwim Salmon ASL Assessment Project* (FIS proposed project #10-303). Investigators will also record daily water temperature, water level, and

weather conditions, and maintain equipment in support of *Temperature Monitoring* FIS #08-701. A local technician hired by KNA will operate the project along with a lead crew member provided by ADF&G. The project will serve as a platform for several research initiatives including those listed above and genetic and otolith collection for stock identification. Potential exists for this project to provide a platform for future studies as well.

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.

Justification

The Tatlawiksuk River weir is a well-established and successful cooperative project operated by KNA and ADF&G. The project provides valuable escapement and biological sampling data for salmon stocks in an important subbasin of the Kuskokwim River, promotes local involvement, and develops the capacity of KNA to monitor fish populations. The investigators have the expertise and experience to conduct the proposed work and have consistently met performance and reporting requirements. There is a strong partnership between KNA and ADF&G.

Project Number: 10-305
Project Title: Kuskokwim River Sheefish Spawning Distribution and Timing
Geographic Region: Kuskokwim
Information Type: Stock Status and Trends
Principle Investigator: Lisa Stuby, ADF&G Division of Sport Fish

Cost: 2010: \$54,245 2011: \$52,532

Recommendation: Fund

Issue

Sheefish are a highly migratory, long-lived species that migrate throughout most of the Kuskokwim River drainage and are important to both subsistence and sport fishers. A three-year radiotelemetry study (06-305) was initiated during 2007 on sheefish in the Kuskokwim River drainage. Management of the Kuskokwim River sheefish population for long-term sustainability requires a better understanding of their life history. The information gathered from this study can be utilized to design future studies to investigate the population dynamics of specific spawning stocks, stock abundance, and stock compositions of harvests. In addition, a baseline understanding of migratory timing and seasonal distributions will be important for understanding changes that may occur as a result of habitat perturbations. The majority of the 119 radio transmitters already implanted are expected to continue working through the fall of 2011. An additional two years of tracking the radio-tagged sheefish will provide refined information on spawning locations, migratory timing to spawning, overwintering, and feeding areas, and life history traits such as frequency of spawning and fidelity to spawning areas.

Objectives

The main objective for the continuation of this project is to:

1. document spawning stocks and spawning locations of sheefish in the Kuskokwim River drainage.
2. Secondary objectives of this project are to:
3. determine the migratory timing of sheefish to their spawning, overwintering, and feeding areas;
4. identify specific summer feeding areas used by known spawning stocks;
5. travel to areas identified during radio tracking surveys as spawning areas and sample a minimum of sheefish from each area to assess spawning readiness to verify spawning is occurring at these areas;
6. collect tissue samples from each sheefish captured at spawning areas for future genetic stock identification analysis; and,
7. continue to assist with the whitefish telemetry project (06-303) by incorporating whitefish frequencies during aerial tracking and in the stationary tracking stations.
8. record and describe habitat characteristics such as channel characteristics, water temperature, spawning substrate, flow, depth, and/or turbidity while visiting spawning areas to sample sheefish.

Methods

Stationary tracking stations located between Aniak and the mouth of Big River will track movements and timing of the radio-tagged sheefish during their upriver and downriver migrations. Aerial surveys from small aircraft will be conducted during late June throughout the Kuskokwim River drainage to locate sheefish at their summer feeding areas, and during late September and early October to locate sheefish at their spawning areas. Sheefish are iteroparous, but most do not spawn every year, especially females. Additional aerial surveys of radio-tagged sheefish during fall 2010 and 2011 will give greater insight into the spawning frequency of sheefish in the Kuskokwim River drainage and may lead to identification of additional spawning areas.

Sheefish will be sampled for spawning readiness in the Big River, Middle Fork, Highpower Creek, and any other areas with suspected spawning activity to confirm that spawning is occurring there. A minimum of 10 sheefish will be captured from each site using seines and hook and line gear. Spawning readiness will be assessed from either extrusion of gametes or through visual inspection of the gonads. No more than 10 sheefish will be sacrificed at any spawning area, and if the population of sheefish at the spawning areas appears to be small (100–200 fish), then less than 10 fish will be sampled. Gonadosomatic indices (GSI) will be calculated from each sheefish. For every sheefish sampled, lengths will be taken, otoliths will be removed for later age analysis, and a fin clip will be collected and archived for future genetic analysis.

Few studies have been performed to classify and/or characterize sheefish spawning habitats, but it has been noted that sheefish require very specific habitats to spawn. We will note habitat characteristics in spawning areas such as water temperature, channel characteristics, spawning substrate, flow, depth, turbidity, and/or other pertinent habitat characteristics. These measurements will be taken at the same time as fish are sampled to determine spawning readiness.

Partnerships and Capacity Building

This study has been conducted cooperatively with Ken Harper's (USFWS) study, "Telemetry studies of humpback and broad whitefish in the lower Kuskokwim River (06-303)". Project staff has helped set up, download, and maintain Ken's stationary tracking stations and have included tracking whitefish during aerial surveys for sheefish. The Kuskokwim Native Association (KNA) will assist in maintaining the stationary tracking stations and provide a college intern(s) to assist with upriver fall sheefish sampling on the spawning grounds, habitat analysis of upriver sheefish spawning areas, and tracking radio-tagged fish by small aircraft. This project has been discussed with Kuskokwim River residents, the McGrath Native Council, representatives of KNA, and McGrath, Takotna, Nikolai, and Telida (MTNT, Limited). In addition, project updates will be given on KSKO and KYUK radios, Fisheries Awareness Information and Responsibility (FAIR) forum, and at the Kuskokwim Area staff meetings.

Justification

The requested two-year extension of Project 06-305; a well planned, designed and executed project, addresses a priority information need identified in the 2006 request for proposals and will maximize information available from sheefish already radio-tagged. The majority of the 119 transmitter tags allotted for this study were deployed during May and June 2008. These tags have a 3-year guaranteed operating life and, therefore, are expected to continue working through the 2011 field season. Two additional years of tracking the radio-tagged fish will provide more and refined information on spawning locations, migratory timing to spawning, overwintering and feeding areas, and life history traits such as frequency of spawning and fidelity to spawning areas.

Project Number: 10-306
Project Title: Kwethluk River Salmon
Geographic Area: Kuskokwim
Information Type: Stock Status and Trends
Principal Investigator: Ken Harper, USFWS Kenai Field Office
Co-Investigators: Steve J. Miller, USFWS Kenai Field Office
Herman Evan, Organized Village of Kwethluk

Cost: **2010:** \$207,131 **2011:** \$226,795 **2012:** \$221,276 **2013:** \$224,342

Recommendation: Fund

Issue

Kwethluk River salmon contribute to subsistence, commercial and recreational fisheries within the Yukon Delta National Wildlife Refuge. Fishery managers need salmon escapement data from representative rivers such as the Kwethluk River that contribute to these complex mixed stock fisheries. This project provides fundamental escapement information necessary to facilitate in-season management decisions and to assess trends in salmon populations. Salmon escapements to the Kwethluk River weir have been monitored successfully during 1992 and 2000–2009. Information from this project has become integrated into the annual management process, by providing insights into escapements in a lower Kuskokwim River tributary. The escapement, age, sex, and length information collected at Kwethluk River provides part of the context needed to assess the impacts of subsistence harvest practices.

Objectives

1. Estimate 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 90% 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. Estimate the number of Chinook, chum, coho, sockeye, and pink salmon carcasses that wash down onto the weir each day.

Methods

Investigators will install and operate a resistance board weir on the Kwethluk River 88 river kilometers (rkm) upstream from the confluence with the Kuskokwim River. The weir will be operated between June 15 and September 10 over a four year period beginning in 2010. The weir will be installed in April each year immediately after ice out and prior to spring floods. A helicopter will be used to transport personnel and gear to the weir site during this time to begin weir installation. Passage chutes in the weir will allow fish to be counted and identified to species as they pass upstream. A live trap will be used to sample salmon for scales, sex and length information.

Partnership/Collaboration

The Kenai Fish and Wildlife Field Office (KFWFO) and the Organized Village of Kwethluk (OVK) have cooperatively operated the Kwethluk River weir since 2000. OVK provides personnel for the weir and administrative oversight to these employees. Capacity building will continue, as the KFWFO mentors and trains residents hired by the OVK to work at the weir.

Justification

The Kwethluk River salmon run assessment project is well-established and successful and provides the primary escapement and run strength data used to ensure sustainability of subsistence fisheries in the Kwethluk River on the Yukon Delta NWR. These salmon stocks are harvested by a large lower river subsistence fishery, and pass through a commercial fishing district between the Kuskokwim and the Kwethluk River mouths.

The investigators have successfully operated the weir for nine seasons; 2010 would be the eleventh year of operation. Reports for this project have been professionally written and submitted in a timely manner.

This project has the potential to become a full partnership between the USFWS and the Native Village of Kwethluk.

Project Number: 10-307
Project Title: Tuluksak River Salmon Assessment
Geographic Area: Kuskokwim
Information Type: Stock Status and Trends
Principal Investigator: Ken Harper, USFWS Kenai Field Office
Co-Investigator(s): Steve J. Miller, USFWS Kenai Office
George Lamont, Tuluksak Native Community

Cost: **2010:** \$205,449 **2011:** \$150,538 **2012:** \$167,207 **2013:** \$157,800

Recommendation: Fund

Issue

Tuluksak River salmon contribute to subsistence, commercial and recreational fisheries within the Yukon Delta National Wildlife Refuge. Fishery managers need salmon escapement data from representative rivers such as the Tuluksak River that contribute to these complex mixed stock fisheries. This project provides fundamental escapement information necessary to facilitate in-season management decisions and to assess trends in salmon populations. Salmon escapements to the Tuluksak River weir have been monitored successfully during 1991–1994 and 2001–2009. Information from this project has become integrated into the annual management process, by providing insights into escapements in a lower Kuskokwim River tributary. The escapement age, sex, and length information collected at Tuluksak River provides part of the context needed to assess the impacts of subsistence harvest practices. In addition, renewed interest in extraction of mineral resources within the drainage heightens the need for continued monitoring of Tuluksak River salmon escapements.

Objectives

1. Estimate 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 90% 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. Estimate the number of Chinook, chum, coho, sockeye, and pink salmon carcasses that wash down onto the weir each day.

Methods

Investigators will install a resistance board weir on the Tuluksak River 49 river kilometers (rkm) upstream from the confluence with the Kuskokwim River. The weir will be operated between June 15 and September 10 over a four year period beginning in 2010. The weir will use the same configuration as in past years except that an underwater video system will be installed upstream of the fish trap to enumerate salmon. Advantages in using video enumeration include unobstructed fish passage, significant long-term cost savings, more accurate escapement estimates, and perhaps most importantly, operations can continue during high flows and turbid water conditions. A live trap will be used to sample salmon for scales, sex and length information.

Partnership/Collaboration

The Kenai Fish and Wildlife Field Office (KFWFO) and Tuluksak Native Community (TNC) have cooperatively operated the Tuluksak River weir since 2001. TNC provides personnel for the weir and administrative oversight to these employees. Capacity building will continue, as the KFWFO mentors and trains residents hired by the TNC to work at the weir.

Justification

The Tuluksak River salmon run assessment project is a well-established and successful long-term monitoring project that provides escapement and run strength data utilized to ensure sustainability of subsistence fisheries in the Yukon Delta NWR and conserve fisheries stocks in the Kuskokwim River.

The investigators have successfully operated the weir at its present location for thirteen seasons; 2010 would be the fourteenth year of operation. Reports for this project have been professionally written and submitted in a timely manner.

This project has the potential to become a full partnership between the USFWS and the Tuluksak Native Community.

Project Number: 10-352
Project Title: Kuskokwim Salmon Postseason Harvest Monitoring
Geographic Region: Kuskokwim
Information Type: Harvest Monitoring/Traditional Ecological Knowledge
Principal Investigator: Jeff Estensen, ADF&G Division of Commercial Fisheries
Co-Investigators: Holly Carroll, ADF&G Division of Commercial Fisheries
Greg Roczicka, Orutsararmiut Native Council
Michael Thalhauser, Kuskokwim Native Association

Cost: **2010** \$100,896 **2011** \$87,771 **2012** \$91,225 **2013** \$82,337

Recommendation: Fund

Issue

This four-year project funds the Kuskokwim Subsistence Salmon Harvest Monitoring Program, which ADF&G has implemented since 1960. 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. The Kuskokwim Area subsistence salmon fishery is one of the largest in the state in terms of amounts harvested. From June through October, the movement of families from permanent winter residences to summer fish camps situated along rivers and sloughs continues to be very important in annual subsistence harvest efforts. The Kuskokwim Subsistence Salmon Harvest Monitoring Program has estimated the harvest primarily through household surveys, and to a lesser extent harvest calendars and post card surveys. This information has been critical in helping ADF&G, FWS, the Alaska Board of Fisheries, and the Federal Subsistence Board to identify the amounts of salmon reasonably necessary for subsistence uses and to provide for continued customary and traditional uses of salmon throughout the region. Since 1999, ADF&G's Kuskokwim Subsistence Salmon Harvest Monitoring Program has partnered with Orutsararmiut Native Council in Bethel and since 2002 with Kuskokwim Native Association in Aniak. OSM has contributed funds to the harvest monitoring program through projects 00-009, 01-024, 02-036, 04-359, 05-356, and 08-352. This is a request to continue OSM funding.

Objectives

1. Estimate the number of Chinook salmon, chum salmon, sockeye salmon, and coho salmon harvested for subsistence uses by residents of Bethel;
2. Estimate the number of Chinook salmon, chum salmon, sockeye salmon, and coho salmon harvested for subsistence uses by residents of Aniak; and
3. Place the Bethel and Aniak estimates within the context of the estimate for the entire Kuskokwim Management Area

Methods

Household surveys will be conducted annually between October and November with Kuskokwim River drainage communities. The subsistence harvest of Bethel residents will be estimated by employing a simple random sample survey method. The subsistence harvests of the remaining 37 communities will be estimated by employing either census (100% survey) or stratified sampling survey methods, depending on

community size. In addition to household harvest surveys, subsistence salmon harvest calendars will be distributed by mass mailing to all known households in the Kuskokwim Area in spring time each year.

Partnership/Capacity Building

This project includes a strong and proven partnership between the State, Orutsararmiut Native Council, and Kuskokwim Native Association. It will strengthen the capacity of the organizations to carry out subsistence fisheries harvest assessment projects in the region. This collaborative effort will result in a better understanding of the subsistence fisheries involvement by residents in the region.

Justification

This four-year project funds the Kuskokwim Subsistence Salmon Harvest Monitoring Program, which ADF&G 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 fisheries management. The project includes proven partnerships between ADF&G, Kuskokwim Native Association, and Orutsararmiut Native Council. The technical and scientific merit and the investigator ability and resources are highly rated. OSM has contributed funds to the project since 2000, and this is a request to continue OSM funding. The State is contributing over 50% of project funds.

Project Number: 10-353
Project Title: Kuskokwim Salmon Working Group Support
Geographic Region: Kuskokwim
Information Type: Harvest Monitoring/Traditional Ecological Knowledge
Principal Investigator: Jeff Estensen, ADF&G Division of Commercial Fisheries.
Co-Investigator: Holly Carroll, ADF&G Division of Commercial Fisheries.

Cost: **2010:** \$44,974 **2011:** \$45,169 **2012:** \$46,740 **2013:** \$45,336

Recommendation: Fund

Issue

This four-year project funds the Kuskokwim River Salmon Management Working Group, formed in 1988 at the direction of the Alaska Board of Fisheries in response to requests from stakeholders along the Kuskokwim River. Stakeholders were seeking a more active role in the management of salmon fisheries. Since then, the Working Group has become increasingly active in the preseason, inseason, and postseason management of the Kuskokwim River drainage subsistence, commercial, and sport salmon fisheries. In 2001, the Working Group modified its charter in order to more effectively address the needs of the Federal Subsistence Management Program by including members of the Coordinating Fisheries Committee of the Yukon Kuskokwim Delta and the Western Interior regional advisory councils. The Working Group provides information that assists ADF&G and FWS to implement the subsistence priority in these fisheries. OSM has contributed funds to the operation of the Working Group through projects 01-116 and 06-307 since 2001. This is a request to continue OSM funding.

Objectives

1. Provide inseason run assessment information to all parties participating in cooperative management of the Kuskokwim River subsistence salmon fishery.
2. Provide a forum for FWS, Regional Advisory Council members, ADF&G, and other participants of the cooperative management process to discuss inseason run assessment information and fishery management decisions affecting subsistence fisheries.
3. Provide an opportunity for participants in the cooperative management process to forecast and plan (preseason) and to summarize (postseason) the fishing season.
4. Report the discussion and decisions made during the cooperative management process.

Partnership/Capacity Building

This investigation plan demonstrates a high level of community involvement. The Working Group process has received attention as a successful model for cooperative management. Local subsistence users, Council members, and local fisheries representatives are given the opportunity to examine and discuss fisheries data as it is being collected and develop a recommendation that managers consider carefully.

Justification

This four-year project funds the Kuskokwim River Salmon Management Working Group. Formed in 1988, the Working Group is a successful model of cooperative management and serves as a public forum

for fisheries managers to meet with local users of the salmon resource. The subsistence salmon fishery of the Kuskokwim River is one of the largest in the state, and this project is of high strategic importance. The investigator ability and resources and the the partnership and capacity building components of the investigation plan are highly rated. OSM has contributed funds to the Working Group process since 2006, and this is a request to continue OSM funding. ADF&G is providing 50% of project funds.

Project Number: 10-354
Project Title: Kuskokwim Salmon Inseason Harvest Monitoring
Geographic Region: Kuskokwim
Information Type: Harvest Monitoring/Traditional Ecological Knowledge
Principal Investigator: Jeff Estensen, ADF&G Division of Commercial Fisheries
Co-Investigators: Greg Roczicka, Orutsararmiut Native Council
Doug Bue, ADF&G Division of Commercial Fisheries.

Cost: **2010:** \$37,636 **2011:** \$30,078 **2012:** \$31,443 **2013:** \$21,523

Recommendation: Fund

Issue

This four-year, collaborative project uses a questionnaire to survey participants in the subsistence salmon fishery in the vicinity of the community of Bethel. The methodology is designed to obtain inseason salmon harvest information to be used in combination with other information to assess Kuskokwim River salmon-run timing and abundance compared to previous years. The inseason monitoring program has been conducted annually since 2001. It provides information that assists ADF&G and FWS to implement the subsistence priority in Kuskokwim River fisheries. OSM has contributed funds to this ongoing investigation through projects 00-008, 01-023, 01-132, 01-225, 04-353, 05-307, and 06-306 since 2000. This is a request to continue OSM funding.

Objectives

1. Characterize salmon run timing and relative abundance in May, June, and July through weekly interviews with Bethel Area subsistence salmon fishers.
2. Characterize fishing activity and gear use through weekly interviews with Bethel Area subsistence salmon fishers in May, June, and July.
3. Build management capacity by providing local input into the management process for the subsistence salmon fishery in May, June, and July through the presentation of weekly summaries of interviews with Bethel Area subsistence salmon fishers at Kuskokwim River Salmon Management Working Group meetings
4. Build local capacity by providing cross training to an Orutsararmiut Native Council technician in other ADF&G and USFWS projects for up to two weeks.

Methods

Orutsararmiut technicians will conduct interviews with subsistence fishermen beginning May 15 and ending July 15. Interviews will begin Thursday of every subsistence-fishing period (Wednesday through Saturday) or week (when fishing seven days per week). The interviewer will ask questions in order to complete a two-page interview form. Interview responses will be entered into a spreadsheet and summarized across each calendar or weekly fishing period. Summary tables will be provided to ADF&G for distribution to FWS, Yukon Kuskokwim Delta and the Western Interior regional advisory council members, Kuskokwim River Salmon Management Working Group members, and the public at Working Group meetings. A brief report will be added to capture fishers' comments and concerns expressed during the interview.

Partnership/Capacity Building

Staff from Orutsararmiut Native Council will conduct this project in consultation with staff from ADF&G, Division of Commercial Fisheries. This (2010) will be the tenth year of subsistence interviews. Orutsararmiut staff responsible for the field work will be trained by the Orutsararmiut principal investigator. ADF&G CF staff will review forms for completeness and train Orutsararmiut staff to prepare weekly summaries. The Orutsararmiut project investigator will draft the performance report and coauthor the final report.

Justification

This four-year project uses a questionnaire to survey participants in the subsistence salmon fishery in the vicinity of the community of Bethel, providing inseason information to the Kuskokwim River Salmon Management Working Group and aiding in the management of the salmon fisheries in the Kuskokwim Area. Although not rigorous technically, the project is viewed as a high priority by fisheries managers and stakeholders in the region. This project provides a strong capacity building component. OSM has contributed funds to the project since 2000. This is a request to continue OSM funding. ADF&G is more than matching OSM's contribution to that agency.

Project Number: 10-401
Project Title: Afognak Lake Sockeye Salmon Smolt and Adult Assessment
Geographic Area: Southwest Alaska
Information Type: Stock Status and Trends
Principal Investigator: Robert T. Baer, ADF&G Division of Commercial Fisheries
Co-Investigators: M. Birch Foster, ADF&G Division of Commercial Fisheries
Heather Finkle, ADF&G Division of Commercial Fisheries

Cost: **2010:** \$139,536 **2011:** \$141,617 **2012:** \$147,033 **2013:** \$150,887

Recommendation: Fund

Issue

The investigators will continue to assess sockeye salmon *Oncorhynchus nerka* production at Afognak Lake in response to the declining adult runs that began in 2001 and have continued through 2008. In response to the declining runs, State and Federal managers closed subsistence fishing in early June during the 2002 season, and in-season closures have occurred in 2003, 2004, and 2007 in an attempt to achieve the escapement goal for sockeye salmon into Afognak Lake.

This project will continue the smolt and lake limnology investigations started in 2003 and ensure adult escapement monitoring and sampling continues for an additional four years to provide uninterrupted stock assessment information that is critical for in-season management of State and Federal subsistence fisheries. Newly introduced objectives will further evaluate the condition of juvenile sockeye salmon relative to their energy density and correlated to environmental factors. Additionally, the bioenergetics data will be modeled with paleolimnological and limnological data to help identify how exogenous factors such as climate change and volcanic ash fall affect juvenile salmon rearing.

Local user groups, represented by the Kodiak Regional Advisory Council, have determined that assessment and monitoring of Afognak Lake sockeye salmon to be their highest priority information need. This proposed investigation satisfies a *Priority Information Need* within the Southwest Region of Alaska as listed in the Office of Subsistence Management's 2010 Fisheries Resource Monitoring Program request for proposals. Data collected from this project will enable researchers to better identify what factors are controlling sockeye salmon production within the freshwater environment which will help refine the optimum and biological escapement goal and help improve pre-season run forecasts. This will allow managers to better manage for maximum sustainable yield and prevent unnecessary restrictions of State and Federal subsistence fisheries.

Objectives

1. Estimate the abundance, age composition, and average size of sockeye salmon smolt emigrating from Afognak Lake and adults escaping to Afognak Lake from 2010–2013.
2. Evaluate the effects of the water chemistry, nutrient status, and plankton production of Afognak Lake on the smolt production and future adult returns from 2010–2013.
3. Evaluate the condition of juvenile sockeye salmon relative to diet and energy density from 2010–2013.

4. Assess available historical fisheries and limnological data in relation to climate change effects upon completion of objectives 1–3.

Methods

An inclined-plane smolt trap will be installed in the Afognak River to capture a portion of the sockeye salmon smolt outmigration from Afognak Lake with mark-recapture techniques used to estimate the total smolt outmigration. Age, weight, and length data from sockeye salmon smolt will be used to estimate the age composition and average length, weight and condition factor by age of the outmigration. Limnology information, including water chemistry, nutrient, phytoplankton, zooplankton, temperature, dissolved oxygen, and light penetration data will be collected from Afognak Lake. Lake samples will be analyzed in Kodiak at the ADF&G limnology laboratory. Data obtained from limnological sampling will be used to identify habitat parameters necessary for modeling purposes. Diet and caloric energy assessments will be conducted on a portion of the lake-rearing juvenile sockeye salmon. Energy densities of juvenile sockeye salmon will be used in conjunction with diet and temperature data to construct a bioenergetics model to estimate and identify growth limitations associated with freshwater rearing. Following all data collection further modeling and assessment using recent smolt emigration data paired with bioenergetics modeling, paleolimnological analysis, nutrient-phytoplankton-zooplankton models, and spawner-recruit models will be used to help identify the impact climate changes have on fish species.

Partnerships and Capacity Building

ADF&G in collaboration with Afognak Native Corporation and Afognak Native Village will work together in an annual educational project designed to cross educate and train native student interns in fisheries management and research practices and ADF&G staff in subsistence harvesting methods and traditional culture. Student interns will be educated and trained in the importance on sustainable fisheries management and research practices on-site as they work side-by-side with ADF&G field technicians at the Afognak Lake field station. In turn ADF&G field staff will visit the nearby Dig Afognak Traditional Harvesting camp where they will learn from Elders and other subsistence gatherers the importance of subsistence foods for the Alutiiq people. Additionally all groups will participate in a communal subsistence salmon fishery within Afognak Bay where sockeye salmon will be harvested, processed, dried, and smoked in the traditional manner.

Justification

This project addresses a priority information need listed in the 2010 Request for Proposals, is technically sound, and is mostly a continuation of work successfully conducted since 2003. The investigators added new objectives concerning smolt caloric content, climate change effects, and adult escapement in addition to existing ones concerning smolt abundance and rearing conditions. The investigators have proven records of successfully conducting, administering, and completing other Fisheries Resource Monitoring Program projects. Although there are no local organizations willing or able to assume a leadership role in this project, the investigator has made excellent efforts to partner with local organizations and agencies and to enhance capacity building. A variety of training, learning, and education activities would occur by working with up to four student interns from Afognak Native Corporation as well as with all students participating in the Traditional Harvesting Camp conducted by Afognak Native Village as part of their Dig Afognak program. Requested annual costs to operate this project would be about \$60,000 to \$70,000 more per year than the annual budget provided for project 07-401 in 2009, and matching funds would also increase from 25% of the total cost of project 07-401 to 41% of the total cost of the 2010 project. Increased costs would mostly be due to the addition of three new project objectives, including partial funding of the adult weir that the State has operated since 1978. The Alaska Department of Fish

and Game would provide about 65% of the total funding needed to operate the weir over the four years of this project, which conforms to existing policy and funding guidelines that limit Fisheries Resource Monitoring Program funding to a maximum of 50% of the cost for a long-term project that can no longer be fully funded by an agency, if it provides information directly used for Federal subsistence fisheries management.

Project Number: 10-402
Project Title: Togiak River Chinook Salmon Assessment
Geographic Region: Southwest Alaska
Information Type: Stock Status and Trends
Principal Investigator: Cheryl Anderson, USFWS Anchorage Field Office
Co-Investigator(s): Pat Walsh, Togiak National Wildlife Refuge
 Courtenay Carty, Bristol Bay Native Association
 Jason Dye, ADF&G Division of Sport Fish
 Tim Sands, ADF&G Division of Commercial Fisheries

Cost: **2010:** \$241,342 **2011:** \$203,713 **2012:** \$210,132

Recommendation: Fund

Issue

Recent Chinook salmon *Oncorhynchus tshawytscha* production throughout the region, as well as much of Alaska is in decline. Chinook salmon are important components of valuable subsistence, sport, and commercial fisheries. Assessment of Chinook salmon escapements in the Togiak River is poor – escapements are assessed via aerial surveys which at best have large variability and have been conducted sporadically in recent years. Escapement estimates are calculated by expanding visual counts with correction factors. A comprehensive investigation of Chinook salmon abundance and distribution within the Togiak River watershed has never been accomplished. Aerial survey abundance estimates within the Togiak River watershed have not been verified with other methods, and the accuracy with which the observations index abundance is unknown. The investigators would build upon estimates of spawning distribution and run timing provided under Project 08-402 to include estimates of spawning abundance.

Objectives:

1. Estimate the proportion of Chinook salmon migrating past a weir on Gechiak Creek;
2. Estimate the abundance of Chinook salmon escaping into the Togiak River watershed such that the estimate will have a 90% probability of being within 25% of the true abundance;
3. Estimate the weekly age and sex composition of spawning Chinook salmon in Gechiak Creek, such that simultaneous 90% confidence intervals have a maximum width of 0.20;
4. Estimate the mean length of Chinook salmon by sex and age;
5. Document Chinook salmon spawning locations in the Togiak River watershed;
6. Evaluate the effectiveness of aerial spawning ground surveys for monitoring Chinook salmon abundance in the Togiak River watershed; and
7. Measure and document water temperature throughout the main stem and lower tributaries in the Togiak River watershed (BBNA).

Methods

The investigators will conduct a mark-recapture experiment to estimate the abundance of Chinook salmon in the Togiak River watershed using radio telemetry methods. Fish will be captured and marked with

radio transmitters of the lower 5 km in the mainstem Togiak River. The recapture event will consist of a fixed receiver station co-located with a floating weir on Gechiak Creek. Additional receiver stations will be placed at strategic locations within the watershed.

Partnerships and Capacity Building

BBNA will hire two technicians per year from the local villages, and provide logistical and administrative support. BBNA will supply temperature data loggers to be deployed throughout the main stem Togiak River and in the lower reaches of the five major tributaries to monitor water temperatures. BBNA will compile and summarize water temperature data results as daily maximum, minimum, and mean. The information will be forwarded to the primary investigator for annual reporting.

Justification

This project addresses a priority information need listed in the 2010 Request for Proposals; project objectives are clearly written, many are quantifiable, and all are measurable; and the investigators have a proven record of successfully conducting, administering, and completing other Fisheries Resource Monitoring Program projects. This project would build upon work begun under project 08-402, which is providing information on Chinook salmon distribution and run timing needed to obtain reliable mark-recapture abundance estimates. Based on the first year of results from project 08-402, the current proposal would be able to provide accurate Chinook salmon abundance estimates over its three years of operation. The total estimated cost of the proposed work appears reasonable, and the investigators would be able to provide matching funds to cover about 44% of the total funding. While a local Alaska Native organization was listed as a co-investigator, capacity building was ranked as medium since this organization's role would be to provide local knowledge and local research assistants and to conduct activities involved with temperature monitoring. An additional research opportunity for Bristol Bay Native Association staff or interns would be to determine whether a relationship existed between Chinook salmon movements and water temperature. This analysis could be included in Objective 7, which currently only addresses measuring and documenting water temperatures. Upon completion of this project, the investigators should provide recommendations concerning the most reliable and cost effective method to use in obtaining future annual Chinook salmon abundance estimates for this system.

Project Number: 10-403
Project Title: Buskin River Sockeye Salmon Adult Assessment
Geographic Area: Southwest Alaska
Information Type: Stock Status and Trends
Principal Investigator: Donn Tracy, ADF&G Division of Sport Fish

Costs: **2010:** \$ 90,600 **2011:** \$ 93,000 **2012:** \$ 95,000 **2013:** \$ 96,800

Recommendation: Fund

Issue

Investigators will annually count the number and sample the age composition of sockeye salmon migrating into Buskin River drainage for inseason management of subsistence and other fisheries, and will evaluate and refine the Biological Escapement Goal. Investigators will also interview subsistence fishers to determine their residency demographics and historical participation in subsistence fisheries occurring within the Kodiak-Aleutians region. Lastly, genetics samples from the sockeye salmon subsistence harvest will be collected and analyzed to apportion run components comprising the total catch.

Objectives

1. Estimate 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 through DNA analysis of the sockeye salmon subsistence harvest in the Buskin River Section of Chiniak Bay comprised of Buskin and Louise/Catherine lakes run components such that the estimates are within 7.5 percentage points of the true value 90% of the time.
5. Evaluate and, if necessary, refine the sockeye salmon Biological Escapement Goal on a triennial basis concurrent with the Alaska Board of Fisheries meeting cycle for Kodiak area finfisheries.
6. Document local residency of Buskin River sockeye salmon subsistence users and user preferences for areas traditionally fished.

Methods

Investigators will install a salmon counting weir on the Buskin River and Louise/Catherine lakes tributary to annually estimate the spawning escapement of sockeye salmon. Additionally, sockeye salmon will be sampled at the weirs and from the subsistence harvest for age, sex and length, providing estimates of the combined escapement and subsistence harvest by age within 25% of the true values 95% of the time. 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 Biological Escapement Goal. Participants in the subsistence fishery will be surveyed to determine their residency and traditional areas fished.

Partnerships and 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 student intern program established in 2003 to provide education and career development opportunity for 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.

Justification

This project addresses a priority information need listed in the 2010 Request for Proposals, is mostly a continuation of work successfully conducted since 2000, and the investigator has a proven record of successfully conducting and completing other Fisheries Resource Monitoring Program projects. The project is well designed with objectives that are clearly written, quantifiable, and achievable. A new project objective would provide estimates of the contributions of Buskin Lake and Louise/Catherine lakes stocks to subsistence harvests. This would allow managers to determine whether these stocks were being harvested in proportion to their total abundance, could indicate whether these stocks were available to the fishery throughout the season, and might also be useful in evaluating the escapement goal. While climate change effects were not included as a specific project objective, the investigator is encouraged to use the data time series from this project to document any trends and to provide management advice. The investigator has made strong efforts to improve capacity building, but it does not appear he can do anything further to advance this project component since no local organization appears willing or able to assume a role in operating this project. He has obtained impressive results from his high school student intern program, and his overall efforts have resulted in a very high level of partnership with the community as well as with agencies and local organizations. Finally, requested funding for the proposed work appears reasonable, and about 25% of the total cost would be provided as matching funds.

Project Number: 10-404
Project Title: Buskin River Sockeye Salmon Smolt Assessment
Geographic Area: Southwest Alaska
Information Type: Stock Status and Trends
Principal Investigator: Donn Tracy, ADF&G Division of Sport Fish

Costs: 2010: \$115,700 2011: \$81,100

Recommendation: Fund

Issue

During a two year study investigators will assess feasibility of two methods to annually estimate total seaward emigration of Buskin River drainage sockeye salmon smolt for enhanced management of subsistence and other fisheries through run forecasting and refinement of the Biological Escapement Goal. Investigators will install weirs at outlets from Buskin and Louise/Catherine lakes to estimate smolt abundance and randomly sample outmigrant smolt for age, weight and length. Mark-recapture experiments utilizing downriver traps will also be conducted to estimate total smolt abundance.

Objectives

1. Estimate the sockeye salmon smolt emigration from Buskin, Louise and Catherine lakes between April 15 and June 30.
2. Estimate the age composition of emigrating smolt such that each age class proportion is estimated within 5% of the true values 95% of the time.

Methods

Investigators will annually install screened weirs at the outlets of Buskin River and Louise/Catherine lakes between April 15 and June 30 to trap emigrating smolt, extrapolate total abundance from biomass weights and sample counts, and also employ dye-testing and downriver traps to conduct periodic mark-recapture experiments as a comparative method of estimation. Additionally, smolt captured at the weirs will be randomly sampled to provide estimates of age proportions within 5% of the true values 95% of the time. Mean weight and mean length at age will also be calculated. With successful project results the investigators will seek a continuation of funding so that estimates of smolt abundance and age can be obtained to more accurately forecast future adult returns and to refine the Biological Escapement Goal.

Partnerships and Capacity Building

During each year of the project the investigators will strive to employ Kodiak residents, including Alaska Natives, and will attempt to incorporate into the smolt study a currently established high school student intern program targeting federally qualified subsistence users. Additionally, to the extent possible, use of Buskin River weirs by ADF&G and Kodiak National Wildlife Refuge as an educational tool for the Refuge's 'Summer Science and Salmon Camp' program will be expanded to include operations conducted as part of the proposed study.

Justification

This project addresses a priority information need listed in the 2010 Request for Proposals, and the investigator has a proven record of successfully conducting, administering, and completing other Fisheries Resource Monitoring Program projects. While partnership and capacity building was only rated as “Medium”, there does not seem to be a local organization with an interest in assuming a role in operating Monitoring Program projects. Since smolt assessment has not been attempted on this system, this project would examine two different methods and determine the most suitable one for use on this particular system. Based on results from this feasibility study, a proposal for a fully operational project can be submitted for consideration in 2012. Since smolt is not as important for Federal subsistence fishery management as adult sockeye salmon assessment, Buskin River smolt assessment is not viewed as a continuing, long term commitment for the Fisheries Resource Monitoring Program. Therefore, a 2012 proposal would need to contain a clear statement of the number of years information should continue to be collected.

Project Number: FIS 10-502
Project Title: Tanada Creek Salmon Assessment
Geographic Region: Southcentral Alaska
Information Type: Stock Status and Trends
Principal Investigator: Dave Sarafin, National Park Service

Cost: **2010:** \$64,609 **2011:** \$65,821 **2012:** \$67,356 **2013:** \$69,457

Recommendation: Fund

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 meets the mandates of the Alaska National Interest Lands Conservation Act. The upper Copper River sockeye salmon populations are of particular importance to both federally qualified and state subsistence users. Tanada Lake supports one of the uppermost runs of sockeye salmon on the Copper River, and the run supports subsistence salmon fisheries in both the Copper River and Tanada Creek. In January 2006, the Federal Subsistence Board adopted a proposal to allow 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 the Board's adoption of this regulation was based on the assumption that the inseason manager, the Park Superintendent for Wrangell-St. Elias National Park/Preserve, would have accurate knowledge of sockeye salmon escapement into the creek.

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 operate a floating resistance board weir equipped with an underwater video camera and recording system to count migrating adult salmon. Underwater LED lighting will permit viewable conditions during the nighttime and periods of low ambient light. Each day, the recorded video footage will be reviewed to count adult salmon, and the weir will be checked to ensure fish tight integrity. A passage gate will be closed during periods of video review or weir maintenance, but video will be recorded at all times the gate is open. The gate will also be closed whenever viewing conditions do not allow for video recording. Such conditions would only occur during high water events, which can be a problem at this site during some years. However, if the weir can be maintained during these conditions, it is likely that video recording can also be continued. Since all scales collected at the weir site have been unreadable due to extensive erosion of their margins, otoliths will be collected from carcasses in Tanada Lake during late-August thru September and sent to the Alaska Department of Fish and Game for age interpretation.

Partnerships and Capacity Building

Several local groups are interested in the Copper River watershed. This project provides an opportunity to collaborate with local students, tribes, Alaska Native culture camps, nonprofits, and agencies in the data collecting process. Biotechnician positions are currently filled under local hire designation. The Batzulnetas culture camp occurs the third week in June, and 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 Alaska Department of Fish and Game in conducting salmonid research in the Copper River.

Justification

Although this project does not address a priority information need listed in the 2010 Request for Proposals, this project is important for management and also has historical importance for the Federal subsistence fishery management program. Although the site has seen little use by Federally qualified fishers over the last two years, it is difficult to determine whether this will continue. Tanada Creek weir information may prove useful for post-season management assessments and devising pre-season management plans. The project site is used as an educational tool for local culture camps as well as to recover tagged salmon and collect genetic data. The investigator modified the objectives of this project, as requested in the project proposal review, so that they are quantifiable and measurable. While climate change effects were not included as a specific objective, the investigator is encouraged to document any observations and insights on climate change effects in reports. The principal investigator and his agency have attempted to institute efficiency and cost saving methods, requested annual costs would be about \$14,000 less than those for the currently funded project, and the investigator's agency would provide almost half of the annual operating costs for the project. A second camera would be purchased for use as a backup in case the original camera fails. The investigator would examine ways to lessen effects of flood events, as was requested in the proposal review. Design of the camera housing and passage chute, coupled with closer monitoring of the weir and water conditions, make it unlikely that video recording would be hampered by turbid water conditions. Crew members would be trained prior to the season and monitored during the season to ensure video counts were accurate and comparable. This would be relatively easy to do since only one or two salmon usually pass the camera at the same time, the speed of the VHS tape and DVR hard drive can be adjusted during counting, and VHS and DVR recordings for the same time periods would be periodically reviewed and compared. Finally, while no local organization appears willing or able to assume a role in operating this project, partnership efforts have been very good and capacity building could be enhanced through use of student interns.

Project Number: 10-503
Project Title: Copper River Chinook Salmon Assessment
Geographic Region: Southcentral Alaska
Information Type: Stock Status and Trends
Principal Investigator: Keith van den Broek, Native Village of Eyak
Co-Investigator(s): Jason J. Smith, LGL Alaska Research Associates, Inc.
 Michael R. Link, LGL Alaska Research Associates, Inc.

Cost: **2010:** \$373,008 **2011:** \$373,064 **2012:** \$373,011 **2013:** \$373,043

Recommendation: Fund

Issue

The importance of Copper River Chinook 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 resource, fishery managers have found it difficult to obtain annual estimates of Chinook 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 has successfully provided annual inriver abundance estimates 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). This project would continue work being conducted under project 07-503, and specifically addresses one of the priority information needs identified by the Office of Subsistence Management (OSM) in the FY10 Request for Proposals (“*Estimate total run abundance and obtain reliable estimates of spawning escapement for Chinook salmon*”).

Objective

To estimate the annual inriver abundance of Chinook salmon returning to the Copper River from 2010 to 2013 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 (1 km below Wood Canyon). Escape panels will be used on the live tanks to minimize crowding by allowing sockeye salmon to escape. At each location, crews will visit the fishwheels a minimum of three times a day and remove all fish from the live tanks. Using a dip net, all healthy adult Chinook salmon measuring more than 500 mm fork length will be transferred from the live tanks to a water-filled, foam-lined trough for sampling. At Baird Canyon, all Chinook salmon, up to a maximum of 150/day, will be tagged using uniquely coded dorsal T-Bar Encapsulated Passive Integrated Transponder (TBA-PIT) tags and a secondary operculum punch. At Canyon Creek, all fish will be examined for presence or absence of a tag and operculum punch.

Data will be collected at both sample events using ruggedized handheld Palm computers with integrated scanners that detect and record data from the TBA-PIT tags. Project investigators and fishery managers will receive daily updates through email or on the Native Village of Eyak's 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 during the season. Inriver abundance of Chinook salmon above Baird Canyon in each year of the study will be estimated using two-event mark-recapture methods. Tests will be performed to determine whether underlying assumptions for using this method have been met and whether modifications to data analyses are needed.

Partnerships and Capacity Building

This project provides the Native Village of Eyak with an opportunity for meaningful inclusion in the research and long-term management of Copper River salmon. The Native Village of Eyak 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 assessment projects. Fishery technicians will acquire the necessary skills and experience required for this and other fisheries research jobs. This project will allow the Native Village of Eyak to further develop the skills of its members via local training, hiring for key positions in future fisheries assessment projects, and recruiting and encouraging young people to get an education in fisheries and natural resource management. This project will also promote meaningful interactions between an Alaska Native organization and fisheries management agencies. Finally, the overall study design will engage tribal organizations from different regions of the Copper River drainage in discussions on the project and promote interactions among subsistence users. The Native Village of Eyak 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. The Native Village of Eyak will also actively participate in public meetings throughout the year to disseminate project results, review the project, and discuss future refinements. These consultations will culminate in the overall assessment of the project that will drive continued development of a long-term program.

Justification

This proposal addresses a priority information need identified in the 2010 Request for Proposals, and is ranked highly in all evaluation criteria. This 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 proposed project would continue work begun in 2001 that is critically important to Federal and State agencies in managing Copper River Chinook salmon fisheries and sustaining the Chinook salmon resource. The objective of this project is 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. Although the investigators have attempted to institute efficiency and cost saving methods over the course of this project, annual costs have continued to rise and a source of matching funds has not been found. However, as requested in the proposal review, the investigators capped annual costs at a level that did not exceed \$373,100, which is the annual project cost for 2009. While partnership and capacity building are both at high levels, there may still be room to improve outreach efforts with upriver communities and organizations.

Project Number: 10-505
Project Title: Long Lake Salmon Assessment
Geographic Area: Southcentral Alaska
Information Type: Stock Status and Trends
Principal Investigator: Molly McCormick, National Park Service

Cost: **2010:** \$23,050 **2011:** \$11,811 **2012:** \$12,042 **2013:** \$12,662

Recommendation: Fund

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. 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 Wrangell-St. Elias National Park/Preserve. In addition, the Long Lake population has the longest known annual spawning duration of any sockeye salmon population in North America, and estimates of its abundance constitute the longest time series of salmon weir counts in the Copper River drainage. Thirty-five years of weir data show annual variations in abundance of Long Lake runs ranging from 631 to over 49,000 sockeye. This system is an excellent candidate for a long term monitoring site that can provide valuable data to examine the effects of climate change for relatively little cost.

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 789 salmon here in 2008 using dipnets. This harvest number was down from a high of 1,379 in 2006. Harvest by as many as 10,000 households occurs in a state managed fishery that has been both a subsistence and personal use fishery with annual harvests as great as 125,000 salmon. All these fisheries harvest some of the salmon returning to Long Lake.

Objectives

1. To count adult sockeye salmon migrating past a weir from late July until mid October by using video equipment to count all individuals entering Long Lake.
2. To use hierarchical models and model selection criteria (e.g. AIC, DIC) to determine whether there are detectable trends in run timing and to identify relationships between run timing and climate conditions. Trends and relationships to climate variables would be considered to be identifiable if supported by the model selection criteria and if the 95% credible intervals did not include 0.
3. To estimate the age, sex, length composition of the sockeye salmon escapement from scale and 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 a recording system to count the number of salmon migrating into Long Lake, and will also be a sampling platform to obtain age, sex and length information from 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 on the video recordings will be counted by species. A passage gate will be closed during periods of video review or weir maintenance, and video will be recorded during all times the gate is open. While a portion of the sockeye salmon run passing the weir will be sampled for age, sex and length, age information will also be obtained from otoliths obtained from carcasses of spawned out sockeye salmon sampled from the spawning grounds. Scale and otolith samples will be sent to the Alaska Department of Fish and Game for analysis. Since many scales have eroded margins, a length-at-age relation developed for Copper River sockeye salmon will be used to help interpret these scales. Stream and air temperature data, as well as water depth information, will be collected at the weir site. Weir operations will end in mid-October. At this time, all pickets will be removed from the weir structure, which will remain in place over the winter. Data analysis and reporting will take place during the winter months.

Partnerships and Capacity Building

Several local groups and organizations are interested in the Copper River watershed, including the Copper River Watershed Project 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 collection process. Biotechnician positions have been filled under local hire designation. The Park has and will continue to collaborate with the Alaska Department of Fish and Game in conducting salmonid research in the Copper River.

Justification

Although this project does not address a priority information need listed in the 2010 Request for Proposals, the relatively long time series of salmon passage, water depth recordings, and temperature measurements at the Long Lake weir site would provide useful information to assess management performance, suggest changes in management strategies, and monitor effects of climate change. The investigator modified the objectives of this project, as requested in the project proposal review, so that they are quantifiable and measurable, and included climate change effects as part of one of the objectives. The principal investigator and her agency have attempted to institute efficiency and cost saving methods, requested annual costs would be about \$7,000 or \$8,000 less than those for the currently funded project, and the investigator's agency would provide almost half of the annual operating costs for the project. The use of video technology would allow visual records of salmon escapement to be saved, reduce operating costs, allow salmon to pass the weir at all times of the day, and reduce bear predation and other problems caused by concentrating salmon below the weirs. Crew members would be trained prior to the season and monitored during the season to ensure video counts were accurate and comparable. This would be relatively easy to do since the passage chute would usually allow only one or two salmon to pass the camera at a same time, the speed of the VHS tape and DVR hard drive could be adjusted during counting, and VHS and DVR recordings for the same time periods would be periodically reviewed and compared. Finally, while no local organization appears willing or able to assume a role in operating this project, partnership efforts have been very good.

Project Number: 10-552
Project Title: Copper River Subsistence Salmon Harvest Validity
Geographic Region: Southcentral Alaska
Information Type: Harvest Monitoring and Traditional Ecological Knowledge
Principal Investigator: James Brady, HDR, Alaska
Co-Investigators: Dr. William Simeone, ADF&G Division of Subsistence
 Erica McCall-Valentine, Ecotrust

Cost: **2010:** \$211,631 **2011:** \$194,782 **2012:** \$42,903

Recommendation: Fund

Issue

This three-year project responds to an information need identified as a high priority for the Southcentral Region in the 2010 Monitoring Program Request for Proposal to determine the validity and reliability of permit estimates of subsistence salmon harvests from the Copper River. Under both State and Federal regulations, fish wheels must be operated by only one permit holder at a time, and the permit holder is required to enter all harvested fish on a permit before concealing the fish from view or removing them from the fishing site. If this does not occur, then the permit data are not capturing all of the harvest. The investigators hypothesize that one source of error in the reporting process is the way fish wheel owners manage their fish wheels and another source of error may be how agencies collect and compile harvest data.

Objectives

1. Systematically describe and analyze the process by which harvest data is compiled and reported by State and Federal subsistence management agencies.
2. Investigate the validity of the potential sources of error.

Methods

1. Conduct semi-directed interviews to document the processes by which subsistence salmon harvest data is compiled, reported and shared by state and federal subsistence management agencies;
2. Conduct a structured systems analysis to visualize and analyze the processes by which harvest data is compiled, reported and shared by state and federal subsistence management agencies;
3. Conduct preseason and postseason interviews with fish wheel owners at Copperville and the Chitina/McCarthy Bridge to determine operating, management, and reporting techniques;
4. Monitor selected fish wheels at Copperville and the Chitina/McCarthy Bridge during a fishing season to document activity, harvest rates and catch per unit effort; and
5. Assess evidence for unreported harvest through a post season postal survey.

Partnerships and Capacity Building

This investigation directly addresses concerns expressed by Copper River basin residents. Investigators met with the Ahtna Subsistence Committee and discussed this proposed study. While the Ahtna

Subsistence Committee was not interested in being involved in the project, the investigators will continue to consult with the Ahtna Subsistence Committee for hiring the local field technicians for the project. At the conclusion of the project, the investigators will present findings of the study to the Ahtna Subsistence Committee. Local cooperation will be sought by contracting local research assistants to perform field research activities, including a local field technician and partial funding for the Ecotrust Tribal Projects Coordinator; both positions will be Ahtna. Their traditional knowledge of the Copper River, of fish wheel operations and of subsistence fishing practices will strengthen the research activities. Through their participation in the project they will gain new skill sets and knowledge and will broaden community education. Additionally, the investigators will be working closely with fish wheel owners developing two-way communication with them. The investigators will count on the fish wheel owners to counsel them during the pre-season interviews to refine or adapt later study approaches to improve the success of the project. Study findings will be reported back to the fish wheel owners at the conclusion of the project.

Justification

The goal of this three-year, collaborative project is to evaluate the validity of annual subsistence salmon harvest estimates for the Upper Copper River. The investigators hypothesize that one source of error in the reporting process is the way fish wheel owners manage their fish wheels and another source of error may be how agencies collect and compile harvest data. The focus of the study design is two pronged: objective one describes and analyzes how subsistence salmon harvest data are compiled and reported by State and Federal managers and investigates the potential sources of error. Objective two focuses on fish wheel management. The project includes pre-and post season interviews of 60% of fish wheel owners, monitoring fish wheels at Copperville and Chitina/McCarthy Bridge to document activity, harvest rates, and catch per unit effort through participant observation and fish wheel rotation counters on 20 fish wheels, as well as a post-season postal survey. The proposed project is technically sound. The investigators are well-qualified, although there have been concerns in the past with the co-principal investigators regarding timeliness. In response to this concern, an additional year has been added to the original proposed schedule. This project provides a medium capacity building component. This proposal addresses an information need specifically identified as a high priority for the Southcentral Region in the 2010 Monitoring Program Request for Proposal and the Federal linkage is strong.

Project Number: 10-600
Project Title: Karta River Sockeye Salmon Assessment
Geographic Area: Southeast Alaska
Information Type: Stock Status and Trends
Principal Investigators: Michael Peel, Organized Village of Kasaan
 Paula Peterson, Organized Village of Kasaan
Co-Investigators: Glenn Chen, Bureau of Indian Affairs
 Ben VanAlen and Jeffery Reeves, USFS
 Steve Heintz, ADF&G Division of Commercial Fisheries

Cost: **2010:** \$157,545 **2011:** \$142,108 **2012:** \$152,162 **2013:** \$161,424

Recommendation: Fund

Issues

The objective of this proposal is to determine an escapement estimate and population structure of sockeye salmon stocks on the Karta River, which is identified as an information need for Southeast Alaska as stated in the call for proposals. This will be done by placing a weir on the Karta River and counting sockeye as they migrate back into the river. Escapement estimates will be cross-checked using mark-recapture methods. The project fully meets the federal jurisdiction criteria for FRMP funding because of the ecological association of the marine subsistence fishery to an adjacent federal CSU. Sockeye salmon returning to this system spawn in the Karta River.

Objectives

1. Count the number of sockeye salmon returning to the Karta River system via a weir between June 1 and September 15 of each year.
2. Estimate the total escapement of sockeye salmon into the Karta River system using mark-recapture methods so that the estimated coefficient of variation is less than 15%.
3. Estimate the age, length, and sex composition of the Karta River system sockeye escapement so that the estimated coefficient of variation for the dominate age class is less than 10%.

Methods

The project will estimate the number of sockeye salmon returning to the Karta River system. Escapement data will be collected at an adult fish weir. In addition to counting the number of returning fish, age, sex and length data will be taken to evaluate population structure. A mark-recapture estimate will be used to validate the weir count and determine if any sockeye passed the weir without detection. Sockeye will be marked at the weir with a fin clip, and re-capture efforts will focus on two known spawning creeks: McGilvery and Anderson Creeks. The mark-recapture estimate will be used as the escapement estimate in the event that the weir is breached for a period of time.

Partnerships and Capacity Building

Glenn Chen of BIA has agreed to continue to work with OVK on building capacity and technical support for their fisheries program. Collaboration with the U.S. Forest Service (USFS) and the ADF&G

is essential in making this project successful. The USFS, Craig Ranger District has agreed to provide technical support by providing feedback on operation planning and technical report writing. OVK currently has an USFS wilderness permit that will expire at the end of the 2009 field season, and collaboration between agencies will be required to get this permit re-issued. The ADF&G Commercial Fisheries has agreed to continue its technical support by providing assistance with operational planning, fish scale reading and report writing. OVK will apply a local hire priority for this project.

Justification

This project would provide reliable estimates escapement and age composition of sockeye salmon into the Karta Lake system using a picket weir and mark-recapture validation techniques. This run is an important subsistence resource for the community of Kasaan, and there are concerns with reduced escapement estimates and subsistence harvests. The need for escapement estimates of sockeye salmon at Karta was listed as a priority in the 2006 Southeast Alaska Strategic Plan; and was included as a priority information need in the 2010 Request for Proposals. The principal and co-investigators have experience with this type of salmon stock assessment project and have demonstrated their ability to accomplish project objectives. The project is technically sound and achievable. The budget is reasonable and capacity building is at the highest level, since funds would go directly to the Organized Village of Kasaan to operate and administer the project.

Project Number: 10-601
Project Title: Hatchery Creek Sockeye Salmon Assessment
Geographic Area: Southeast Alaska
Information Type: Stock Status and Trends
Principal Investigator: Jeff Reeves, USFS Craig Ranger District
Co-Investigators: Ben VanAlen, USFS Juneau Ranger District
 Mike Peel and Paula Peterson, Organized Village of
 Dr. Glenn Chen, Bureau of Indian Affairs.

Cost: **2010:** \$182,784 **2011:** \$164,621 **2012:** \$175,172 **2013:** \$173,773

Recommendation: Fund

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 U.S. Forest Service 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

1. 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 dipnet 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
2. 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.

Partnerships 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, the USFS, and the BIA. 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.

Justification

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 continuation of FRMP project 07-601 with an increased emphasis in the design and operation of a picket weir that encourages fish to pass without delay and increased emphasis in a mark-recapture estimate of escapement. The remote, multi-lake, distribution of spawners above the weir makes it difficult to do a simple mark-at-the-weir, examine-on-the-spawning grounds mark-recapture study so video sampling for weir marks (adipose fin clips) is planned. 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, Alaska Department of Fish and Game, US Forest Service, and USDI Bureau of Indian Affairs investigators. The principal investigator will be a Forest Service biologist and the weir personnel will be Organized Village of Kasaan employees.

Project Number: 10-603
Project Title: Yakutat Eulachon Surveys
Geographic Area: Southeast Alaska
Information Type: Stock Status and Trends
Principal Investigator: Barbara Adams, USFS, Yakutat Ranger District
Co-Investigators: Bill Lucey, Yakutat Salmon Board
 Brian Marston, ADF&G Yakutat District
 Ben Van Alen, USFS Juneau Ranger District
 Nate Catterson, USFS Yakutat Ranger District

Cost: **2010:** \$27,509 **2011:** \$27,853 **2012:** \$29,865 **2013:** \$31,558

Recommendation: Fund

Issue

Little is known, and less is written, about the annual distribution, timing, and abundance of eulachon (*Thaleichthys pacificus*) along the Yakutat Foreland (Willson et al. 2006). This project will provide baseline stock assessment information from Tawah Creek to the Doame River. This information is needed to understand the status of these stocks and better provide for the continuation of subsistence take by the Federally qualified subsistence users in Yakutat. In November 2007, NMFS received a petition to list the Pacific Eulachon in California, Oregon and Washington as a threatened or endangered species. If this petition is granted, all information gathered on other Eulachon areas would be of value.

Objective

Estimate the timing, distribution, and relative abundance of eulachon in river systems along the Yakutat foreland from Tawah Creek to the Doame River.

Methods

The project will consist of five or six fixed-wing flight surveys looking for eulachon at the estuary/mouth and lower reaches of the streams along the Yakutat Foreland from Tawah Creek to the Doame River. Surveys will be flown about every 10 days between mid-February and early-April, weather permitting. Survey dates and times will vary due to weather and plane availability but the down and back flight paths will be relatively consistent. For each stream, observers will record presence/absence of eulachon, take pictures of any Eulachon present and, if present, abundance will be estimated (some, few, moderate, or lots). Along with these qualitative measures, observers will map eulachon observations along the river taking a GPS point at the upper and lower most reaches of the Eulachon, record observed predators such as birds and mammals and record survey conditions. On the ground observations will be considered for glacial streams or during times when turbidity is high, when possible. These observations will be maintained in a database that is easily shared. There is a possibility that the mapped information could be imported into a GIS application to better quantify timing, distribution, and abundance of annual runs of eulachon. We will try to have at least one observer do all the flights for the same year barring any unforeseen circumstances. Photos of the rivers with Eulachon will assist us in consistency among observers. When conditions are right, estuary areas may be sampled for Eulachon on a small number of the sites in an effort to make sure that what we are seeing are really Eulachon and not herring. Although,

any fish in the upper reaches of the streams will be considered Eulachon since herring do not go into freshwater. We will contact the local bush pilots who fly the area and ask them to contact us if they see Eulachon in the rivers. These pilots have been very helpful with these projects in the past. We will also contact known Eulachon subsistence users to see where and when they are getting their harvest.

Partnerships and Capacity Building

The project will be a collaboration between U.S. Forest Service (FS), Yakutat Salmon Board (YSB) and Alaska Department of Fish and Game (ADF&G). The fieldwork will be completed mostly by the YSB, ADF&G and some FS. The FS will be responsible for the contracting and payment of the airplane as well as the annual reports and final report.

Justification

This project would detect presence, timing and provide an abundance index for eulachon returning to 19 streams of the Yakutat forelands in the months of February and April via five or six aerial surveys. Surveys will be flown approximately every ten days throughout the eulachon spawning season. This project addresses a priority information need as stated in the 2010 Request for Proposals. This information is needed to better understand the eulachon resource and provide for the continuation of subsistence take by Federally qualified subsistence users in Yakutat. The project should provide a reasonable index of abundance, timing, distribution and trend information for eulachon on the Yakutat Forelands. The investigators have the experience to complete the project. The budget is commensurate with the scope of the project. There is good cooperation with local groups. The project would add to the overall knowledge and management of eulachon near Yakutat as well as other streams along the coast of Southeast Alaska.

Project Number: 10-604
Project Title: Klag Lake Sockeye Salmon Assessment
Geographic Region: Southeast Alaska
Information Type: Stock Status and Trends
Principle Investigator: Benjamin Mann, Sitka Tribe of Alaska.
Co-Investigator: Terry Suminski, US Forest Service

Cost: 2010: \$128,242 **2011:** \$128,111 **2012:** \$134,514 **2013:** \$141,239

Recommendation: Fund

Issue

Sockeye salmon are an important subsistence resource for the community of Sitka, AK and Klag Bay has customary and traditional 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 with approximately 30% of an eight-year average annual escapement returning to Klag Lake to spawn. If escapement numbers continue to be reduced in the Klag Bay system while harvesting levels remain consistent, the population could be overharvested, becoming 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 using a weir and mark-recapture methods.
2. Describe the run-timing, or proportional daily passage of sockeye salmon through the weir.
3. To estimate the sex and age composition of sockeye salmon such that the coefficient of variation is 10% or less.
4. To enumerate harvest totals by subsistence and sport fishermen at Klag Bay so that the coefficient of variation is 15% or less.

Methods

A 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 approximately 20% of the sockeye salmon will be sampled for sex (M/F), length (mm), and weight (g) to describe run timing and scale samples taken for age analysis. Sampled fish will also be given fin clip for a mark-recapture study. Recovery events for the mark-recapture study will occur on the spawning grounds once the fish have reached the area to spawn. Fish will be sampled using dip nets with a minimum of two recovery events pending assessed need. Recovered fish will receive an additional mark to ensure sampling is conducted without replacement. The total number of fish sampled and the number of sampled fish with marks will be recorded. If the ratio of marked-to-unmarked fish in the recovery sample is significantly different than the ratio of marked-to-unmarked fish at the weir, the mark-recapture study 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. Weir technicians will also conduct a creel survey to estimate the sockeye harvest in Klag Bay. Escapement and harvest data will be reported to Terry Suminski (USFS) daily via

Forrest Service Radio Network to aid in-season management of the 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 biologist) regarding stream height and temperature.

Partnership/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 USFS, the ADF&G, and the Office of Subsistence Management. Terry Suminski (USFS) will work closely with the PI to ensure accurate, reliable data collection and that operations are completed successfully. Local residents will be hired to operate the weir and collect escapement, mark-recapture, and harvest data. An effort is being made to attract 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. 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 them access to knowledge and training on a day-to-day basis throughout the field season while assuring accurate, reliable data is collected.

Justification

This project will support continued operation of the Klag Lake sockeye stock assessment project to estimate the sport and subsistence harvest of sockeye salmon in Klag Bay and the escapement and age, sex, and length composition of sockeye salmon into Klag Lake. Annual escapements of Klag Lake sockeye salmon have been successfully estimated with this weir and weir-to-above-weir mark-recapture project. Klag Lake sockeye salmon are an important subsistence resource to residents of Sitka, especially in years when the Redoubt Lake sockeye run is low. This project represents the highest level of community involvement since all project funding will go to the Sitka Tribe of Alaska and they will employ the principal investigator and all field personnel and take the lead in analysis and reporting on project findings.

Project Number: 10-605
Project Title: Sitkoh Lake Sockeye Salmon Assessment
Geographic Region: Southeast Alaska
Information Type: Stock Status and Trends
Principal Investigator: Ben Van Alen, U. S. Forest Service
Co-Investigators: Raynelle Jack, Angoon Community Association
 Scale Lab, ADF&G Division of Commercial Fisheries

Cost: **2010:** \$71,445 **2011:** \$68,751 **2012:** \$70,750 **2013:** \$72,755

Recommendation: Fund

Issue

FRMP funds are needed to reinstate the Sitkoh Lake sockeye stock status and trends project that began in 2001 but ended in 2006.

Objectives

Index the annual escapement of sockeye salmon into Sitkoh Lake using mark-recapture and remote sensing methods so that the estimated coefficient of variation is less than 20%.

Estimate the age, sex, and length composition of the sockeye salmon escapement into Sitkoh Lake with a coefficient of variation less than 20% for the principal age class.

Methods

This project 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 (Cook 1998; Crabtree 2000, 2001; Conitz and Cartwright 2003, 2005, 2007; Burril and Conitz 2007; and Conitz and Burril 2008). Sampling trips will be made in mid-September, late-September/early-October, and mid-October at a minimum. Sockeye salmon will be sampled for scale (age), sex, and length data using standard ADF&G methods. Time-lapse video of key beach spawning areas will also be tested to assess the timing and abundance of sockeye spawners into Sitkoh Lake.

Partnerships and 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 since 2001. This project will provide September and October employment for ACA employees who work on the Kook Lake sockeye stock assessment project. The USFS will seek to fill the project biologist position with a local ANILCA hire.

Justification

This project will continue using mark-recapture methods to index the abundance of sockeye spawning in a study area in Sitkoh Lake. The need for escapement estimates of sockeye salmon at Sitkoh Lake was listed as a priority in the 2006 Southeast Alaska Strategic Plan; and was included as a priority information need in the 2010 Request for Proposals. Angoon residents currently rely on Kook and Sitkoh stocks for their subsistence sockeye harvest since Kanalku sockeye escapements have been poor. Technical merit is

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high with objectives and methods that are clear, measurable, and achievable. The project would build on previous mark-recapture indexes using a study design proven to work at this location. The investigators have completed projects funded by the FRMP. Partnership and Capacity Building is rated medium since The US Forest Service is taking the lead role in implementing this project and the Angoon Community Association is providing field technicians and some supplies and transportation.

Project Number: 10-606
Project Title: Hetta Lake Sockeye Salmon Assessment.
Geographic Region: Southeast Alaska
Information Type: Stock Status Trends
Principle Investigator: Anthony Christianson, Hydaburg Cooperative Association
Co-Investigator: Cathy Needham, Kai Environmental Consulting Services

Cost **2010:** \$181,278 **2011:** \$165,416 **2012:** \$171,884 **2013:** \$169,052

Recommendation: Fund

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 2010 Request for Proposals 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 escarpment).

Objectives

1. Census the sockeye 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 salmonids returning to Hetta Lake through a weir.
3. Estimate the escapement of sockeye salmon into Hetta Lake using mark-recapture methods so that the estimated coefficient of variation is less than 10%.
4. 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.

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 20% of the sockeye salmon that cross the weir will be fin-clipped, using a stratified two-sample marking system to differentiate across the run. Each year, crews will make 5 -6 trips to spawning grounds to seine and dip net fish for the recapture events, and record the recovery of marked fish. Approximately 600 fish that were marked at the weir, will also 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, and the mark-recapture study will be used to validate the weir count. 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

Over the past 8 seasons, HCA has been working 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 2009 field season. HCA has accomplished this goal and demonstrates community control level of involvement. ADFG will still offer scale reading services to the project

Justification

This project would continue operation of the FRMP Hetta Lake sockeye stock assessment project that began in 2001. This project has successfully estimated the Hetta Lake sockeye escapement using weir and mark-recapture and estimated the subsistence sockeye harvest by Hydaburg residents using completed-trip interviews. Hetta Lake supports one of the larger subsistence sockeye harvests in the region and the most important to residents of Hydaburg. This system is in close proximity to significant commercial fisheries, the potential for significant competing harvest is high, subsistence exploitation is high, and there is evidence of recent low escapements that could limit future returns. Hydaburg Cooperative Association staff has performed admirably in implementing this relatively large and complex program with assistance from ADF&G in the past and this will continue with some assistance from an environmental consultant. This project represents the highest level of community involvement since all project funding will go to the Hydaburg Cooperative Association and they will employ the principal investigator and all field personnel and take the lead in analysis and reporting on project findings.

Project Number: 10-607
Title: Kanalku Lake Sockeye Salmon Assessment
Geographic Area: Southeast Alaska
Information Type: Stock Status and Trends
Principal Investigator: Julie Bednarski, ADF&G Division of Commercial Fisheries
Co-Investigators: Edward Gamble Sr., Angoon Community

Cost: **2010:** \$178,773 **2011:** \$187,713 **2012:** \$197,099 **2013:** \$206,953

Recommendation: Fund

Issue

The area around Kanalku Bay and Kanalku Lake is one of the Angoon people's oldest and most frequently-used subsistence fishing and hunting areas, and their use has always centered around the Kanalku Lake sockeye salmon run (George and Bosworth 1988). In recent years, subsistence fishers and fisheries management biologists have observed a sharp decline in sockeye salmon returns and severely reduced harvest opportunities in the Kanalku Lake system (Conitz and Cartwright 2005; M. Kookesh retired subsistence biologist, ADF&G, personal communication 2002).

The Kanalku Lake sockeye stock assessment project began in 2001, and in that year the escapement of sockeye salmon in Kanalku Lake was less than 250 fish (Conitz and Cartwright 2002). This discovery prompted an agreement between ADF&G management and the community of Angoon to implement a voluntary fishing closure in Kanalku Bay in 2002. Since the voluntary fishing closures sockeye salmon escapement have been generally stable, and fluctuated from about 1,600 fish in 2002 to less than 300 fish in 2003 (Conitz and Cartwright 2005). Although the size of the harvest has clearly been reduced by the voluntary closure, we do not know the true relationship between harvest and escapement. A majority of Angoon residents supported the closure and abstained from fishing in Kanalku Bay in the years after it was implemented. However, the voluntary closure was not universally observed, and became increasingly contentious in 2004 and 2005. ADF&G management biologists have decided to recommend it not be continued in 2006. However, these managers are planning to limit the regular subsistence season and restrict the possession limit for sockeye salmon in Kanalku Bay in 2006, to try and keep effort and harvest low and protect the escapement. Federal subsistence management biologists have not yet decided whether to implement similar limits on the federal portion of the Kanalku subsistence fishery (B. Van Alen USFS biologist, personal communication 2006). In order to be effective, management plans for the Kanalku subsistence fishery must be supported with accurate information about the size and timing of the sockeye run. The small run size on one hand and its importance to the people of Angoon on the other indicate that both the harvest and escapement should be closely monitored

Objectives

1. Estimate the total escapement sockeye salmon into Kanalku Lake using weir and mark-recapture methods so that the estimated coefficient of variation is less than 15 percent.
2. From sockeye salmon sampled at the weir, estimate proportions of fish in each age-sex category with estimated coefficient of variation 10% or less for the two major age classes. Also, estimate the mean length of fish in each age-sex category with estimated coefficient of variation less than 5%.

Methods

A conventional aluminum frame weir opening into an adjoining rectangular trap will be placed across Kanalku Creek, close to the lake outlet. The weir will be periodically opened (usually 1 - 2 times per day) and fish moving upstream visually counted. As a check to the weir counts of total escapement, a two-sample Petersen will be used to estimate for total escapement, based on the total number of fish marked as they move into the lake (first sample), the total number of fish subsequently sampled for marks on the spawning grounds (second sample), and the number of marks recovered in the second sample.

On the first day of each week, fish entering the trap will be retained for marking and sampling. A total of 500 sockeye salmon, but not more than 50% of the total run, will be marked using an adipose clip and uniquely-numbered t-bar tags. As soon as sockeye salmon appear on the spawning grounds, mark-recovery sampling will begin. Recapture events will be conducted on the spawning grounds at approximately weekly intervals throughout the spawning period. Fish will be sampled in all accessible spawning areas. Tag numbers applied at the weir will be sorted into weekly strata based on the week in which they were applied at the weir. Recapture strata are simply the mark-recovery sampling events on the spawning grounds. We will estimate tag loss in this study by recording recaptures of sockeye salmon with a clipped adipose fin but no tag, and calculating the proportion of such fish in the total number of recaptures. Because all tagged fish will be marked with adipose clips, fish with lost tags can be identified as recaptures and included in the recapture data, although the initial capture strata of such fish will be unknown. Recaptures of fish with lost tags can be apportioned, if necessary, to initial capture strata based on proportions of all fish marked at the trap in each stratum.

Length, sex, and scale samples will be collected from 500 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, using the same weekly schedule described for marking fish under Objective 2.

Partnerships and 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.

Justification

This project will use a picket weir validated with mark-recapture methods to estimate the escapements of sockeye salmon into Kanalku Lake. Sockeye salmon will be sampled for scale (age), sex, and length data. The need for escapement estimates of sockeye salmon at Kanalku was listed as a priority in the 2006 Southeast Alaska Strategic Plan; and was included as a priority information need in the 2010 Request for Proposals. Escapement has been low and harvest rates have been quite high. Angoon residents currently must travel farther, to Kook and Sitkoh Lakes, since Kanalku sockeye escapements have been poor. In recent years there have been subsistence fishery restrictions at Kanalku, so there is an increased need for

information on both spawning escapements and fishery contributions of sockeye salmon stocks in the Northern Chatham Strait area. Technical merit is high with clear, measurable and achievable objectives. The investigators have completed projects funded by the Fisheries Resource Monitoring Program. The Partnership and Capacity Building is rated as medium since the ADF&G is taking the lead role in implementing this project and the Angoon Community Association is providing field technicians and some supplies and transportation.

Project Number: 10-609
Project Title: Falls Lake Sockeye Salmon Assessment
Geographic Region: Southeast Alaska
Information Type: Stock Status and Trends
Principal Investigator: Terry Suminski, USFS Tongass National Forest.
Co-Investigator: Dawn Jackson, Organized Village of Kake

Costs: **2010:** \$118,654 **2011:** \$118,019 **2012:** \$123,421 **2013:** \$129,885

Recommendation: Fund

Issues

Sockeye salmon returning to Falls Lake are heavily utilized by Kake residents. Because of the need for careful monitoring of this sockeye run and the need for active management of its subsistence fishery, the stock assessment program is needed to assess both harvest and escapement. In season assessments allow managers to maximize subsistence uses of sockeye. Without an in season assessment of sockeye abundance and subsistence harvest, managers would be forced to manage more conservatively (lower harvest limits and shorter season) which could result in lost harvest opportunity for users.

Objectives

Estimate the escapement of sockeye salmon into Falls Lake, as they enter the lake, using mark-recapture methods.

Estimate the subsistence harvest of sockeye salmon in the marine area around Falls Lake Creek with an estimated coefficient of variation less than 15%.

Estimate the age, sex, and size distribution of sockeye salmon in the Falls Lake escapement with an estimated coefficient of variation less than 5% for each estimate.

Methods

We will count sockeye salmon through a trap at the top of the fish ladder and will mark each fish with a fin clip. A net weir equipped with a video camera will be installed immediately upstream (in the lake) and used to recapture fish to sample for marks. Counts of all fish passed will be recorded by species. The abundance of sockeye salmon passing through the net weir will be estimated using Chapman's modification of the Petersen two-sample model (Seber 1982).

A single-stage sampling design, stratified by gear type, will be used to estimate sockeye salmon harvest, and, if possible, fishing effort (Bernard et al. 1998, Cochran 1977). The sport fishery will constitute one stratum, the subsistence fishers using gillnets and seines will comprise another. Given the low number of participants in the fishery, samplers will attempt to interview all participating boat groups.

Age, sex, and length data will be collected from adult sockeye salmon at the weir to describe the biological structure of the population. Scale samples will be prepared for analysis as described by Clutter and Whitesel (1956) and analyzed at the ADF&G Salmon Aging Laboratory in Douglas, Alaska. Age and length data are paired for each fish sample.

Partnerships and Capacity Building

OVK leaders USFS and ADF&G fisheries management biologists have worked together on pro-active 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 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.

Justification

This project will support continued operation of the Falls Lake sockeye stock assessment project to estimate the sport and 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. Annual escapements of Falls Lake sockeye salmon have been successfully estimated with this fishpass trap-to-above-trap mark-recapture project. The use of a lake net weir and underwater video to sample fish for marks (adipose fin clips) should improve the reliability and efficiency of the escapement estimate. This project is of high strategic importance. This system is in close proximity to significant commercial fisheries, the potential for significant competing harvest is high, subsistence exploitation is high, and the subject of inseason management. This project represents the good collaboration between the Forest Service and the Organized Village of Kake and a reasonable allocation of responsibilities and funding between these entities.

Project Number: 10-610
Project Title: Kook Lake Sockeye Salmon Assessment
Geographic Region: Southeast Alaska
Information Type: Stock Status and Trends
Principal Investigator: Ben Van Alen, U. S. Forest Service
Co-Investigators: Raynelle Jack, Angoon Community Association
Scale Lab, ADF&G Division of Commercial Fisheries

Cost: **2010:** \$198,370 **2011:** \$189,793 **2012:** \$187,253 **2013:** \$190,894

Recommendation: Fund

Issue

FRMP funds are needed to continue the Kook Lake sockeye stock status and trends project which began in 2001.

Objectives

1. Estimate the annual escapement of sockeye salmon into Kook Lake using a two weir, four camera system.
2. Estimate the age, length, and sex composition of the sockeye escapement into Kook Lake so that the estimated coefficient of variation for the principal age class is less than 20 percent.

Methods

Project personnel will count the number of upstream migrating adult salmon, trout, and char (by species) that swim into Kook Lake past two cameras on each of two lake net weirs. One of the net weirs will have a trap for sampling sockeye salmon for age, sex, and length data.

Partnerships and 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 since 2001. 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 USFS will seek to fill the project biologist position with a local ANILCA hire.

Justification

This project will use two weirs to estimate annual escapement of sockeye salmon into Kook Lake. Sockeye will be sampled for scale (age), sex, and length data using standard ADF&G methods. The need for escapement estimates of sockeye salmon at Kook Lake was listed as a priority in the 2006 Southeast Alaska Strategic Plan; and was included as a priority information need in the 2010 Request for Proposals. Angoon residents currently must travel farther, to Kook and Sitkoh Lakes, since Kanalku sockeye escapements have been poor. The project will build on the escapement information previously collected at Kook Lake. The budget is commensurate with similar projects in the region. Technical merit is high with clear, measurable and achievable objectives. The investigators have completed projects funded by the FRMP. Partnership and capacity building is rated as medium since the US Forest Service is taking

the lead role in implementing this project and the Angoon Community Association is providing field technicians and some supplies and transportation.

Project Number: 10-611
Project Title: Redoubt Lake Sockeye Salmon Assessment
Geographic Region: Southeast Alaska
Information Type: Stock Status and Trends
Principal Investigator: Perry Edwards, USFS, Sitka Ranger District
Co-Investigators: Ben VanAlen, USFS Juneau Ranger District
Maura Santora, USFS Sitka Ranger District
Eric Coonradt, ADF&G Division of Commercial Fisheries
Dave Gordon, ADF&G Division of Commercial Fisheries

Cost: **2010:** \$25,000 **2011:** \$25,000 **2012:** \$25,000 **2013:** \$25,000

Recommendation: Fund

Issue

This project will use weir counts and mark-recapture methods to estimate the annual escapements of sockeye salmon (*Oncorhynchus nerka*) into Redoubt Lake, near Sitka, in the Tongass National Forest. Redoubt Lake is the most important source of subsistence salmon for Sitka area residents, with up to 14,000 sockeye per year being harvested in the subsistence fishery. Redoubt Lake escapements are highly variable, ranging from 400 to over 100,000 sockeye. Since 1992, sockeye weir counts have been low enough to close the in-season subsistence fishery seven years, and high enough to increase the subsistence take five years. For years that the fishery has remained open, Redoubt Lake made up an average of 35% of the total sockeye subsistence take in the Sitka area. However, for some of these years Redoubt Lake has provided up to 60% of the total sockeye subsistence take in Sitka.

Operating costs have increased while funding within USFS for the Redoubt Lake weir has been reduced. 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. Continuation of the weir project will contribute to a spawner/recruit database which dates back 20 years. The need for escapement estimates of sockeye at Redoubt Lake was included as a priority information need in the 2010 Request for Proposals.

Objectives

Estimate the escapement of sockeye salmon into Redoubt Lake so that the estimated coefficient of variation is less than 15%, using a weir at the outlet of the lake with mark-recapture sampling upstream of the weir.

Estimate the age, length, weight, and sex composition of the Redoubt Lake sockeye escapement so that the estimated coefficient of variation for the dominant age class is less than 10%.

Methods

A removable tripod and picket weir with pass boards and a trap will be placed across the outflow of Redoubt Lake to count the number of salmon returning to Redoubt Lake from early June through mid September. Six hundred sockeye salmon will be sampled for age, sex, weight, and length data. Scale sampling and processing methods will follow standard ADF&G procedures.

A mark-recapture study will be conducted to validate weir counts. A running average of 20% of the sockeye salmon counted through the weir each day will be marked with an adipose fin clip. The proportion of marked fish entering the lake will be estimated using net weir and underwater video system at the outlet constriction upstream from the weir.

Partnerships and Capacity Building

Collaboration between the USFS and ADF&G is essential in making this project successful. The USFS will continue to oversee the operation planning and technical report writing. The ADF&G will also continue providing assistance with operational planning, scale reading, and technical support. Daily monitoring and sampling operations in the field will be performed by USFS and ADF&G hired technicians, and a Student Conservation Association (SCA) intern. Letters of support submitted with the Investigation Plan from Sitka Tribe of Alaska (STA) and Sitka Conservation Society (SCS) display the strong community support for this project continuation.

Justification

This project will use two weirs to estimate annual escapement of sockeye salmon into Redoubt Lake. Sockeye salmon will be sampled for scale (age), sex, and length data using standard ADF&G methods. The need for escapement estimates of sockeye at Redoubt Lake was not listed as a priority in the Southeast Alaska Strategic Plan since the work was being accomplished outside the FRMP. However, it was included as a priority information need in the 2010 Request for Proposals. Redoubt Lake was closed to harvest by all users in 2008 due to low escapement. 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 budget is very reasonable due to efficiencies of combining this project with the ongoing fertilization effort. The matching funds are substantial and the amount asked for is less than the 50% funding guideline established by the FRMP for long term projects. The principal investigator has not completed a project funded by the Fisheries Resource Monitoring Program, but one of the co-investigators has. The Forest Service has successfully operated this project for many years. Partnership and capacity building is rated as low since the US Forest Service is taking the lead role in implementing this project with assistance from ADF&G. 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.

Project Number: 10-612
Project Title: Neva Lake Sockeye Salmon Assessment
Geographic Region: Southeast Alaska
Information Type: Stock Status and Trends
Principal Investigator: Ben Van Alen, U. S. Forest Service
Co-Investigators: Johanna Dybdahl, Hoonah Indian Association
Scale Lab, ADF&G Division of Commercial Fisheries

Cost: **2010:** \$157,735 **2011:** \$144,829 **2012:** \$148,971 **2013:** \$153,103

Recommendation: Fund

Issue

FRMP funds are needed to continue the Neva Lake sockeye stock status and trends project which began in 2002.

Objectives

1. Estimate the total escapement of adult and jack sockeye salmon into Neva Lake using weir and mark-recapture methods so that the estimated coefficient of variation is less than 15 percent.
2. Estimate the age, length, and sex composition of the sockeye escapement into Neva Lake so that the estimated coefficient of variation for the principal age class is less than 10 percent.

Methods

We will count the number of upstream migrating adult salmon, trout, and char as they are passed upstream out of a trap mounted on the face of a picket weir installed across Neva Creek. Project personnel will also use a lake net weir and redundant underwater camera/mini-DVR system to count the sockeye escapement into Neva Lake and to examine these fish for the proportion that were adipose clipped at the picket weir as part of the weir-to-above-weir mark-recapture study (see below).

Partnerships and Capacity Building

The Hoonah Indian Association has successfully filled past crew positions with local hires and I anticipate that HIA will hire locally for this project as well. The USFS will seek to fill the project biologist position with a local ANILCA hire.

Justification

This project will use two weirs to estimate annual escapement of sockeye salmon into Neva Lake. Sockeye salmon will be sampled for scale (age), sex, and length data using standard ADF&G methods. The need for escapement estimates of sockeye at Neva Lake was listed as a priority in the 2006 Southeast Alaska Strategic Plan and was included in the 2010 Request for Proposals as a priority information need. Sockeye systems in the Hoonah area are limited. The project will build on the escapement information previously collected at Neva Lake. Technical merit is high with clear, measurable and achievable objectives. The budget is commensurate with similar projects in the region. The investigators have completed projects funded by the FRMP. Partnership and capacity building is rated as medium since the

US Forest Service is taking the lead role in implementing this project and the Hoonah Indian Association is providing field technicians and some supplies and transportation.