Fisheries Resource Monitoring Plans 2000-2010

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2010 FISHERIES RESOURCE MONITORING PLAN

January 25, 2010

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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.

2010 FISHERIES RESOURCE MONITORING PLAN

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.

	Cost ($000)		
Geographic Region	SST	HM-TEK	Total
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
	Stock Status and Trends				
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
	Harvest Monitoring and Traditional Ecological Knowledge				
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.

Study #	Title	Approved Budget ($000) 2010	2011	2012	2013
	Stock Status and Trends				
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
	Harvest Monitoring and Traditional Ecological Knowledge				
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
	Stock Status and Trends				
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
	Harvest Monitoring and Traditional Ecological Knowledge				
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
	Stock Status and Trends				
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.

Study #	Title	Approved Budget ($000) 2010	2011	2012	2013
	Stock Status and Trends				
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
	Harvest Monitoring and Traditional Ecological Knowledge				
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
	Stock Status and Trends				
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 ±10% (α=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 (NSEDC) are providing matching funds in the form of biologist or technician time for weir fabrication (BLM), installation (BLM and NSEDC), and operations (BLM). NSEDC 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. Secondarily, 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.

Northern Region

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. Kaweak 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

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 Unalakeet 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 Berkbigler, 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) and1.5% (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 Berkbigler (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.

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 ±10% (a=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 iteroperous, 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, paleolimnologcal 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 Afongak 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 be 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 Heinl, 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 subpopulation 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 biologisst 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

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, mangers 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 to provide input on community issues, natural resource issues, and future direction of the project, employ field technicians, provide the camp and manage a budget for personnel, supplies, and services such as transport.

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.

2008

FISHERIES RESOURCE MONITORING PLAN

FEDERAL SUBSISTENCE MANAGEMENT

CONTENTS

INTRODUCTION

BACKGROUND

Since 1999, under the authority of Title VIII of ANILCA, the Federal government has assumed 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 Interior and Agriculture, cooperating with the State of Alaska and other Federal agencies, to research 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 created 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.

> *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.*

Original guidance for the Monitoring Program was provided by the Federal Subsistence Board and outlined in the *Operational Strategy for Information Management*[1]. The Regional Advisory Councils (Councils) have identified important issues and information needs for their regions, with review and update on an annual basis. To ensure that the Monitoring Program addresses the highest priority information needs for Federal subsistence fisheries management, the Office of Subsistence Management began a strategic planning process in 2004 to build on the work done by the Councils. Facilitated workshops for the Southwest, Southcentral, and Southeast regions have been held over the last three years with representatives of Federal and State agencies, academia, Alaska Native and rural organizations, and Councils. Participants at each workshop identified fisheries units for their region; developed goals, objectives, and information needs for each fishery unit; and then prioritized fishery units, goals, objectives and information needs. Final workshop reports for the Southeast, Southcentral and Southwest regions have been completed, and results were used to guide the 2008 Request for Proposals. In addition, issues and information needs for salmon were identified for the Yukon[2] and Kuskokwim[3] regions by interagency strategic planning groups.

To implement the Monitoring Program, a collaborative approach is utilized where five Federal agencies (Fish and Wildlife Service, Bureau of Land Management, National Park Service, Bureau of Indian Affairs, and USDA Forest Service) work with the Alaska Department of Fish and Game, Regional Advisory Councils, Alaska Native organizations, and other organizations. An inter-agency Technical Review Committee provides scientific evaluation of proposals and investigation plans. Public review and recommendations for funding are provided through the Councils. An inter-agency Staff Committee

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[1] Krueger, C., Brelsford, T., Casipit, C., Harper, K., Hildebrand, I., Rost, P., Thompson, K., and Jones, L. 1999. Federal Subsistence Fisheries Management: Operational Strategy for Information Management. Report to the Federal Subsistence Staff Committee by the Sub-Committee for the Development of a Blueprint for Interagency Functions, Roles, and Responsibilities. 122 p.

[2] Yukon River Joint Technical Committee. 2005. U.S. and Canada Yukon River Joint Technical Committee Plan. A.T. Publishing and Printing, Inc., Anchorage, AK.

[3] Kuskokwim Fisheries Resources Coalition. 2006. Gap analysis for the Kuskokwim Area salmon research plan. M. Nemeth, editor. LGL Alaska Research Associates, Inc., Anchorage, Alaska.

reviews all recommendations, and reconciles differences between staff and public recommendations. The Federal Subsistence Board (Board) approves annual monitoring plans with the benefit of both a technical recommendation by the Technical Review Committee and public review by the Regional Advisory Councils.

The purpose of this section is to present the Technical Review Committee's funding recommendations for the 2008 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 Chief of the Office of Subsistence Management Fisheries Division, and is composed of representatives from each of the five Federal agencies and three representatives from the Alaska Department of Fish and Game. An additional anthropologist from the Minerals Management Service provides additional social science expertise on the Technical Review Committee and provides a balance of disciplines. Fisheries and social science 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, and risk that subsistence harvest needs will not be met.

   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. These are evaluated using the following information for each investigator:

Ability

- Education and training
- Related work experience
- Publications, reports, and presentations
- Past or ongoing work on Monitoring Program studies

Resources

- Office and laboratory facilities
- Technical and logistic support
- Personnel and budget administration

4. **Partnership-Capacity Building**

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

POLICY AND FUNDING GUIDELINES

Several policies have been developed to aid in implementing funding.

- Studies must be non-duplicative with existing projects. Most Monitoring Program funding is dedicated to non-Federal sources.
- 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.
- Proposals may be funded for up to four years duration.

Finances and Guideline Model for Funding

The Monitoring Program was first implemented in 2000, with an initial investment of $5 million. In 2008, a total of $6.05 million will be allocated to the Monitoring Program. The Department of Interior, through the U.S. Fish and Wildlife Service, annually provides $4.25 million. The Department of Agriculture, through the U.S. Forest Service, annually provides $1.8 million. On an annual basis, this budget funds both continuations of existing studies (year 2, 3 or 4 of multi-year projects), and new study starts. A total

of 43 projects ($3.8 million) previously approved by the Federal Subsistence Board for 2006 and 2007 will be continued in 2008 (Table 1). Descriptions for these projects can be found in the 2006 and 2007 Monitoring Plans. Beginning in 2008, the Office of Subsistence Management will issue future requests for proposals on a biennial basis. The next call will be issued in November 2008 for the 2010–2013 Monitoring Plan. Budget guidelines are established by geographic region and data type, and for 2008, $2.1 million is available for new starts. Proposals are solicited according to the following two data types.

1. **Stock Status and Trends (SST).**

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

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

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

2008 FISHERIES RESOURCE MONITORING PLAN DEVELOPMENT

A Request for Proposals was issued in November 2006 that identified 25 priority information needs for Federal subsistence fisheries management. The Office of Subsistence Management and the Technical Review Committee utilized regional strategic plans to identify priority information needs for each region. Researchers utilized the priority information needs to develop proposals addressing the most important knowledge gaps for the management and regulation of Federal subsistence fisheries.

Fifty-four proposals ($5.0 million) were received in January 2007. These proposals were reviewed by OSM fishery biologists and anthropologists and then the Technical Review Committee. In March of 2007, the Technical Review Committee recommended 34 proposals ($3.2 million) for investigation plan development. In May of 2007, 30 investigation plans ($2.7 million) were submitted for funding consideration. The Technical Review Committee recommended funding 23 projects totaling $2.1 million. Regional Advisory Councils supported the committee's recommendations for all but two of the investigation plans.

The Federal Subsistence Board reviewed the draft 2008 Fisheries Resource Monitoring Plan in December 2007 and selected 23 projects for inclusion in the plan. Subsequent to the Federal Subsistence Board meeting, the Office of Subsistence Management cancelled the lowest priority project, due to budget reductions. Fifteen of the 22 projects funded in 2008 address priority information needs identified in the Request for Proposals. The plan provides 30% of the funding to Alaska Native organizations, 36% to Federal agencies 29% to State agencies and 5% to others (Figure 1).

Tables summarizing the 2008 Fisheries Resource Monitoring Plan are provided on pages 6–10. Descriptions of the projects included in the plan can be found on pages 11–56.

Table 1. 2008 continuation projects approved in 2006 and 2007.

Northern Alaska

06-108	North Slope Dolly Varden Aerial Monitoring
07-105	North Slope Dolly Varden Genetic Baseline Completion
07-151	Northwest Alaska Subsistence Fish Harvest Patterns and Trends

Yukon

06-205	Yukon River Chum Salmon Mixed-stock Analysis
06-252	Yukon Flats Non-Salmon Traditional Ecological Knowledge
07-202	East Fork Andreafsky River Salmon Weir
07-204	Lower Yukon River Salmon Drift Test Fishery
07-206	Innoko River Inconnu Radio Telemetry
07-207	Gisasa River Salmon Weir
07-208	Tozitna River Salmon Weir
07-253	Yukon River Salmon Harvest Patterns

Kuskokwim

06-303	Kuskokwim River Whitefish Migratory Behavior
06-305	Kuskokwim River Inconnu Spawning Distribution
06-306	Lower Kuskokwim River Salmon Inseason Subsistence Catch Monitoring
06-307	Kuskokwim River Salmon Management Working Group
07-302	Kuskokwim River Chum Salmon Run Reconstruction
07-303	Kuskokwim River Salmon Age-Sex-Length Assessment
07-304	Tatlawiksuk River Salmon Weir
07-305	Kanektok-Goodnews Rivers Salmon and Dolly Varden Weirs
07-306	Kwethluk River Salmon Weir
07-307	Tuluksak River Salmon Weir

Southwest Alaska

07-401	Afognak Lake Sockeye Salmon Smolt Assessment
07-402	Buskin River Sockeye Salmon Weir
07-404	Perryville and Chignik Lake Tributaries Salmon Escapement
07-405	McLees Lake Sockeye Salmon Weir
07-408	Togiak River Rainbow Smelt Assessment
07-452	Kvichak Watershed Subsistence Fishing Ethnography

Southcentral Alaska

07-501	Tanada and Copper Lakes Burbot Abundance
07-502	Tanada Creek Salmon Weir
07-503	Copper River Chinook and Sockeye Salmon Abundance
07-505	Long Lake Salmon Weir
07-507	Tustemena Lake Coho Salmon Abundance
07-509	Kasilof River Steelhead Trout Radio Telemetry

Southeast Alaska

06-601	Neva Lake Sockeye Salmon Assessment
06-651	Southeast Alaska Customary Trade of Seafood Products
07-601	Hatchery Creek Sockeye Salmon Assessment
07-604	Klag Lake Sockeye Salmon Assessment
07-606	Hetta Lake Sockeye Salmon Assessment
07-607	Kanalku Lake Sockeye Salmon Assessment
07-608	Klawock Lake Sockeye Salmon Assessment
07-609	Falls Lake Sockeye Salmon Assessment
07-610	Behm Canal Eulachon Genetics
07-651	Hydaburg Sockeye Salmon Customary and Traditional Systems

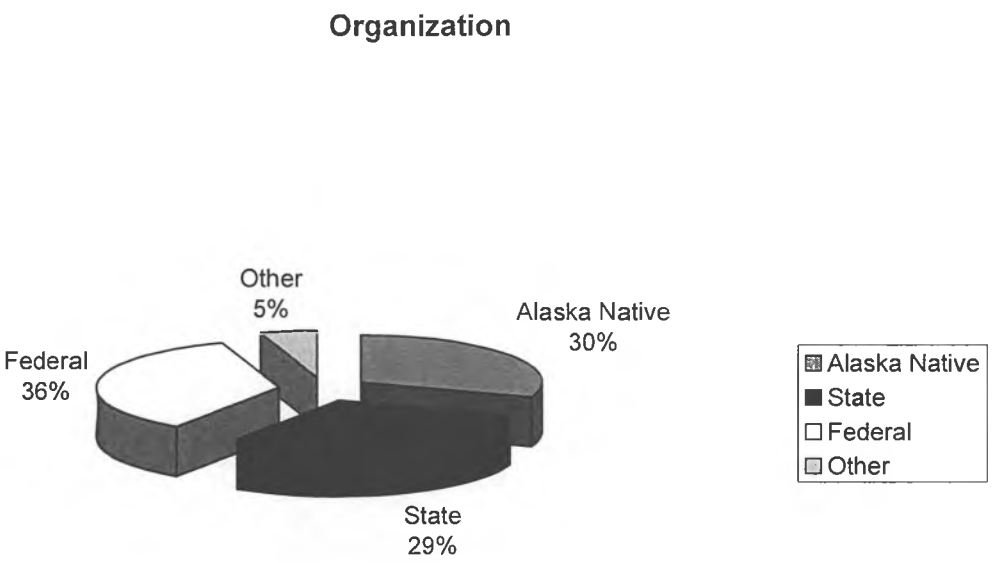


Figure 1. 2008 funding by organization type.

Table 2. Number of projects funded for the 2008 Fisheries Resource Monitoring Plan. Projects include stock status and trends (SST) and harvest monitoring and traditional ecological knowledge (HM-TEK) projects.

Geographic Region	SST	HM-TEK	Total
Northern Alaska	1	0	1
Yukon	4	2	6
Kuskokwim	4	1	5
Southwest Alaska	2	0	2
Southcentral Alaska	4	0	4
Southeast Alaska	2	2	4
Total	17	5	22

Table 3. Cost of projects funded for the 2008 Fisheries Resource Monitoring Plan. Projects include stock status and trends (SST) and harvest monitoring and traditional ecological knowledge (HM-TEK) projects.

	Cost ($000)		
Geographic Region	SST	HM-TEK	Total
Northern Alaska	$87	$0	$87
Yukon	$236	$94	$330
Kuskokwim	$395	$76	$471
Southwest Alaska	$233	$0	$233
Southcentral Alaska	$543	$0	$543
Southeast Alaska	$146	$98	$244
Total	$1,640	$268	$1,908

Table 4. Northern Alaska region project funded in 2008.

Study #	Title	2008	2009	2010	2011
	Stock Status and Trends				
08-103	Kobuk River Sheefish Spawning and Run Timing	$87.3	$78.5	$17.0	$17.0
	Total	$87.3	$78.5	$17.0	$17.0

Table 5. Yukon region projects funded in 2008.

		Approved Budget ($000)			
Study #	Title	2008	2009	2010	2011
	Stock Status and Trends				
08-200	Kaltag Chinook Salmon Sampling	$3.7	$4.0	$4.0	$4.0
08-201	Henshaw Creek Salmon Weir	$43.9	$43.2	$46.2	$52.3
08-202	Anvik River Chum Salmon Sonar Enumeration	$68.7	$71.1	$73.6	$75.9
08-206	Yukon and Kuskokwim Coregonid Strategic Plan	$119.7	$175.7	$0.0	$0.0
	Harvest Monitoring and Traditional Ecological Knowledge				
08-250	Use of Subsistence Fish to Feed Sled Dogs	$42.9	$31.9	$0.0	$0.0
08-253	Yukon River Teleconferences and In-season Monitoring	$51.1	$51.1	$51.1	$51.1
	Total	$330.0	$377.0	$174.9	$183.3

Table 6. Kuskokwim region projects funded in 2008.

Study #	Title	Approved Budget ($000) 2008	2009	2010	2011
	Stock Status and Trends				
08-300	Aniak River Rainbow Trout Seasonal Distribution	$54.6	$38.8	$0.0	$0.0
08-302	Lower Kuskokwim Subsistence Chinook Salmon ASL	$94.0	$117.6	$119.1	$127.5
08-303	George River Salmon Weir	$162.8	$171.5	$150.0	$142.2
08-304	Takotna River Salmon Weir	$83.7	$80.2	$93.4	$118.8
	Harvest Monitoring and Traditional Ecological Knowledge				
08-351	Tuluksak Subsistence Chinook Salmon ASL	$75.5	$79.9	$15.5	$0.0
	Total	$470.6	$488.0	$378.0	$388.5

Table 7. Southwest Alaska region projects funded in 2008.

Study #	Title	Approved Budget ($000) 2008	2009	2010	2011
	Stock Status and Trends				
08-402	Togiak River Chinook Salmon Radio Telemetry	$176.4	$120.7	$0.0	$0.0
08-405	Lake Clark Sockeye Salmon Counting Towers	$56.1	$57.0	$58.3	$59.6
	Total	$232.5	$177.7	$58.3	$59.6

Table 8. Southcentral Alaska region projects funded in 2008.

Study #	Title	Approved Budget ($000) 2008	2009	2010	2011
	Stock Status and Trends				
08-501	Copper River Sockeye Salmon Inriver Abundance	$185.8	$205.4	$0.0	$0.0
08-502	Tustumena Lake Coho Salmon Radio Telemetry & Weirs	$238.3	$118.4	$44.2	$0.0
08-503	Kasilof River Steelhead Trout Radio Telemetry	$78.9	$62.9	$22.4	$0.0
08-504	Crooked & Nikolai Creeks Steelhead Trout Weirs & Video	$40.0	$45.6	$12.6	$0.0
	Total	$543.0	$432.3	$79.2	$0.0

Table 9. Southeast Alaska region projects funded in 2008.

Study #	Title	Approved Budget ($000) 2008	2009	2010	2011
	Stock Status and Trends				
08-600	Karta River Sockeye Salmon Assessment	$111.6	$123.6	$0.0	$0.0
08-607	Unuk River Eulachon Assessment	$34.0	$36.4	$0.0	$0.0
	Harvest Monitoring and Traditional Ecological Knowledge				
08-650	POW Island Steelhead Trout Subsistence Harvest Survey	$70.4	$74.0	$0.0	$0.0
08-651	Maknahti Island Subsistence Herring Fishery Assessment	$27.2	$42.0	$0.0	$0.0
	Total	$243.2	$276.0	$0.0	$0.0

Project Number:	08-103
Project Title:	Kobuk River Sheefish Spawning and Run Timing
Geographic Region:	Northern Alaska
Data Type:	Stock Status and Trends
Principal Investigator:	Klaus Wuttig, ADF&G Sport Fish Division
Co-Investigator(s):	Randy Brown, USFWS, Fairbanks Fish and Wildlife Field Office

Cost: **2008:** $87,299 **2009:** $78,534 **2010:** $17,011 **2011:** $17,011

Issue

The Kobuk River sheefish *Stenodus leucichthys* population supports a very substantial winter subsistence harvest that occurs in Hotham Inlet and Selawik Lake, and significant in-river subsistence and sport fisheries. Most sheefish are harvested in Hotham Inlet and Selawik Lake where the population is comprised of two discrete spawning populations, the Selawik and Kobuk River populations. The exploitation of these stocks is poorly understood due to incomplete estimates of total annual harvest, unknown stock composition in the mixed-stock winter fisheries, and unknown total exploitable stock abundance. An understanding of these basic elements is necessary to begin to describe the population dynamics of these stocks and identify sustainable harvest levels. Population monitoring is only feasible in river on the individual spawning populations, and estimates have been attained in the Kobuk River during 1995-1997, and in the Selawik River during 1995–1996 and 2004–2005. However, these spawning population estimates are problematic because an unknown but potentially significant proportion of mature fish from each population do not spawn annually and are therefore not enumerated. Prior to additional stock assessments, a better understanding of spawning locations, run timing, and particularly spawning frequency is needed. Estimates of spawning frequency are critical in determining whole population sizes based on in-river spawning population estimates (past and future) and precise descriptions of run timing and spawning locations would provide the basis for improving the design of mark-recapture techniques and provide valuable information for assessing the feasibility of using sonar technology for future enumeration work.

Objectives

1. Document spawning locations within the Kobuk River upstream of the village of Kobuk.
2. Describe the timing of spawning migrations (upstream and downstream) for mature sheefish within the Kobuk River drainage.
3. Estimate the proportion of the sheefish spawning population in 2008 and 2009 that returned annually to spawning areas upstream of the village of Kobuk from 2009 to 2013 such that each annual proportion is within 10% percentage points 90% of the time.
4. Identify and characterize different spawning frequency strategies used by adult sheefish in the Kobuk River, estimate the proportion of adults for each strategy, and estimate the potential variation in the proportion of adult sheefish spawning in any one year.

Methods

During 2008 and 2009, 130 sheefish will be surgically implanted with radio tags each year. Deploying tags over two years will guard against potential temporal variation. Because the spawning population returns to a single, discrete spawning area (i.e. hydrologic unit), behavioral-related differences such

as spawning frequency and selection of spawning areas is not expected to be a function of run timing. Nevertheless, efforts will be made to distribute radio tags in proportion to run strength to help ensure a more random sample. Sex-related differences in spawning behavior are more likely and therefore attempts will be made to distribute radio tags equally among males and females as the run progresses. Radio tags will be operational annually from mid June to mid November over a five-year period. Data related to movements, run-timing and spawning locations will be collected using a combination of aerial tracking surveys, ground-based receiving stations and boat surveys. At a minimum, each cohort of 130 radio-tagged sheefish will be monitored over a four-year period.

Partnerships/Capacity Building

This project is a cooperative effort between ADF&G, USFWS and the National Park Service (NPS), each providing significant in-kind support. Maniilaq and the villages of Shungnak and Kobuk support this project. At least one local hire will be formally employed by ADF&G to assist with sampling of fish and maintenance of tracking stations, and efforts will be made to utilize and compensate locals for logistical support (e.g. boat rentals, boat drivers, and land leases). Developing a trusting relationship among regional communities is vital for project success and future application of study results in sheefish management. To help establish trust, a long-term (2008–2013) educational program on sheefish will be designed to develop strong community interest/support, educate the students and adults about sheefish and the project, and develop fisheries skills in the community. The program will be administered by the ADF&G Rural Outreach Education Program in Kobuk and Shungnak where students will: 1) learn about sheefish and the project; 2) participate in hands-on activities such as practicing surgeries and maintaining their own tracking station in town; 3) monitor the progression of the spawning migration annually "real-time" using all data collected (i.e. aerial surveys and tracking station data); and 4) develop their own synthesis of what they have learned into a presentation to be shared with their community - locally and regionally.

Justification

The proposed work is technically sound and addresses an important subsistence sheefish fishery associated with Gates of the Arctic National Preserve, Selawik National Wildlife Refuge, Kobuk Valley Wilderness Area and Kobuk Valley National Park. Exploitation of sheefish is poorly understood, yielding incomplete information on stock abundance, stock composition, and annual harvest. Results from this work will describe run timing and spawning frequency, giving fishery managers the context for understanding previously completed stock abundance work. Furthermore, information gained in this project will provide a basis for developing future stock assessment projects. This project provides fundamental information needed to manage and sustain subsistence fisheries that target these stocks.

Project Number: 08-200
Project Title: Kaltag Chinook Salmon Sampling
Geographic Region: Yukon
Data Type: Stock Status and Trends
Principal Investigator: Richard Burnham, City of Kaltag

Cost: **2008:** $3,750 **2009:** $4,000 **2010:** $4,000 **2011:** $4,000

Issue

Knowledge of Chinook salmon mixed stock harvests are a prerequisite to understanding and evaluating changes to stock-specific production. This project helps fulfill the US-Canada Treaty Agreement by estimating the age, sex, length (ASL), and stock composition for the fishery in Subdistrict 4-A. Federal and State managers rate this project as a high strategic priority. The Office of Subsistence Management supported this project in 2001 (01-050), 2004–2006 (04-234) and 2007.

Objectives

1. Collect biological data from 250 Chinook salmon harvested by Kaltag subsistence fishers. These data include scales, sex, length, and an axillary process clip.
2. Record associated data such as date, harvest location, gear type, and mesh size.

Methods

1. ***Study design:*** Chinook salmon will be sampled in the round from the Kaltag subsistence harvest as soon after capture as practical. Sampling will occur throughout the duration of the run in proportion to abundance as much as possible. During sampling, all available fish will be sampled for an axillary process clip, scales, sex, and length. Capture method, mesh size, location, date, fish number, scale card number, and genetic vial number will be recorded.
2. ***Data collection and reduction:*** ADF&G will send sampling supplies to Kaltag before the field season begins in late May. Sampling technicians will be hired before the field season. Sample collection will begin as soon as subsistence fishers start harvesting salmon, usually early to mid-June.

   Three scales are collected from the left side of the fish, two rows above the lateral line on the diagonal from the posterior insertion of the dorsal fin to the anterior insertion of the anal fin, and then mounted on pre-printed gum cards. Length will be measured from mid-eye to fork of tail to the nearest five mm. Sex will be visually determined from external morphological characteristics or from internal examination of the gonads. Approximately ¾-inch of the auxiliary process is clipped, placed in individually numbered vials, and the vial filled with ethanol. Associated data are recorded in field logbooks and later transferred to Opscan forms. After the majority of the Chinook salmon subsistence harvest has occurred, samples and associated data will be will be sent to the ADF&G Anchorage office for processing and database entry.

3. ***Data reduction:*** From August through December, samples will be processed, analyzed and summarized by ADF&G. ASL data will be compiled by the Stock Biology Laboratory and the axillary process clips will be compiled by the Genetics Laboratory to estimate stock composition for Canadian- and US-origin fish. Upon completion of sample processing and analysis, ADF&G will

forward preliminary results to the principal investigator for inclusion in performance, annual, and final reports. ADF&G final reports, which include data collected by the principal investigator, will be forwarded to the PI when available.

Partnerships/Capacity Building

The project directly involves Kaltag residents collecting in-season fisheries data from the subsistence Chinook salmon harvest and is in partnership with the Alaska Department of Fish and Game.

Justification

The project addresses an information need identified in the 2008 Request for Proposals. The project supplements the commercial ASL database by providing 250 samples from subsistence caught Chinook salmon in Subdistrict 4A. The scope of work is reasonable and the objectives are clear, measurable, and achievable. The project provides for direct involvement of a local community (two local hire technicians) in the collection of in-season fisheries data on the subsistence harvest. The project is reasonably priced and the information collected benefits the post-season evaluation of Chinook salmon. Federal and State managers have supported, and the Office of Subsistence Management has provided funds for, this continuation project since 2001.

Project Number: 08-201
Project Title: Henshaw Creek Salmon Weir
Geographic Region: Yukon
Data Type: Stock Status and Trends
Principal Investigator: Brandy Berkbigler, Tanana Chiefs Conference

Cost: **2008:** $43,872 **2009:** $43,215 **2010:** $46,230 **2011:** $52,280

Issue

Management of Koyukuk River salmon fishery is complex due to the limited number of escapement studies in the drainage. The Alaska Department of Fish and Game, Commercial Fisheries Division has conducted aerial surveys within this drainage since 1960 but the usefulness and reliability of that information s limited. Due to the mixed stock nature of the Yukon River salmon fishery, management practices are complex and the data needed for management must be collected throughout the drainage. The United States Fish and Wildlife Service (USFWS), Fairbanks Fish and Wildlife Field Office have compiled salmon escapement data from Henshaw Creek since 2000. The information collected (genetic fin clips, age, sex, and length) has allowed Federal and State managers to bridge the information gap between projects on the Koyukuk River. The Henshaw Creek weir is the only upper Koyukuk River drainage escapement project and can be used to compare with lower Koyukuk river escapement projects. Chinook *Oncorhyncus tshawytscha* and chum *O. keta* salmon from Henshaw Creek contribute to the subsistence and commercial fisheries harvest occurring in the Yukon River drainage. Subsistence and commercial harvesters along the Yukon and Koyukuk Rivers have identified a concern with the apparent decrease in the size of Chinook salmon. The usefulness in maintaining reliable escapement estimates and continued collection of age, sex and length data at Henshaw Creek will help to assess possible trends in Chinook and summer chum salmon run timing and escapement over time. This project addresses the priority information needs outlined for Yukon River salmon, including maintaining reliable estimates of Chinook and chum salmon escapement over time, and assessment of trends in Chinook age, sex and length. Additionally, with Tanana Chiefs Conference (TCC) as the primary investigator and through the hire of local residents, this project will satisfy the capacity building component addressed in the RFP for Native entities to effectively manage the resources.

Objectives

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

Methods

A resistance board weir will be installed and operated on Henshaw Creek each year from 2008–2011. A live trap, installed near mid-channel, will allow salmon and resident species to migrate through the weir, where their passage will be enumerated daily and from where fish will be sampled to collect biological information. The weir will be operational from approximately the third week of June until the middle of August. A fish trap will be used to collect and sample salmon for age, length, and sex as they migrate

upstream as well as document the presence of resident fish. Escapement counts will be forwarded to the USFWS office daily. A camp will be established in association with the weir for the crew. The crew will consist of four people on site for the project duration. There will be high emphasis on local hires, most notably from those villages within the vicinity of the study site (Allakaket, Alatna, Bettles, Hughes, and Huslia). Henshaw Creek will also serve as a platform for a one week science camp with KNWR.

Partnerships/Capacity Building

This project has consulted with the Evansville Tribal Council in Bettles / Evansville to rent vehicles that will provide assistance in pre and post season logistics. There has also been consultation with KNWR to provide, in kind support with over wintering storage facilities for gear and annually being a participant in a science camp hosted at Henshaw Creek weir through a Challenge Cost Share Grant with KNWR. TCC will work with refuge staff, the Western Regional Advisory Council, Allakaket, Alatna, Hughes, and Evansville traditional councils to recruit locals. Local community support will be elicited through members at the annual TCC meeting of delegates. This project has been successful in hiring the required weir staff from the local village of Allakaket and plans to keep hiring locally within the communities of the Koyukuk River Drainage.

Justification

The Henshaw Creek weir is the only upper Koyukuk River drainage escapement project and is valuable in providing data to effectively manage the subsistence Yukon salmon fisheries. It provides an educational opportunity to rural students to learn about fisheries science and careers in natural resource management. The project has reached the highest level of capacity building and is a model for future projects in this arena.

Project Number:	08-202
Project Title:	Anvik River Chum Salmon Sonar Enumeration
Geographic Region:	Yukon
Data Type:	Stock Status and Trends
Principal Investigator:	Carl Pfisterer, ADF&G
Co-Investigator:	Malcolm McEwen, ADF&G

Cost: **2008:** $68,668 **2009:** $71,051 **2010:** $73,554 **2011:** $76,181

Issue

The Anvik River contributes to the subsistence chum salmon fishery in the lower Yukon River, which is part of the Yukon Delta National Wildlife Refuge. The Anvik River sonar project has provided reliable estimates of chum salmon escapement to the Anvik River since 1979, is one of only two projects in the Yukon River drainage with an established Biological Escapement Goal (BEG) for summer chum salmon, and was identified in the 2008 FRMP as an important priority need in the Yukon Region for maintaining reliable estimates of chum salmon escapement over time. The sonar project's longevity and the river's history of being one of the largest producers of summer chum salmon in the Yukon River drainage combine to make this one of the most important projects for escapement monitoring and management of chum salmon in the Yukon Region.

Objectives

1. Estimate the daily summer chum salmon escapement passing the Anvik River sonar site.
2. Estimate the age and sex composition of the summer chum salmon spawning escapement.

Methods

Objective 1: The Anvik River sonar project will transition to operating a Dual Frequency Identification Sonar (DIDSON) in 2007. The DIDSON produces video like images of fish passing the site. Sonar will be deployed on each bank of the Anvik River and sonar data will be collected for 30 minutes of each hour, 24-hours per day, 7 days a week for the duration of the study. This will provide a total of 12 hours of data per day per bank. Counts will be expanded for the fraction of the day sampled to estimate daily passage.

Objective 2: For age and sex composition, a sample of 162 summer chum salmon will be collected in each of the following time strata: June 17–30, July 1–7, July 8–14, and July 15–30. Scale sample cards and mark-sense forms will be sent to Anchorage for processing at the conclusion of the season. A field notebook will be maintained recording sex, length, date, and gear type for each fish sampled.

Partnerships/Capacity Building

This project provides limited opportunities to develop partnerships and build local capacity. Information from this project is provided to both State and Federal fishery managers and is used in making daily summer chum salmon management decisions. In addition, the data are presented at Yukon River Fisheries Association teleconferences when discussing management actions with subsistence and commercial fishermen.

Justification

This project addresses an information need specifically identified in the 2008 Request for Proposals. The Anvik River is one of the top producers of summer chum salmon in the Yukon River accounting for approximately one third of total production. Approximately 74% of the total subsistence harvest for summer chum salmon occurs in the lower Yukon River. The Anvik River Sonar is an important monitoring project for summer chum salmon to assess run strength and meet biological escapement goals. Because of its 28-year funding history by the State, and the importance of the information to both State and Federal managed fisheries, OSM requires a 50% match by the State in the investigation plan, which is covered by 10.8 months of salary per year of three permanent ADF&G Fishery Biologists ($84,000+).

Project Number:	08-206
Project Title:	Yukon and Kuskokwim Coregonid Strategic Plan
Geographic Region:	Yukon
Data Type:	Stock Status and Trends
Principal Investigator:	Randy Brown, USFWS, Fairbanks Fish and Wildlife Field Office
Co-Investigator:	Caroline Brown, ADF&G Subsistence Division

Cost: **2008:** $119,737 **2009:** $175,727 **2010:** $0 **2011:** $0

Issue

Six whitefish species are commonly recognized in the Yukon and Kuskokwim rivers; sheefish *Stenodus leucichthys*, broad whitefish *Coregonus nasus*, humpback whitefish *C. pidschian*, Bering cisco *C. laurettae*, least cisco *C. sardinella*, and round whitefish *Prosopium cylindraceum.* Major subsistence fisheries take place for sheefish, broad whitefish, humpback whitefish, and Bering cisco at various locations and seasons. Least cisco and round whitefish are also harvested in subsistence fisheries but are generally not as specifically targeted as the others. At this time, no formal monitoring or management programs have been developed in the region for subsistence whitefish fisheries. In fact, our current understanding of whitefish life history and population biology in most areas of the Yukon and Kuskokwim regions is not sufficient to allow monitoring or management programs to be developed.

Geographic distributions of the whitefish species are reasonably well documented in a wide array of formal and informal fish survey reports, and in the general fish guidebooks for the region (McPhail and Lindsey 1970; Morrow 1980; Mecklenberg et al. 2002); however, species and stock-specific data on migrations, spawning habitats, rearing habitats, abundance, harvest levels, and other related information are insufficiently described. A strategic action plan for whitefish species will provide direction for research on these fish important for subsistence by outlining our current understanding of whitefish and whitefish fisheries within the two drainages, identifying information required for monitoring and management, highlighting gaps in biological and life history data, discussing major fisheries issues within the two drainages, and suggesting appropriate methods and approaches for research. Ultimately, an improved understanding of these species will enable the development of effective monitoring and management plans.

Objectives

Develop a strategic plan for research of whitefish species for the Yukon and Kuskokwim river drainages. This plan will include six major components:

1. a review of whitefish fisheries within the two drainages;
2. a review of the biological, life history, and ethnographic studies that have occurred in the region;
3. an assessment of data gaps;
4. a review of methods and approaches that have been used around the world to monitor and manage whitefish species with an assessment of their appropriateness for use in Alaska;
5. a discussion with stakeholders and other interested parties of issues, fisheries, and species of regional concern; and

6. writing and critical review of a strategic plan for whitefish research in the Yukon and Kuskokwim regions.

The plan will aim to provide a region-wide perspective to guide future whitefish research.

Methods

The proposed approach includes several major components, as outlined above. Initially the principal investigators will conduct background research and synthesis of biological and ethnographic studies, documentation of traditional knowledge, harvest data, and management reports. These syntheses will be distributed to a group of delegates with experience in fish biology, anthropology, and fish management, as well as representatives from fishery user groups in the Yukon and Kuskokwim regions. A series of meetings will be convened with these delegates to discuss and debate the information presented in the syntheses, and prioritize critical research needs and approaches. The principal investigators will consider the information from all sources and prepare a strategic plan for research of coregonid species for the Yukon and Kuskokwim river drainages.

Partnerships/Capacity Building

A number of potential participants from several organizations have been contacted to assess the interest level in the proposal project, and responses have been favorable. The contact list includes individuals from the Alaska Department of Fish and Game, the U.S. Fish and Wildlife Service, Alaska Department of Natural Resources, the Association of Village Council Presidents, Tanana Chiefs Conference, the Council of Athabascan Tribal Governments, the Kuskokwim Native Association, and the Yukon River Drainage Fisheries Association. In addition, a representative from the Yukon-Kuskokwim Delta, Western Interior, and Eastern Interior Regional Advisory Councils will be invited to participate in the meetings. Letters of support have been requested from a number of organizations.

Justification

This proposal addresses a priority information need identified in the 2008 Request for Proposals. Subsistence whitefish fisheries are second only to salmon in importance as a food resource for the Yukon and Kuskokwim rivers. With little information available about basic stock structure and life history information, subsistence management for whitefish stocks remains largely passive. The proposed study would identify biological and social science gaps in existing information, and explore appropriate methods for assessment, research, and management. Additionally, the group would develop criteria that could be used to assign relative priority levels among fisheries, species, user-groups, research objectives, and management options. The end product will be a peer reviewed strategic plan for research of whitefish species for the Yukon and Kuskokwim river drainages that can be used to direct future coregonid research and funding.

Project Number: 08-250
Project Title: Use of Subsistence Fish to Feed Sled Dogs
Geographic Region: Yukon
Data Type: Harvest Monitoring and Traditional Ecological Knowledge
Principal Investigator: David Andersen, Research North
Co-Investigator: Cheryl Scott, Alaskan Connections

Cost: **2008:** $42,921 **2009:** $31,920 **2010:** $0 **2011:** $0

Issue

It has been 16 years since the use and feeding of sled dogs has been systematically examined in the Yukon River drainage. A 1991 ADF&G study found that approximately 5,000 sled dogs in 32 Yukon River communities were being maintained to varying degrees using subsistence-caught fish and that more than 250,000 small salmon were being utilized each year to feed dogs. In the intervening decade and a half, salmon runs and salmon harvests have declined, sometimes dramatically. In 2000, the total subsistence harvest of Yukon River small salmon was estimated at less than 100,000 fish with an estimated 21,000 salmon utilized for dog food. It seems improbable that dog team owners heavily reliant on salmon to feed their dogs could cope with such significant reductions in salmon harvests without reducing kennel size or altering long-standing feeding practices, or both. The effects of these changes on the size, number, and use of dog teams in rural communities are unknown. The baseline data set collected in 1991 provides a rare opportunity to examine the dynamics of one of the more significant uses of subsistence-caught fish in interior Alaska during a time of unprecedented change. This study proposes to update the 1991 data set using the same methods and communities, to understand what changes have occurred with regard to village dog teams and the strategies mushers have utilized to feed them. Current information on this important issue will help Federal managers to be proactive and to better understand factors affecting subsistence fisheries along the Yukon River.

Objectives

1. Estimate the number of sled dogs in rural Yukon River Communities.
2. Describe contemporary uses of dog teams in Yukon River Communities.
3. Assess the extent to which subsistence-caught fish (salmon and non-salmon) are used to feed dogs.
4. Compare these data with data gathered in 1991 to assess changes and evaluate implications for subsistence management.

Methods

A two-year project is proposed, sampling the same seven study communities and using the same basic methodology as the 1991 study in order to achieve a comparable data set and assess specific changes. The project will utilize standard ethnographic research methods including face-to-face household surveys conducted with all dog-team owners in each survey community and key respondent interviews with a small subset of dog-team owners. Research practices will adhere to recognized social science ethics standards and principles for the conduct of research in the Arctic. The seven study communities proposed for sampling are: Fort Yukon, Huslia, Kaltag, Manley Hot Springs, Russian Mission, St. Marys, and

Tanana. Together, these communities are thought to represent the diversity of the Yukon River drainage in terms of geography, Native cultures, fishery resources, and participation in dog mushing activities.

Partnerships/Capacity Building

Community partnerships will be encouraged and enhanced through the hiring of local assistants in each community. Local assistants will be instrumental in identifying survey households and will accompany and assist the researcher during survey and interview sessions. Although the duties of each local assistant are expected to involve only 10–15 hours of work over a several day survey period, participation as the local assistant will provide that individual with important insight into social science data collection methods and will build capacity by contributing to the work experience, or expanding the pool, of individuals in rural communities familiarized with this kind of work.

Justification

This project is recommended for funding. The investigation plan addresses an important issue for Federal subsistence fisheries management, and will provide a diachronic perspective much needed to understand changing subsistence practices and inform subsistence management in an area with numerous conservation units. The project is technically sound, with solid objectives and proven methodology. The time frame and budget are reasonable. Investigators are uniquely well qualified to conduct the proposed work, as they did the original study 16 years ago.

Project Number:	08-253
Project Title:	Yukon River Teleconferences and In-season Monitoring
Geographic Region:	Yukon
Data Type:	Harvest Monitoring and Traditional Ecological Knowledge
Principal Investigator:	Jill Klein, Yukon River Drainage Fisheries Association
Co-Investigator:	Jonathon Gerken, USFWS Fairbanks Fish and Wildlife Field Office

Cost: **2008:** $51,000 **2009:** $51,000 **2010:** $51,000 **2011:** $51,000

Issue

The proposed project deals with an important subsistence resource (salmon) in an area with multiple Federal conservation units. Improving management of this resource and finding ways to incorporate users and local knowledge into resource management is a priority for the Yukon-Kuskokwim Delta, Western Interior, and Eastern Interior Regional Advisory Councils , management agencies and tribal organizations. In-season teleconferences and in-season harvest interviewers are a practical method for improving communication and bringing these entities together.

Objectives

1. Maintain and expand communication and information sharing between the Yukon salmon fishery users and agency staff through weekly in-season teleconferences.
2. Promote local involvement in Yukon River fisheries management through capacity building and participation.
3. Promote inter-agency information sharing for Yukon River salmon fisheries with State, Federal and international entities (i.e., ADF&G, U.S. Fish & Wildlife Service, Yukon River Salmon Committee, Canada and Department of Fisheries and Ocean, Canada).
4. Foster increased participation, timely sharing and uniform reporting of in-season information from fishers to managers and vice versa.
5. Document local salmon run timing and perceived abundance of salmon in the Yukon River drainage through summer and fall fishing seasons.
6. Estimate the weekly average subsistence harvest progress for Chinook salmon in 10 communities within the drainage.

Methods

Teleconference calls will be facilitated once a week during the 2008–2011 fishing seasons by the YRDFA Executive Director and/or staff on every Tuesday of the season at 1300 hours (Alaska Time). Following each call YRDFA will distribute a short summary, detailing announcements of the management decisions, management rationale and key points of subsistence users and public.

The inclusion of in-season harvest interviewers as consistent participants in the teleconference calls will provide a greater consistency in reporting subsistence harvest information. Ten interviewers will be selected and hired by YRDFA from the communities of Emmonak, Marshall, Holy Cross, Kaltag, Huslia, Allakaket, Galena, Beaver, Circle, and Eagle. Interview methodology and information collection

will follow the methods outlined by Gerken and Holder (2005). Preseason training will occur to ensure interviewers are collecting information appropriate to the methodology.

Partnerships/Capacity Building

Teleconferences are a practical method for bringing together a diverse group of local users that utilize and manage the salmon resource. However, participation in each teleconference call varies dependent upon salmon run timing and management actions. A summary of attendance on the 2006 teleconferences indicated that community attendance declined throughout the season after the historical quarter point of the run, June 15, in the lower river, traditionally the beginning of commercial fishing in the lower river. Similarly, an increase in community attendance was observed prior to the first fall season commercial period occurring on July 28. The use of teleconferences to promote information sharing is a valuable tool if communities participate, but without attendance the utility is diminished.

Justification

The Technical Review Committee recommends funding Option B of this project pending modifications as outlined above. Specifically, investigators need to correctly characterize how the information will be used, and also revise objectives to include no more than three. The project addresses an important subsistence resource (salmon) in an area with multiple Federal conservation units. Improving management of this resource and finding ways to incorporate users and local knowledge into the management of this resource has been a priority of the three area Regional Advisory Councils (Western Interior, Eastern Interior and Yukon-Kuskokwim Delta). The project is a collaborative effort, and investigators have the capability to successfully conduct the project. The methods are basic, but overall the project is technically sound and the budget is reasonable.

Project Number:	08-300
Project Title:	Aniak River Rainbow Trout Seasonal Distribution
Geographic Region:	Kuskokwim
Data Type:	Stock Status and Trends
Principal Investigator:	Klaus Wuttig, ADF&G Sport Fish Division
Co-Investigator:	Corey Schwanke, ADF&G Sport Fish Division
	Dave Orabutt, Kuskokwim Native Association
	Derek Radar, Kuskokwim Native Association

Cost: **2008:** $52,284 **2009:** $37,182 **2010:** $0 **2011:** $0

Issue

The rainbow trout *Oncoryhnchus mykiss* population in the Aniak River contributes significantly to the local subsistence harvest of freshwater fish and also supports an increasingly popular rainbow trout sport fishery. Customary and traditional use determinations of rainbow trout are in Federal regulation for the nearby communities of Aniak, Chuathbaluk, and Upper and Lower Kalskag. Currently, there is a strong local concern about an apparent large decline in the population of rainbow trout in the Aniak River since the mid 1980s. Historic and baseline information on their life history, abundance, and stock composition does not exist and is needed to formulate and implement regulations to properly manage the rainbow trout for the purpose of satisfying a diversity of user groups while ensuring long-term sustainability. Therefore, the goal of this study is to collect information on the seasonal movements of rainbow trout in the Aniak River to determine if discrete stocks exist within the drainage. In the absence of abundance-based information, quantifying rainbow trout movements will help to identify the distribution(s) of those fish affected by the subsistence and sport fisheries. The telemetric data, survey or catch information attained during radio-tagging operations, and interviews are needed in designing a mark-recapture experiment to estimate population size to address relevant issues such as population closure, timing of sampling, and selection of index areas.

Objectives

1. Describe the seasonal (summer 2008 to winter 2009/2010) distributions of mature sized rainbow trout ≥420 mm FL in the Aniak River implanted with radio transmitters during the summer feeding period when rainbow trout distributions are most widespread.
2. For each of the four hydrologic units (Salmon River, Kipchuk River, the East Fork Aniak River to the Kipchuk River, and mainstem Aniak River from the Kipchuk River to the Buckstock River) estimate the proportion of radio-tagged rainbow trout that remained in the hydrologic unit where they were tagged. These estimates will be made for each aerial tracking survey and each estimated proportion will be within 25 percentage points of the true value 95% of the time.

Methods

During the summer of 2008, 125 rainbow trout will be radio-tagged during the peak spawning period of Chinook and chum salmon (late July–early August). Radio tags will be systematically deployed throughout what is believed to most (e.g., >90%) of their summer distribution. These fish will be monitored over an approximately 18-month period and will be used to describe seasonal movement patterns, locate significant spawning and overwintering areas, and identify potentially unique stocks within the drainage that may be differentially affected by the subsistence and sport fisheries.

Partnerships/Capacity Building

KNA and ADF&G, Sport Fish Division, have developed a meaningful relationship through the Chinook salmon telemetry projects on the Kuskokwim and Holitna Rivers (FIS 02-046 and 05-302). This developing relationship is vital to develop local support for this project, particularly in the interpretation of the data collected for formulating future regulations or management plans. KNA is very supportive of this project, are co-investigators on this project, and will have direct, meaningful participation in field work, project planning, report reviewing, and community outreach. KNA has agreed to provide an intern and technician for the field work, and in communities most affected, to coordinate local outreach efforts including traditional council or community meetings, regional meetings, school visits, and news letters/ articles. Consultations with the Yukon Delta National Wildlife refuge are ongoing and the refuge has agreed to provide in-kind support (e.g., use of aircraft for aerial surveys).

Justification

This is a well designed study that potentially could address a long term resource issue. The investigators are qualified and experienced in conducting this type of project. The technical merit, investigator ability and partnership and capacity building component of this investigation were all rated high. The investigators addressed study design concerns raised by the TRC in the 2006 IP review. Local concern over stock declines observed by subsistence fishermen raises the potential for regulatory action for the Federal Subsistence Board. Information on basic stock biology of Aniak River rainbow trout will be necessary to evaluate the sustainability of current subsistence harvest levels and the potential harvests from the catch and release sport fishery. Matching funds of over $95,000 by ADF&G make this project very compelling.

Project Number:	08-302
Project Title:	Lower Kuskokwim Subsistence Chinook Salmon ASL
Geographic Region:	Kuskokwim
Data Type:	Stock Status and Trends
Principal Investigator:	Doug Molyneaux, ADF&G Commercial Fisheries Division
Co-Investigator:	Greg Roczicka, Orutsaramiut Native Council

Cost: **2008:** $90,923 **2009:** $112,305 **2010:** $113,772 **2011:** $121,920

Issue

About 80% of the Kuskokwim River Chinook subsistence harvest is taken from the lower river, which is within the boundaries of the Yukon Delta National Wildlife Refuge. The 2008 Request for Proposals seeks projects that quantify and assess subsistence salmon harvest in the region, and there is special need to also quantify the annual age, sex, and length (ASL) composition of the subsistence harvest. In addition, managers must consider the ASL composition of the spawning escapement and commercial harvest when formulating fishery management strategies. Chinook salmon mature and return to spawn over a wide range of ages, and the array of age classes span a size range much broader than any other salmon species. Kuskokwim River subsistence fishers harvest a large fraction of the total annual Chinook salmon run, and these fishers commonly employ practices that selectively take the larger and older fish. One of the consequences of this selective harvest practice is that it leaves a higher proportion of smaller Chinook salmon to spawn each year. Managers are concerned about hereditary implications of this practice that could lower the average age and size of maturity of future generations of Chinook salmon returns. In addition, there is concern that selective harvest practices removes a disproportionate fraction of female Chinook and that this removal could result in critically low egg deposition, especially in years of low escapement. Not withstanding these concerns, subsistence fishers clearly prefer to harvest large Chinook.

Also at issue is how the subsistence fishery is impacted by the commercial fishery. The Alaska Board of Fisheries (BOF) reestablished a directed commercial fishery for Chinook in the lower Kuskokwim River during their January 2007 meeting, and gave managers the option to allow use of gillnets with up to 8-inch stretched mesh sizes (large mesh), a practice that has not been allowed since 1984. The default option is to restrict commercial fishers to using 6-inch or smaller mesh size (small mesh). The selectivity of small mesh web in the commercial fishery actually has a strong mitigating effect to the large mesh web preferred by subsistence fishers.

The potential of a commercial fishery with large mesh web has raised concerns among Federal subsistence users that the commercial fishery would directly compete with subsistence fishers for the same segment of the Chinook salmon run—large fish, and would progressively reduce the availability of larger Chinook salmon to upstream subsistence users. A large mesh commercial fishery would also compound the impacts of selective harvest practices described above for the subsistence fishery.

Objectives

1. Describe the annual ASL composition of Chinook salmon in the lower Kuskokwim River subsistence harvest.
2. Characterize the annual ASL composition of Chinook salmon in the lower Kuskokwim River subsistence harvest by gear type (i.e., gillnets with mesh of 6 inches or smaller, gillnets with mesh between 6 and 8 inches, gillnets with mesh of 8 inches or larger, and rod and reel).

3. Characterize and compare the annual ASL composition of Chinook salmon in the lower Kuskokwim River subsistence harvest by temporal strata (i.e., fish harvested for the early, middle and late portions of the run).

Methods

This study estimates the ASL composition of the subsistence harvest of Chinook salmon in the lower Kuskokwim River by recruiting subsistence fishers from Bethel and lower river villages to collect ASL data from their subsistence catches, and then applying the findings to the total subsistence Chinook harvest in the lower river. This study is a continuation of FIS 05-306. Lower Kuskokwim River is defined as the portion of the river from Eek Island at the mouth of the Kuskokwim River upstream to Tuluksak (rkm 192).

Partnerships/Capacity Building

ADF&G/CF and ONC will conduct this project in partnership. ADF&G/CF is responsible for data collection from communities outside the Bethel area, for data processing, and reporting. ONC is responsible for data collection from Bethel and fish camps within a few miles of Bethel. ONC has applied for an OSM Partners Biologist position under the 2008 Request for Proposals, and if funded, the ONC Partners Biologist will be involved with data processing and reporting.

Justification

This investigation plan is seeking contination funding for the collection and analysis of biological age-sex-lengh (ASL) samples from subsistence caught Chinook salmon harvested in the lower Kusokwim River. Technical questions regarding sampling procedures have been addressed by the investigators. The investigators have demostrated the ability of conducting this work in a timely and professional manner. Collection of biological samples from the Chinook salmon subsistence harvest have been identified as a high priority by the Kuskokwim Fisheries Resource Coalition (KFRC) and Kuskokwim Salmon Strategic Plan. Collection of samples from subsistence fisheries requires the support and cooperation of subsistence users; consideration of local social and cultural values must be respected when undertaking scientific sampling of subsistence foods. For this reason, ONC, the traditional tribal council for the Bethel area, plays a major role in social/cultural aspects of this project and the successful implementation and community support of this project.

Project Number:	08-303
Project Title:	George River Salmon Weir
Geographic Region:	Kuskokwim
Data Type:	Stock Status and Trends
Principal Investigator:	Doug Molyneaux, ADF&G Commercial Fisheries Division
Co-Investigator:	David Orabutt, Kuskokwim Native Association
	Daniel Costello, ADF&G Commercial Fisheries Division

Cost: **2008:** $158,982 **2009:** $167,394 **2010:** $145,864 **2011:** $138,163

Issue

George River salmon contribute to subsistence, commercial, and recreational fisheries within the Yukon Delta National Wildlife Refuge. Contributing to numerous initiatives that are inclusive of the entire Kuskokwim River drainage, the George River weir is one of several projects used to develop reliable estimates of abundance, run timing, stock structure, productivity, and carrying capacity of salmon stocks over a broad geographic scale in the Kuskokwim Region. The project provides fundamental escapement information necessary to facilitate in-season management decisions and to assess trends in salmon populations. This project incorporates substantial capacity building and outreach components. Natural resource development in nearby drainages is expected to intensify subsistence and recreational use of George River salmon populations, heightening the need for continued monitoring of George River salmon escapements.

Salmon escapements to the George River weir have been monitored successfully since 1996. Information from this project has become integrated into the annual management process, both by providing insights into escapement and stock specific run timing through the fishery. The escapement age, sex, and length information collected at George River provides part of the context needed to assess the impacts of subsistence harvest practices.

Objectives

1. Determine daily and annual escapements of Chinook, chum, sockeye, and coho salmon to the George River from 15 June to 20 September.
2. Estimate the age-sex-length (ASL) composition of total Chinook, chum, and coho salmon escapements to the George River from a minimum of three pulse samples, one collected from each third of the run, such that the simultaneous 95% confidence intervals of age composition in each pulse are no wider than 0.20 ($\alpha = 0.05$ and $d = 0.10$).
3. Serve as platforms to facilitate other fisheries research projects (e.g., tagging studies).

Methods

Investigators will install a resistance board weir on the lower George River. Passage chutes in the weir will allow fish to be specieated and counted as the pass upstream, and a live trap will be used to sample salmon for scales, sex and length information, and for tag recovery. ASL data is processed post-season under the *Kuskokwim Salmon ASL Assessment Project* (FIS 07-303). Investigators will also record daily water temperature, water level, and weather conditions. A local technician hired by KNA will operate

the project along with a lead crew member provided by ADF&G. The project will serve as a platform for several research initiatives proposed to AYK-SSI beginning in 2008, and for continuation of a high school internship program funding which is being sought though separate sources.

Partnerships/Capacity Building

ADF&G and KNA operate the George River weir jointly. Planning, operation and data analysis associated with the weir is done jointly by staff from KNA and ADF&G. 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

Although the cost of this project has increased significantly for the reasons provided by the investigators, the TRC recommends continued funding of this project. The George River weir provides important information to in-season subsistence fishery managers and continuation of the weir is important for monitoring escapement of Chinook, chum and coho salmon in the middle Kuskokwim River. Data from this project is used in-season to assess escapements and postseason for run reconstruction studies currently being developed for Chinook, chum and sockeye salmon stocks in the Kuskokwim River. Salmon produced in the George River provide a clear nexus to large subsistence salmon fisheries in the Yukon Delta NWR. The project is technically sound and the investigators have an excellent record for completing the proposed work and delivering quality work products in a timely manner. A high level of capacity building has been developed between ADF&G and KNA as co-investigators of this project. Public outreach, opportunities for high school and college internships, and a strong sense of community involvement and identification with this project have been accomplished and should continue.

Project Number:	08-304
Project Title:	Takotna River Salmon Weir
Geographic Region:	Kuskokwim
Data Type:	Stock Status and Trends
Principal Investigator:	Doug Molyneaux, ADF&G Commercial Fisheries Division
Co-Investigator:	Carole Absher, Takotna Tribal Council
	Daniel Costello, ADF&G Commercial Fisheries Division

Cost: **2008:** $82,967 **2009:** $79,923 **2010:** $92,867 **2011:** $118,410

Issue

Takotna River salmon contribute to subsistence, commercial, and recreational fisheries within the Yukon Delta National Wildlife Refuge, and the Takotna River weir contributes to numerous initiatives that are inclusive of the entire Kuskokwim River drainage. As the only ground-based escapement monitoring project in the upper Kuskokwim River drainage, the Takotna River weir is one of several projects used to develop reliable estimates of abundance, run timing, stock structure, productivity, and carrying capacity of salmon stocks over a broad geographic scale in the Kuskokwim Region. The project provides fundamental escapement information necessary to facilitate in-season management decisions and to assess trends in salmon populations. This project is essential as a platform for several other projects and for developing escapement goals.

Salmon escapements to Takotna River weir have been monitored successfully since 2000. Information from this project has become integrated into the annual management process, by providing escapement and stock specific run timing data.

Objectives

1. Determine daily and annual escapements of Chinook, chum, sockeye, and coho salmon to the Takotna River upstream of the village of Takotna from 24 June to 20 September.
2. Estimate the age-sex-length (ASL) composition of total Chinook, chum, and coho salmon escapements to the Takotna River from a minimum of three pulse samples, one collected from each third of the run, such that the simultaneous 95% confidence intervals of age composition in each pulse are no wider than 0.20 ($\alpha = 0.05$ and $d = 0.10$).
3. Serve as platforms to facilitate other fisheries research projects (e.g., tagging studies).
4. Mentor high school students through the TTC high school internship program.

Methods

Investigators will install a resistance board weir on the Takotna River. Passage chutes in the weir will allow fish to be specieated and counted as the pass upstream, and a live trap will be used to sample salmon for scales, sex and length information, and for tag recovery for proposed tagging projects. Investigators will also record daily water temperature, water level, and weather conditions. A local technician hired by TTC will operate the project along with a lead crew member provided by ADF&G. The project will also serve as a platform for an established high school mentorship program operated by TTC in which local students will assist in weir operations as part-time employees.

Partnerships/Capacity Building

Takotna River weir will be operated as a partnership between ADF&G/CF and TTC. ADF&G/CF will provide crew members and biologist support, and TTC will provide crew members and high school interns. TTC will assume primary responsibility for logistic support during the field season, and ADF&G/CF will assume primary responsibility for technical support and post-season data analysis and reporting. Focus areas of both partners differs, but each has equal standing. Decisions as to planning, operations, and data interpretation are derived through joint consultation. Past interactions between TTC, 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 Takotna River weir provides important information to in-season subsistence fishery managers and continuation of the weirs is important for monitoring escapement of Chinook, chum and coho salmon in the upper Kuskokwim River. The project is also used as a capture site for several mark/recapture studies currently ongoing in the Kuskokwim drainage. The project is technically sound and the investigators have demonstrated the capability to conduct the proposed work in a timely and professional manner. The capacity building elements of this project have been given recognition by educators and community leaders.

Project Number:	08-351
Project Title:	Tuluksak Subsistence Chinook Salmon ASL
Geographic Region:	Kuskokwim
Data Type:	Harvest Monitoring and Traditional Ecological Knowledge
Principal Investigator:	Ken Harper, USFWS Kenai Fish and Wildlife Field Office
Co-Investigator:	Steve Miller, USFWS Kenai Fish and Wildlife Field Office

Cost: **2008:** $89,663 **2009:** $96,482 **2010:** $34,444 **2011:** $0

Issue

The Tuluksak River Chinook salmon escapement typically has a low percentage of females, ranging between 14% and 37% and averaged 26% between 1991 and 2006. The lowest female percentages correspond with the highest total harvests of subsistence and commercial fisheries, that occurred in the early 1990s. Direct causal effects from the high utilization years have not been established. In 2006, female Chinook salmon comprised 28% of the escapement in the Tuluksak River, although this number was derived from one of the lowest Chinook salmon escapements documented in the history of the Tuluksak River weir. Heavier than normal harvest pressure on the Tuluksak River natal stock may have occurred. High fuel costs exceeding $5.00 per gallon may have shifted fishing pressure from an active drift gillnet fishery in the main Kuskokwim River to a passive set-net fishery along channels in the Kuskokwim River leading to and channels within the Tuluksak River. An intensive in-river fishery targeting a specific river's salmon population may negatively affect size, age and sex composition.

Adequate escapements to individual tributaries and main stem spawning areas are required to maintain genetic diversity and sustainable harvests. Stocks or species returning in low numbers, or early and late portions of runs may be incidentally over harvested by intensive fishing pressure on abundant stocks. Data on escapement is lacking for many individual stocks in the Kuskokwim River drainage. It is important to monitor the fish returning to the Tuluksak River for in-season management and to build a database to establish escapement goals. Information on the abundance, run timing and subsistence use of Chinook salmon in the Tuluksak River is needed to ensure its conservation.

Objectives

1. Estimate the age, sex, and length composition of the Chinook salmon subsistence harvest in each of three zones near the confluence of the Kuskokwim and Tuluksak rivers such that simultaneous 95% confidence intervals of 0.20.
2. Test the hypothesis that the age, sex, and length composition of the Chinook salmon harvested in the subsistence fishery does not differ among three zones near the confluence of the Kuskokwim and Tuluksak rivers.
3. Test the hypothesis that the age, sex, and length composition of Chinook salmon harvested in the subsistence fishery near the confluence of the Kuskokwim and Tuluksak rivers does not differ from that of the escapement that passes the Tuluksak River weir, with a probability of at least 0.65 to detect a difference of at least 0.10 between any two sex at age proportions.

Methods

Local residents will be hired through the Tuluksak village council to conduct sampling during the season. The subsistence fishing area around the confluence of the Tuluksak and Kuskokwim rivers will be divided

into three zones constructed to capture potential differences in fishing gear and location. The statistical criteria can be satisfied with a sample size of approximately 225 fish from each zone to account for incomplete age and sex information based on 10 sex at age categories (two sexes and ages 1.1, 1.2, 1.3, 1.4, and 1.5). Harvests occur throughout the period from late May to mid-July, though the majority of the harvest will likely be taken in early to mid-June. An attempt will be made to collect ASL data from each Chinook salmon in a catch being sampled to avoid potential bias caused by the selection of individual fish.

Chinook salmon sampled from the Tuluksak River escapement will be pooled into a single sample that will be treated as a simple random sample. A chi-square test of homogeneity will be used to test the hypothesis that the sex at age composition of the resultant harvest and weir samples do not differ. ANOVA will be used to test the hypothesis that mean length does not vary between the harvest and weir, by sex at age category.

Partnerships/Capacity Building

Capacity building will continue, as the USFWS mentors and trains 2 village technicians and high school students. We have developed a formal agreement that has been signed by both parties committing the Service to train village personnel. This will provide an educational basis for employees and the village government to further their understanding of the management of lower Kuskokwim River commercial and subsistence fisheries.

Justification

While not identified as a priority in the Request for Proposals, the issue that would be addressed by this project, a low proportion of females in the Tuluksak River Chinook salmon spawning escapement, is of great concern to fishery managers. This project would provide information that would indicate whether Chinook salmon subsistence fisheries near the Tuluksak River are harvesting a disproportionately high proportion of females. While the investigators successfully addressed the technical issues identified in the TRC proposal review, the following items in the investigation plan need to be addressed and modifications made where needed: 1) participating families should be using gillnet gear representative of that used by most other families in each zone; 2) the field season should be shortened to about 1.5 months to reduce project costs while still obtaining needed information; 3) to further reduce costs, consideration should be given to hiring only one weir technician, if the investigators are successful in hiring a local individual to coordinate and monitor sampling; and 4) consultations need to be held with Tuluksak Native Community to obtain their cooperation and input on the proposed project.

Project Number:	08-402
Project Title:	Togiak River Chinook Salmon Radio Telemetry
Geographic Region:	Southwest Alaska
Data Type:	Stock Status and Trends
Principal Investigator:	Cheryl Dion, USFWS Anchorage Fish and Wildlife Field Office
Co-Investigator:	Pat Walsh, USFWS Togiak National Wildlife Refuge
	Robbin LaVine, Bristol Bay Native Association

Cost: **2008:** $176,376 **2009:** $120,656 **2010:** $0 **2011:** $0

Issue

Chinook salmon *Oncorhynchus tshawytscha* are important for subsistence, sport, and commercial harvest in the Togiak River. The Alaska Department of Fish and Game (ADF&G) has established an escapement goal in the watershed of 10,000 Chinook salmon based on aerial surveys. Average estimated Chinook salmon spawning escapement from 1995 to 2004 was 13,134 fish, with an average harvest of 10,282 fish, representing a 44% exploitation rate. In 2005 9,500 Chinook salmon were harvested with escapement estimated at 10,188, representing a 48% exploitation rate (Westing et al. 2006). The Office of Subsistence Management, through its strategic planning process, has identified the need to obtain reliable escapement estimates for Chinook salmon in the Togiak River (OSM 2005). The Bristol Bay Regional Advisory Council has also identified the need for improved monitoring of salmon escapement in the Togiak River (OSM 2003). The USFWS will use mark-recapture methods to estimate the total abundance of Chinook salmon and to investigate the effectiveness of aerial surveys to monitor Chinook salmon escapement in the Togiak River watershed.

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; and
6. Evaluate the effectiveness of aerial spawning ground surveys for monitoring Chinook salmon abundance in the Togiak River watershed.

Methods

The USFWS will conduct a mark-recapture experiment to estimate the abundance of Chinook salmon in the Togiak River watershed. Fish will be captured and marked with radio transmitters in the lower 5 km in the mainstem of the Togiak River. The marking location is upriver from the majority of the harvest, so estimates of abundance will be related to the escapement. Capture effort will be controlled to deploy tags in proportion to abundance. Chinook salmon will also be tagged with colored spaghetti tags to test the feasibility of identifying the presence of spaghetti tagged fish at the Gechiak Creek weir using underwater

video. These tags will serve as a secondary mark to determine loss of radio tags. The recapture event will consist of a fixed receiver station co-located with a video equipped weir on Gechiak Creek. Additional receiver stations will be placed at strategic locations within the watershed. Multiple searches from a fixed-wing aircraft will be conducted to locate marked fish in other areas of the Togiak River watershed, verify accuracy of fixed telemetry stations, and to document Chinook salmon spawning activity and locations.

Partnerships/Capacity Building

The USFWS Anchorage Fish and Wildlife Field Office will be responsible for the day-to-day operations at the project sites and will provide biological expertise and training to conduct the study, a crew leader, a technician, and two volunteers. BBNA will work with the Village of Togiak to provide one local hire to work with the weir crew and one local hire to work with the gillnetting and tagging crew. Togiak NWR will conduct aerial surveys and provide logistical support.

Justification

Obtaining reliable estimates of spawning escapement over time, identifying critical factors, and describing timing and migration patterns for Togiak River Chinook salmon is a high priority information need identified in the 2008 Request for Proposals. Togiak River Chinook salmon provide an important fishery for subsistence, sport and commercial harvesters. Improved information on Chinook salmon spawning escapement will provide for better management and will help evaluate the effectiveness of aerial surveys. The investigators have been responsive to the TRC comments in developing the investigation plan and have included a substantial match of $112,000 in 2008 and $96,000 in 2009, providing greater than a 50% match as requested in the RFP.

Project Number:	08-405
Project Title:	Lake Clark Sockeye Salmon Escapement and Population Monitoring
Geographic Region:	Southwest Alaska
Data Type:	Stock Status and Trends
Principal Investigator:	Dan Young, National Park Service
Co-Investigator:	Carol Ann Woody, US: Science and Education
	Robbin LaVine, Bristol Bay Native Association

Cost: **2008:** $56,052 **2009:** $56,962 **2010:** $58,318 **2011:** $59,633

Issue

This project continues monitoring sockeye salmon escapement to the Lake Clark drainage in southwest Alaska. Escapement monitoring on the Newhalen River has been funded by OSM since 2000 to provide a reliable estimate of escapement to Lake Clark. Obtaining reliable estimates of spawning escapement over time is the number one priority identified in the Bristol Bay-Chignik Strategic Plan and was specifically identified in the 2008 request for proposals. This project will provide information on daily and annual Lake Clark escapement estimates, run timing, and salmon age, sex and length composition, which will aid in assessing whether escapement is adequate to meet subsistence needs and evaluating current stock status and trends. The Lake Clark drainage is located within the Federally managed Lake Clark National Park and Preserve.

Since 1996, sockeye salmon returns to the Kvichak River and Lake Clark watersheds have declined for unknown reasons. The Kvichak River escapement has been below the minimum escapement goal in five of the last seven years and the average escapement of sockeye salmon to Lake Clark during 2000–2006 has been about 68% lower than the documented escapements in 1980–1984. Concurrent with declines in escapement, subsistence harvest in the Kvichak River drainage has declined from an average of about 60,000 fish harvested annually to 38,000 fish harvested in 2004.

Objectives

1. Estimate sockeye salmon escapement to Lake Clark.
2. Determine age, sex and length composition of the Lake Clark escapement

Methods

Sockeye salmon will be counted and sampled as they ascend the Newhalen River. Standard ADF&G counting tower protocols will be used to enumerate fish. Age, sex and length data will be collected from sockeye salmon in collaboration with the subsistence communities of Newhalen/Iliamna and Nondalton. Locally hired technicians will assist with escapement monitoring and sampling the age composition of the subsistence catch.

Partnerships/Capacity Building

This project has an established history of partnerships and capacity building. The USGS and NPS have successfully administered FIS 01-095 *Population monitoring of sockeye salmon from Lake Clark and the Tazimina River*, FIS 00-042 *Population assessment of Lake Clark sockeye salmon*, and FIS 05-402 *Lake Clark sockeye salmon escapement and population monitoring* in collaboration with the Kijik Corporation,

Nondalton Tribal Council and Villagers, Iliamna/Newhalen Villagers, and the Universities of Alaska and Montana. Local youth have been trained as biotechnicians and future project leaders through an intern program initiated in 2000.

A partnership with Bristol Bay Native Association has been added to this project to formalize partnering between NPS and local Native organizations and to assist with hiring local residents.

Justification

Lake Clark sockeye salmon escapement monitoring has been identified as a high priority information need in the strategic plan for this area as well as by the Regional Advisory Council. This project will continue monitoring efforts previously funded through Monitoring Program since 2000. There continues to be strong community support for continuing this project, and past efforts by investigators have been highly successful in hiring, training, and mentoring local high school and college students. The investigators have included a substantial match of $45,420, providing an 81% match to requested funds. Finally, the investigators and their agencies are well qualified to conduct and administer this work.

Project Number:	08-501
Project Title:	Copper River Sockeye Salmon In-river Abundance
Geographic Region:	Southcentral Alaska
Data Type:	Stock Status and Trends
Principal Investigator:	Keith van den Broek, Native Village of Eyak
Co-Investigator:	Michael Link, Jason Smith, Guy Wade, LGL AK Research Assoc.

Cost: **2008:** $185,809 **2009:** $205,385 **2010:** $0 **2011:** $0

Issue

Copper River sockeye salmon sustain large and important subsistence fisheries under Federal jurisdiction; and subsistence, commercial and sport harvests are significant in comparison to abundance. Management of Copper River sockeye salmon is complex due to inter-annual variation in the size and timing of stocks, fisheries that target a mixture of stocks and difficulties in estimating abundance due to the physical characteristics of the drainage. Recently, returns of sockeye salmon to several tributaries of the upper Copper River basin (e.g., Gulkana Hatchery, Tanada Creek weir) have been lower than expected given the acoustic-based estimates of abundance obtained from the Miles Lake sonar site. To further confound certainty in the abundance estimates provided by the Miles Lake sonar, the Alaska Department of Fish and Game (ADF&G) is close to completion in upgrading their Bendix acoustic system with a newer and much different acoustic system (dual frequency identification sonar—DIDSON). The management system and management plans for Copper River sockeye salmon have been built around the old Bendix sonar counts. The degree of comparability of the old and new acoustic systems is uncertain and the efficacy of the original Bendix acoustic counter has never been independently validated with an alternative technique.

We propose to use an independent technique to validate estimates provided by the new acoustic system and to the extent it remains, the Bendix-based estimates at Miles Lake. The purpose of this project is to use mark-recapture methods to estimate the weekly abundance of sockeye salmon returning to the Copper River above Miles Lake and compare these estimates to those provided by the Miles Lake sonar. The information collected from this project can be used by fishery managers to better manage the subsistence fishery for individual stocks, which ultimately could lead to increased subsistence harvest opportunities.

Objectives

To estimate the annual in-river abundance of sockeye salmon returning to the Copper River in 2008 and 2009 such that the estimates are within 25% of the true values 95% of the time.

Methods

This project will use two-event mark-recapture methods to estimate the weekly abundance of sockeye salmon at Baird Canyon in 2008–09. For the first event, sockeye salmon will be externally tagged with T-Bar anchor tops containing passive integrated transponders (TBA-PIT) daily at three fishwheels operated in Baird Canyon (rkm 66) from mid May to late August. These fishwheels will be located upstream of the Miles Lake sonar site and downstream of any in-river fisheries and major spawning tributaries. The second event will consist of fish examined for tags at two fishwheels located near Canyon Creek (rkm 157), located 12 km downstream of Chitina, AK. The fishing sites at Baird Canyon and Canyon Creek have been used successfully by the project team for these purposes since 2002. Data at both camps will be

recorded electronically using FS2001 PIT scanners and PDA handheld computers. Data will be stored in a Microsoft Access database, and analyzed using Microsoft Excel and the computer program SPAS.

Partnerships/Capacity Building

This project gives NVE an opportunity for meaningful inclusion in the research and long-term management of Copper River sockeye salmon. NVE will oversee all aspects of the project and provide critical logistical, technical and field assistance, thereby acquiring the array of skills needed to carry out major fisheries assessment projects. NVE fishery technicians will acquire the necessary skills and experience required for this and other fisheries research jobs. This project will allow NVE to further develop the skills of 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 interaction between a major subsistence group (NVE) and fisheries management agencies (ADF&G Commercial Fisheries Division). 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 amongst subsistence users.

NVE will continue to work with the Tribal Council, staff, consultants and government agencies to identify key personnel to help carry on a long-term program. NVE will also actively participate in the workshop held at the end of each field season to review the project and discuss future refinements. These consultations will culminate in the overall assessment of the project that will drive the development of a long-term program, if deemed necessary.

Justification

Assessment of in-river abundance of Copper River sockeye salmon was identified as a high priority information need in the 2008 Request for Proposals. Sockeye salmon sustain a large and important subsistence fishery in the Copper River. In 2006, a total of 18,000 fish were harvested by Federal subsistence fishers. Currently, in-river abundance is estimated using sonar at Miles Lake. Independent estimation of sockeye salmon abundance would provide important verification of sonar passage estimates and help resolve whether offshore distribution and species apportionment significantly bias sonar assessment of sockeye salmon.

Project Number:	08-502
Project Title:	Tustumena Lake Coho Salmon Radio Telemetry and Weirs
Geographic Region:	Southcentral Alaska
Data Type:	Stock Status and Trends
Principal Investigator:	Douglas Palmer, USFWS Kenai Fish and Wildlife Field Office
Co-Investigator:	Kenneth Gates, USFWS Kenai Fish and Wildlife Field Office

Cost: **2008:** $238,250 **2009:** $118,360 **2010:** $44,236 **2011:** $0

Issue

The Federal Subsistence Board granted Ninilchik residents customary and traditional use for all fish species on Federal waters within the Kasilof River watershed in January 2006. The Federal Subsistence Board has addressed several regulatory proposals for Kasilof River salmon and steelhead trout since 2006. We lack basic population size and distribution information on coho salmon. The development of new Federal subsistence fisheries has triggered a need for information on the abundance, run-timing and distribution of coho salmon in the Kasilof River watershed.

Objectives

1. Determine the abundance and run-timing of adult coho salmon entering Glacier, Indian, Nikolai, and Shantatalik creeks.
2. Detect the ultimate spawning destination upstream of Silver Salmon rapids (rkm 24), via the presence of at least two tagged fish, of a population comprising 10% or more of all the coho salmon passing the capture site during each temporal stratum with probability 0.8.
3. Test the hypothesis that the distributions of spawners among strata are equal.

Methods

Feasibility work for this proposal was funded in out-of-cycle proposals 07-506 *Coho salmon spawning assessment in Tustumena Lake tributaries* and 07-507 *Run timing, abundance, and distribution of coho salmon in the Kasilof River watershed.* This proposal will build on information collected during these initial investigations.

Fish weirs equipped with underwater video equipment will be used to determine the run-timing and abundance of adult coho salmon in four tributaries of Tustumena Lake; Glacier, Indian, Nikolai, and Shantatalik creeks. These four streams are currently considered the primary contributors to the upper Kasilof River coho salmon population based on aerial and ground surveys and conversations with area residents. We will also deploy up to 150 radio transmitters in adult coho salmon to identify other potential spawning areas in the upper Kasilof River watershed.

Partnerships/Capacity Building

This project has been discussed with the Kenai National Wildlife Refuge and Alaska Department of Fish and Game. Consultations are currently ongoing with the Department and will continue throughout the project. We also plan to advertise and hopefully recruit qualified seasonal fishery technicians from the community of Ninilchik to assist with field operations.

Justification

This project is of the highest strategic importance for Federal subsistence management in the Southcentral region, and directly addresses data needs for assessing possible changes to coho salmon harvest guidelines. Currently, the Federal Board has expanded subsistence fishing opportunities in the Kasilof River drainage. Information from this project would provide more accurate spawning abundance estimates than are currently available through ground and aerial surveys. Information from this project would increase the chances of correctly determining and meeting spawning escapement needs and making correct management decisions for this emerging subsistence fishery. If this project is funded, the Technical Review Committee will assess the need for long-term monitoring after two years of project results.

Project Number:	08-503
Project Title:	Kasilof River Steelhead Trout Radio Telemetry
Geographic Region:	Southcentral Alaska
Data Type:	Stock Status and Trends
Principal Investigator:	Kenneth Gates, USFWS Kenai Fish and Wildlife Field Office
Co-Investigator:	Douglas Palmer, USFWS Kenai Fish and Wildlife Field Office

Cost: **2008:** $78,860 **2009:** $62,938 **2010:** $22,395 **2011:** $0

Issue

The Federal Subsistence Board granted Ninilchik residents customary and traditional use for all fish species on Federal waters within the Kasilof River watershed in January 2006. The Federal Subsistence Board has addressed several regulatory proposals for Kasilof River salmon and steelhead trout since 2006. Adult steelhead trout which spawn or over-winter in the upper Kasliof River watershed can be harvested in Federal subsistence rod and reel fisheries. A better understanding of movement patterns and over-wintering and spawning locations is needed to ensure conservation of steelhead trout in the Kasilof River watershed.

Objectives

1. Describe the freshwater migratory patterns and over-wintering distribution of radio-tagged adult steelhead trout which enter the Kasilof River during the fall.
2. Identify spawning areas selected by radio-tagged steelhead trout.

Methods

Feasibility work for this proposal was funded in out-of-cycle proposal 07-509 *Spawning and seasonal distribution of steelhead trout in the Kasilof River watershed.* This proposal requests funding for one additional year of radio tagging and follow-up monitoring to build on information collected during the initial radio-tagging effort in 2007.

Radio telemetry will be used to uniquely identify and track individual steelhead trout in the Kasilof River watershed. A target goal of 80 radio transmitters will be surgically implanted in steelhead trout captured in the mainstem Kasilof River between September and freeze-up. A variety of gear types will be used to capture fish for radio-tagging, including nets and sport fishing gear. Freshwater migratory patterns and over-wintering and spawning locations of radio-tagged steelhead will be determined throughout the fall, winter, spring, and early summer using a combination of fixed data-logging receiver stations and mobile tracking.

Partnerships/Capacity Building

This project has been discussed with the Kenai National Wildlife Refuge and Alaska Department of Fish and Game. Consultations are currently ongoing with the Department and will continue throughout the project. We also plan to advertise and hopefully recruit qualified seasonal fishery technicians from the community of Ninilchik to assist with field operations.

Justification

Assessment of steelhead distribution in the Kasilof River is a priority information need specifically identified by the Federal Subsistence Board. Little is known about distribution of steelhead in the Kasilof River watershed. Currently, the known population of steelhead trout is a few hundred fish. The combination of this proposed project and Investigation Plan 08-502 on coho salmon will allow steelhead spawning and distribution to be evaluated at less cost than a stand alone project. Knowledge gained in this project would help guide the Board in making regulatory decisions and help Federal managers develop effective long term monitoring tools.

Project Number:	08-504
Project Title:	Crooked and Nikolai Creeks Steelhead Trout Weirs and Video
Geographic Region:	Southcentral Alaska
Data Type:	Stock Status and Trends
Principal Investigator:	Kenneth Gates, USFWS Kenai Fish and Wildlife Field Office
Co-Investigator:	Douglas Palmer, USFWS Kenai Fish and Wildlife Field Office

Cost: **2008:** $39,965 **2009:** $45,565 **2010:** $12,590 **2011:** $0

Issue

The Federal Subsistence Board granted Ninilchik residents customary and traditional use for all fish species on Federal waters within the Kasilof River watershed in January 2006. The Federal Subsistence Board has addressed several regulatory proposals for Kasilof River salmon and steelhead trout since 2006. Crooked and Nikolai creeks are the only two streams within the Kasilof River watershed known to support steelhead trout. Annual returns to each stream are typically a few hundred fish. Adult steelhead trout which spawn or over-winter in the upper Kasilof River watershed can be harvested in Federal subsistence rod and reel fisheries. Annual escapement monitoring in Crooked and Nikolai creeks will be necessary to ensure conservation of these small populations.

Objectives

1. Determine the abundance and run-timing of adult steelhead trout entering Crooked and Nikolai creeks.
2. Estimate the age, sex and length of adult steelhead trout entering Crooked and Nikolai creeks.
3. Determine if the steelhead trout spawning in Crooked and Nikolai creeks are genetically distinct from one another and, if so, estimate the level of genetic differentiation.

Methods

Weirs equipped with underwater video systems will be used to determine the run-timing and abundance of adult steelhead trout returning to Crooked and Nikolai creeks during 2008 and 2009. Each weir and video system will be installed by April 20 and will operate through May 31 each year. The weirs and video systems will be unmanned except during times of maintenance and sampling. Sampling will be conducted weekly at each weir to estimate age and length composition of the return. Sex composition of the return to each stream will be determined using video images. Fin tissue will be collected from a sample of 50 adult steelhead trout at each weir. Genetic samples will be forwarded to the Conservation Genetics Laboratory in Anchorage for processing and analysis.

Partnerships/Capacity Building

This project has been discussed with the Kenai National Wildlife Refuge and Alaska Department of Fish and Game. Consultations are currently ongoing with the Department and will continue throughout the project. We also plan to advertise and hopefully recruit qualified seasonal fishery technicians from the community of Ninilchik to assist with field operations.

Justification

At this time Nikolai Creek is one of only two tributaries in the Kasilof River watershed known to support steelhead. Continued assessment of abundance in Nikolai Creek is needed for responsible management of a subsistence steelhead fishery. Little is known about abundance and distribution of steelhead trout in the Kasilof River watershed. Information gained from the combination of this project and FIS Project 08-503 *Spawning and seasonal distribution of steelhead trout in the Kasilof River* will help evaluate the effectiveness of using Crooked and Nikolai creeks as long-term monitoring tools. The investigator will also monitor abundance of Crooked Creek steelhead trout. The Technical Review Committee will assess the need for long-term monitoring after two years of project results.

Project Number:	08-600
Project Title:	Karta River Sockeye Salmon Assessment
Geographic Region:	Southcentral Alaska
Data Type:	Stock Status and Trends
Principal Investigator:	Cathy Needham and Lisa Lang, Organized Village of Kasaan (OVKa)
Co-Investigator:	Jan Conitz and Scott Host, ADF&G Commercial Fisheries Division
	Susan Howell and Delilah Brigham, US Forest Service
	Glenn Chen, Bureau of Indian Affairs

Cost: **2008:** $104,218 **2009:** $116,217 **2010:** $0 **2011:** $0

Issue

This project will assess the sockeye population for the Karta River, the traditional and current subsistence use area for the Tribe. In reference to the 2008 Request for Proposals and the Strategic Plan for the Subsistence Fisheries Resource Monitoring Program, Southeast Region (2006), this proposal addresses the highest priority species (sockeye salmon) and information need (estimate the current escapement). In addition, the Karta Lake system is ranked sixth on the list of prioritized systems.

Objectives

1. Count the number of sockeye salmon into the Karta River using a weir.
2. Estimate the number of sockeye salmon into the Karta River using mark-recapture methods with a coefficient of variation less than 10%.
3. Estimate the age, length, and sex composition of returning sockeye salmon into the Karta River system, based on a sample size equivalent to 6% of the number returning, with an estimated coefficient of variation for the two major age classes of 10% or less.

Methods

A 200 foot channel-spanning aluminum bipod weir will be constructed across the Karta River. On one section of the weir, an entrance cone leading into an 8' x 8' trap will be constructed to capture fish migrating upstream to spawn. The weir will operate from early June through September of each year, and all fish crossing the weir will be identified and counted. Approximately 15% of the sockeye salmon that cross the weir will be marked with a fin clip. Towards the end of the field season, crews will fly into the known sockeye spawning grounds and attempt to recapture fish that were marked at the weir. Mark-recapture data will be sent to the Alaska Department of Fish and Game (ADF&G) for data analysis, to provide a secondary escapement estimate to compare back to the real number of fish counted across the weir. In addition, approximately 600 sockeye, distributed across the entire run for each year, will be sampled for age, sex and length data. Sampled fish will be measured and sexed on site. Scales will be removed and sent to ADF&G to be read to determine age.

Partnerships/Capacity Building

The Organized Village of Kasaan has been working with a team of cooperating agencies on Prince of Wales Island since the beginning of 2005 on fisheries projects with steelhead and sockeye. A strong

partnership between Federal, State and Tribal government has been established, with key players working together across projects.

This project will continue to rely on the strong partnerships built with local agencies, and will assist OVKa in continuing to build it's Fisheries program so that the Tribe can address subsistence issues important to it's Tribal members. In addition the project offers local hiring opportunities for field crews. Some crew have been trained under other projects and this project secures position over time, and offers the opportunity for new Tribal members to be trained and employed by the Tribe.

Justification

This is a proven weir project which will provide reliable estimates of the annual escapement and age composition of sockeye salmon into the Karta Lake system which is an important subsistence resource for the community of Kasaan. Project costs are reasonable and all project funds go directly to OVKa. There is some question regarding the current status of this stock — recent estimates of escapements and subsistence harvests are less than they were 20 years ago. This project must make better use of the foot survey counts and mark-recapture data collected by ADF&G from 1995 to 2003; doing so will yield annual estimates of escapement for 19 of the past 27 years. The Technical Review Committee requests a revised investigation plan to incorporate both a mark-recapture estimate of the abundance of sockeye salmon in McGilvery and Andersen Creeks and a basic assessment of the current status of the stock based on historical escapement and harvest estimates. A moderate increase in project costs and involvement by the ADF&G co-investigators are expected in the revised investigation plan.

Project Number: 08-607
Project Title: Unuk River Eulachon Assessment
Geographic Region: Southcentral Alaska
Data Type: Stock Status and Trends
Principal Investigator: Todd Tisler, US Forest Service

Cost: **2008:** $34,030 **2009:** $36,425 **2010:** $0 **2011:** $0

Issue

Eulachon production from the Unuk River area is important ecologically and to subsistence and personal use fishermen in Ketchikan and Metlakatla. The harvest of eulachon in the Unuk River takes place in waters under Federal jurisdiction. The Unuk eulachon run has declined in recent years and very few eulachon returned to spawn in 2004, 2005, 2006, and 2007. The fishery was closed in 2006 and 2007. Reliable assessments of the annual abundance of eulachon in the area are needed to understand the status of the stock and responsibly manage the Federal subsistence fishery. This was identified as a priority information need in the 2006 Southeast Alaska Strategic Plan and in the 2008 Request for Proposals.

Objectives

1. Describe the timing, distribution, and abundance of eulachon returning to the Unuk River area.
2. Estimate the age, sex, length and weight composition of eulachon spawning in the Hooligan River, Landing Slough, and lower Unuk mainstem areas so that the estimated coefficient of variation for the principal age class is less than 15%.
3. Assess the status and management options for Unuk eulachon.

Methods

Surveys will be done each spring to assess the timing, distribution, abundance, and age, sex, and size composition of eulachon in the Unuk River area. The goal of this project is to make consistent, observer-independent, qualitative and quantitative assessments of the abundance of eulachon in the Unuk River area. All the main locations where eulachon have been observed in the past will be surveyed so we can best monitor their annual distribution and abundance. Records will be kept on survey conditions, the abundance of live and dead eulachon, the abundance of eulachon eggs, and the number and activity of birds and mammals in the area. During the month of March, project personnel will do daily foot and boat surveys of the six main eulachon spawning locations in the lower Unuk River area—Hooligan River, Upper Landing Slough, Lower Landing Slough, Side Channel, Matney Slough, and Lower Unuk mainstem. Survey routes and data collection methods will be standardized for each location. Numbers of small and large schools will be counted when counting individual fish is impossible. In three principal spawning locations, Hooligan River, Side Channel, and Matney Slough, the abundance of live eulachon in will be measured as a percentage of the stream bottom covered with fish (or eggs) at each of the 6 to 11 numbered stations in each location. The Unuk estuary, upper Burroughs Bay, Klahini River, and Chickamin River will also be surveyed but less intensively. Photos will be used to document survey conditions and eulachon abundance. If Federal subsistence fishing is allowed, fishing activities will be closely monitored and the harvest will be sampled to estimate the number and pounds of the harvest and the age, sex, and size composition of the fish.

There is very little stock assessment and management information for Borroughs Bay and Chickamin River eulachon. However, the available information needs to be compiled and summarized along with the information collected by this project. The emphasis will be to develop the best time series of annual abundance estimates and look at relationships among harvests, escapements, and returns. Finally, we will compare this information with that for other eulachon runs along the coast to assess the status of Unuk eulachon and propose a management plan for restoring and maintaining this run and a subsistence fishery.

Partnerships/Capacity Building

The Forest Service has been working with the local eulachon fishers, the communities of Metlakatla, Ketchikan, and Saxman, and biologists with ADF&G, Forest Service, Canadian Department of Fisheries and Oceans, and others to better understand the use, status, and management of Unuk eulachon. This project promotes this information sharing. Project funds will employ local residents and benefit the local economy. The Forest Service will solicit bids from local property owners for the field housing.

Justification

This project addresses an issue specifically identified in the 2008 Request for Proposals. The project has high strategic value since eulachon returns to the Unuk River have been dismal in recent years, and there is a severe conservation issue. There is also a fundamental lack of knowledge regarding population dynamics of this stock. The investigation plan describes a very workable and repeatable methodology and will greatly improve the documentation over past surveys. The information will be used to evaluate the stock status to ensure appropriate harvest levels.

Project Number:	08-650
Project Title:	POW Island Steelhead Trout Subsistence Harvest Survey
Geographic Region:	Southcentral Alaska
Data Type:	Harvest Monitoring and Traditional Ecological Knowledge
Principal Investigator:	Cathy Needham, Organized Village of Kasaan
Co-Investigator:	Tony Christianson, Hydaburg Cooperative Association Pat Petrivelli, Bureau of Indian Affairs Jeff Reeves, US Forest Service

Cost: **2008:** $65,092 **2009:** $73,390 **2010:** $0 **2011:** $0

Issue

The disparity between steelhead harvests recorded in confidential surveys and steelhead harvests reported in the permitting process has been documented in a previous FIS study (Turek 2005). This project will collect and analyze data through a confidential harvest survey in all Prince of Wales Island communities and compare this information with the reported harvests to provide a direct measure of the level of disparity. Follow-up interviews with steelhead harvesters will elicit the rationale for their level of participation in the Federal subsistence fishing permitting process. The information collected by this research project addresses the validity and reliability of subsistence harvest data for Prince of Wales steelhead, an information need for Southeast Alaska.

Objectives

1. Accurately estimate the subsistence steelhead harvests on Prince of Wales Island by conducting household surveys in all the communities and compare these harvests with the harvests reported by Federal permit holders.
2. Describe the factors affecting participation in the permitting process.

Methods

This project will gather data on steelhead harvest levels through confidential household surveys in each community on Prince of Wales Island. These data will be summarized and compared with data reported through the permitting process. Interviews will be conducted with subsistence steelhead harvesters identified from the household harvest surveys about the level of their participation in the Federal permitting process. The reasons and constraints for their participation from the first year of the study will be used to construct an ethnographic decision model. This model will be field tested on the key interviews conducted during the second year of the study. Findings from the household harvest surveys and the key interviews will be analyzed and included in the final report which will be reviewed during a community meeting on Prince of Wales Island.

Partnerships/Capacity Building

The Hydaburg Cooperative Association and Organized Village of Kasaan will lead this project, in collaboration with the other two Tribes on Prince of Wales Island (Craig Community Association and Klawock Cooperative Association), the Bureau of Indian Affairs Subsistence Branch and the U.S. Forest Service staff in Craig responsible for implementing the subsistence steelhead permitting on Prince of

Wales Island. Preliminary discussions with all collaborators started in early in 2006, and phone calls and a teleconference have occurred more recently to formulate this proposal.

This project continues to develop upon relationships between the Prince of Wales Tribes and the Federal government, in working together to address subsistence priorities important to the communities. Through continued partnerships, HCA and OVKa can maintain their capacity building for the development of their fisheries programs.

Justification

This project is recommended for funding with modification. The project addresses a high priority issue for the Federal Subsistence Program, in an area with considerable Federal jurisdiction. Investigators have performed well on previous Monitoring Program projects. The collaborative nature of the project and the strong capacity building component greatly strengthen the proposal. However, some technical issues need to be addressed in a revised investigation plan before the project moves forward.

Project Number:	08-651
Project Title:	Maknahti Island Subsistence Herring Fishery Assessment
Geographic Region:	Southcentral Alaska
Data Type:	Harvest Monitoring and Traditional Ecological Knowledge
Principal Investigator:	Helen Dangel Lorrigan, Sitka Tribe of Alaska
Co-Investigator:	Thomas Thornton, Portland State University

Cost: **2008:** $27,162 **2009:** $42,023 **2010:** $0 **2011:** $0

Issue

In 2006, 610 acres of submerged lands around Maknahti Island were included in the Federal Subsistence Management area. The Federal Subsistence Board has deferred a proposal to close this area to all non-Federal subsistence users. To understand the importance of the customary and traditional herring egg fishery in the Maknahti Island waters, Sitka Tribe seeks to gather historical and contemporary subsistence fishing information related to efforts made and harvests received in this area.

Objectives

Document and describe the customary and traditional herring egg fishery in Maknahti Island Federal waters, including harvest, effort, and customary and traditional practices.

To achieve this objective, Sitka Tribe of Alaska will:

1. Gather and analyze contemporary information on the subsistence harvest and use of herring eggs in Maknahti Island Federal waters
2. Gather and analyze historical Information on subsistence harvest and use of herring eggs in Maknahti Island Federal waters.

Methods

1. Contemporary Data Collection: Companion herring egg harvest survey
STA proposes to develop a number of survey questions to supplement the Herring egg Harvest Survey in 2008 and 2009, focusing specifically on harvest and use of the Maknahti area. The existing survey instrument was developed in consultation with ADF&G. Under this project, additional questions will be asked to get at site specific locations of harvest, and effort directed at harvest in this area. The harvest survey is administered to about 150 households, based on the most recent census of subsistence harvesting households in the Sitka Sound subsistence herring fishery. The sample surveyed includes routine and high harvesting households. The additional questions will be asked of all survey participants, although responses will not be included for ADF&G analysis due to local concerns about the site specific information being used against subsistence users.

2. Historical Information Collection
Sitka Tribe of Alaska will work in coordination with Dr. Thomas Thornton, who is currently applying for a grant from North Pacific Research Board to document the historic herring egg spawning and massing areas in Southeast Alaska and how those areas relate to historic subsistence and non-subsistence herring uses in Southeast Alaska. This study will use archaeological, historical, and environmental records as well as ethnographic interviews with contemporary local experts involved with herring fisheries. A key

objective of Dr. Thornton's project is to understand changes in herring stocks, spawning and massing patterns, and uses over long time scales, as complement to more detailed recent records kept by ADF&G since 1980.

Partnerships/Capacity Building

Sitka Tribe of Alaska has been collaborating with ADF&G from 2002–2006 on an annual customary and traditional herring egg harvest survey. This project will build upon that collaboration. STA has been working with USFS Sitka District Ranger Office on herring issues for the past year, since the Maknahti Island Federal waters were identified. Because Sitka's subsistence herring egg harvest is the last of its kind through the State, STA works with Alaska Natives around the state who either harvest or receive eggs from the Sitka subsistence herring egg fishery.

Justification

This project is recommended for funding. The project addresses a high priority information need specifically identified by the Federal Subsistence Board at its January 2007 meeting. The project appears to be a good collaborative effort between Sitka Tribe of Alaska and Portland State University, with some consultation on the part of the USDA Forest Service. The study design has some minor technical issues that investigators need to address or clarify. The budget is reasonable, and includes a significant match ($61,416). The project includes a good capacity building effort, and the investigators are qualified to do the work.

2007

FISHERIES RESOURCE MONITORING PLAN

FEDERAL SUBSISTENCE MANAGEMENT

CONTENTS

INTRODUCTION

BACKGROUND

Since 1999, under the authority of Title VIII of ANILCA, the Federal government has assumed 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 Interior and Agriculture, cooperating with the State of Alaska and other Federal agencies, to research 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 created 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.

Original guidance for the Monitoring Program was provided by the Federal Subsistence Board and outlined in the *Operational Strategy for Information Management*[1]. The Regional Advisory Councils (Councils) have identified important issues and information needs for their regions, with review and update on an annual basis. To ensure that the Monitoring Program addresses the highest priority information needs for Federal subsistence fisheries management, the Office of Subsistence Management began a strategic planning process in 2004 to build on the work done by the Councils. Facilitated workshops for the Southwest, Southcentral, and Southeast regions have been held over the last three years with representatives of Federal and State agencies, academia, Alaska Native and rural organizations, and Councils. Participants at each workshop identified fisheries units for their region; developed goals, objectives, and information needs for each fishery unit; and then prioritized fishery units, goals, objectives and information needs. Final workshop reports for the Southcentral region and Bristol Bay-Chignik area have been completed, and results were used to guide the 2007 Request for Proposals. The Kodiak-Aleutians report should be completed by November 2006, the first workshop for the Northern Alaska Region is tentatively scheduled for spring 2007, and plans for the remaining regions should be completed within three years.

> *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 where five Federal agencies (Fish and Wildlife Service, Bureau of Land Management, National Park Service, Bureau of Indian Affairs, and USDA Forest Service) work with the Alaska Department of Fish and Game, Regional Advisory Councils, Alaska Native organizations, and other organizations. An inter-agency Technical Review Committee provides scientific evaluation of proposals and investigation plans. Public review and recommendations for funding are provided through the Councils. An inter-agency Staff Committee reviews all recommendations, and reconciles differences between staff and public recommendations. The Federal Subsistence Board approves annual monitoring plans with the benefit of both a technical recommendation by the Technical Review Committee and public review by the Regional Advisory Councils.

[1] Krueger, C., Brelsford, T., Casipit, C., Harper, K., Hildebrand, I., Rost, P., Thompson, K., and Jones, L. 1999. *Federal Subsistence Fisheries Management: Operational Strategy for Information Management. Report to the Federal Subsistence Staff Committee by the Sub-Committee for the Development of a Blueprint for Interagency Functions, Roles, and Responsibilities. 122 p.*

The purpose of this section is to present the Technical Review Committee's funding recommendations for the 2007 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 Chief of the Office of Subsistence Management Fisheries Information Services Division, and is composed of representatives from each of the five Federal agencies and three representatives from the Alaska Department of Fish and Game. An additional anthropologist from the Minerals Management Service provides additional social science expertise on the Technical Review Committee and provides a balance of disciplines. Staff from Fisheries Information Services provides 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, and risk that subsistence harvest needs will not be met.

   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 using the following information for each investigator:

Ability

- Education and training
- Related work experience
- Publications, reports, and presentations
- Past or ongoing work on Monitoring Program studies

Resources

- Office and laboratory facilities
- Technical and logistic support
- Personnel and budget administration

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

POLICY AND FUNDING GUIDELINES

Several policies have been developed to aid in implementing funding.

- Studies must be non-duplicative with existing projects.
- Most Monitoring Program funding is dedicated to non-Federal sources.
- 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.
- Proposals may be funded for up to three years duration.

Finances and Guideline Model for Funding

The Monitoring Program was first implemented in 2000, with an initial investment of $5 million. Since 2001, a total of $6.25 million is annually allocated for the Monitoring Program. The Department of Interior, through the U.S. Fish and Wildlife Service, annually provides $4.25 million. The Department of Agriculture, through the U.S. Forest Service, annually provides $2 million. On an annual basis, this budget funds both continuations of existing studies (year-2 or 3 of multi-year projects), and new study starts. Budget guidelines are established by geographic region and data type, and for 2007, $3.97 million is available for new starts. Proposals are solicited according to the following two data types.

1. **Stock Status and Trends Studies (SST).**
   These projects address abundance, composition, timing, behavior, or status of fish populations that sustain subsistence fisheries with nexus to Federal public lands. The budget guideline for this category is two-thirds of available funding.

2. **Harvest Monitoring and Traditional Ecological Knowledge (HM-TEK).**
These projects address assessment of subsistence fisheries including quantification of harvest and effort, and description and assessment of fishing and use patterns. The budget guideline for this category is one-third of available funding.

2007 FISHERIES RESOURCE MONITORING PLAN DEVELOPMENT

A Request for Proposals was issued in November 2005 that identified the following information needs:

- Escapement assessment of sockeye salmon stocks in southeast Alaska that support subsistence fisheries, particularly in the Chatham Straits area.
- Local knowledge of sockeye salmon stream locations, abundance and changes over time in southeast Alaska.
- Research to improve/ verify estimates of inriver return for Copper River Chinook and sockeye salmon.
- Escapement assessment of sockeye salmon stocks that support subsistence fisheries in the Kodiak and Alaska Peninsula area, particularly Afognak Lake, Buskin River, and McLees Lake.
- Document subsistence harvest patterns in southwest Alaska.
- Assessment of Lake Clark sockeye salmon (Kvichak River drainage).
- Evaluate patterns and trends in subsistence fish harvests in the Kuskokwim and Yukon rivers.
- Develop and maintain reliable estimates of mainstem abundance and tributary escapements for Chinook and chum salmon in the Kuskokwim and Yukon rivers.
- Develop basic biological monitoring information (distribution, abundance and stock structure) to detect and track changes in the status of fish stocks utilized for subsistence in the northern region
- Evaluate patterns and trends in subsistence fish harvests in Norton and Kotzebue Sounds

Sixty-eight proposals ($7.1 million) were received in February 2006. These proposals were reviewed by Fisheries Information Services Division staff and then the Technical Review Committee. In March 2006, the Technical Review Committee recommended 44 proposals ($4.8 million) for investigation plan development. In May 2006, 38 investigation plans ($4.1 million) were submitted for funding consideration. The Technical Review Committee recommended funding 35 projects ($3.8 million). The Regional Advisory Councils supported the committee's recommendations for all but one investigation plan, *07-455 Adak Island Subsistence Fishing*.

The Federal Subsistence Board reviewed the draft 2007 Fisheries Resource Monitoring Plan in January 2007 and selected 34 projects for inclusion in the plan. The plan provides 35% of the funding to Alaska Native organizations, 28% to Federal agencies, and 33% to State agencies (Figure 1).

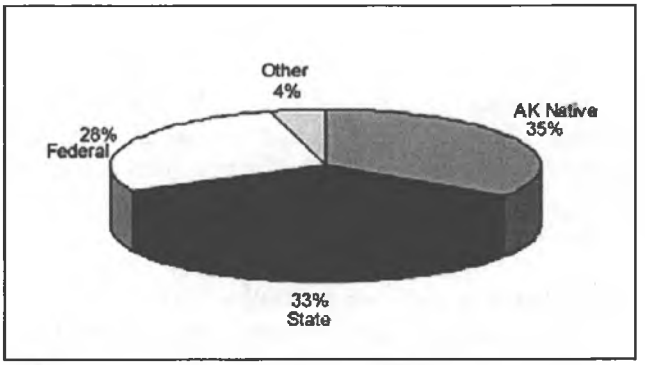


Figure 1. Distribution of 2007 funding to Alaska Native, Federal, State, and other organizations.

Tables summarizing the 2007 Fisheries Resource Monitoring Plan are provided on pages 8–11. Descriptions of the projects included in the plan can be found on pages 12–87.

Table 1. Number of projects funded for the 2007 Fisheries Resource Monitoring Plan. Project type includes stock status and trends (SST) and harvest monitoring and traditional ecological knowledge (HM-TEK).

Geographic Region	SST	HM-TEK	Total
Northern Alaska	2	1	3
Yukon	5	2	7
Kuskokwim	6	0	6
Southwest Alaska	5	1	6
Southcentral Alaska	4	0	4
Southeast Alaska	7	1	8
Total	29	5	34

Table 2. Cost of projects funded for the 2007 Fisheries Resource Monitoring Plan. Project type includes stock status and trends (SST) and harvest monitoring and traditional ecological knowledge (HM-TEK).

	Cost ($000)		
Geographic Region	SST	HM-TEK	Total
Northern Alaska	$152	$136	$288
Yukon	$522	$164	$686
Kuskokwim	$724	$0	$724
Southwest Alaska	$334	$146	$480
Southcentral Alaska	$514	$0	$514
Southeast Alaska	$749	$95	$844
Total	$2,995	$542	$3,537

Table 3. Northern Alaska region stock status and trends projects funded in 2007.

Study #	Title	Approved Budget ($000) 2007	2008	2009
07-105	North Slope Dolly Varden Genetic Baseline Completion	$33.0	$28.3	$15.1
07-107	Hulahula River Enumeration of Dolly Varden	$119.0	$0.0	$0.0
	Total	$152.0	$28.3	$15.1

Table 4. Northern Alaska region harvest monitoring and traditional ecological knowledge projects funded in 2007.

Study #	Title	Approved Budget ($000) 2007	2008	2009
07-151	NW Alaska Subsistence Fish Harvest Patterns and Trends	$136.4	$129.3	$79.6
	Total	$136.4	$129.3	$79.6

Table 5. Yukon region stock status and trends funded in 2007.

Study #	Title	Approved Budget ($000) 2007	2008	2009
07-202	East Fork Andreafsky River Salmon Weir	$148.6	$148.3	$139.2
07-204	Lower Yukon River Salmon Drift Test Fishing	$58.7	$50.9	$50.9
07-206	Innoko River Inconnu Radio Telemetry	$80.6	$73.2	$30.2
07-207	Gisasa River Salmon Weir	$123.0	$127.4	$135.1
07-208	Tozitna River Salmon Weir	$111.3	$111.3	$111.3
	Total	$522.2	$511.1	$466.7

Table 6. Yukon region harvest monitoring and traditional ecological knowledge projects funded in 2007.

Study #	Title	Approved Budget ($000) 2007	2008	2009
07-252	Yukon Flats Fishing Practices	$89.7	$76.4	$86.0
07-253	Yukon River Salmon Harvest Patterns	$74.4	$204.4	$46.1
	Total	$164.1	$280.8	$132.1

Table 7. Kuskokwim region stock status projects funded in 2007.

Study #	Title	Approved Budget ($000) 2007	2008	2009
07-302	Kuskokwim River Chum Salmon Run Reconstruction	$49.0	$56.4	$0.0
07-303	Kuskokwim River Salmon Age-Sex-Length Assessment	$81.4	$96.0	$99.5
07-304	Tatlawiksuk River Salmon Weir	$154.7	$161.8	$176.1
07-305	Kanektok-Goodnews River Salmon & Dolly Varden Weirs	$108.9	$101.0	$104.6
07-306	Kwethluk River Salmon Weir	$176.2	$187.9	$190.4
07-307	Tuluksak River Salmon Weir	$154.1	$159.6	$173.6
	Total	$724.3	$762.7	$744.2

Table 8. Southwest Alaska region stock status and trends projects funded in 2007.

Study #	Title	Approved Budget ($000) 2007	2008	2009
07-401	Afognak Lake Sockeye Salmon Smolt Assessment	$76.7	$76.7	$81.0
07-402	Buskin River Sockeye Salmon Weir	$99.2	$78.1	$79.2
07-404	Perryville-Clark River Coho-Sockeye Aerial Counts	$0.0	$31.0	$31.0
07-405	McLees Lake Sockeye Salmon Weir	$80.0	$75.9	$78.0
07-408	Togiak River Rainbow Smelt Assessment	$78.1	$78.4	$31.8
	Total	$334.0	$340.1	$301.0

Table 9. Southwest Alaska region harvest monitoring and traditional ecological knowledge projects funded in 2007.

Study #	Title	Approved Budget ($000) 2007	2008	2009
07-452	Kvichak Watershed Subsistence Fishing Ethnography	$146.1	$111.8	$42.3
	Total	$146.1	$111.8	$42.3

Table 10. Southcentral Alaska region stock status and trends projects funded in 2007.

Study #	Title	Approved Budget ($000) 2007	2008	2009
07-501	Tanada and Copper Lakes Burbot Abundance	$41.0	$37.0	$37.0
07-502	Tanada Creek Salmon Weir	$81.0	$81.9	$83.9
07-503	Copper River Chinook & Sockeye Salmon Abundance	$372.5	$366.7	$373.1
07-505	Long Lake Salmon Weir	$19.3	$19.7	$20.1
	Total	$513.8	$505.3	$514.1

Table 11. Southeast Alaska region stock status and trends projects funded in 2007.

Study #	Title	Approved Budget ($000) 2007	2008	2009
07-601	Hatchery Creek Sockeye Salmon Assessment	$117.8	$123.2	$122.9
07-604	Klag Lake Sockeye Salmon Assessment	$108.4	$109.1	$109.8
07-606	Hetta Lake Sockeye Salmon Assessment	$161.0	$161.8	$154.0
07-607	Kanalku Lake Sockeye Salmon Assessment	$172.8	$161.7	$165.4
07-608	Klawock Lake Sockeye Salmon Assessment	$73.2	$75.1	$76.3
07-609	Falls Lake Sockeye Salmon Assessment	$87.7	$90.3	$92.6
07-610	Behm Canal Eulachon Genetics	$27.9	$28.1	$0.0
	Total	$748.8	$749.3	$721.0

Table 12. Southeast Alaska region harvest monitoring and traditional ecological knowledge projects funded in 2007.

Study #	Title	Approved Budget ($000) 2007	2008	2009
07-651	Hydaburg Sockeye Salmon Customary & Traditional Systems	$94.9	$38.7	$0.0
	Total	$94.9	$38.7	$0.0

Project Number: 07-105

Project Title: Completion of a Genetic Baseline for Mixed-stock Analysis of Dolly Varden in the North Slope

Geographic Region: Northern

Data Type: Stock Status and Trends

Principal Investigator: Penny Crane, USFWS Conservation Genetics Laboratory

Co-Investigator(s): John Wenburg, USFWS Conservation Genetics Laboratory
Jim Reist, Canada Department of Fisheries and Oceans

Cost: 2007: $32,988 **2008:** $28,349 **2009:** $15,096

ISSUE

The North Slope Council has identified char fisheries as among the most important subsistence fisheries for this region. This proposal addresses the following priority information need for char, "Basic biological monitoring information (distribution, abundance and stock structure) to detect and track changes in the status of fish stocks utilized for subsistence."

Dolly Varden are harvested in coastal fisheries in the summer, and in inland fisheries in the winter. The largest harvests occur near Kaktovik, located in the Arctic National Wildlife Refuge (ANWR) near the U.S./Canada border. Marine fisheries harvest anadromous fish on their summer feeding migrations; harvests comprise fish from numerous spawning stocks, including fish from Canada. Inland fisheries harvest fish overwintering in rivers. The origin of fish in overwintering areas and the extent of mixing is largely unknown. We propose completing a genetic baseline initiated in FIS 01-113, "Eastern North Slope Dolly Varden genetic stock identification and stock assessment." Baseline data were collected from the Anaktuvuk River, Sagavanirktok River (Echooka, Ribdon, Saviukviayak, and Ivishak rivers), Canning River (Marsh and Main forks), Kavik River, Hulahula River, and Kongakut River. Simulation studies indicated that the stock contribution of individual rivers could be estimated reliably. However, adequate samples from rivers in ANWR and Canada are lacking. Inclusion of samples from rivers supporting the largest spawning aggregates in ANWR and anadromous populations in Canada would finalize an extensive baseline suitable for a multitude of mixed-stock analysis projects in coastal fisheries and in overwintering areas in Arctic Alaska and Canada. This baseline would facilitate subsistence fishery management: mixed-stock analysis using the baseline could be used to estimate the stock contributions to subsistence catches in Kaktovik to monitor trends in stock abundance which may be affected by changes in subsistence or sport fish harvests, increased industrialization in the North Slope, and climate change affecting species composition and hydrology in North Slope streams. Studies estimating the stock composition of fish in overwintering areas will aid the interpretation of aerial survey and sonar counts and evaluate the impacts of winter harvests.

OBJECTIVES

1. Collect tissue samples from Dolly Varden from two rivers in ANWR and one stream in Canada. Obtain tissue samples from DFO-Canada for archive Dolly Varden collections made in the five rivers in Canada that support anadromous Dolly Varden populations.

2. Assay samples (N=approximately 800 fish) for genetic variation at seven microsatellite loci to complete a genetic/tissue database for North Slope Dolly Varden for future mixed-stock analysis studies.

METHODS

Fin clips will be collected from approximately 200 Dolly Varden adults in spawning condition or juveniles from two rivers in the ANWR (likely the Aichilik and Egaksrak rivers) and one in Canada. Sampling of juveniles will be conducted to minimize the possibility of sampling error (see Waples 1998) by sampling a variety of size classes at multiple locations in a drainage. Sampling in Alaska will be coordinated through FIS 06-108 to minimize costs and impact in the ANWR. DFO-Canada will provide tissue from archived collections from five rivers in Canada known to support spawning aggregates of anadromous Dolly Varden: Firth, Babbage, Big Fish, Rat, and Vittrekwa rivers. Samples will be genotyped for at least seven microsatellite loci. Conformation of genotypic frequencies to Hardy-Weinberg expectation will be conducted on each putative population sample to verify that samples do not comprise more than one population; data will be evaluated for temporal stability of allele frequencies; and juvenile collections will be evaluated to determine at which size class family groups disperse. Data will be tested using analysis of artificial mixtures to define stock groups of Dolly Varden that can be estimated in mixtures.

PARTNERSHIPS/CAPACITY BUILDING

A poster summarizing results will be prepared for the ANWR, the village of Kaktovik, and appropriate communities in Canada. This project will foster partnerships between USFWS and DFO-Canada and will provide the basis to foster new partnerships between these agencies and North Slope villages for future mixed-stock fishery projects.

JUSTIFICATION

Funding this work will allow these investigators to complete and evaluate a comprehensive genetic baseline for Dolly Varden within the North Slope area. If genetic differences are great enough, the model developed can be used to obtain information on stock composition of harvests and wintering aggregations. This type of information will help managers ensure that this important resource and the fisheries that depend upon it are sustained.

Project Number: 07-107

Project Title: Enumeration of Dolly Varden Using Dual Frequency Identification Sonar in the Hulahula River, Alaska

Geographic Region: Northern

Data Type: Stock Status and Trends

Principal Investigator: Bruce Osborne, USFWS Fairbanks Fish and Wildlife Field Office

Co-Investigator(s): Jeff Melegari, USFWS Fairbanks Fish and Wildlife Field Office

Cost: 2007: $119,023 **2008:** $0 **2009:** $0

ISSUE

Dolly Varden from the nearshore coastal waters of the Beaufort Sea are one of the most extensively used and favored fish species in the subsistence harvest of coastal villages (Jacobson and Wentworth 1982; Craig 1989). They are primarily harvested in the nearshore narrow band of brackish water during the summer open-water season and during the late winter and early spring at overwintering locations in various rivers. Seven North Slope rivers, the Kongakut, Egaksak, Aichilik, Hulahula, Canning, Sagavanirktok, and Anaktuvuk, provide known spawning and overwintering habitat for separate stocks of Dolly Varden (Craig 1973; Krueger et al. 1999). Very little is known about the population sizes of these stocks or their contribution to subsistence fisheries. However, it is known that these stocks are an important subsistence resource for the communities of Kaktovik, Nuiqsut, and Anaktuvuk Pass (Jacobson and Wentworth 1982; Craig 1989; Pedersen 1990; Pedersen and Linn 2005).

Kaktovik is the center of federal subsistence fishing activity in the eastern North Slope. During April 2003, fishers indicated that throughout the winter 2002–2003 season, at Fish Hole Two on the Hulahula River, greater effort was being expended for harvesting fewer fish than in previous years (David Wiswar, U.S. Fish and Wildlife Service, personal communication). Some village residents have also described the last three years' harvests as having smaller sized fish. Continued concerns raised by residents of Kaktovik over reduced harvest of Dolly Varden in the Hulahula River make it logical to continue the DIDSON enumeration study for an additional year.

OBJECTIVES

The objectives of this study are to use DIDSON technology to:

1. Estimate annual abundance and describe variability in run size and timing of Dolly Varden in the Hulahula River;
2. Evaluate the presence of non-target species.

METHODS

The operational phase of the study will begin the third week of July and run through the third week of September 2007. Target validation of DIDSON images using underwater video, hook and line sampling and netting will continue during this third year. We will test the hypothesis that Dolly Varden are the only

fish present at the site during counting operations. To evaluate the presence of non-target species on the Hulahula River, an underwater camera synchronized with the sonar to view passing fish will be operated. The video monitoring in the Hulahula River will be used to identify what species are present, and verify DIDSON data. Video and DIDSON images will be compared and evaluated to identify swimming or other behavioral aspects that could influence counts or that may suggest potential methods of separating other species from Dolly Varden in the DIDSON images.

Additional sampling with a beach seine will be conducted to confirm timing and relative abundance of Dolly Varden and other species. The netting will be used to document species presence when water clarity prevents use of video monitoring and when the DIDSON data shows lots of fish. Species identification using DIDSON is difficult or impossible with fish of similar size and body shape. Arctic grayling are the only known species of a similar size and shape as Dolly Varden present in the Hulahula River when we are counting with the DIDSON. However, sampling efforts in previous years on the Hulahula River lead us to believe that they do not make up a large component of the fish population at any given time, and so do not compromise the Dolly Varden abundance estimate.

PARTNERSHIP/CAPACITY BUILDING

During fall 2006–winter 2007, the investigators will travel to the village of Kaktovik to discuss the nature and status of this project. Funding is requested for a local hire from the village of Kaktovik to utilize his/her knowledge of Dolly Varden and the area. Also, the possibility of placing a sonar intern on the project will be researched. Consultation with the Arctic National Wildlife Refuge will also continue.

JUSTIFICATION

Continuation of funding for an additional year will allow collection of one more year of sonar counts on the Hulahula River, and, more importantly, more rigorous examination of species apportionment assumptions. The investigators also need to determine whether a substantial proportion of the run enters this river after cessation of sonar operations, including the possibility of under-the-ice migration, by first obtaining information from Kaktovik residents to assess the need to extend the sonar operation season and sample under the ice. The investigators would need to modify the investigation plan, if additional information on this issue needs to be collected. If successful, this project would provide annual abundance estimates and describe annual variability in run size and timing of Dolly Varden in an important system within the Arctic National Wildlife Refuge. These techniques could then be adopted for other systems within the refuge to validate and supplement aerial survey counts that are now used to assess Dolly Varden.

Project Number:	07-151
Project Title:	Patterns and Trends in Subsistence Fish Harvests, Northwest Alaska 1994–2003
Geographic Region:	Northern
Data Type:	Harvest Monitoring/Traditional Ecological Knowledge
Principal Investigator:	James Magdanz, ADFG Division of Subsistence
Co-Investigator(s):	Hazel Apok, Maniilaq Association

Cost: **2007:** $136,425 **2008:** $129,314 **2009:** $79,627

ISSUE

This project will explore subsistence fishery harvest patterns and trends in six Northwest Alaska communities: Ambler, Kiana, Kobuk, Noatak, Noorvik, and Shungnak. In every one of the six study communities, estimated salmon harvests have declined since 1994. In some communities, declines in salmon harvests have been mitigated by increases in other fish harvests. But in other communities, this has not occurred. In each of the six communities, this project will explore community harvest trends and community patterns of use for salmon, Dolly Varden (trout), whitefish, and inconnu (sheefish). In an unusual feature of the study, researchers will invite a respondent in selected fishing households in two communities to participate in the analysis by reviewing their own households' ten-year harvest history and providing commentary and explanations for their own harvest patterns. In two communities, researchers also will work with high school science teachers and students to review existing data and collect new data in their communities. The main focus of the study is to identify variables that could improve the reliability of predictive harvest models so managers can better understand the factors associated with changing fish harvests. A specific focus will be on characterizing changes related to social, economic, and environmental factors—which cannot be influenced—from changes related to managerial factors—which can be influenced.

OBJECTIVES

1. Compare community and household harvest databases; identify and correct data errors.
2. Analyze community database to identify harvest trends for four fish species in six communities.
3. In two communities, work with high school students to review community harvest patterns, and with respondents in selected households to review household harvest patterns.
4. In six communities, collect household attributes (age of household head, changes in health status, deaths, marriages, etc.) from key respondents and through household interviews.
5. Summarize data from interviews and add household interview data to the harvest database.
6. Analyze the household-level database to identify associations between harvests and social, economic, and demographic variables.

METHODS

This project will rely extensively on two subsistence fishery harvest databases developed during previous projects. One is a community-level database, in which each record contains the fish harvests for one community in one year. The other is a household-level database, in which each record contains the fish harvests for one household in one year. The general study design calls for a coordinated analysis of the two datasets. The household harvest dataset will be enhanced with additional data on household attributes and from household interviews. To verify the household level database, researchers will calculate the sums of the annual reported harvests for each species in each community, and compare the results with the previously published annual summaries in the community-level database. If discrepancies are found, researchers will locate and correct the discrepancies. Researchers will visit each study community to verify household identifiers and gather additional data about household characteristics to supplement each household's harvest data. Data from these forms will be entered in a series of Microsoft Access databases, one for each study community. Researchers will use SPSS to merge the aggregated harvest database with the household characteristics data. Household identifiers will be corrected as necessary and duplicate records, if any, will be merged. The final expanded household-level database will be stored in SPSS. Researchers will use the SPSS to categorize households based on their harvesting histories, then test for correlations between reported harvests and household attributes. Researchers also will prepare a narrative summary discussing the explanations households offered for their own harvesting patterns. Researchers expect respondents will discuss changes in processing methods, changes in employment levels, increases in fuel and equipment costs, and changing environmental conditions as factors in their households' harvest levels.

PARTNERSHIPS/CAPACITY BUILDING

The project will work through the local IRA governments in each community, and contract with local research assistants in each study community to gather the data. When possible the project will employ the same local residents who gathered the fisheries data during the original salmon harvest survey projects. The project also will work with high school students and teachers in two communities. The ADFG Division of Subsistence and Maniilaq Association have cooperated on a number of research projects in Northwest Alaska dating back to the 1980s.

JUSTIFICATION

A majority of the Technical Review Committee (7 of 10 members) recommends funding this project. The goal of this project is to improve the reliability of a predictive harvest model for understanding changing subsistence harvest patterns, which is a high priority for the Monitoring Program. The investigation plan is scientifically and technically sound; the principal investigator is highly qualified to conduct the proposed work, and has an excellent record of performance with the Monitoring Program. Of concern, however, is the significantly increased cost and expanded timeframe compared with previous submissions for the same project. At the request of the Technical Review Committee, the principal investigator provided a budget justification for the $96,000 budget increase over the proposal, however, a minority of the committee (3 of 10 members) recommended that the project not be funded due to the high cost and lack of agency match. The minority of the Technical Review Committee recognized that while this project benefits the State and Federal subsistence programs, the State is seeking to have the Monitoring Program fund the entire effort. The minority of the Technical Review Committee felt that this project should only be done on a partnership basis with the State sharing costs.

Project Number: 07-202
Project Title: Abundance and Run Timing of Adult Salmon, East Fork Andreafsky River
Geographic Region: Yukon
Data Type: Stock Status and Trends
Principal Investigator: Raymond Hander, USFWS Fairbanks Fish and Wildlife Field Office
Co-Investigator(s): Francis Thompson, Algaaciq Tribal Council
David Waltemeyer, Association of Village Council Presidents
Ursula Hunt, Yupiit of Andreafski Tribal Council

Cost: **2007:** $148,623 **2008:** $148,293 **2009:** $139,221

ISSUE

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, the Yukon River Comprehensive Management Plan for Alaska, and the Yukon River Joint Technical Committee Plan. The Andreafsky River system supports relatively large populations of Chinook, summer chum and coho salmon. The project's location in the lower river allows its escapement estimates to be used in-season by fishery managers. 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 weir has operated for the past twelve years and provides one of the longer term databases on escapement in the entire Yukon River, meeting the priority information need of the Office of Subsistence Management to "maintain reliable estimates of Chinook and chum salmon escapement over time." Andreafsky River salmon stocks comprise an important component of the diet of villagers along the Andreafsky River and the Yukon River below and including Pitka's Point. In addition, these stocks are harvested in commercial and subsistence fisheries below the confluence of the Andreafsky River from May through October. This investigation plan addresses enumeration of only Chinook and chum salmon.

OBJECTIVES

1. Determine daily escapement numbers and run timing of two species of adult 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

The location of the weir site is approximately 43 rkm upriver from the confluence of the Andreafsky and Yukon Rivers. A resistance board weir will be installed and operated on the Andreafsky River each year from 2007 to 2009. The abundance of salmon and resident fish species will be recorded to determine run timing and escapement size. A stratified random sampling design will be used to collect age, length, and sex ratio information for Chinook and summer chum salmon.

PARTNERSHIPS/CAPACITY BUILDING

The Fairbanks Fish and Wildlife Field Office will work with the Office of Subsistence Management Fisheries Information Services staff to strengthen the capacity building component of this project. Consultation will occur with Ursula Hunt, Andreafsky Tribal Council Leader, and Francis Thompson, Algaaciq Tribal Government, for hiring people from the local area, and David Wages, St. Mary's School Principal, for coordination with the Science Camp. David Waltemeyer, Association of Village Council Presidents will be working with weir personnel to become more familiar with weir operations. The Fairbanks Fish and Wildlife Field Office will continue the long running precedence of hiring local persons to staff and operate the Andreafsky River weir and provide outreach and educational opportunities for the benefit of the local communities. Discussions will continue regarding the Association of Village Council Presidents becoming a co-investigator on the project during this funding cycle.

JUSTIFICATION

This project addresses an issue specifically identified as a high priority need in the 2007 Request for Proposals, namely maintenance of reliable estimates of Chinook and chum salmon escapement over time. The Andreafsky River weir supports one of the most comprehensive data sets (12 consecutive years) for salmon escapement in the lower Yukon River. It currently operates from late June through July, providing escapement counts for Chinook and chum salmon. The U.S. section of the Joint Technical Committee ranked the East Fork Andreafsky River weir as third in importance for Chinook salmon, fourth for summer chum salmon, and second for coho salmon among existing escapement projects. Managers use the information provided by this weir as an indicator of run timing and strength in the lower Yukon River Geographic Unit for Chinook and summer chum salmon.

Project Number: 07-204
Project Title: Lower Yukon River Salmon Drift Test Fishing
Geographic Region: Yukon
Data Type: Stock Status and Trends
Principal Investigator: Fred Bue and Eric Newland, ADFG Division of Commercial Fisheries

Cost: 2007: $58,708 **2008:** $50,876 **2009:** $50,876

ISSUE

Fluctuations in production of Yukon River fall chum salmon make optimal harvest management of the mixed stocks especially difficult. Most commercial salmon harvest occurs near the mouth of the Yukon River in Districts 1 and 2, whereas the majority of the subsistence harvest occurs in the upper portion of the drainage. The subsistence fishery has priority use of these resources, but the fish pass through the major commercial harvesting area in the lower river before they arrive into the upper regions where most of the subsistence harvest occurs. Fishery managers are challenged to quickly and accurately assess run timing and abundance inseason to ensure that sufficient numbers of salmon pass through the downstream commercial fishing districts in order to provide for subsistence needs and adequate escapements to Alaskan and Canadian streams.

This proposal is an extension of the FIS 04-229 cooperative project. The U.S. section of the Joint Technical Committee ranked the lower Yukon River cooperative fall salmon drift test fishing project as one of the highest assessment projects for fall chum salmon based on it's performance and utility for providing information relevant for management decisions. Both State and Federal managers are in direct contact with this project inseason which enables a good understanding of the data and it's relevance to the fisheries as the salmon return.

OBJECTIVES

The objectives for the lower Yukon River fall salmon drift gillnet test fishery are to:

1. Estimate relative abundance of fall chum and coho salmon on a daily basis as they enter the mouth of the Yukon River.
2. Estimate run timing of fall chum and coho salmon as they enter the mouth of the Yukon River.
3. Estimate the age, sex, and length composition of the return of fall chum and coho salmon for use in brood year assessment and run forecasting.
4. Build partnerships and capacity by involving local technicians and communities in the project operation and information sharing.

METHODS

Project operation and data collection will be conducted in a manner similar to the project's operations over the past five fall seasons. Two test fish crews will be assigned one each to the Big Eddy and Middle Mouth locations. Drift test fishing will be conducted twice daily at each location using standardized methods and gear for consistency to allow time-series comparisons with previous years. Fishing times

and catch by species are recorded and catch per unit effort data is calculated for each drift. Age-sex-length sample data will be collected from a portion of the catch lost due to netting mortality with all mortalities distributed locally.

Test fishing results will be recorded twice daily on Excel spreadsheets at the ADFG Emmonak field office, consolidated and distributed daily to ADFG and USFWS offices. Daily results are made available to the public via an ADFG recorded telephone message. ADFG also provides test fish information to the public in weekly update packets which include other current Yukon River fisheries information that are distributed by fax, email, and web-posting. The updates track the project in season and makes relative comparisons to previous years and subjective observations. Post season, test fish data will be incorporated in annual project reports and merged into a larger data base for access by other studies.

PARTNERSHIPS/CAPACITY BUILDING

Staff from the Division of Commercial Fisheries would work cooperatively with local staff from the Yukon Delta Fisheries Development Association to recruit and appoint local technicians into crew-member positions. Participants would collect data utilizing drift gill nets and use standardized techniques for taking biological samples. In addition, staff from ADFG would mentor local-hire staff to develop skills for advancement within the program. The project will be reviewed inseason by the Regional Advisory Council and communities throughout the Yukon River drainage during teleconferences sponsored by the Yukon River Drainage Fisheries Association. The project has been used in the past as a platform to collect biological samples for other studies which will be considered an important function in the future as time permits and opportunities are presented. The annual start up of the fall drift project would be an extension of the summer chum salmon drift test fish project that has cooperative funding from ADFG and the Community Development Quota Program. The Yukon River Drainage Fisheries Association plans to continue their capacity building commitments by providing additional local technicians to assist in this project as well as overlap with other harvest monitoring projects operating in the same location.

JUSTIFICATION

Although the production of Yukon River fall chum salmon has improved since 2003, the Alaska Board of Fisheries has designated Yukon River fall chum salmon as stocks of yield concern. In 2001, the amounts necessary for subsistence (ANS) for Yukon River salmon species was revised. For fall chum salmon the range, based on historical harvests, was set to 89,500 to 167,100 fish annually. The subsistence harvest of fall chum salmon has fallen below the ANS range in five of the last six years. Based on the 1998–2002 averages, approximately 17% of the subsistence harvest and 97% of the commercial harvest of Yukon River fall chum salmon occurs in the lower Yukon River. This project provides one of the first reliable indications of run timing and strength for fall chum and coho salmon returning to the Yukon River. The U.S. Section of the Joint Technical Committee ranked the lower Yukon River cooperative salmon drift test fishing project as one of the highest priority assessment projects for fall chum salmon.

Project Number: 07-206

Project Title: A Radio Telemetry Investigation of the Spawning Origins of Innoko River Sheefish

Geographic Region: Yukon

Data Type: Stock Status and Trends

Principal Investigator: Randy Brown, USFWS Fairbanks Fish and Wildlife Field Office

Co-Investigator(s): John Burr, ADFG Division of Sport Fisheries
Caroline Brown, ADFG Division of Subsistence

Cost: **2007:** $80,593 **2008:** $73,159 **2009:** $30,240 **2010:** $30,976 **2011:** $43,187

ISSUE

Although not identified as a formal priority in the 2007 Monitoring Program, life history and stock distribution information regarding sheefish and other whitefish species utilized in the subsistence fisheries of the Yukon River drainage will be critical for future management of these stocks. Previous sheefish studies carried out in the Innoko River and elsewhere in the Yukon River drainage suggest that they use the Innoko River for feeding only and migrate elsewhere to spawn. Five spawning areas have been identified in the Yukon River drainage; two in the upper Koyukuk River, one in the upper reaches of the Yukon Flats, one in the upper Nowitna River, and one in the Chatanika River. At this point it appears that most or all sheefish in the drainage originate in one of these spawning areas. During their annual migrations between overwintering, feeding, and spawning areas, Innoko River sheefish would undoubtedly be subject to a wide variety of commercial, subsistence, and sport fisheries within the Innoko River and elsewhere in the Yukon River drainage. If Innoko River sheefish are members of Yukon River populations that spawn elsewhere, as suggested by previous studies, then effective management will be possible only by identifying the contributing stocks, the user groups throughout the range of each contributing stock, and the magnitude of the fishery harvests. In this study we propose to use radio telemetry techniques to test the hypothesis that Innoko River sheefish are members of Yukon River populations that spawn in locations other than the Innoko River drainage, and identify the spawning locations of those contributing stocks. Other biological data will be gathered as well, including spawning frequency, feeding habitat fidelity, and annual survival rates.

OBJECTIVES

1. Identify the spawning origins of sheefish radio-tagged in the Innoko River during summer by surveying known and suspected spawning areas in the drainage during spawning season.
2. Determine spawning frequency of radio-tagged sheefish by locating fish on spawning grounds over the course of four spawning seasons.
3. Investigate feeding habitat fidelity of radio-tagged sheefish by surveying major feeding habitats in the drainage during four summer feeding seasons.
4. Estimate annual survival of radio-tagged sheefish directly by assessing the status of each tagged fish over time.
5. Estimate the proportional contributions of identified spawning stocks to the aggregation of feeding sheefish in the Innoko River during 2007 and 2008.

6. Involve students and other Shageluk community members in the project directly during the tagging component of the project, and provide location data so the community can map the migrations of tagged fish through time.

METHODS

Radio telemetry techniques will be used in this study to identify the spawning origins of mature sheefish (≥72.5 cm fl) tagged in the Innoko River drainage during the summer feeding season. The transmitters will be surgically implanted in candidate fish. They will be programmed to operate for eight weeks during each of three seasons; spawning during September and October, overwintering during January and February, and feeding during May and June. They are expected to last for well over 4 years with this operating schedule. Aerial surveys will be conducted to locate tagged fish in known or possible spawning areas, feeding habitats, and overwintering locations. Spawning destinations will be identified based on the presence of radio-tagged fish in previously identified spawning areas, or in new areas of riverine habitats with gravel substrate during late September and early October. Spawning frequency will be evaluated based on the time intervals between spawning events, as determined by their presence in spawning areas during the fall. Feeding habitat fidelity will be investigated based on their presence in the same or different geographic areas during the summer feeding season from one year to the next. Annual survival will be estimated directly based on the fraction of tagged fish that are known to survive from one year to the next. Survival will be judged based on seasonal migrations. Stock contributions to the Innoko River feeding aggregation will be estimated based on the fraction of all sheefish located in spawning habitats that migrate to particular spawning areas. Some of the tagging will be conducted in the vicinity of Shageluk, and regular contact with the Shageluk School and sharing of location data will ensure community awareness and involvement in the project and its findings.

PARTNERSHIPS AND CAPACITY BUILDING

Caroline Brown has initiated an arrangement with Joy Hamilton, a teacher in the Shageluk School, to involve middle school students in an educational unit focused on this project. They will read about the project, join us in tagging fish in the Shageluk area, map migrations based on tag locations during the course of the year, share migration data with elders in the community, interview elders about their knowledge and how it relates to the telemetry findings, and write about the project. In this way, the students will take some ownership of the project and communicate the findings to the community.

JUSTIFICATION

Sheefish are an important subsistence resource throughout the Yukon River drainage. Currently, there is little information available on the life history of sheefish in the Yukon River. Sheefish are targeted in subsistence, commercial and sport fisheries, and caught incidentally in salmon fisheries. This project would build on the work initiated in 2005 on the lower Nowitna River. In 2007–2008, investigators propose to radio tag 50 sheefish annually from the Innoko River drainage and track them seasonally through 2011. This project will provide the opportunity to relocate each fish four times during spawning and feeding periods and three times during the overwintering period. The investigators have a strong capacity building component incorporating multiple disciplines and emphasizing outreach to local communities. The Technical Review Committee recommends funding this project for 3 years, with years 4–5 funding contingent upon committee review.

Project Number: 07-207

Project Title: Abundance and Run Timing of Chinook and Summer Chum Salmon in the Gisasa River, Koyukuk National Wildlife Refuge, Alaska

Geographic Region: Yukon

Data Type: Stock Status and Trends

Principal Investigator: Mark Voight, USFWS Fairbanks Fish and Wildlife Field Office

Cost: **2007:** $123,016 **2008:** $127,440 **2009:** $135,138

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 (Henshaw Creek weir) that provides inseason information to assess management actions as well as a postseason indexes of escapements of other tributaries 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 twelve years and provides one of the longer term databases on escapement in the entire Yukon River.

OBJECTIVES

This project is proposed as a three-year (2007–2009) study. The objectives are:

1. Enumerate the daily passage of Chinook and summer chum salmon.
2. Describe the age, sex, and length of Chinook and summer chum salmon.
3. Enumerate the daily passage of resident fish species.

METHODS

Investigators will install a resistance board weir across the Gisasa River, 4 km upstream from the mouth of the Gisasa River. The weir and passing chute will funnel fish into a live trap, which holds the fish so they can be counted (by species). Fish sampling will include measuring length, determining sex, and collecting scales.

PARTNERSHIP/CAPACITY BUILDING

Fairbanks Fish and Wildlife Field Office 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, the Fairbanks Fish and Wildlife Field Office 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. In 2007, renewed efforts will focus on promoting the project and the potential for local involvement to tribal and village groups in the lower Koyukuk River area.

JUSTIFICATION

This project addresses an issue specifically identified as a high priority need in the 2007 Request for Proposals, namely maintenance of reliable estimates of Chinook and chum salmon escapement over time. The project is technically sound and the Gisasa River weir supports one of the most comprehensive data sets (12 consecutive years) for salmon escapement in the lower Yukon River Geographic Unit for Chinook and summer chum salmon. It currently operates from late June through the middle of August, and provides escapement counts for Chinook and chum salmon. The U. S. Section of the Joint Technical Committee ranked the Gisasa River weir as second importance for Chinook salmon and third for summer chum salmon among existing escapement projects. Managers use the information provided by this weir project as an indicator of run timing and strength.

Project Number: 07-208
Project Title: Abundance and Run Timing of Adult Salmon in the Tozitna River
Geographic Region: Yukon
Data Type: Stock Status and Trends
Principal Investigator: Bob Karlen, Carl Kretsinger, and Jason Post, Bureau of Land Management

Cost: **2007:** $111,349 **2008:** $111,349 **2009:** $111,349

ISSUE

There is a need to document the abundance and run timing of salmon spawning in the middle and upper portions of the Yukon River. This data gap has been identified by fishery managers and as part of the Yukon River Comprehensive Salmon Plan for Alaska. The current lack of information makes it difficult for Federal and State managers to adjust fishing schedules to assure that the many objectives of salmon management are met. Recent severe declines in Yukon River drainage salmon runs have resulted in additional concerns about conserving stocks and providing for subsistence uses. The region's Regional Advisory Councils have called for a range of studies to address the salmon declines, including new projects that assess the production of salmon from tributary streams and quantify their contribution to the overall productivity of the Yukon River drainage. The Tozitna River escapement project addresses these concerns.

OBJECTIVES

1. Count adult Chinook and summer chum salmon passing through the weir.
2. Describe run-timing characteristics of Chinook and summer chum salmon.
3. Estimate the proportion of Chinook and summer chum salmon spawning in the Tozitna River downstream of the weir and document the location of spawning habitat throughout the drainage using aerial survey techniques.
4. Estimate the age and sex composition of Chinook and summer chum salmon weekly.
5. Estimate the mean length of Chinook and summer chum salmon by sex and age.

METHODS

The Bureau of Land Management (BLM) proposes to count adult Chinook and summer chum salmon as they pass through a floating resistance-board weir located at river kilometer 79 on the Tozitna River. Counting and sampling for age, sex, and length information would begin with the arrival of the first salmon and continue until the daily salmon passage drops to <1% of the cumulative count for three consecutive days for both species.

PARTNERSHIPS/CAPACITY BUILDING

In 2005 (and again in 2006), the Yukon River Drainage Fisheries Association provided BLM with a research assistant who provided the project with over 30 years of local knowledge. In an ongoing effort to involve nearby communities in the project, BLM would like to continue hiring rural residents while using the Yukon River Drainage Fisheries Association as a source of technicians for the project. If the project is funded, BLM will put a portion of the money into an agreement with the Yukon River Drainage Fisheries Association to cover the annual cost of one technician for the project.

To further capacity development, BLM also presents the Tozitna River escapement data annually to the Resource Advisory Councils as a means of information sharing with subsistence users of the Yukon River. BLM has also promoted interaction with subsistence users through the Partners for Fisheries Monitoring Program. Kim Elkin (Tanana Chiefs Conference) and Dave Waltemyer (Association of Village Council Presidents) and their technicians from the Partners Program visited the Tozitna project in 2003 in an effort to gain exposure to project operations and data gathering methodologies. BLM encourages continued information sharing like this in the future.

JUSTIFICATION

This project addresses an issue specifically identified as a high priority need in the 2007 Request for Proposals. The project is technically sound and supports 5 consecutive years of salmon escapement in the middle Yukon River. The U.S. Section of the Joint Technical Committee ranked the project as sixth importance for both Chinook and summer chum salmon, making the Tozitna River weir the lowest ranked Chinook salmon monitoring project in the lower Yukon River Geographic Unit. Managers use the information provided by this weir as an indicator of run timing and strength for the lower Yukon River Geographic Unit for Chinook and summer chum salmon.

Project Number:	07-252
Project Title:	Non-Salmon Fishing Practices and Traditional Knowledge in the Northern Yukon Flats Region of Alaska
Geographic Region:	Yukon
Data Type:	Harvest Monitoring/Traditional Ecological Knowledge
Principal Investigator:	Mike Koskey, ADFG Division of Subsistence
Co-Investigator(s):	Hishinlai' "Kathy " Sikorski, UAF Alaska Native Language Center Ingrid McSweeny, Bureau of Land Management Wennona Brown, USFWS Yukon Flats National Wildlife Refuge Davey James, Gwichyaa Zhee Gwich'in Tribal Government

Cost: 2007: $89,691 **2008:** $76,433 **2009:** $85,957

ISSUE

Non-salmon fish are an important subsistence resource. There may be an inverse relationship between salmon and non-salmon harvests, but there is little in-depth information on the changes that have influenced non-salmon fishing practices in the Northern Yukon Flats region. The ADFG Community Subsistence Information System reports wide variation in the contribution of non-salmon fish to the regional subsistence harvest by both year and location. The greatest take of non-salmon fish reported for a single year (1987) was in Fort Yukon at 75,965 pounds (29,083 fish). The proposed project will provide information on the contemporary harvest and use of non-salmon fish by residents of four Yukon Flats communities: Chalkyitsik, Venetie, Arctic Village and Fort Yukon—and to place these data within a historical framework of changing fishing practices within the region

OBJECTIVES

This project is designed on a three-year time-frame with the following goals:

1. Document the traditional ecological knowledge of non-salmon fish species in the Yukon Flats communities of Fort Yukon, Chalkyitsik, Venetie, and Arctic Village.
2. Estimate the harvest levels and use patterns of non-salmon fish species by village residents through systematic household surveys.
3. Identify and document historic and contemporary non-salmon harvest areas through resource use and Gwich'in placename mapping.

METHODS

The project relies on semi-structured ethnographic interviews with elders and other knowledgeable fishers, mapping, placename analysis, archival research, and participant-observation in order to address the first objective. The second objective is addressed through the implementation of a household harvest survey in each community conducted by a local research assistant. The final objective is addressed through a review of previously collected Gwich'in placenames as well as resource use mapping to be conducted during ethnographic interviews and reviewed during community meetings

PARTNERSHIPS/CAPACITY BUILDING

One of the primary strengths of this project is the cooperation of five organizations representing two Federal agencies (BLM and USFWS), one State agency (ADFG), one academic institution (Alaska Native Language Center), and one Alaska Native government (Gwichyaa Zhee).

JUSTIFICATION

The Technical Review Committee recommends funding this project. This is a potentially important project that ties in with several other Monitoring Program funded projects to provide a comprehensive understanding of non salmon harvest and use along the Yukon River. The project addresses an issue specifically identified as a high priority in the 2007 Request for Proposals, namely evaluating patterns and trends in subsistence fish harvests for important non-salmon fish species, and will likely provide valuable information for Federal subsistence fisheries management. The project is technically sound, contains a solid capacity building project, and investigators are qualified to conduct the proposed work. Investigators responded to Technical Review Committee comments in full. The budget increased 33% over the proposal submitted in January 2006.

Project Number: 07-253
Project Title: Continuity and Change in Salmon Harvest Patterns, Yukon River Drainage, Alaska
Geographic Region: Yukon
Data Type: Harvest Monitoring/Traditional Ecological Knowledge
Principal Investigator: Robert J. Wolfe, Robert Wolfe and Associates
Co-Investigator(s): Cheryl Scott, Alaskan Connections

Cost: 2007: $74,431 **2008:** $204,370 **2009:** $46,116

ISSUES

The primary issues addressed are the factors contributing to changes in subsistence harvest patterns for salmon along the Yukon River since the 1990s, the period of recent collapse of summer chum, fall chum, and coho salmon runs and restrictions of local subsistence and commercial salmon fisheries. The study will describe and analyze continuity, change, and trends in harvest patterns of federally-qualified subsistence users during this time period. The analysis will clarify how local families have responded to the salmon downturn in terms of household participation rates, fishing areas, mobility, use of seasonal fishing camps, types of equipment (such as boats, motors, fishwheels, net mesh size, and net length), effort, labor force composition, commercial-subsistence fishing interactions, species selection, harvests of fish, furbearers, and other wildlife, customary management practices, and other factors. The research will explore relationships of subsistence salmon harvests with other sectors of the local socioeconomic system, including commercial salmon harvests, furbearer harvests, and other fish and wildlife harvests. This type of information fits with Priority Information Needs for the Yukon Region: "Evaluate patterns and trends in subsistence fish harvests; factors to include, but are not limited to, demographic, economic, regulatory, and cultural issues."

OBJECTIVES

The objective of this study is to document continuity, change, and trends in the subsistence salmon fisheries of the Yukon River drainage as families have responded to salmon declines during the 1990s. The research will describe and examine continuity and changes in factors such as the following: local participation in salmon fishing, fishing efficiency, equipment, areas, mobility, fishing camps, species composition, workers, dogs, dog food, trapping/hunting furbearers, customary management of furbearer areas, commercial-subsistence fishing relationships, and out-migration of family members. The objective of the analysis is to produce a report that assesses continuity and change in these factors.

METHODS

The primary methods are face-to-face interviews with knowledgeable, local subsistence experts, and systematic surveys of households in three villages in the lower, middle, and upper Yukon River drainage. Additional methods are the compilation and analysis of existing databases on fish harvests by area, and consultation with other experts familiar with the fisheries.

PARTNERSHIPS/CAPACITY BUILDING

This project will develop partnerships and build capacity in rural villages. Before collecting new information, the first year provides a period of consultation with rural villages, fishing organizations, and local experts. The principal investigator will train three local researchers at each village location in social science methodology, including training in survey construction, sample selection, survey administration, note taking, key respondent interviews, and data management techniques. The local researchers will be responsible for conducting household interviews, comprising a central part of the study. To the extent the local researchers are members of existing rural organizations, this training will build capacity in local entities as well as in individuals. The project will pay honorarium to persons interviewed as part of the project. This recognizes the significant contributions of their knowledge in documenting trends and patterns in subsistence fisheries.

JUSTIFICATION

The Technical Review Committee recommends funding this project. The project addresses an issue specifically identified as a high priority issue in the 2007 Request for Proposals, namely to evaluate patterns and trends in subsistence fish harvests, including demographic, economic, regulatory and cultural issues. Project investigators are uniquely qualified to conduct the proposed work, and have a proven track record in conducting complex analyses such as the one described in this investigation plan. Investigators were highly responsive to all the Technical Review Committee comments, and have provided a very thorough, well written, and technically sound project. While somewhat high, the budget is clearly justified in the investigation plan, and based on the extensive involvement of the principal investigators in all phases of the project, appears justified. Understanding changing harvest patterns is a critical element of Federal subsistence fisheries management, and this research will make a significant contribution towards this goal. Investigators are encouraged to include an assessment of the effects of windowed fishing schedules on subsistence fishing in their analysis.

Project Number:	07-302
Project Title:	Kuskokwim River Chum Salmon Run Reconstruction
Geographic Region:	Kuskokwim
Data Type:	Stock Status and Trends
Principal Investigator:	Brian Bue, Bue Consulting LLC
Co-Investigator(s):	Douglas Molyneaux, ADFG Division of Commercial Fisheries

Cost: 2007: $49,015 **2008:** $56,398 **2009:** $0

ISSUE

The status of chum salmon populations within the Kuskokwim River drainage has been of concern in recent years due to apparently low run abundance. The Alaska Board of Fisheries identified Kuskokwim River chum salmon as a stock of concern in November 2000, and enacted regulations to reduce fishing opportunity in all fisheries so more chum salmon could escape to spawn. Reliable information on the numbers of salmon returning by year is essential if researchers are going to understand the mechanisms that drive variation of salmon abundance. This information is a prerequisite to investigating the effects of subsistence management actions, historical exploitation rates, long-term consequences of harvest practices, and the likelihood that projected abundance levels can sustain future harvests.

University of Alaska researchers began to approach the problem of reconstructing past returns by developing a statistical model which incorporated historical information (1976–1999) to estimate the magnitude of past chum salmon returns. The project showed promise but suffered because of insufficient information on salmon escapement. Numerous new projects to enumerate salmon escapement have been in place since the late 1990s and there is a strong chance that this new data will provide the needed resolution to allow the model to work properly. This project will build upon previous work by drawing in information from escapement and mark-recapture projects collected since 1999. Objectives of this project have been identified as high priority information needs by the Kuskokwim Fisheries Resource Coalition in the recent draft Gap Analysis for the Kuskokwim Area Salmon Research Plan.

OBJECTIVES

1. Estimate spawning and total abundance of chum salmon in the Kuskokwim River from 1976 through 2007 using a statistical model for combining multiple data sources.
2. Develop brood year tables for Kuskokwim chum salmon for the years 1976 through 2007 by combining the abundance estimates with estimates of age composition obtained from the subsistence and commercial fisheries as well as escapement enumeration projects.
3. Estimate the stock-recruitment relationship for the Kuskokwim River chum salmon population using the brood table developed in Objective 2 and the Ricker and Beverton-Holt stock-recruitment models.

METHODS

Total chum salmon abundance and escapement into the Kuskokwim River for return years 1976 through 2007 will be estimated using statistical models similar to those developed by University of Alaska

researchers for estimating historical chum salmon abundance in the Yukon and Kuskokwim Rivers. Our strategy will use all historic data related to abundance; including: subsistence catch numbers, catch numbers and rates from the inriver commercial fisheries, test fishery catch rates, weir counts, aerial surveys, sonar counts, and mark-recapture estimates. While no one of these abundance indices is likely to provide a reliable estimate of historical drainage wide abundance or escapement, when used in aggregate, they should provide a reasonably accurate estimate. We will combine these indices of abundance using multivariate statistical tools and a maximum likelihood estimation framework. The abundance and escapement estimates will be combined with all available data on salmon age composition to estimate brood tables for the Kuskokwim River chum salmon stock. Brood table information will then be used to estimate the stock-recruitment relationship for the drainage.

PARTNERSHIPS/CAPACITY BUILDING

Organizations that provide data processed by this project include Kuskokwim Native Association, Organized Village of Kwethluk, Orutsararmiut Native Council, Takotna Tribal Council, Tuluksak Traditional Council, ADFG Commercial Fisheries Division, and U.S. Fish and Wildlife Service (Kenai Fish and Wildlife Field Office; Yukon Delta and Togiak National Wildlife Refuges). In December 2005, this project was reviewed and supported by the Kuskokwim Fisheries Resources Coalition, a group that includes representatives from the ADFG Subsistence Division, ADFG Commercial Fisheries Division, the Association of Village Council Presidents, Kuskokwim Native Association, Orutsararmiut Native Council, Yukon Delta National Wildlife Refuge, USFWS Fisheries Information Services, and others.

JUSTIFICATION

The investigators propose analysis of existing data from 1976 through 2007 to estimate spawning and total abundance of chum salmon in the Kuskokwim River using a statistical model for combining multiple data sources; and to describe the spawner-recruit relationship of Kuskokwim River chum salmon assessing the influence of parental escapement abundance on variations in return. The proposed work would address an important research question and potentially could introduce innovative methodologies and management tools for Kuskokwim River chum salmon fisheries.

Project Number: 07-303
Project Title: Kuskokwim Salmon Age-Sex-Length Assessment
Geographic Region: Kuskokwim
Data Type: Stock Status and Trends
Principal Investigator: Douglas Molyneaux ADFG Division of Commercial Fisheries

Cost: 2007: $81,440 **2008:** $96,010 **2009:** $99,510

ISSUE

A number of projects have been funded through Fisheries Information Service to monitor salmon escapements and subsistence harvest, and most include collection of samples used to estimate salmon age, sex, and length (ASL) compositions. In 2005, ASL data were collected from 30,000 escapement samples, commercial and subsistence harvests, and the Bethel test fishery. This project provides the support required to process these ASL samples, compile the information, and provide consistent analysis of results to managers, project leaders and the public. The ASL information is used in a variety of ways including forecasting future run abundance, assessing effects of harvest methods, determining spawner-recruit relationships, studying causes of variation in freshwater and marine growth, and assessing many other short-term and long-term population trends.

OBJECTIVES

1. Estimate the age-sex-length (ASL) composition of Chinook, chum, and coho salmon samples collected from fisheries, escapements, and other Monitoring Program funded projects in the Kuskokwim Area.
2. Standardize ASL sampling throughout the Kuskokwim Area by providing sampling kits and instructions for measuring salmon length, sex determination, and collection of scales to all projects collecting ASL data in the Kuskokwim Area.
3. Standardize age determination of Kuskokwim Area salmon from scales by processing all collected scales at a central lab in Anchorage ADF&G with scale-ageing standardization across AYK.
4. Provide electronic and physical sample storage for project ASL data by loading ALS data into a central database and filing physical records (scales, acetates, data collection forms) in Anchorage (merging with data collected since 1961).
5. Provide access ASL data to researchers and public through responding to data requests for physical and electronic records of age and growth.

METHODS

Participants will deliver salmon ASL samples to the principal investigator. Samples will be from subsistence and commercial fisheries, as well as Kuskokwim River Region 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 electronically processed with standard computer programs to provide summaries of harvest and escapements partitioned into age, sex, and length categories. A local hire fish

and wildlife technician will be employed through Work Place Alaska hiring procedures to assist with ASL processing during the summer months. Summary information will be provided to various contributing project leaders and to participating subsistence harvest samplers.

PARTNERSHIP/CAPACITY BUILDING

The *Kuskokwim Salmon Age-Sex-Length Assessment* project is integrated into several Monitoring Program funded projects. Some of the organizations that will directly benefit from the project include ADFG Commercial Fisheries Division, ADFG Sport Fish Division, ADFG Subsistence Division, Association of Village Council Presidents, Kuskokwim Native Association, Organized Village of Kwethluk, Orutsararmiut Native Council, Native Village of Kwinhagak, Takotna Tribal Council, Tuluksak Traditional Council, Kenai Fish and Wildlife Field Office, Togiak National Wildlife Refuge, and Yukon Delta National Wildlife Refuge. All of these groups have projects that include the collection of salmon ASL samples and depend on ADFG Commercial Fisheries Division for processing samples.

JUSTIFICATION

The proposed work addresses an important research and monitoring needed by supporting standardization and quality control for the collection, analysis and documentation of analysis techniques for use by the fishery managers. This information is used to monitor sex, age and size composition of commercial, subsistence fisheries and escapement projects; develop brood tables to assess management actions, develop run strength outlooks, and describe spawner recruit relationships.

Project Number:	07-304
Project Title:	Tatlawiksuk River Salmon Weir
Geographic Region:	Kuskokwim
Data Type:	Stock Status and Trends
Principal Investigator:	Douglas Molyneaux,, ADFG Division of Commercial Fisheries
Co-Investigator(s):	David Orabutt, Kuskokwim Native Association Dan Costello, ADFG

Cost: 2007: $154,665 **2008:** $161,777 **2009:** $176,134

ISSUE

Tatlawiksuk River salmon contribute to subsistence, commercial, and recreational fisheries within the Yukon Delta National Wildlife Refuge. The status of salmon populations within the drainage, including Tatlawiksuk River, has been of concern due to low run abundance. Tatlawiksuk River weir is one of several projects used to develop reliable estimates of abundance, run timing, stock structure, productivity, and carrying capacity of salmon stocks in the Kuskokwim Region, which is identified by Office of Subsistence Management as a priority information need. The project provides fundamental escapement information necessary to facilitate in-season management decisions and to assess trends in salmon populations. This project is essential as a platform for several other projects and for developing escapement goals as is currently in consideration. This project also incorporates substantial capacity building and outreach components.

Salmon escapements to Tatlawiksuk River weir have been monitored successfully since 1999. Information from this project has become integrated into the annual management process, 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 #04-354).

OBJECTIVES

1. Determine daily and total annual Chinook, chum, and coho salmon escapements to Tatlawiksuk River from 15 June to 20 September;
2. Estimate age, sex, and length composition of annual Chinook, chum, and coho salmon escapements;
3. Monitor habitat variables including daily water temperature, water level, and stream discharge;
4. Provide mentorship and administer education curriculum to Kuskokwim Native Association high school interns; and,
5. 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. A live trap will be used to sample salmon for scales, sex and length information, and for tag recovery. Investigators will also record daily water temperature, water level, and weather conditions. A local technician hired by the Kuskokwim Native Association will operate the project along with a lead crew member provided by ADFG. The project will also serve as a platform to host students from the Kuskokwim Native Association Student Internship Program.

PARTNERSHIP/CAPACITY BUILDING

Kuskokwim Native Association and ADFG have been cooperators on salmon escapement enumeration projects on the George and Tatlawiksuk Rivers since 1996 and 1998, respectively. Oversight of field operations is shared between the Kuskokwim Native Association and ADFG Division of Commercial Fisheries. ADFG takes the lead in data management, data analysis and reporting; however, more of this responsibility is expected to shift to the Kuskokwim Native Association. This budget also includes approximately $25,000 annual funding support for ADFG senior scientists, and $16,000 annual funding support for the Kuskokwim Native Association senior scientists.

JUSTIFICATION

The Tatlawiksuk River weir is an established and successful cooperative project operated by Kuskokwim Native Association and ADFG. The project provides valuable escapement and biological sampling data for salmon stocks in an important sub basin of the Kuskokwim River, promotes local involvement, and develops the capacity of Kuskokwim Native Association to monitor fish populations.

Project Number:	07-305
Project Title:	Kanektok — Goodnews River Salmon Run Assessment Projects
Geographic Region:	Kuskokwim
Data Type:	Stock Status and Trends
Principal Investigator:	John Linderman, ADFG Division of Commercial Fisheries
Co-Investigator(s):	Edward Mark, Native Village of Kwinhagak Mark Lisac, USFWS Togiak National Wildlife Refuge

Cost: **2007:** $108,900 **2008:** $101,000 **2009:** $104,600

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 enumerate coho salmon stocks). Both of these projects enumerate 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. Enumerate 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 enumerate 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/CAPACITY BUILDING

Goodnews weir will be staffed by two ADFG Fish and Wildlife Technicians and one local hire USFWS Fisheries Technician.

The Kanektok River weir is operated cooperatively by ADFG, Native Village of Kwinhagak, and USFWS Togiak National Wildlife Refuge.

Regular consultations between ADFG, the Native Village of Kwinhagak, USFWS, CVRF and local stake holders will occur throughout the year to coordinate logistics, discuss results, and exchange ideas.

JUSTIFICATION

The Goodnews and Kanektok River weirs are established and successful monitoring projects that provide the primary escapement and run strength data used to ensure sustainability of Kuskokwim Bay subsistence fisheries and conserve fisheries stocks in the Goodnews and Kanektok Rivers. This proposal would support continued operations of both the Kanektok and Goodnews River weirs for a complete field season enumerating escapements of Chinook, sockeye, chum and coho salmon. These projects also serve as important platforms for ongoing Dolly Varden char research being conducted by the Togiak NWR.

Project Number:	07-306
Project Title:	Kwethluk River Salmon Weir
Geographic Region:	Kuskokwim
Data Type:	Stock Status and Trends
Principal Investigator:	Ken Harper, USFWS Kenai Fish and Wildlife Field Office
Co-Investigator(s):	Native Village of Kwethluk

Cost: 2007: $176,157 **2008:** $187,863 **2009:** $190,403

ISSUE

Management of Kuskokwim Area salmon fisheries is complex because of annual variability in run size and timing, harvesting of mixed stocks, overlapping runs of multiple species, allocation issues, and the immense size of the Kuskokwim River drainage. Fishery managers need salmon escapement data from representative rivers that contribute to this complex mixed stock subsistence fishery. Investigators will collect data on chum, Chinook, sockeye, and coho salmon.

OBJECTIVES

1. Enumerate the daily passage of Chinook, chum, sockeye, and coho salmon and resident fish species through the weir.
2. Describe the run-timing or proportional daily passage of Chinook, chum, pink, sockeye, and coho salmon through the weir.
3. Estimate the weekly sex and age composition of Chinook, chum, and coho salmon such that simultaneous 90% confidence intervals have a maximum width of 0.20.
4. Estimate the mean length of Chinook, chum and coho salmon by sex and age.
5. Enumerate the number of Chinook, chum, pink, sockeye, and coho salmon carcasses that wash down onto the weir each day.
6. Monitor passage of any salmon (Chinook, chum, sockeye and coho salmon) that may be tagged in middle Kuskokwim River mark recapture studies.

METHODS

Investigators will install a resistance board weir across the Kwethluk River, 78 river kilometers upstream from the Kuskokwim River. Salmon will be counted as they pass through a counting chute located on a live trap. Weekly samples of length, sex, and scales will be collected from fish passing up stream, and gill net marks will be noted before releasing sampled fish up-stream from the weir. Local technicians hired by the Organized Village of Kwethluk will be trained by the Kenai Fish and Wildlife Field Office in weir operations and biological sample collection methodology.

PARTNERSHIP/CAPACITY BUILDING

Capacity building will continue, as the USFWS mentors and trains 3–5 village technicians in project operations. This project reaches the cooperation level of capacity building (level 5) and potentially could fully become a partnership of equals between the USFWS and the Organized Village of Kwethluk. We have developed a formal agreement that has been signed by both parties committing the Service to making it a priority to train village personnel for crew and possible leaders. Under this signed agreement, the village has agreed to recruiting technicians with the understanding that they will be expected to follow a set work schedule to ensure proper function of the project. The village will also have technicians available to assist with and learn the process of installation and removal of the weir. They will participate in the operation and collection of escapement data. This will provide an educational basis for employees and the village government to further their understanding of the management of lower Kuskokwim River commercial and subsistence fisheries.

In partnership with the Association of Village Council Presidents and their Partners Biologist the Kenai Kenai Fish and Wildlife Field Office office is currently working with Association of Village Council Presidents and the Yukon Delta National Wildlife Refuge and planning for hosting science camp students at the weir in 2006 and beyond. The Kenai Fish and Wildlife Field Office will provide biologists to mentor students when they spend time at the fish weir. It is expected that the Partners Biologist will be available to work at the weir when needed to expand their understanding of the weir. This educational mentoring will be crucial in developing future village weir technicians, crew leaders, and biologists at these projects.

JUSTIFICATION

The Kwethluk 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 Kwethluk River. There is a strong Federal Nexus with the Yukon Delta National Wildlife Refuge; and the Kwethluk River 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.

Project Number:	07-307
Project Title:	Salmon Run Timing and Abundance in the Tuluksak River
Geographic Region:	Kuskokwim
Data Type:	Stock Status and Trends
Principal Investigator:	Ken Harper, USFWS Kenai Fish and Wildlife Field Office
Co-Investigator(s):	Tuluksak Native Community

Cost: 2007: $154,061 **2008:** $159,574 **2009:** $173,610

ISSUE

Management of Kuskokwim Area salmon fisheries is complex because of annual variability in run size and timing, harvesting of mixed stocks, overlapping runs of multiple species, allocation issues, and the immense size of the Kuskokwim River drainage. Fishery managers need salmon escapement data from representative rivers that contribute to this complex mixed stock subsistence fishery. Investigators will collect data on chum, Chinook, sockeye, and coho salmon.

OBJECTIVES

1. Enumerate the daily passage of Chinook, chum, sockeye, and coho salmon and resident fish species through the weir.
2. Describe the run-timing or proportional daily passage of Chinook, chum, pink, sockeye, and coho salmon through the weir.
3. Estimate the weekly sex and age composition of Chinook, chum, and coho salmon such that simultaneous 90% confidence intervals have a maximum width of 0.20.
4. Estimate the mean length of Chinook, chum and coho salmon by sex and age.
5. Enumerate the number of Chinook, chum, pink, sockeye, and coho salmon carcasses that wash down onto the weir each day.
6. Monitor passage of any salmon (Chinook, chum, sockeye and coho salmon) that may be tagged in middle Kuskokwim River mark recapture studies.

METHODS

Investigators will install a resistance board weir across the Tuluksak River 49 river kilometers (rkm) upstream from the confluence with the Kuskokwim River. Salmon will be counted as they pass through a counting chute located on a live trap. Weekly samples of length, sex, and scales will be collected from fish passing up stream, and gill net marks will be noted before releasing sampled fish up-stream from the weir. Local technicians hired by the Tuluksak Native Community will be trained by the Kenai Fish and Wildlife Field Office in weir operations and biological sample collection methodology.

PARTNERSHIP/CAPACITY BUILDING

Capacity building will continue, as the USFWS mentors and trains 3–5 village technicians in project operations. This project reaches the cooperation level of capacity building (level 5) and potentially could fully become a partnership of equals between the USFWS and the Tuluksak Native Community. We have developed a formal agreement that has been signed by both parties committing the Service to making it a priority to train village personnel for crew and possible leaders. Under this signed agreement, the village has agreed to recruiting technicians with the understanding that they will be expected to follow a set work schedule to ensure proper function of the project. The village will also have technicians available to assist with and learn the process of installation and removal of the weir. They will participate in the operation and collection of escapement data. This will provide an educational basis for employees and the village government to further their understanding of the management of lower Kuskokwim River commercial and subsistence fisheries.

In partnership with the Association of Village Council Presidents and their Partners Biologist the Kenai Fish and Wildlife Field Office is currently working with the Association of Village Council Presidents and the Yukon Delta National Wildlife Refuge and planning for hosting science camp students at the weir in 2006 and beyond. The Kenai Fish and Wildlife Field Office will provide biologists to mentor students when they spend time at the fish weir. It is expected that the Partners Biologist will be available to work at the weir when needed to expand their understanding of the weir. This educational mentoring will be crucial in developing future village weir technicians, crew leaders, and biologists at these projects.

JUSTIFICATION

The Tuluksak River weir is an established and successful monitoring project that provides the escapement and run strength data used to ensure sustainability and conservation of fisheries stocks in the Kuskokwim River. There is a strong federal nexus with the Yukon Delta National Wildlife Refuge; and the Tuluksak River 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.

Project Number:	07-401
Project Title:	Stock Assessment and Restoration of the Afognak Lake Sockeye Salmon Run
Geographic Region:	Southwest
Data Type:	Stock Status and Trends
Principal Investigator:	Steven Honnold, ADFG Division of Commercial Fisheries
Co-Investigator(s):	Stephen Schrof and Robert Baer, ADFG Division of Commercial Fisheries

Cost: 2007: $76,726 **2008:** $76,726 **2009:** $81,039

ISSUE

The investigators will continue to assess sockeye salmon production at Afognak Lake in response to the declining adult runs that began in 2001 and have continued through 2005. In response to the declining runs from 2001 to 2004, State and Federal managers closed subsistence fishing in early June during the 2002 season, and in-season closures have occurred each year through 2005 in an attempt to achieve the escapement goals for sockeye salmon into Afognak Lake. This project will continue investigations started in 2003 that were intended to develop possible strategies for increasing future sockeye salmon production for the subsistence fishery in Afognak Bay. Moreover, the Kodiak/Aleutians Subsistence Regional Advisory Council has determined the Afognak Lake sockeye assessment and monitoring project to be one of their highest priority issue and information needs.

OBJECTIVES

1. Estimate the number, age, and average size at age of sockeye salmon smolt emigrating from Afognak Lake from 2007–2009.
2. Evaluate the water chemistry, nutrient status, and plankton production of Afognak Lake from 2007–2009.
3. Assess the rearing conditions for juvenile sockeye salmon in Afognak Lake based upon completion of objectives 1 and 2.

Methods

A smolt trap will be installed in the Afognak River to capture a portion of the sockeye salmon smolt outmigration from Afognak Lake. Trap efficiency will be determined using mark-recapture techniques in order to estimate the total sockeye salmon smolt outmigration from Afognak Lake. Associated trapping, handling, and marking mortality will be determined.

The ADFG field crew will collect age, weight, and length data from 40 sockeye salmon smolt per day for five consecutive days per week. These data will be used to estimate the age composition and average length, weight and condition factor by age of the Afognak Lake sockeye salmon smolt outmigration. ADFG staff will also collect limnology information from Afognak Lake, including water chemistry, nutrient, phytoplankton, zooplankton, temperature, dissolved oxygen, and light penetration data. Lake samples will be analyzed in Kodiak at the ADFG limnology laboratory. Investigators will use the smolt information along with limnology and other freshwater data to assess the carrying capacity for juvenile sockeye salmon in Afognak Lake.

PARTNERSHIPS/CAPACITY BUILDING

ADFG biologists are currently working with administrators in the Kodiak Island Borough School District's Rural Schools Office to educate students on the Afognak Lake sockeye salmon project and its importance to the subsistence users. ADFG biologists will travel to the Villages of Port Lions and Ouzinkie, and local Kodiak area schools for a visual presentation of the project. Contact with the Native Village of Afognak, Inc. is underway to foster a relationship for planning future trips to the project site for village members and discuss the work being done at the Afognak Lake system in an attempt to increase sockeye salmon production to Afognak Lake for subsistence purposes.

The ADFG will give preference to locals, including qualified residents of the Villages of Port Lions and Ouzinkie, when hiring sampling crews. If appropriate, internships will be developed through the University of Alaska to provide career-track positions. Local employees will be trained in various biological data collection techniques and will be educated in many research applications that assist with salmon management.

JUSTIFICATION

This project is of high strategic importance for the Kodiak Management Area, is technically sound, is a continuation of work successfully conducted since 2003, and has a reasonable schedule and budget for the proposed work. The investigators have a proven record of successfully conducting, administering, and completing other Fisheries Resource Monitoring Program projects. While capacity building would have been adequate as described in the original proposal, hiring local research assistants and developing the student internship for local residents represents a substantial improvement. The investigators have incorporated Technical Review Committee proposal recommendations concerning strengthening of capacity building and information sharing into the investigation plan.

Project Number: 07-402

Project Title: Buskin River Sockeye Salmon Stock Assessment and Monitoring, Kodiak, Alaska

Geographic Region: Southwest

Data Type: Stock Status and Trends

Principal Investigator: Donn Tracy, ADFG Division of Sport Fish

Cost: 2007: $99,200 **2008:** $78,100 **2009:** $79,200

ISSUE

Investigators will annually enumerate escapement and sample age composition of sockeye salmon into the Buskin River drainage for inseason management of subsistence and other fisheries and development of a biological escapement goal. Investigators will also interview subsistence fishers to determine demographics of participants and use of harvested fish, and previous and potential future participation in subsistence fisheries in the area.

OBJECTIVES

1. Census the sockeye salmon escapement into Buskin and Louise Lakes from June 1 through August 15.
2. Estimate the age composition of the combined subsistence harvest in the Buskin River Section of Chiniak Bay and sockeye salmon escapement into Buskin Lake from June 1 to August 15 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 to Louise Lake from June 1 to August 15 such that the estimates are within 7.5 percentage points of the true value 95% of the time.
4. Evaluate the sockeye salmon biological escapement goal.
5. Census the residence of subsistence fishery participants.
6. Estimate the distribution of use of subsistence-harvested fish, and the historic and potential future use of the Buskin River subsistence fishery such that all estimates are within 8 percentage points of the true values 95% of the time.

METHODS

Investigators will install a salmon counting weir on the Buskin River and Lake Louise tributary to annually census 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. Analyses of the return and age data will be incorporated into a brood table. Past estimates of total return, using sample sizes similar to those proposed here have been associated with a relative precision of about 12%. Collection of return and age data at this level of sampling will improve information in the brood table and, subsequently, evaluation of the biological escapement goal. Participants in the fishery will be surveyed to estimate the residency and fish stock(s) traditionally harvested by fishery participants.

PARTNERSHIPS/CAPACITY BUILDING

The investigators promote local hire of federally qualified subsistence users as project technicians. During each year of funding the investigators will continue a 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 priority information needs for the Kodiak Management Area, is technically sound, is a continuation of work successfully conducted since 2000, and has both a reasonable schedule and budget for the proposed work. The investigators have a proven record of successfully conducting, administering, and completing other Fisheries Resource Monitoring Program projects. The investigators were responsive to recommendations made by the Technical Review Committee during their review of the initial proposal, and were generally successful in addressing these within the investigation plan. Further clarification is needed within the Methods section concerning the reasoning behind the investigators' decision to interview 150 subsistence fishers during the season and why this would result in estimates of "the distribution of use of subsistence-harvested fish, and the historic and potential future use of the Buskin River subsistence fishery…that…are within 8 percentage points of the true values 95% of the time." Finally, minor discrepancies in subsistence harvest numbers for 2002 and 2003 reported in the investigation plan should be resolved with harvest numbers for these years included in the 2004 annual report for project 04-414.

Project Number:	07-404
Project Title:	Estimation of Coho Salmon Escapement in Streams Adjacent to Perryville and Sockeye Salmon Escapement in Clark River, Alaska Peninsula National Wildlife Refuge
Geographic Region:	Southwest
Data Type:	Stock Status and Trends
Principal Investigator:	Jim Larson, USFWS, King Salmon Fish and Wildlife Field Office

Cost: 2007: $0 2008: $31,000 2009: $31,000

ISSUE

Conservation and subsistence concerns still exist for coho salmon stocks in the Kametolook drainage, and subsistence effort has expanded to adjacent drainages. During Regional Advisory Council meetings and at the Perryville Subsistence Working Group meetings, local residents stated that they were now taking coho salmon from other streams outside the immediate vicinity of Perryville. In many ways, these streams are similar to streams near Perryville in that they are short, high gradient streams with limited coho salmon abundance. In order to prevent over harvest of these small coho salmon stocks, escapement and harvest levels need to be monitored.

Sockeye salmon in the Chignik watershed are an important species for commercial and subsistence harvest. Subsistence fishers from the Chignik Villages target late run sockeye salmon. In recent years, subsistence fishers in the Chignik area have had difficulty harvesting enough late run fish and are concerned that this run has declined and may be over-exploited by the commercial fishery. We need to monitor sockeye salmon escapement in the Chignik watershed to ensure escapement is maintained to meet subsistence needs for residents of the Chignik villages.

The King Salmon Fish and Wildlife Field Office proposes to continue monitoring adult coho salmon returns in streams near Perryville, and to continue monitoring late run sockeye salmon returns to Clark River, a tributary to Chignik Lake. The run timing of these stocks is similar and lend themselves to concurrent monitoring. This project addresses Priority Need #1 for the Chignik Unit identified for the 2007 Fisheries Resource Monitoring Program by providing escapement information for late-run sockeye salmon in the Clark River, and addresses Priority Need #2 for the Chignik Salmon Unit by providing coho salmon escapement information for systems draining into Ivanof, Humpback, Anchor, and Ivan bays. Continuation of this project will increase baseline escapement data and provide a better understanding of run timing and adult production in these systems.

OBJECTIVES

1. Estimate minimum numbers of coho salmon returning to streams near the village of Perryville.
2. Estimate minimum numbers of late run sockeye salmon returning to the Clark River, a tributary to Chignik Lake.

METHODS

Two aerial surveys will be conducted annually (one in late September/early October, and one in mid to late October) using low-level helicopter flights. An observer will fly all of the chosen stream reaches in the study area (streams in Ivanof, Humpback, Anchor, and Ivan bays, and the Clark River) and count coho and sockeye salmon from a low-flying helicopter. We will coordinate our flights to avoid periods of turbid flow to minimize counting error. Our assumption is that aerial counts will provide a minimum estimate of escapement. We will not expand the counts.

PARTNERSHIPS/CAPACITY BUILDING

The project has developed partnerships between the villages of Perryville and Chignik and the King Salmon Fish and Wildlife Field Office through meetings that utilized the local knowledge to identify streams for monitoring. The local citizens have the knowledge of where fishing pressure has shifted with the closure of the local rivers, and thus where monitoring is necessary to ensure escapement needs are met. In-season communication with the local residents is also conducted to determine if salmon escapement is sufficient to satisfy subsistence needs in the survey area, and to coordinate survey timing.

JUSTIFICATION

This project is of high strategic importance for the Chignik Management Area, is a continuation of work successfully conducted since 2003, and has both a reasonable schedule and budget for the proposed work. The investigator has a proven record of successfully conducting, administering, and completing other Fisheries Resource Monitoring Program projects. While it would be preferable to have quantifiable objectives to monitor these runs, it would not be feasible or cost-effective to modify this project to accomplish this due to frequent storms, high water events, and the difficulty to access most of these streams.

Project Number:	07-405
Project Title:	Estimation of Sockeye Salmon Escapement into McLees Lake, Unalaska Island
Geographic Region:	Southwest
Data Type:	Stock Status and Trends
Principal Investigator:	Jim Larson, USFWS King Salmon Fish and Wildlife Field Office
Co-Investigator(s):	Sharon Livingston, Qawalangin Tribe Forest Bowers and Matt Foster, ADFG Division of Commercial Fisheries

Cost: 2007: $79,964 **2008:** $75,929 **2009:** $77,961

ISSUE

The King Salmon Fish and Wildlife Field Office is seeking to continue monitoring the sockeye salmon escapement into McLees Lake for an additional three years. Sockeye salmon returns to McLees Lake have varied greatly over the past five years ranging from 12,097 in 2005 to 101,793 in 2002. Continuation of this project will increase the baseline escapement data and provide a better understanding of system productivity. A better understanding of productivity is necessary to manage the subsistence fishery and know the level of exploitation on this stock. If annual production results in run sizes around the 2005 escapement, there is the potential for this stock to be highly exploited. However, if the 2002 and 2003 escapements are typical, then concerns of high exploitation are not warranted at the current harvest level. At this time we do not have a clear pattern of escapement into McLees Lake. Without this information the management of the subsistence fishery will be conservative. Conservative management could limit subsistence fishing opportunities unnecessarily. If the need for an escapement goal arises in the future, the continued monitoring we propose will provide information necessary for the development of an escapement goal for this system. Managers need a better understanding of McLees Lake sockeye salmon production to maximize subsistence opportunities while protecting the health of the population. Additionally, continuation of this project will provide information needed to determine the effects the large escapements of 2002 (97,780) and 2003 (101,793) had on the dynamics of this stock. The sockeye salmon run is important to local subsistence users in Unalaska.

OBJECTIVES

1. Enumerate the daily passage of sockeye salmon through the weir;
2. Describe the run-timing, or proportional daily passage, of sockeye salmon through the weir;
3. Estimate the sex and age composition of sockeye salmon such that simultaneous 90% confidence intervals have a maximum width of 0.20; and
4. Estimate the mean length of sockeye salmon by sex and age.

METHODS

The U.S. Fish and Wildlife Service will install and operate a flexible picket weir at the outlet of McLees Lake. The weir will be operated from approximately May 30 to August 15 during each year of the project. A trap and holding area will be located on the upstream side of the weir to facilitate sampling

and passing adult salmon through the weir. Fish will be passed and counted intermittently between 0800 and 2300 hours each day. All fish passing upstream will be identified to species and enumerated. Data on sockeye salmon age, sex, and length will be collected weekly. Sampling will consist of measuring length, determining sex, collecting scales, and then releasing the fish upstream of the weir.

PARTNERSHIP/CAPACITY BUILDING

This project will assist in developing partnerships between the U.S. Fish and Wildlife Service, the Qawalangin Tribe of Unalaska, and the Alaska Department of Fish and Game. Capacity building will occur with the Qawalangin Tribe by their direct participation in the collection of escapement data that will be used to develop management strategies for the Reese Bay subsistence fishery. The King Salmon Fish and Wildlife Field Office crew leader will act as a mentor with the purpose of training the local technicians to become crew leaders for future weir operations. Local technicians will be trained in the installation and operation of a fish weir, biological sampling procedures, and data collection and verification methods. In conjunction with the University of Alaska Fairbanks Marine Advisory Program representative, annual project presentations will be given to the community of Unalaska.

JUSTIFICATION

This project is of high strategic importance for the Aleutian Islands Management Area, is technically sound, is a continuation of work successfully conducted since 2001, and has both a reasonable schedule and budget for the proposed work. The Principal Investigator has a proven record of successfully conducting, administering, and completing other Fisheries Resource Monitoring Program projects. The investigators addressed Technical Committee proposal review comments by including information on variance estimates for mean length in the Methods section for Objective 4 and omitting Objective 5 concerning escapement goal development. The investigators also need to include information in the Methods section on their intention to report standard errors and ranges of mean lengths, by age and sex, as they have done for projects 01-059 and 04-403.

Project Number:	07-408
Project Title:	Stock Assessment of Rainbow Smelt in the Togiak River
Geographic Region:	Southwest
Data Type:	Stock Status and Trends
Principal Investigator:	Jim Larson, USFWS King Salmon Fish and Wildlife Field Office
Co-Investigator(s):	Robbin LaVine, Bristol Bay Native Association Pat Walsh, USFWS Togiak National Wildlife Refuge

Cost: 2007: $78,141 **2008:** $78,352 **2009:** $31,827

ISSUE

Rainbow smelt are among the most harvested non-salmon fish by subsistence users in the villages of Togiak and Twin Hills. The only information on smelt in southwest Alaska is the documented subsistence harvest surveys conducted by ADFG and Bristol Bay Native Association. Conservation managers need basic life history data such as sex and age composition, in addition to harvest information, to maximize subsistence opportunities while continuing to protect the health of the population. This project would be the first steps in furthering our understanding of the life history of an important subsistence species. This project addresses two of the six priority information needs for the Bristol Bay-Chignik non-salmon group.

OBJECTIVES

1. Estimate age and sex composition of spring spawning populations of rainbow smelt in the Togiak River such that simultaneous 90% confidence intervals have a maximum width of 0.20.
2. Estimate age and sex composition of rainbow smelt harvested by the winter subsistence fishery in the Togiak River such that simultaneous 90% confidence intervals have a maximum width of 0.20.
3. Estimate mean length of rainbow smelt in the Togiak River by sex, age, and time of year.
4. Describe the maturation rate from November to June.
5. Identify spawning locations and timing of rainbow smelt in the Togiak River.
6. Conduct larval assessment as index of relative run strength.

METHODS

A two-year sampling regime will begin in 2007 with winter sampling during the subsistence harvest season followed by spring sampling from mid-May through June 2008. Rainbow smelt will be harvested during the winter subsistence fishery and analyzed for age, length, sex, food habits, and maturity. Locations for sampling will be determined by accessing local knowledge of customary fishing areas; time and dates to fish will be scheduled to match as closely as possible the schedule used by the subsistence fishers. Fish will be frozen and shipped to the King Salmon Fish and Wildlife Field Office for processing. Beginning in May, a three person crew will access the lower Togiak River by boat, sampling for spawning locations, egg and larvae collection, run timing, and population characteristics. Sampling will be conducted using a long-handled dip net, a variable-mesh monofilament gill net and a seine net. Sampling

locations include a gravel bar located about 200 m upstream from the mouth of the Togiak River as well as other spawning areas correlated with the gull activity and other surface disturbances associated with spawning activity. We will examine each location with a small under-water video camera and sample the substrate directly below. This sampling regime will allow for comparison between fish targeted by the subsistence fishery in the winter and fish found in the river during the spring spawning run.

Spawning productivity estimates based on in-river, egg and larval density measurements will be used to develop an index of larval smelt abundance that will be used to monitor the long-term population trends of the Togiak rainbow smelt. Variation in vulnerability and catchability of adults can be a problem with other assessment techniques that use seines, trawls, gill nets or traps. Ichthyoplankton catchability, however, is relatively constant, as most targets are small (< 15 mm), and unable to avoid the nets. Fishing skill usually is not a complicating factor in capturing larvae so catchability or sampling variation is minimal. For these reasons, larval samples may provide better unbiased estimates of the population than samples from other gear types. Ichthyoplankton surveys that utilized replicate sampling and bootstrapping techniques derived consistent estimates with relatively tight confidence intervals.

PARTNERSHIPS AND CAPACITY BUILDING

The Bristol Bay-Chignik Area Planning Work Group identified the lack of information on rainbow smelt in the Togiak River as a high priority need (OSM 2005). King Salmon Fish and Wildlife Field Office will provide a crew leader for this project and will conduct the data analysis; Togiak National Wildlife Refuge will conduct the sampling of the winter subsistence fishery; Bristol Bay Native Association will provide technicians to assist in data collection. This project will assist in developing partnerships between the U.S. Fish and Wildlife Service, the Native Village of Togiak, and the Bristol Bay Native Association. Capacity building will occur with the Native Village of Togiak by their direct participation in the collection of life history data that will be used to develop management strategies for the Togiak River subsistence fishery. The King Salmon Fish and Wildlife Field Office crew leader will act as a mentor with the purpose of training the local technicians to become crew leaders for future fishery data-collection operations. Local technicians will be trained in the use of collection gear, boating, biological sampling procedures, and data collection and verification methods. In this manner, local community members will develop a greater sense of ownership of conservation programs, with the intent that technicians will return as crew leaders, and these crew leaders will later attend post-secondary and graduate schools to develop the professional skills needed to take charge of conservation research. In conjunction with the Togiak National Wildlife Refuge representative, annual project presentations will be given to the community of Togiak.

JUSTIFICATION

This proposal would address information needs of strategic importance for non-salmon fisheries within the Bristol Bay Management Area. While the Non-Salmon Fisheries Unit was ranked as a lower priority than either of the salmon fisheries units within the strategic plan, rainbow smelt is an important component of the Togiak subsistence harvest and very little information is available on this resource. The investigators successfully addressed all needed modifications contained within the Technical Review Committee's proposal review. The proposal is technically sound, has a reasonable schedule and budget for the proposed work, and investigators have a proven record of successfully conducting, administering, and completing other Fisheries Resource Monitoring Program projects.

Project Number: 07-452
Project Title: The Kvichak Watershed Subsistence Fishery: An Ethnographic Study
Geographic Region: Southwest
Data Type: Harvest Monitoring/Traditional Ecological Knowledge
Principal Investigator: James Fall, ADFG, Division of Commercial Fisheries
Co-Investigator(s): Davin Holen, ADFG, Division of Subsistence
Robbin La Vine, Bristol Bay Native Association Natural Resource Department
Theodore Krieg, ADFG, Division of Subsistence
Michelle Ravenmoon and Karen Gaul, NPS Lake Clark National Park and Preserve

Cost: 2007: $146,119 **2008:** $111,814 **2009:** $42,320

ISSUE

This ethnographic study will investigate how families in four communities of the Kvichak District of the Bristol Bay Management Area (Iliamna, Newhalen, Nondalton, and Port Alsworth) develop subsistence fishing strategies in response to changing sociocultural, economic, and environmental circumstances. Such ethnographic information about community patterns of subsistence use and adaptation is lacking, but is essential for the effective management of fisheries to provide for subsistence uses. Subsistence sockeye salmon harvests in the Kvichak District have declined since the early 1990s. Poor sockeye salmon returns are likely one factor responsible for declining harvests, but socioeconomic and sociocultural factors may be partly responsible as well. Further, the current household permit system may inadequately document participation, harvest levels, and harvest timing for at least some very active multi-household extended families, creating difficulties for tracking harvest trends. The three research questions are: (1) how do families make decisions about subsistence fishing in light of ever-changing sociocultural, economic, and environmental circumstances; (2) what factors shape annual variations in subsistence harvests of Kvichak fish, and (3) which of these factors shape long-term trends in the fishery. The study will use a combination of research methods organized in stages to build upon findings as the study progresses. The results will be directly useful for fisheries managers for interpreting changing subsistence harvest levels and participation rates for salmon and for nonsalmon fish and in providing more precise harvest data. Portions of this management area are within the Lake Clark National Park and Preserve; the proposed study communities are Resident Zone Communities of the park.

OBJECTIVES

1. Prepare an ethnographic description of the subsistence sockeye salmon fisheries of the communities of Nondalton, Newhalen, Iliamna, and Port Alsworth in 2007 regarding: the social organization of harvesting, processing, and distributing the catch; the location of harvests, including use of fish camps; gear types; and processing methods.
2. Estimate the subsistence sockeye salmon harvests, including harvests by location, date, and social group for Nondalton, Iliamna, Newhalen, and Port Alsworth in 2007.

3. Document the social context of subsistence fishing for salmon and other fish for four case study families over the course of one year as examples of community use patterns (2007/2008).
4. Describe the decision-making process of the four case study families in annual subsistence harvests of salmon and other fish, including adjustments made in response to resource abundance, the species selection process, and the selection of family members for harvesting.
5. Identify the social, cultural, economic and environmental factors that shaped subsistence salmon harvesting activities in Nondalton, Iliamna, Newhalen, and Port Alsworth in 2007.
6. Describe changing subsistence fishing strategies and patterns in the subsistence salmon fishery that have developed in the study communities over the last 20 to 25 years.

METHODS

(1) *A literature review* will identify trends in the Kvichak sockeye run and the subsistence fishery and help frame questions for key respondents and topics for the ethnographic fieldwork. (2) *Ethnographic fieldwork* during subsistence sockeye salmon fishing in the summer and fall of 2007 will address Objectives 2, 3, 5, and 6. The goal will be to describe the decision-making processes involved in subsistence fishing and organization of subsistence salmon harvesting. (3) *Family case studies* address Objectives 3, 4, 5, and 6. Documentation of subsistence activities and harvests of four families will take place over the course of a year (2007/2008) using logbooks, journals, photographs, and interviews. (4) *Key respondent interviews and oral histories* will contribute to meeting Objectives 1 and 2. About 20 interviews will record the history of fish camps, describe organizational principles of the subsistence fishery, and assess trends in the salmon run and subsistence fishing methods and harvests as informed by traditional knowledge. (5) *Systematic household harvest surveys* with about 20 to 30 households will address objective 2 and supplement 2007 harvest data from permits to help evaluate harvest data in light of observations about the social organization of fishing from the ethnographic fieldwork, family case studies, and key respondent interviews.

PARTNERSHIP/CAPACITY BUILDING

The project will be a collaboration between ADFG, NPS, and BBNA. NPS and BBNA local resident interns and other local resident research assistants will be trained to assist with literature review, ethnographic fieldwork, key respondent interviews, and harvest surveys. Case study families will be trained in data gathering methods and compensated for their involvement.

JUSTIFICATION

The Technical Review Committee recommends funding this proposal with modifications. The project addresses several high priority issues identified in the 2007 Request for Proposals, and is a strong collaborative effort. However, this is a highly ambitious and complex project, and while the data collection methods are technically sound, the various components are not well integrated into a cohesive project plan. Further, analysis and synthesis of the data are not well developed and investigator responsibilities and time commitments are not clearly delineated.

Project Number:	07-501
Project Title:	Tanada and Copper Lakes Burbot Abundance
Geographic Region:	Southcentral
Data Type:	Stock Status and Trends
Principal Investigator:	Molly McCormick, NPS
Co-Investigator(s):	Tom Taube, ADFG Sport Fish Division Shawn Sanford, Mentasta Village

Cost: 2007: $41,000 **2008:** $37,000 **2009:** $37,000

ISSUE

The Wrangell-St. Elias National Park/Preserve Superintendent is the local area manager for Federal subsistence fisheries in the Copper River drainage. Currently there are no Federal subsistence harvest limits established for freshwater fish species in the Copper River drainage including burbot. Therefore, when local rural residents request a subsistence permit to harvest burbot, we have no data to support limiting their harvest. This project will provide a population estimate for burbot in these lakes which we can use in cooperation with local users, Regional Advisory Councils and the Alaska Department of Fish and Game to establish appropriate burbot harvest limits using recognized fish and wildlife conservation principles.

OBJECTIVES

1. Estimate the length composition of fully recruited burbot ($\geq$ 450 mm TL) at Copper and Tanada lakes for each sampling event (Spring 2007, 2008 and 2009) such that the estimated proportions are within $\pm$ 10 percentage points of the actual values 95% of the time.
2. Estimate mean catch-per-unit of effort (CPUE) of burbot ($\geq$ 450 mm TL) in Copper and Tanada lakes for each sampling event (Spring 2007, 2008 and 2009) such that the estimated mean CPUE is within $\pm$ 50% of its asymptotic value 90% of the time.
3. Estimate the abundance of fully recruited burbot ($\geq$ 450 mm TL) in Copper and Tanada lakes for spring 2008 such that the estimated abundance is within $\pm$ 25% of the true abundance 90% of the time.

METHODS

Burbot will be captured in hoop traps, immediately following the lakes becoming ice-free in 2007. Transects will be established and baited traps will be set following standard methods similar to those described by Taube and Bernard (2004). Captured burbot will be marked and released. Traps will be reset using the same techniques in 2008 and 2009. Abundance, survival rate and recruitment estimates will be generated for each burbot population with the Jolly-Seber model (Seber 1982) for 2008. This model requires a minimum of three sampling periods (years) to provide an abundance estimate for the second sampling period. CPUE estimates will provide an index of abundance for each lake during each sampling event.

PARTNERSHIPS/CAPACITY BUILDING

This project will utilize local hire employees including residents of the Village of Mentasta. Local knowledge was used in developing the proposal and will be used in implementing the project. Results will be shared with the village councils of Mentasta and Chistochina during our biannual government to government meetings. The community of Mentasta is and will be involved in policy and decision making about the project objectives. While joint decision making is not institutionalized, through the Park's government to government relationship with the Village of Mentasta, the village is considered an equal partner and is consulted regarding local area management decisions whenever possible. We consider our level of community involvement to be between "Collaboration" and "Partnerships" in the diagram of community involvement in Fisheries Resource Monitoring Program Projects.

JUSTIFICATION

This proposal directly addresses an information need identified as a high priority in the strategic plan, and requested in the Request for Proposals. Further, this proposal is technically sound, administratively competent, and furthers capacity building commensurate with the nature of the work and the tribal cooperator.

Project Number: 07-502
Project Title: Tanada Creek Salmon Weir
Geographic Region: Southcentral
Data Type: Stock Status and Trends
Principal Investigator: Molly McCormick, NPS

Cost: 2007: $81,015 **2008:** $81,928 **2009:** $83,885

ISSUE

Accurate assessment of yearly run strength and migratory timing in tributaries to the Copper River is essential to the development of a management strategy that provides for natural and healthy populations as mandated by the Alaska National Interest Lands Conservation Act (ANILCA). The upper Copper River sockeye salmon populations are of particular importance to both Federally qualified and state subsistence users. Tanada Creek sockeye are one of the uppermost runs of sockeye on the Copper River and support a subsistence salmon fishery both in the Copper River and Tanada Creek. In-season escapement estimates are a useful tool to manage subsistence fisheries, particularly the subsistence fishery in the Batzulnetas area. The Park Superintendent at Wrangell-St. Elias National Park/Preserve is the Federal local area or in-season manager for the Copper River. The Batzulnetas subsistence fishery targets two sockeye salmon stocks that utilize Tanada Lake for spawning and rearing habitat. The Batzulnetas fishery and the entire Tanada Creek watershed, including Tanada Lake, occur within Wrangell-St.Elias National Park. The Batzulnetas subsistence fishery is primarily a fishwheel fishery, although spears, dipnets and rod and reel are also legal gear. In January 2006, the Federal Subsistence Board adopted a proposal to allow the use of a fyke net to harvest salmon in Tanada Creek. As we begin to implement the use of this new gear type, the Tanada Creek weir will be a crucial in-season management tool. The fishery occurs annually June through September. The Batzulnetas Area subsistence fishery has supported harvests of up to 997 salmon since 1987, primarily by fish wheel.

OBJECTIVES

1. To use a weir and a video counting tower to estimate the abundance of adult sockeye and chinook salmon in Tanada Creek and document the timing of the passage of these fish past the weir site between early June and mid-September.
2. To estimate the abundance of adult sockeye salmon in Tanada Creek using additional mark and recapture censuses should high flows cause fish leakage around the weir, such that estimates are within 10% of the actual abundance 95% of the time.
3. To measure the entry pattern of sockeye and chinook salmon to Tanada Creek and compare the entry pattern to the historic entry pattern data set to test for changes in annual run timing.
4. To estimate the age, sex and length of the sockeye population by sampling 10% of the sockeye salmon proportionate to their abundance with a minimum of 100 fish per week and a maximum of 100 fish per night.
5. To determine if correlations exist between staff gauge height and migration timing.
6. To instruct local students and residents regarding sockeye and chinook salmon populations and to link this knowledge to providing for subsistence needs and compliance with the mandates of ANILCA.

METHODS

In 2007 the weir will move to a more suitable location upstream of the confluence of Caribou Creek and Tanada Creek. The project will use a floating resistance board weir in conjunction with an underwater video system to enumerate the number of salmon migrating up Tanada Creek and to sample age, sex and length of a portion of the salmon migrating through the weir. The weir will be monitored seven days a week from late May through early to mid September for at least 10 hours per day. The video camera will run 24 hours a day, will be monitored on site and tapes will be reviewed at a viewing station on a daily basis. The weir will be open continuously unless sampling is being done. A portion of the sockeye salmon will be sampled for age, sex and length and marked. Scales will be sent to ADFG for analysis. Sampled salmon will be marked with an opercle punch. Live salmon and carcasses will be recovered and a mark-recapture estimate of the total population will be derived in late September if necessary. The weir and video will be removed from the water in late September. Data entry and analysis will take place in October and November. The annual and final reports will be written during the winter months.

PARTNERSHIPS/CAPACITY BUILDING

Several local groups are interested in the Copper River watershed. This project provides an opportunity to collaborate with local students, tribes and culture camps, nonprofits, and agencies to partner in the data collecting process. Biotechnician positions are currently filled under local hire designation. The Batzulnetas culture camp occurs in mid-summer. Annually camp attendees participate in an interpretive visit to the weir site to learn about subsistence fisheries management. Annual data is regularly discussed with them during their annual meetings. ADFG is willing to provide scale analysis. Wrangell-St. Elias National Park/Preserve has and will continue to collaborate with ADFG to examine sockeye salmon genetics and recover radio tagged sockeye salmon.

JUSTIFICATION

This is a long standing project under the Monitoring Program that addresses an important strategic priority. This project provides an instrumental tool for Federal management of the Batzulnetas subsistence fishery. Continued escapement assessment into Tanada Creek will complement results from project (05-501) to estimate stock-specific timing and distribution of sockeye stocks. The investigator addressed Technical Review Committee review comments to explore alternative technology that is more robust to frequent flood conditions, and pilot work will be conducted in 2006, including exploration of a new weir site. The requested budget is increased over historic costs to the Monitoring Program, is largely due to funding for the crew leader position previously funded outside of the Monitoring Program, and appropriately reflects actual project costs.

Project Number: 07-503
Project Title: Copper River Chinook and Sockeye Salmon Abundance
Geographic Region: Southcentral
Data Type: Stock Status and Trends
Principal Investigator: Keith van den Broek, Native Village of Eyak
Co-Investigator(s): Jason Smith and Michael Link, LGL Alaska Research Associates, Inc.
ADFG, Division of Commercial Fisheries

Cost: 2007: $372,456 **2008:** $366,726 **2009:** $373,093

ISSUE

Copper River chinook and sockeye salmon sustain large and important subsistence fisheries under Federal jurisdiction; and subsistence, commercial and sport harvests are significant in comparison to abundance. Management of Copper River sockeye salmon is complex due to inter-annual variation in the size and timing of stocks, fisheries that target a mixture of stocks and difficulties in estimating abundance due to the physical characteristics of the drainage. Recently, returns of salmon to several tributaries of the upper Copper River basin (e.g., Gulkana Hatchery, Tanada Creek weir) have been lower than expected given the acoustic-based estimates of abundance obtained from the Miles Lake sonar site. To further confound certainty in the abundance estimates provided by the Miles Lake sonar, the Alaska Department of Fish and Game (ADFG) is currently upgrading their Bendix acoustic system with a newer and much different acoustic system (dual frequency identification sonar – DIDSON). The management system and management plans for Copper River sockeye salmon have been built around the old Bendix sonar counts. The degree of comparability of the old and new acoustic systems is uncertain and the efficacy of the original Bendix acoustic counter has never been independently validated with an alternative technique.

We propose to use an independent technique to validate estimates provided by the new acoustic system and to the extent it remains, the Bendix-based estimates at Miles Lake. The purpose of this project is to use mark-recapture methods to estimate the annual abundance of both chinook and sockeye salmon returning to the Copper River above Miles Lake and compare these estimates to those provided by the Miles Lake sonar gear. The information collected from this project can be used by fishery managers to better manage the subsistence fishery for individual stocks, which ultimately could lead to increased subsistence harvest opportunities. This project will also continue the efforts begun in 2001 by the Native Village of Eyak (NVE) to develop a long term monitoring program for Copper River chinook salmon. This component of the proposed project will remain important until acoustic technology advances to such a stage as to allow for accurate species apportionment of counts at Miles Lake. The need for continued study of annual sockeye salmon escapement will be reassessed after reviewing results from the 2007 season.

OBJECTIVES

1. To estimate the inriver abundance of sockeye salmon returning to the Copper River in 2007, such that the estimate is within 25% of the true value 95% of the time.
2. To continue a long-term monitoring program operated by the Native Village of Eyak, estimating the annual, system-wide escapement of chinook salmon to the Copper River using mark-recapture techniques such that the estimate is within 25% of the actual escapement 95% of the time.

METHODS

This project will use two-event mark-recapture methods to estimate the annual abundance of chinook and sockeye salmon at Baird Canyon in 2007, and chinook salmon in 2008–09. For the first event, salmon will be PIT-tagged daily at three fishwheels operated in Baird Canyon (rkm 66) from mid May to mid August. These fishwheels will be located upstream of the Miles Lake sonar site and downstream of any inriver fisheries and major spawning tributaries. The second event will consist of fish examined for tags using digital video and automated PIT tag readers at two fishwheels located near Canyon Creek (rkm 157), located 12 km downstream of Chitina, AK. The fishing sites at Baird Canyon and Canyon Creek have been used successfully by the project team for these purposes since 2001.

PARTNERSHIPS/CAPACITY BUILDING

This project gives the Native Village of Eyak an opportunity for meaningful inclusion in the research and long-term management of Copper River chinook and sockeye salmon. They 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. The Native Village of Eyak 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 interaction between a major subsistence group (Native Village of Eyak) and fisheries management agencies (ADFG Division of Commercial Fisheries). 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 amongst 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.

JUSTIFICATION

This proposal ranks high in all evaluation criteria, and directly addresses the highest priority information need identified in the 2007 Request for Proposals and strategic planning for this region. Previously funded projects by these investigators that address this same strategic priority were technically sound and administratively competent. This study design contains appropriate modifications to address sampling of sockeye salmon on a production basis, and should also reduce costs for further assessment of Chinook salmon. The Native Village of Eyak has served as an effective and high profile Principal Investigator, providing arguably the best example of capacity building under the Monitoring Program. The need to continue abundance estimation of sockeye salmon will be evaluated, and proposed after 2007 if appropriate.

Project Number: 07-505
Project Title: Long Lake Salmon Weir
Geographic Region: Southcentral
Data Type: Stock Status and Trends
Principal Investigator: Molly McCormick, NPS
Co-Investigator(s): Kristen Smith, Copper River Watershed Project

Cost: 2007: $19,252 **2008:** $19,698 **2009:** $20,121

ISSUE

Accurate assessment of yearly run strength and migratory timing in tributaries to the Copper River is essential to the development of a management strategy that provides for natural and healthy populations as mandated by the Alaska National Interest Lands Conservation Act (ANILCA). The Upper Copper River sockeye salmon populations are of particular importance to both federally qualified and state subsistence users. The sockeye salmon stock that spawns within Long Lake is the largest salmon stock within the Chitina River drainage. The Chitina River drainage, approximately 5 million acres in size, is the largest anadromous drainage contained in its entirety, within the 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 (Ken Roberson, personal communication). Therefore, this system is an excellent candidate for a long term monitoring site. Weir counts of salmon are a simple and basic dataset and therefore likely to provide valuable data far beyond the foreseeable future. Thirty-two years of weir show annual variations in abundance of Long Lake runs ranging from 4,400 to over 49,000 sockeye. This is the longest running data set of weir counts of salmon in the Copper River drainage.

The Alaska Department of Fish and Game (ADFG) initially operated the Long Lake weir, which stands on private property owned by the Collins family, in 1974 and 1975. In 1976 Cliff Collins voluntarily took over operation of the weir when ADFG was no longer able to fund the operation of the weir. He operated the weir continuously until 2003 when the Wrangell-St. Elias National Park/Preserve and the Copper River Watershed Project became partners with the Collins family trust in the operation of the weir.

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 approximately 20,000 salmon here in 2005 using dipnets. Harvest by as many as 10,000 households occurs in a state managed fishery that has been both a subsistence and personal use fishery harvesting as many as 125,000 salmon annually some years. These fisheries undoubtedly harvest some salmon returning to Long Lake.

OBJECTIVES

1. To enumerate the number of sockeye salmon entering Long Lake from July 1 to mid-September, thereby continuing a data set initiated in 1974.
2. To measure the entry pattern of sockeye salmon to Long Lake and compare the entry pattern to the historic entry pattern data set to test for change in the interannual run timing.
3. To estimate age-sex-length composition of the Long Lake sockeye salmon population such that estimates are within 10 percent of the actual composition 95 percent of the time.

4. To correlate run timing and numbers of sockeye entering Long Lake with similar data from the Miles Lake sonar.

METHODS

The project will use a weir to enumerate the number of salmon migrating into Long Lake and to sample age, sex and length of a portion of the salmon migrating through the weir. The pickets will be installed in the rigid picket weir and the sampling box will be erected around July 15. The weir will be monitored on a daily basis from July 15 to around October 15 and all adult salmon passing through it will be enumerated. The weir will be closed when it is not monitored. A portion of the sockeye salmon will be sampled for age, sex and length. Scale samples will be sent to ADFG for analysis. The pickets will be removed from the weir in mid-October. Data analysis will take place in October and November. The performance reports, annual reports and final report will be written during the winter months.

PARTNERSHIPS/CAPACITY BUILDING:

The Wrangell-St. Elias National Park/Preserve has partnered with the Copper River Watershed Project to perform this project since 2003 and will continue to do so in 2006. The project should result in increased capacity of the Copper River Watershed Project, a non-profit group that works with the support of the State of Alaska, Federal agencies and local organizations to monitor fish, fish habitat and water quality within the Copper River watershed. The Park sees this site as integral to monitoring Park resources and intends to utilize both the Principal Investigator and his staff to assist in the operation of this weir and analysis of data and will fund these individuals through Park base funds.

JUSTIFICATION

This is the longest standing escapement project in the Copper River drainage and addresses an important strategic priority. Continued escapement assessment into Long Lake complements project 05-501 to estimate stock-specific timing and distribution of sockeye salmon stocks. Unique logistics make this project extremely cost-effective in comparison to other weir projects.

Project Number:	07-601
Project Title:	Hatchery Creek Sockeye Salmon Population Assessment
Geographic Region:	Southeast
Data Type:	Stock Status and Trends
Principal Investigator:	Glenn Chen, Bureau of Indian Affairs
Co-Investigator(s):	Jack Lorrigan, Organized Village of Kasaan Steve McCurdy, ADFG Sport Fish Division Sheila Jacobson, USDA Forest Service

Cost: 2007: $117,837 **2008:** $123,199 **2009:** $122,866

ISSUE

The Hatchery Creek drainage on Prince of Wales Island has supported extensive subsistence and sport harvests by both Alaska resident and non-resident anglers. It is of particular importance to Prince of Wales Island rural residents, as it provides for a unique sockeye salmon harvest opportunity due to the early run timing of this stock, and because this location is entirely accessible from the Island's road system. In recent years, state biologists have taken action via emergency closures and changes in sportfishing regulations, to protect this stock from over-exploitation. However, in spite of the importance of this system to multiple user groups, the Hatchery Creek sockeye salmon population has not been formally studied.

The Hatchery Creek watershed is a 4th order stream system located in the north-central portion of Prince of Wales Island, on the U.S. Forest Service Thorne Bay Ranger District (Tongass National Forest). It is a major tributary to Sweetwater Lake. A 1.5-meter waterfall is located approximately 0.4 km upstream of the stream's confluence with the lake. The falls are a major obstacle to upstream migration at all flows, and can delay migrating fish for weeks before passage can be negotiated. It is thought that the majority of Hatchery Creek's early run adult sockeye spawn above the falls, and their offspring rear in lakes within the upper watershed. Hatchery Creek fisheries have been the subject of regulatory and management action by the State. USDA Forest Service has constructed a boardwalk trail to the falls, and subsistence fishing occurs under Federal jurisdiction.

OBJECTIVES

1. Census the total annual abundance of early run adult sockeye salmon returning to spawn in the upper reaches of Hatchery Creek, via a weir operated from June 1–August 31 above the waterfall partial migration barrier.
2. Quantitatively estimate the age, sex, and length compositions from a sub-sampled proportion of these early run adult fish.
3. Determine the primary spawning locations, and time of spawning, for sockeyes that utilize the stream area upstream of the waterfall partial barrier (via radio telemetry).
4. Estimate harvest levels of sockeyes by subsistence and sport users.

METHODS

This proposal provides funding to estimate sockeye salmon escapement into Hatchery Creek Prince of Wales Island through a weir. The weir from the Karta River will be used, which significantly reduces cost in 2007. Little is know about sockeye salmon returns to this drainage, and the location of spawning locations will be determined through a radio tagging experiment. The sample size for the radio tagging experiment is 40 fish. Tracking will be accomplished through aerial surveys. Additionally, harvest at the falls fishery will be estimated through a harvest survey. All assessment will focus on what is believed to be early run fish, which support inriver harvests.

PARTNERSHIPS/CAPACITY BUILDING

The Organized Village of Kasaan will be provided funds to hire the lead field biologist, crew leader, and field technicians needed for this study; local hiring priority will be given to qualified personnel from the Hatchery, Native organizations, and the 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 Organized Village of Kasaan, the USFS Craig Ranger District, ADFG Sportfish Division, 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 proposal addresses an issue of the highest strategic importance. Subsistence fishing in this system is under Federal jurisdiction, which is unusual for sockeye salmon fisheries in southeast. Exploitation is believed to be high, although there are no credible estimates of escapement. The need for the harvest survey of just the falls is not well developed. Approval of the harvest survey is contingent upon further assessment of need; and completion of the study design. The investigators should base the harvest survey upon proven and documented methodology from ADFG Sportfish Division.

Project Number: 07-604
Project Title: Klag Lake Subsistence Sockeye Salmon Stock Assessment
Geographic Region: Southeast
Data Type: Stock Status and Trends
Principal Investigator: Brian Woody, Sitka Tribe of Alaska
Co-Investigator(s): Terry Suminski, USDA Forest Service

Cost: 2007: $108,350 **2008:** $109,093 **2009:** $109,836

ISSUE

Because Klag Lake is one of the largest producers of subsistence sockeye salmon in Southeast Alaska and is so important to the people of Sitka, there is an obvious need for quantifiable escapement goals and the ability to regulate harvest opportunities to ensure that escapements are within goal ranges and adequately distributed through time. This Investigation Plan outlines three additional years of funding for the field project. Three additional years of stock assessment work at Klag Lake will enable fishery managers to begin setting scientifically-based escapement goals to manage the Klag Lake sockeye salmon run for sustainable subsistence harvests into the future.

OBJECTIVES

1. Estimate the escapement of sockeye salmon into the Klag Lake system, with the aid of a weir on the outlet stream of the lake and additional mark-recapture censuses, so that the estimated coefficient of variation is less than 10%.
2. Count the number and determine the timing of sockeye salmon returning to Klag Lake outlet stream through a weir.
3. Estimate the subsistence harvest of sockeye adults in the terminal area of Klag Bay so that the estimated coefficient of variation is less than 15%.
4. Describe the size, sex and age distribution of sockeye salmon adults returning to Klag Lake so that the estimated coefficient of variation is less than 5%.

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 or holding pen and directly counted be the field crew. Counts of all fish passed through the weir will be recorded by species.

An on-site harvest survey will be conducted to estimate terminal harvest. A sampling design, stratified by gear type, will be used to estimate sockeye salmon harvest, and, if possible, fishing effort. 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. The crew will be instructed to sample at a rate of 20% in a systematic manner (e.g. sample every fifth fish) to avoid bias. The sampling rate may be adjusted upward or downward, depending on the size of the run, to achieve the sampling goal, but we will attempt to maintain consistent sampling rates through all parts of the run.

A stratified, two sample mark-recapture study is used to estimate sockeye salmon escapement into Klag Lake; a comparison between the estimate and the weir count tests the integrity of the weir and trap. Sockeye salmon passed through the trap are marked with fin clips, with marking stratified by time to allow separate estimation of different parts of the run should the weir fail or violations of mark recapture assumptions occur during some part of the run. The target daily marking rate at the weir is 15–20% of the run depending on the overall volume of the run.

PARTNERSHIP/CAPACITY DEVELOPMENT

It is the intention of all three partners that Sitka Tribe of Alaska and its members build on their capacity for management of their subsistence fishery resources. This project will give the Tribe an opportunity to increase its involvement as an organization in fisheries research and management, with active project leadership by the Tribe's biologist(s) and management of the project budget by the administrative staff. Through the joint involvement of the Sitka Tribe of Alaska, ADFG, and USFS in public and agency meetings on subsistence fishing issues, the project is already promoting interaction among Tribe staff and members, other subsistence users, and state and Federal fisheries managers and scientists. All three agencies will continue to be involved in information gathering, data analysis, reporting, and information sharing.

JUSTIFICATION

This is a solid proposal that ranks as *High* in all evaluation criteria. This proposal is technically sound and the investigators are administratively competent. As an outside stock, there is little competing harvest and exploitation is likely sustainable. However, Sitka has the largest concentration of Federally-qualified substance fishers in the region, the relative importance of Klag Lake increases in the event of reduced returns to Redoubt Lake, and there is compelling reason for the Monitoring Program to maintain assessment of important subsistence fisheries in Sitka Sound. The principal investigator is an Alaska Native organization and this project provides meaningful capacity building. The investigators addressed all Technical Review Committee comments regarding the harvest survey and costs.

Project Number:	07-606
Project Title:	Hetta Lake Subsistence Sockeye Salmon Stock Assessment
Geographic Region:	Southeast
Data Type:	Stock Status and Trends
Principal Investigator:	Jan Conitz, ADFG Division of Commercial Fisheries
Co-Investigator(s):	Tony Christianson, Hydaburg Cooperative Association Jeff Reeves, USDA Forest Service

Cost: 2007: $160,994 **2008:** $161,849 **2009:** $154,045

ISSUE

Investigators will collect information on sockeye salmon returning to Hetta Cove and Hetta Lake by interviewing subsistence fishers for the number of sockeye harvested in Hetta Cove and by counting salmon through a weir on the outlet stream of Hetta Lake. This information will be used to better establish subsistence needs, to monitor stock trends at Hetta Lake, and to assist fishery managers in ensuring that escapement and subsistence opportunities are adequate.

OBJECTIVES

1. Census the harvest of sockeye salmon 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 the 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

The primary focus of this research will be to census the harvest of sockeye salmon in Hetta Cove by subsistence fishers, and to estimate the number of sockeye salmon escaping into Hetta Lake. The Hydaburg crew will interview all fishers at the completion of their subsistence fishing, and record the information daily. Investigators will operate a weir from the beginning of June to the end of September to count the number of salmon by species entering Hetta Lake. A mark-recapture study will also be conducted to test the integrity of the weir, marking fish at the weir and conducting mark-recovery sampling on the spawning grounds. The mark-recapture estimate of sockeye spawners will be used as the official sockeye escapement estimate if the weir fails. The ages of returning sockeye salmon will be described so as to be able to look at the lake's productivity on a year-specific basis.

PARTNERSHIPS/CAPACITY BUILDING

ADFG and Hydaburg Cooperative Association staff have worked closely for the last six years to ensure the success of the project and to increase the responsibility of the Hydaburg Cooperative Association each year. The goal is to have Hydaburg Cooperative Association take over the project by 2009. When they assumes total responsibility for the project, they will oversee the technical aspect of the project and ensure the completion of a final report for all three years of work.

JUSTIFICATION

This is a solid proposal that ranks as *High* in all evaluation criteria. This proposal is technically sound and the investigators are administratively competent. 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 very low escapements that could limit future returns. The investigators addressed all Technical Review Committee comments on this proposal to assess escapement and terminal subsistence harvest. Further, the investigators plan to transfer project supervision to Hydaburg Cooperative Association by 2009, which will meaningfully increase capacity building. At question for the future is how continued assessment data will be utilized by ADFG to assess the adequacy of escapements. As originally conceived by the investigators, justification for long-term assessment of this stock was in large part to provide data to make recommendations for an escapement goal. To achieve this goal, and to reduce costs to the Monitoring Program, the Technical Review Committee recommended that this proposal be further enhanced by assessment of this stock to mixed-stock and close proximity commercial fisheries. While there have been significant improvements in genetics technology, further research will be necessary before assessment of the harvest from this small stock is feasible. Also, there are significant issues with sampling these large commercial fisheries that must be addressed. As an alternative and to largely address the Technical Reveiw Committee's concerns with cost, the investigators have significantly reduced the proposed budgets for this and other projects (see 07-607, 608, and 609). The question of contribution of this stock to mixed-stock commercial fisheries is important to formulate recommendations for an escapement goal, and should be revisited upon advances in stock identification technology.

Project Number:	07-607
Project Title:	Kanalku Lake Subsistence Sockeye Salmon Stock Assessment
Geographic Region:	Southeast
Data Type:	Stock Status and Trends
Principal Investigator:	Jan Conitz, ADFG Division of Commercial Fisheries
Co-Investigator(s):	Ed Gamble, Angoon Cooperative Association Ben VanAlen, USDA Forest Service

Cost: 2007: $172,791 **2008:** $161,694 **2009:** $165,396

ISSUE

A voluntary subsistence fishing closure for Kanalku Bay and Creek was in place from 2002 to 2005 in the community of Angoon, in response to estimated escapements of fewer than 300 sockeye salmon in two recent years (2001 and 2003). A majority of Angoon residents supported the closure and abstained from fishing. However, the voluntary closure was not universally observed, and ADFG management biologists have decided to recommend it not be continued in 2006, instead restricting the regular subsistence season and possession limit. 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). Because of the extremely low estimated escapements, and loss of vital subsistence harvesting opportunities for Angoon residents, accurate and ongoing escapement estimates are needed. We propose to rigorously test our mark-recapture estimation methods, guided by results of a telemetry study in 2006 to search for previously unidentified sockeye spawning areas in Kanalku Lake. If no additional spawning areas are found, we will continue the mark-recapture program used in 2001–2006, add a weir and video recording system to count fish entering the freshwater, and also monitor subsistence and sport fisheries in Kanalku Bay. If additional spawning areas are found via telemetry, we will incorporate a conventional weir and trap into our mark-recapture study to ensure the estimate captures all sockeye spawners entering Kanalku Lake.

OBJECTIVES

Plan A (no new spawning areas are identified in 2006 telemetry study)

1. Count sockeye salmon using a weir and video recording system in the lower part of Kanalku Creek.
2. Estimate harvest of sockeye salmon in the Kanalku subsistence and sport fisheries with estimated coefficient of variation less than 15%.
3. Estimate the annual spawning population of sockeye salmon in Kanalku Lake, using mark-recapture methods on the spawning grounds with estimated coefficient of variation less than 15%.
4. Estimate the age, sex, and size distribution of sockeye salmon in the Kanalku Lake.
5. Maintain an ongoing record of physical lake habitat variables including water column temperature and light intensity.

Plan B (additional spawning areas are found with telemetry in 2006)

1. Count sockeye salmon through a weir at the outlet of Kanalku Lake.
2. Estimate the number of sockeye salmon entering Kanalku Lake, using mark-recapture methods at the weir and on the spawning grounds with estimated coefficient of variation less than 10%.

Objectives 3, 4 and 5 are the same as in Plan A.

METHODS

Under Plan A, an underwater video camera and digital video recorder will be used to monitor passage of fish through a weir near the mouth of Kanalku Creek. Trained technicians will play back the video recordings daily to count fish by species, and will periodically check these counts against direct visual counts at the weir. Daily and cumulative total counts of fish, by species, will be compiled for the season. The crew will conduct a harvest survey in Kanalku Bay and Creek, counting all sport and subsistence fishers that enter the area, and obtaining harvest information from the fishers as they leave the area. Total harvest for the season will be estimated using a one-stage roving-access survey design. The spawning population of sockeye salmon in Kanalku Lake will be estimated using mark-recapture methods on the spawning grounds and an open population estimator. The age, sex, and length distribution of the Kanalku Lake sockeye spawning population will be estimated using standard methods. Light intensity and temperature profiles in Kanalku Lake will be measured monthly, and if funding permits, zooplankton population species composition, density, and biomass will be estimated from monthly samples.

Under Plan B, a conventional weir and trap will be placed near the Kanalku Lake outlet, and a sample of fish passing through the weir will be marked with adipose clips and uniquely-numbered tags. Video recording equipment will be used to monitor fish passage between sampling periods. Fish will be sampled again on the spawning grounds for marks and tags, and total escapement will be estimated using a closed population estimator. The spawning population will also be estimated as in Plan A using mark-recapture methods on the spawning grounds and an open population estimator. The weir-based estimate will be compared with the open population estimate on the spawning grounds to determine whether the spawning grounds estimate is an accurate measure of total escapement. Fish will be sampled at the weir for age, sex, and length distribution estimates. Lake light intensity and temperature profiles will be measured and zooplankton population variables will be estimated, if funding permits, as under Plan A.

PARTNERSHIPS/CAPACITY BUILDING

Angoon Cooperative Association 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. The Angoon Cooperative Association 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 Angoon Cooperative Association, ADFG, 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 is a solid proposal that ranks as *High* in most evaluation criteria. This proposal is technically sound and administratively competent. 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 very low escapements that could limit future returns. Subsistence fishing at Kanalku has been significantly reduced, either by voluntary or agency restrictions. During 2006, unspent funds are being utilized to construct a weir, and USDA FS is conducting a radio tagging experiment to estimate spawner distribution. The results of this study will provide the basis to site the weir either below the falls or the lake outlet, and the investigation plan addresses both of these contingencies. The investigators addressed all Technical Review Committee review comments with this proposal to assess escapement and terminal subsistence harvest. At question for the future is how continued assessment data will be utilized by ADFG to assess the adequacy of escapements. As originally conceived by the investigators, justification for long term assessment of this stock was in large part to provide data to make recommendations for an escapement goal. To achieve this goal, and to reduce costs to the Monitoring Program; the Technical Review Committee recommended that this proposal be further enhanced by assessment of this stock to mixed-stock and close proximity commercial fisheries. While there have been significant improvements in genetics technology, further research will be necessary before assessment of the harvest from this small stock is feasible. Also, there are significant issues with sampling these large commercial fisheries that must be addressed. As an alternative and to address the Technical Review Committee concerns with cost, the investigators have significantly reduced the proposed budgets for this and other projects (see 07-608 and 609). The question of contribution of this stock to mixed-stock commercial fisheries is important to formulate recommendations for an escapement goal, and should be revisited upon advances in stock identification technology.

Project Number: 07-608
Project Title: Klawock Lake Subsistence Sockeye Salmon Stock Assessment
Geographic Region: Southeast
Data Type: Stock Status and Trends
Principal Investigator: Jan Conitz, ADFG, Division of Commercial Fisheries
Co-Investigator(s): Cheryl Griffitt, Klawock Cooperative Association
Jeff Reeves, USDA Forest Service

Cost: 2007: $73,246 **2008:** $75,101 **2009:** $76,303

ISSUE

Over the last two decades, residents of Klawock have expressed concerns about a perceived decline of sockeye salmon returning to the subsistence fishery in Klawock Inlet. A low sockeye escapement in 1983 prompted ADFG to initiate a sockeye fry stocking program in 1986. In 1999, local residence expressed continued concerns to tribal, state, and Federal governments about a perceived decline in subsistence sockeye resources. This motivated community leaders, the private non-profit hatchery, and ADF&G managers to hold a community workshop to devise a long-term plan to increase sockeye production in this lake. Not surprisingly, in 2000, Klawock community leaders also identified sockeye salmon in Klawock Lake as their top research priority to receive Fisheries Resource Monitoring Program funds. The Klawock Lake Sockeye Project began in 2001 and is currently funded through the 2006 season.

Our purpose in proposing three more years of escapement monitoring in Klawock Lake is to establish a reliable escapement benchmark for the proposes of tracking stock trends and allowing comparisons in the future. We expect these benchmarks to be used in the future to determine if the population size is declining, increasing, or fluctuating within normal limits. Additionally, this stream-specific benchmark should be used in the future as baseline information for stream restoration work.

Both Federal and State governments have regulations pertaining to the Klawock Lake area. Klawock Lake is recognized as a Federal subsistence area under "customary and traditional uses" for residents of the city of Klawock and portions of the watershed are in the Tongass National Forest, a Federal conservation system unit. The Klawock Lake Sockeye Salmon Project meets the Federal jurisdiction criteria for the Fisheries Resource Monitoring Program funding because part of the subsistence fishery occurs under Federal jurisdiction and sockeye salmon returning to this lake system spawn in the Tongass National Forest.

OBJECTIVES

1. Estimate the sockeye spawning population in Half-mile, Three-mile and Inlet streams using mark-recapture methods at the weir so that the estimated coefficient of variation is less than 25% for the sum of the three estimates.
2. In the Klawock Lake sockeye escapement, estimate proportions of fish in each age-sex category, with an estimated coefficient of variation of 10% or less for the two major age classes, and estimate the mean length of fish in each age-sex category with an estimated coefficient of variation less than 5%.

METHODS

The spawning population of sockeye salmon in Klawock Lake will be estimated using mark-recapture methods in three spawning streams using an open population estimator. In two previous studies, the estimated escapement into these three streams was very near the whole-lake escapement estimates based on weir counts. Fish sampled on the spawning grounds will be marked with opercular punches and uniquely-numbered tags. At the end of the season, an individual capture history will be constructed for each fish sampled, showing all sampling events in which that fish was caught. A Jolly-Seber model, with an appropriate modification for spawning salmon populations, will be used to estimate the total spawning population in Klawock Lake. Length, sex, and scale samples will be collected from 600 adult sockeye salmon sampled on the spawning grounds at Klawock Lake to estimate the size and age structure of the population, by sex. Ages will be determined by trained ADFG technicians and the proportion of fish in each age-sex category will be estimated. Crew members will record sex and length of each fish in the field, and pair these data with the scale samples. The average mid-eye-to-fork length of fish in each age-sex category will be estimated.

PARTNERSHIPS/CAPACITY BUILDING

Personnel from ADFG and Klawock Cooperative Association will work closely to ensure the success of the project through training, assistance in the field, and project and budget planning. CPR and First Aid training will continue to be offered annually in Craig. ADFG will offer a pre-season training on the protocols and basic concepts of estimating populations using mark-recapture methods, collecting fish scales, and fish biology. During the field season, the crew will receive additional on-the-job training, and review the concepts and procedures outlined in the pre-season training, acquire hands-on experience, and learn and practice general safety procedures for boat travel.

JUSTIFICATION

This is a solid proposal that ranks as *High* or *Medium* in all evaluation criteria. This proposal is technically sound and administratively competent. This system is in close proximity to significant commercial fisheries, the potential for significant competing harvest is high, subsistence exploitation is high, and there are significant development issues within the drainage that could limit future returns. The investigators addressed all Technical Review Committee review comments and worked with Fisheries Information Service staff to re-design this project to address the Federal interest of credibly estimating escapement in a more cost-effective manner. As currently designed, this project will provide postseason estimates of escapement. At question for the future is how continued assessment data will be utilized by ADFG to assess the adequacy of escapements. As originally conceived by the investigators, justification for long term assessment of this stock was in large part to provide data to make recommendations for an escapement goal. To achieve this goal, and to reduce costs to the Monitoring Program; the Technical Review Committee recommended that this proposal be further enhanced by assessment of this stock to mixed-stock and close proximity commercial fisheries. While there have been significant improvements in genetics technology, further research will be necessary before assessment of the harvest from this small stock is feasible. Also, there are significant issues with sampling these large commercial fisheries that must be addressed. As an alternative and to largely address the Technical Review Committee concerns with cost, the investigators have significantly reduced the proposed budgets for this and other projects (see 07-607 and 609). The question of contribution of this stock to mixed-stock commercial fisheries is important to formulate recommendations for an escapement goal, and should be revisited upon advances in stock identification technology.

Project Number:	07-609
Project Title:	Falls Lake Subsistence Sockeye Salmon Stock Assessment
Geographic Region:	Southeast
Data Type:	Stock Status and Trends
Principal Investigator:	Jan Conitz, ADFG Division of Commercial Fisheries
Co-Investigator(s):	Mike Jackson, Organized Village of Kake
Cost: 2007: $87,742	**2008:** $90,310 **2009:** $92,620

ISSUE

Sockeye salmon returning to the marine terminal area at Falls Lake are heavily utilized by Kake residents in an active subsistence fishery occurring in mid-July. In the years 2001–2003, approximately 3,700–8,400 sockeye salmon returned to the Falls Lake marine terminal area, and approximately 30%–70% of these fish were harvested in the subsistence fishery (Conitz and Cartwright 2005). In the same period, approximately 1,100–5,700 sockeye salmon spawned in Falls Lake. Because large proportions of returning sockeye salmon have been harvested in the subsistence fishery, ADFG management biologists closely monitor this fishery, and have made adjustments to the season to distribute the harvest so that not all the fish are taken from the beginning of the run, as was the case in 2001 (Conitz et al. 2002, Conitz and Cartwright 2005). Although subsistence fishing in the Falls Lake outlet stream or other freshwater parts of the system is Federally managed, very little occurs. However, management of the Falls Lake subsistence fishery affects Federally qualified subsistence users in Kake, who may shift their efforts to other Federally managed sockeye systems if sockeye returns or fishing opportunities are limited at Falls Lake. Because of the need for careful monitoring of this sockeye run and the need for active management of its subsistence fishery, we plan to continue the stock assessment program and provide annual estimates of escapement. We propose to estimate the sockeye spawning population in the late summer and fall using a mark-recapture sampling design on the spawning grounds with an open-population estimator. We are confident these methods will provide a sufficiently accurate estimate of annual sockeye escapement, because we have used these methods for the past five years and compared results with a conventional weir count and closed-population mark-recapture estimate. Each year, the spawning population estimate was somewhat less than the weir-based estimate, which could be due to the fact the two methods estimate the population at different times (at the time of spawning vs. as fish enter the lake). Furthermore, given the uncertainty associated with each estimate, they were not substantially different. Falls Lake is recognized as a Federal subsistence area under "customary and traditional uses" for residents of Kake and is located in the South Baranof Island Wilderness Area, a Federal conservation system unit.

OBJECTIVES

1. Estimate the size of the Falls Lake sockeye spawning population on spawning grounds, with estimated coefficient of variation less than 15%.
2. In the Falls Lake sockeye escapement, estimate proportions of fish in each age-sex category with estimated coefficient of variation 10% or less for the two major age classes, and estimate the mean length of fish in each age-sex category with estimated coefficient of variation less than 5%.

METHODS

The spawning population of sockeye salmon in Falls Lake will be estimated using mark-recapture methods on the spawning grounds and an open-population estimator. Fish sampled on the spawning grounds will be marked with opercular punches and uniquely-numbered tags. At the end of the season, an individual capture history will be constructed for each fish sampled, showing all sampling events in which that fish was caught. A Jolly-Seber model, with an appropriate modification for spawning salmon populations, will be used to estimate the total spawning population in Falls Lake. Length, sex, and scale samples will be collected from 600 adult sockeye salmon sampled on the spawning grounds at Falls Lake to estimate the size and age structure of the population, by sex. Ages will be determined by trained ADFG technicians and the proportion of fish in each age-sex category will be estimated. Crew members will record sex and length of each fish in the field, and pair these data with the scale samples. The average mid eye to fork length of fish in each age-sex category will be estimated.

PARTNERSHIPS/CAPACITY BUILDING

The Organized Village of Kake 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. Organized Village of Kake 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 may also have an opportunity to learn or enhance computer skills. In addition, all Organized Village of Kake, ADFG, 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 is a solid proposal that ranks as *High* or *Medium* in all evaluation criteria. This proposal is technically sound and administratively competent. This system is in close proximity to significant commercial fisheries, the potential for significant competing harvest is high, subsistence exploitation is high, and timing of the subsistence fishery in relation to migratory timing remains an issue. The investigators addressed all Technical Review Committee review comments and worked with Fisheries Information Service staff to re-design this project to address the Federal interest of credibly estimating escapement in a more cost-effective manner. As currently designed, this project will provide post-season estimates of escapement. At question for the future is how continued assessment data will be utilized by ADFG to assess the adequacy of escapements. As originally conceived by the investigators, justification for long term assessment of this stock was in large part to provide data to make recommendations for an escapement goal. To achieve this goal, and to reduce costs to the Monitoring Program; the Technical Reveiw Committee recommended that this proposal be further enhanced by assessment of this stock to mixed-stock and close proximity commercial fisheries. While there have been significant improvements in genetics technology, further research will be necessary before assessment of the harvest from this small stock is feasible. Also, there are significant issues with sampling these large commercial fisheries that must be addressed. As an alternative and to largely address Technical Review Committee concerns with cost, the investigators have significantly reduced the proposed budgets for this and other projects (see 07-607 and 609). The question of contribution of this stock to mixed-stock commercial fisheries is important

to formulate recommendations for an escapement goal, and should be revisited upon advances in stock identification technology.

Project Number:	07-610
Project Title:	Behm Canal Eulachon Genetics
Geographic Region:	Southeast
Data Type:	Stock Status and Trends
Principal Investigator:	Rob Spangler, USDA Forest Service
Co-Investigator(s):	Blair Flannery and John Wenburg, USFWS Conservation Genetics Laboratory Brenda Norcross, University of Alaska Fairbanks

Cost: 2007: $27,866 **2008:** $28,084 **2009:** $0

ISSUE

This project addresses the following Issues and Information Needs identified in the 2006 Request for Proposals under Stock Status and Trends:

- Assessment of Behm Canal eulachon
- Abundance and composition of Unuk River eulachon

In the past three years, the runs of eulachon in tributaries to Behm Canal (Unuk, Klahini and Eulachon rivers) have been extremely low, raising conservation concerns. In 2005 and 2006, nearly total run failures resulted in no subsistence or personal use harvest in these rivers.

In Alaska, eulachon are considered to be an important subsistence and personal use fishery. In Canada and the lower contiguous U.S., run strength of eulachon populations and spawning distributions between and within rivers can vary dramatically. This variability has been observed in Alaska as well, making management of these populations difficult.

Population discreteness for eulachon within and among river systems in Alaska and Behm Canal is unknown. In fact, very little information exists on eulachon in general. Initial, pilot genetic studies focused on eulachon from British Columbia and Washington observed little population structure, suggesting that eulachon exist as large metapopulations with low levels of genetic diversity. However, a more recent and thorough study of eulachon from this area found that eulachon exhibit much higher levels of genetic diversity than originally thought with significant differences occurring among eulachon from different inlets areas. These contradictory results further complicate management. It is clear that an understanding of eulachon genetic population structure is necessary to identify appropriate management units for maintenance of biodiversity and productivity. In this study, we propose to investigate the population discreteness of eulachon across Alaska, building off previous work.

OBJECTIVES

Evaluate patterns of genetic diversity within and among the three eulachon populations in Behm Canal and compare with the other fifteen eulachon populations distributed throughout Southeast Alaska and with seven populations from Southcentral Alaska.

METHODS

Archived tissues from 25 putative eulachon populations (N=1250) will be genotyped at 14 microsatellite loci. Each population will be analyzed for Hardy Weinburg and gametic phase equilibrium to test whether they represent randomly mating, Mendelian populations. Estimates of allelic richness, percentage polymorphic loci, and observed and expected heterozygosity will be calculated to assess the intrapopulation genetic diversity whereas spatial and hierarchical analyses will be conducted to assess the population structure or the interpopulation genetic diversity.

PARTNERSHIPS/CAPACITY BUILDING

This project is a partnership among the USFS, USFWS, and University of Alaska Fairbanks will provide the basis for future partnerships among these agencies.

JUSTIFICATION

This proposal addresses an important conservation issue for the Federal subsistence program in southeast. Of particular concern is estimation of spawning abundance; however, little is known about the population dynamics of this species including stock structure. This proposal is technically sound and administratively competent. Samples are already collected, archived, and prepared for analysis; which makes for a very cost-effective study. The requested funding is very low and entirely for lab costs. This proposal is of lower priority than those for sockeye salmon assessment; however, some investment on the part of the Monitoring Program to assess stock structure is appropriate.

Project Number: 07-651
Project Title: Customary and Traditional Sockeye Systems of the K'iis Xaadas (Hydaburg Haida)
Geographic Region: Southeast
Data Type: Harvest Monitoring/Traditional Ecological Knowledge
Principal Investigator: Anthony Christianson, Hydaburg Cooperative Association
Co-Investigator(s): Steve Langdon, University of Alaska Anchorage
Cost: 2007: $94,903 **2008:** $38,672 **2009:** $0

ISSUE

Sockeye salmon are critical subsistence resource for the K`iis Xaadas (Hydaburg Haida). In recent years, sockeye returns to the streams customarily and traditionally utilized by K`iis Xaadas have declined significantly, and in some cases runs have disappeared, but reasons for the declines are not well understood by biologists. Through documenting the traditional knowledge of a local elder, longtime customary and traditional user, and observer of sockeye, this project will capture a wealth of information regarding sockeye salmon abundance, run timing, location, and biological characteristics/parameters of run. In addition, this project will also document customary and traditional practices with regard to harvesting and managing sockeye salmon. This information can then be used by biologists to gain an improved understanding of local sockeye salmon populations and factors that may influence sockeye salmon population viability.

OBJECTIVES

The objective of this project is to document the wealth of knowledge pertaining to sockeye salmon abundance, run timing, locations, and biological characteristics held by a key elder, customary and traditional user and long time observer of sockeye salmon. This information will then be corroborated and supplemented with additional key informant interviews with three other elders who hold critical traditional knowledge. The key informant interviews will focus specifically on various aspects of sockeye salmon ecology, biology, and customary and tradition use, including:

- Species utilized and their local names.
- Biological Information including habitat preference, spawning and rearing areas, and seasonal movements.
- Traditional and contemporary harvest methods, including timing of harvest, gear used, and mapping of harvest areas.
- Traditional and contemporary preparation and preservation methods.
- Fish related place names.

This information will then be assessed for coverage by geographic area and topic.

METHODS

Methods will include ethnographic and historical document review, ADFG data acquisition and summary, participant observation, formal interviewing of elders/experts (video and audio recordings), on-site

field investigations (digital video, image and audio recording, GPS recording) with elder/experts and community planning meetings. The information gathering will be achieved through the implementation of a number of tasks, which include, in order of their occurrence: 1) Documentation of K`iis Xaadas Sockeye Salmon TEK; 2) On-site field investigations of sockeye salmon systems; 3) Identification of sockeye salmon stream characteristics; 4) Develop GIS data base; 5) Sustainability Planning

PARTNERSHIP/CAPACITY BUILDING

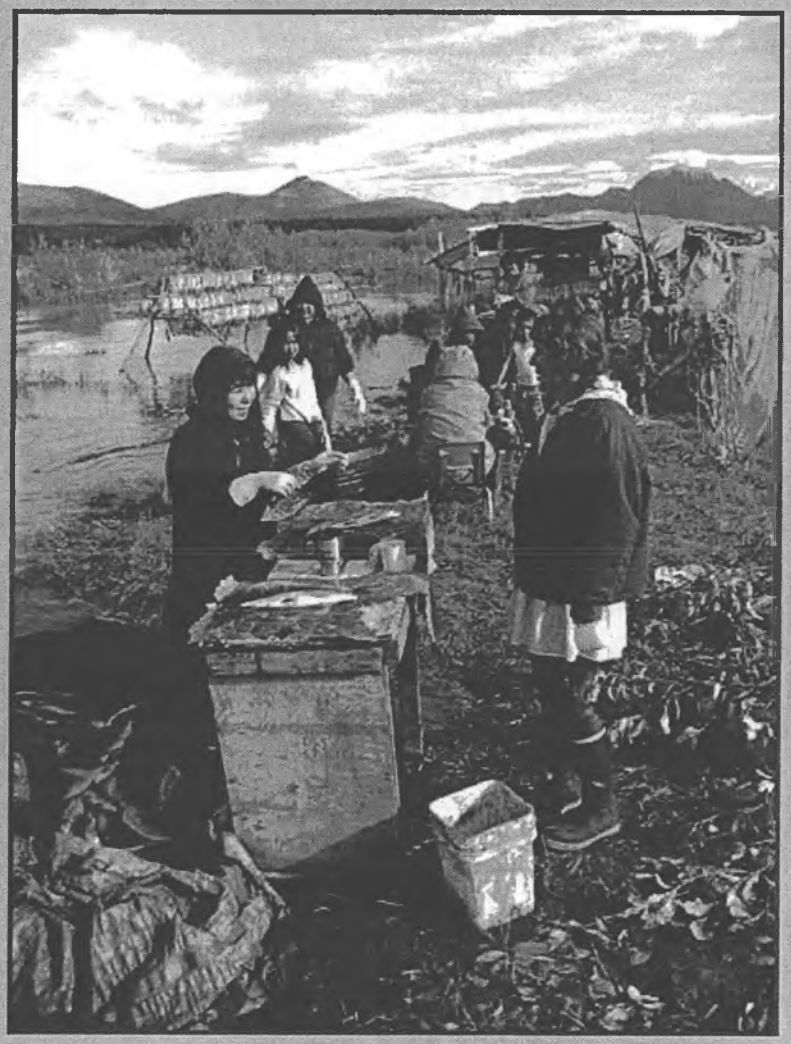
The tribe and consultant will identify key local elders/experts to participate in the research. The consultant's experience in conducting TEK studies, both interviewing and on-site observational methods will be transferred to Hydaburg Cooperative Association personnel. Special efforts will be taken to hire young adults and students to assist in the research so that they can obtain information, research techniques and skills in problem identification and solution.

JUSTIFICATION

This investigation plan addresses several issues identified as being of high priority, in an area with considerable Federal jurisdiction. The Southeast Regional Advisory Council is very interested in attaining TEK to be used in management, and this project will likely be a model for such an approach. The study design, which primarily focuses on collecting and synthesizing TEK regarding sockeye salmon ecology, biology, and cultural use patterns, is clearly laid out and technically sound. Project investigators are experienced in successfully implementing Monitoring Program projects, and together they are a solid partnership with high potential for capacity building.

2006

FISHERIES RESOURCE MONITORING PLAN



FEDERAL SUBSISTENCE MANAGEMENT

CONTENTS

INTRODUCTION

Background

Since 1999, under the authority of Title VIII of ANILCA, the Federal government has assumed 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 Interior and Agriculture, cooperating with the State of Alaska and other Federal agencies, to research 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 was created 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.

> **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, five Federal agencies (U.S. Fish and Wildlife Service, Bureau of Land Management, National Park Service, Bureau of Indian Affairs, and USDA Forest Service) work with the Alaska Department of Fish and Game, Regional Advisory Councils, Alaska Native organizations, and other organizations to identify research priorities and select projects to meet information needs.

Monitoring Plan Development

Based on identified research priorities, an annual request for proposals is made. An inter-agnecy Technical Review Committee evaluates all proposals and selects the ones that should be developed into investigation plans. The Technical Review Committee is composed of representatives from each of the five Federal agencies and three representatives from the Alaska Department of Fish and Game. It is chaired by the Chief of Fisheries Information Services and supported by Fisheries Information Services staff. The Technical Review Committee reviews the investigation plans and recommends which ones should be included in the annual monitoring plan. Public review of the draft monitoring plan occurs at the Regional Advisory Council meetings where the Councils' recommendations on the plan are made. An inter-agency Staff Committee reviews all recommendations and attempts to reconcile any differences between the recommendations of the Technical Review Committee and the Councils.

Project Evaluation

Four factors are applied to the evaluation and selection of studies:

1. Strategic Priorities

To be considered for funding under the Monitoring Program, there must be, at a minimum, a Federal nexus, or interest. Studies must have a direct association to a subsistence fishery, and either the subsistence fishery or fish stocks in question must occur in waters within or adjacent to Federal public

lands. Studies that can establish a Federal nexus are then further evaluated for strategic importance within the region in question by assessing:

- **Conservation Mandate** – Risk to the conservation of species and populations that support subsistence fisheries and risk to conservation unit purposes.
- **Allocation Priority** – Risk of failure to provide a priority to subsistence uses and risk that subsistence harvest needs will not be met.
- **Data Gaps** – Amount of information available to support subsistence management. A higher priority is given where a lack of information exists.
- **Role of Resource** – Importance of a species to a subsistence harvest (e.g. number of subsistence users affected, quantity of subsistence harvest), and qualitative significance (e.g. cultural value, unique seasonal role).
- **Local Concern** – Level of user concern over subsistence harvests (e.g. allocation, competing uses, changes in fish size)

2. Technical-Scientific Merit

Technical quality of the study design must meet accepted standards for information collection, compilation, analysis, and reporting. Studies must have clear objectives, appropriate sampling design and methods, correct analytical procedures, and specified progress and final reports.

3. Past Performance-Administrative Expertise

Investigators and their organizations must have demonstrated technical and administrative expertise to complete prior studies, or have co-investigators or appropriate partnerships with other organizations to meet all requirements of the study.

4. Partnership-Capacity Building

Studies must include appropriate partners and contribute to the capacities of rural organizations, local communities, and residents to participate in fisheries resource management. Investigators must have completed appropriate consultation about their study with local villages and communities in the area where the study is to be conducted. Investigators and their organizations should be able to demonstrate the ability to maintain effective local relationships and a commitment to capacity building.

In addition to consideration of the evaluation criteria as explained above, the Technical Review Committee was mindful of limited funding for 2007 when approximately $1 million will be reallocated to the Partners for Fisheries Monitoring Program. Funding for the Partners Program was always envisioned as a Department of Interior cost under the Monitoring Program; however, the Office of Subsistence Management had been able to utilize other funds to cover these costs. In 2007, the Monitoring Program will be responsible for the full cost of the Partners Program, approximately $1 million. As a result, the Technical Review Committee carefully considered the need to initiate new studies with 2006 funds, and strongly recommends utilizing some of the 2006 funds to increase the available funding in 2007.

Policy and Funding Guidelines

Several policies have been developed to aid in implementing funding.

- Studies must be non-duplicative with existing projects.
- A majority of Monitoring Program funding is dedicated to non-Federal sources.

- Activities not eligible for funding under the Monitoring Program include: a) habitat protection, restoration, and enhancement; b) hatchery propagation, restoration, enhancement, and supplementation; and c) contaminant assessment, evaluation, and monitoring. These activities would most appropriately be addressed by the land management agencies.
- Proposals may be funded for up to three years duration.

Finances and Guideline Model for Funding

The Monitoring Program was first implemented in 2000, with an initial investment of $5 million. Since 2001, a total of $6.25 million is annually allocated for the Monitoring Program. The Department of Interior, through the U.S. Fish and Wildlife Service, annually provides $4.25 million. The Department of Agriculture, through the USDA Forest Service, annually provides $2 million. On an annual basis, this budget funds the continuation of existing studies (year 2 or 3 of multi-year projects), and new study starts. Budget guidelines are established by geographic region and data type, and for 2006, $1.25 million is available for new starts (Table 1). Proposals are solicited according to the following two data types:

1. Stock Status and Trends Studies (SST)

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

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

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

Table 1. Budget guidelines by region and data type for the 2006 Monitoring Program.

	$ Values in 1,000's					$ Values in 1,000's		
	Dept of the Interior		**Dept of Agriculture**					
Region	%	$	%	$	%	Total	SST	TEK
Northern	17.0%	$187			15.0%	$187	$125	$62
Yukon	29.0%	$319			25.5%	$319	$213	$106
Kuskokwim	29.0%	$319			25.5%	$319	$213	$106
Southwest	15.0%	$165			13.2%	$165	$110	$55
Southcentral	5.0%	$55	32.5%	$48	8.3%	$103	$69	$34
Southeast	0.0%	$0	62.5%	$93	7.5%	$93	$62	$31
Inter-regional	5.0%	$55	5.0%	$7	5.0%	$63	$42	$21
TOTALS	100.0%	**$1,101**	100.0%	**$149**	100.0%	$1,250	$833	$417

2006 Fisheries Resource Monitoring Plan

A request for proposals was issued in November, 2004. Fifty-six proposals ($4.4 million) were received in February 2005. These proposals were reviewed by Fisheries Information Services staff and the Technical Review Committee. Of the 56 proposals submitted, the Technical Review Committee recommended 25 proposals ($1.7 million) for further consideration. In March 2005, a request for investigation plans for these proposals was issued by the Technical Review Committee. Twenty investigation plans ($1.4 million) were received in June 2005. The Technical Review Committee recommended funding for 15 of these projects totaling $1.1 million. Regional Advisory Councils agreed with 18 of the 20 Technical Review Committee recommendations. The two projects there was disagreement on were: 06-101 Pikmiktalik River Chum and Coho Salmon Enumeration and Sampling; and 06-304 Seasonal Distribution and Abundance of Rainbow Trout, Aniak River.

The Federal Subsistence Board reviewed the draft monitoring plan in January 2006 and selected 15 projects for inclusion in the 2006 Fisheries Resource Monitoring Plan. With this plan, 45% of the funding will go to Alaska Native organizations, 31% to State agencies, and 24% to Federal agencies (Figure 1).

Tables summarizing the 2006 Subsistence Fisheries Monitoring Plan are provided on pages 5–8. Descriptions of the projects included in the plan can be found on pages 9–40.

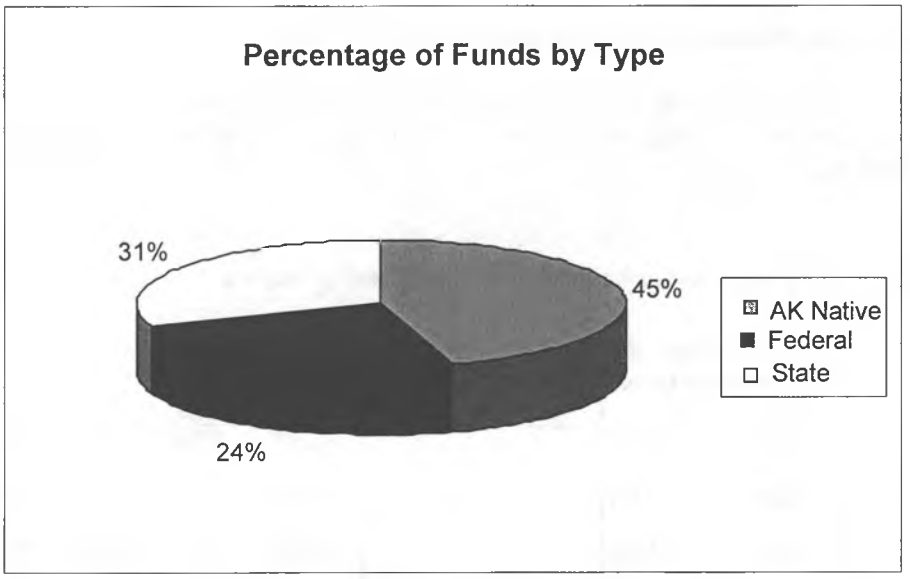


Figure 1. Percent of 2006 funding distributed to Alaska Native, Federal, State, and other organizations.

Number of projects funded for the 2006 Fisheries Resource Monitoring Plan. Project type includes stock status and trends (SST) and harvest monitoring and traditional ecological knowledge (HM-TEK).

Geographic Region	SST	HM-TEK	Total
Northern Alaska	2	0	2
Yukon	1	2	3
Kuskokwim	4	1	5
Southwest Alaska	0	0	0
Southcentral Alaska	1	0	1
Southeast Alaska	2	1	3
Inter-regional	1	0	1
Total	11	4	15

Cost of projects funded for the 2006 Fisheries Resource Monitoring Plan. Project type includes stock status and trends (SST) and harvest monitoring and traditional ecological knowledge (HM-TEK).

	Cost ($000)		
Geographic Region	SST	HM-TEK	Total
Northern Alaska	$167	$0	$167
Yukon	$92	$174	$267
Kuskokwim	$280	$86	$366
Southwest Alaska	$0	$0	$0
Southcentral Alaska	$91	$0	$91
Southeast Alaska	$79	$84	$163
Inter-Regional	$49	$0	$49
Total	$759	$344	$1,103

Summary Tables

Northern Alaska stock status and trends projects funded in 2006.

Study #	Title	Approved Budget 2006	2007	2008
06-101	Pikmiktalik River Chum and Coho Salmon Enumeration and Sampling	$140.5	$142.5	$0.0
06-108	Aerial Monitoring of Kongakut, Anaktuvuk, Ivishak Rivers Dolly Varden Overwintering Abundance	$26.8	$27.3	$27.7
	Total	$167.3	$169.8	$27.7

Yukon River region stock status and trends project funded in 2006.

Study #	Title	Approved Budget 2006	2007	2008
06-205	Application of Mixed-stock Analysis to Estimate Stock Composition Fall Chum Salmon, Yukon River	$92.2	$89.2	$92.2
	Total	$92.2	$89.2	$92.2

Yukon River region harvest monitoring and traditional ecological knowledge projects funded in 2006.

Study #	Title	Approved Budget 2006	2007	2008
06-252	TEK and Biological Sampling of Non-salmon Fish Species, Yukon R	$97.6	$77.7	$33.6
06-253	TEK and Harvest Survey of Non-salmon Fish, Middle Yukon R	$76.8	$53.7	$20.1
	Total	$174.4	$131.4	$53.7

Kuskokwim River region stock status and trends projects funded in 2006.

Study #	Title	Approved Budget 2006	2007	2008
06-303	Migratory Behavior of Broad and Humpback Whitefish, Kuskokwim River	$162.7	$173.1	$172.1
06-305	Spawning Distribution and Migratory Timing of Inconnu, Kuskokwim R	$52.3	$118.6	$43.3
06-306	Inseason Subsistence Salmon Catch Monitoring, Kuskokwim R	$33.9	$36.0	$40.0
06-307	Inseason Support for Cooperative Management of Subsistence Fishery, Kuskokwim River	$31.0	$32.3	$33.6
	Total	$279.9	$360.0	$289.0

Kuskokwim River region harvest monitoring and traditional ecological knowledge project funded in 2006.

Study #	Title	Approved Budget 2006	2007	2008
06-351	Non-salmon Harvest Surveys and Local Knowledge Project, Lower Kuskokwim River	$86.1	$91.8	$0.0
	Total	$86.1	$91.8	$0.0

Southcentral Alaska stock status and trends project funded in 2006.

Study #	Title	Approved Budget 2006	2007	2008
06-502	Estimate Inriver Abundance of Sockeye Salmon, Copper River	$90.9	$0.0	$0.0
	Total	$90.9	$0.0	$0.0

Southeast Alaska stock status and trends projects funded in 2006.

Study #	Title	Approved Budget 2006	2007	2008
06-601	Sockeye Salmon Stock Assessment, Neva Lake	$28.1	$29.0	$32.0
06-602	Subsistence Sockeye Salmon Stock Assessment Kutlaku Lake	$51.0	$0.0	$0.0
	Total	$79.1	$29.0	$32.0

Southeast Alaska harvest monitoring and traditional ecological knowledge project funded in 2006.

Study #	Title	Approved Budget 2006	2007	2008
06-651	Survey of Customary Trade in Seafood Products, Southeast AK	$83.7	$222.6	$108.6
	Total	$83.7	$222.6	$108.6

Interregional Alaska stock status and trends project funded in 2006.

Study #	Title	Approved Budget 2006	2007	2008
06-701	Dolly Varden Stock Composition in Subsistence Fisheries, Southwest AK	$49.4	$47.5	$0.0
	Total	$49.4	$47.5	$0.0

06-101
Pikmiktalik River Chum Salmon Enumeration and Sampling

Geographic Area: Northern Region

Information Type: Stock Status and Trends

Principal Investigator: Karen Dunmall
Kawerak Incorporated
Nome, AK
Phone: (907) 443-4384 Fax: 443-4461
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Co-Investigator: Timothy Kroeker, Kawerak Incorporated
Natural Resources Division

Cost:	2006	2007	2008
	$ 140,514	$142,499	$145,981

Issue

Much of the subsistence harvest of the communities of Stebbins and St. Michael is conducted on the salmon stocks of the Pikmiktalik River, which is in their customary and traditional use area. This customary and traditional use area also includes the Kogok and Kuiak Rivers. However, in-season management of these rivers has been based on escapement information from other systems, more specifically, August fall chum runs on the Yukon River dictate whether Pikmiktalik, Kogok and Kuiak Rivers will be open for the coho run. The availability of escapement information has improved management of these fishery resources by giving Federal managers inseason escapement of the Pikmiktalik River, independent of Yukon River salmon runs and creates an index of the Pikmiktalik River for the Kogok, Kuiak and Pastolik Rivers.

Objectives

This project is proposed as a three-year (2006, 2007, 2008) study with the following objectives:

- Install tower, weir and flash panel at the counting site.
- Provide daily and total annual estimates of chum and coho salmon passing the counting site.
- Provide estimates of the age, sex, and size composition of chum and coho salmon passing the counting site.
- Record weather and water conditions at the salmon counting site.

Methods

Counting apparatus will consist of one 15-foot high scaffold tower, a partial diversion weir to direct fish towards the tower, and a vinyl flash panel on the river substrate to provide contrast. Counts will be made of salmon passage by species for a 20-minute duration each hour. Salmon will be visually identified and counted on a hand tally counter. Salmon passing upstream will be included in the total count, while salmon passing downstream will be subtracted from the total count. The total number of salmon passing the site will be estimated by multiplying each hourly count by three. The 20-minute counting schedule

will occur 24 hours a day, 7 days per week. Daily counts will be transmitted by radio or telephone to National Park Service and Alaska Department of Fish and Game offices for use in fishery management decisions.

Chum and coho salmon will be captured at or near the counting site with a beach seine to collect age, sex, and length information. A stratified sampling design, based on run timing characteristics, will be followed in which approximately 218 chum will be sampled within each stratum. As well, 160 coho salmon will be sampled throughout the coho salmon return. This sample size was selected so that simultaneous 95% confidence interval estimates of age composition proportions would be no wider than 0.20, and includes a 9% adjustment in sample size to account for unreadable scales. Efforts will also be made to sample salmon caught in the subsistence fishery to obtain information on the species, age, sex, and length composition of the harvest.

Partnerships/Capacity Building

The Norton Sound Regional Advisory Council, Stebbins Community Association, and Stebbins Native Association strongly support this project to improve management of local salmon stocks. This project would continue to develop capacity within the communities of Stebbins and St. Michael to actively participate in stock assessment and provide employment for local residents. Some residents already have experience in conducting salmon surveys through work funded by the Native American Rights Fund in 1995, and through the Pikmiktalik River salmon enumeration project, funded by the Office of Subsistence Management, for the 2003 – 2005 seasons. Residents also have much traditional knowledge about this river system.

06-108
Aerial Monitoring of Dolly Varden overwintering abundance in the Anaktuvuk, Ivishak, Canning, Hulahula, and Kongakut rivers.

Geographic Area: Northern Region

Information Type: Stock Status and Trends

Principle Investigators: Tim Viavant and John Burr
ADFG, Sport Fish Division
Fairbanks, AK
Phone: (907) 459-7220
Email: tim_viavant@fishgame.state.ak.us

Co-Investigator: Mitch Osbourne, USFWS, Fairbanks Fish and Wildlife Field Office

Cost:	2006	2007	2008
	$ 26,794	$ 27,252	27,697

Issue

This proposed study will address the Arctic/Kotzebue/Norton Sound Region Subsistence Fisheries Monitoring Issues, Stock Status and Trends #1: Distribution, abundance, and life history of fish species; subheading: Char stock structure as identified in the November 2003 Office of Subsistence Management document: Issues and Information Needs - Federal Subsistence Fisheries.

Objectives

The objective of the project for each of the 3 years is to conduct a single aerial index count of the mid-September overwintering abundance of Dolly Varden within established index areas in the Anaktuvuk, Ivishak, Canning, Hulahula, and Kongakut rivers.

Methods

In all drainages, surveys will be conducted in established index areas, from a helicopter, by two experienced observers. All surveys will be conducted between September 10 – 25. During all surveys, a third observer will participate in the survey, and conduct a count on their side of the helicopter for comparison with an experienced observer.

Surveys of the Ivishak, Anaktuvuk, and Kongakut rivers will be conducted within the boundaries of the index areas established during previous aerial index counts. Surveys of other drainages will be conducted each year within boundaries of index areas established during the first year of the project. These index areas will be established based on the distribution of fish during the initial survey of the drainage combined with local knowledge of fish distribution within the drainage. Local knowledge of fish distribution within drainages will be solicited from subsistence users in cooperation with the North

Slope Regional Advisory Council, the Arctic National Wildlife Refuge and North Slope Borough Wildlife Department. Boundaries of index areas will be recorded as GPS waypoints.

Partnerships/Capacity Building

The North Slope Borough Wildlife Department has agreed to provide an observer to accompany project biologists during some or all of the surveys conducted in order to familiarize a staff member in the techniques used for conducting these surveys. It is the intent of this project to train and familiarize staff of a local organization (local government agency, village or regional corporation, or tribal organization) with this survey methodology, so that a local organization would have the capacity to continue stock monitoring into the future.

06-205
Application of mixed-stock analysis for Yukon River fall chum salmon

Geographic Area: Yukon River

Information Type: Stock Status and Trends

Principle Investigators: Blair Flannery and John Wenburg
USFWS, Conservation Genetics Laboratory
Anchorage, AK
Phone: (907) 786-3355
Email: blair_flannery@fws.gov

Cost:	2006	2007	2008
	$92,200	$89,200	$92,200

Issue

This project relates to the following priority information need identified in the 2006 Office of Subsistence Management Request for Proposals:

- Inseason mainstem stock assessment and mixed-stock analysis of Lower Yukon River salmon

This investigation plan is a continuation of FIS 04-228, which provided stock composition estimates of chum salmon to Federal subsistence managers within 24 to 48 hours of receiving samples from Pilot Station sonar test fisheries. Yukon River chum salmon move through numerous Federal holdings during their spawning migration. Chum salmon in the Yukon River continue a general trend of below average to poor returns. The recent five year (1998-2003) average return was half the previous ten year average and the persistent return shortage has necessitated the continued listing of Yukon River fall chum salmon as a stock of yield concern. The disparate strength of individual stocks, coupled with the overall run shortage and a reduction in subsistence opportunities, makes it clear that individual stock return data would facilitate improved management. The USFWS management team responsible for subsistence management has requested that this work be continued. In this project, we will provide estimates of stock compositions for major fall chum salmon stock groups to continue to facilitate Yukon River chum salmon management.

Objective

Estimate regional stock contributions and run timing from Pilot Station sonar test fishery harvests.

Methods

Genetic samples will be collected from every chum salmon caught in the Pilot Station sonar test fishery from June 27 – August 31, and sent to the Conservation Genetics Laboratory every third day and at the conclusion of each run pulse. Samples will be stratified by 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 pulse of the fall 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/Capacity Building

This project will work with ADFG AYK biologists to coordinate sample collection from the Pilot Station sonar test fishery. A contract with the Association of Village Council Presidents will be established to hire a local to collect genetic samples. Baseline development was completed in partnership with DFOC. This project will consult, collaborate and coordinate with state, Federal and DFOC managers.

06-252
Traditional Ecological Knowledge and Biological Sampling of Non-salmon Fish Species in the Yukon Flats Region

Geographic Area: Yukon Region

Information Type: Harvest monitoring/traditional ecological knowledge (HM/TEK)

Principal Investigator: Mike Koskey, PhD.
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Co-Investigators: Ingrid S. McSweeny, Bureau of Land Management
Wennona Brown, Yukon Flats, Kanuti, and Arctic NWRs
Bruce Thomas, Council of Athabascan Tribal Governments
Caroline Brown, ADFG, Subsistence Division

Cost:	2006	2007	2008
	$97,611	$77,705	$33,641

Issue

This project is designed to expand the available subsistence harvest information for non-salmon fish species in the Yukon Flats region and collect baseline biological information on northern pike in Birch Creek. The subsistence harvest regulations for the Birch Creek drainage have changed considerably over the past three decades, yet there is currently very little reliable qualitative or quantitative baseline information on resident fish species in drainage. At the 2003 Tri-Regional Advisory Council meeting in Wasilla, there was concern over this lack of information on the harvest levels and fish populations of non-salmon species in Birch Creek in light of recent proposals to the Federal Subsistence Board and the Alaska Board of Fisheries addressing current subsistence opportunity for non-salmon harvests. As such, this research seeks to document traditional ecological knowledge about non-salmon fish species held by area residents and describe the characteristics of the annual non-salmon subsistence harvest. Baseline biological data will be collected under a separate cost-share agreement submitted by the Bureau of Land Management (BLM), but will be briefly described in this proposal to provide the full context of the proposed research.

Objectives

1. Document Traditional Ecological Knowledge of non-salmon fish species in the Birch Creek area for the communities of Ft. Yukon, Circle, Central, Beaver and Birch Creek Village, as reported by local experts;
2. Estimate harvest levels and use patterns of non-salmon fish species by village residents through a door-to-door harvest survey;

3. Collect baseline biological information to estimate age, sex, and length (ASL) composition of northern pike populations from upper and lower Birch Creek and monitor water quality parameters important to northern pike (under separate funding).

Methods

This research focuses on the resource use patterns by residents of Fort Yukon, Circle, Central, Beaver and Birch Creek Village, involving the Yukon River, Beaver Creek, Hodzana River, the Little Black River, Sheenjek River, and with a special focus on Birch Creek.

The project relies on semi-structured ethnographic interviews with elders and other knowledgeable fishers, mapping, linguistic and place-name analysis, and participant-observation in order to address the first objective. Researchers will attempt to interview approximately 4-5 key respondents in each community, on an individual basis as well as in small groups or with married couples for a total of approximately 25 interviews. Interviews will include topics such as traditional and contemporary harvest patterns and techniques, different preservation and use practices, and local knowledge regarding broad ecological factors such as run timing, seasonal movements, habitat, and fish health/disease. Additionally, information will be collected where available on historic self-management techniques and the resulting effects on fish populations.

The second objective is addressed through the implementation of a door-to-door harvest survey in each community conducted by a local research assistant. To maximize the accuracy of the household survey, a census method of surveying will be used in each community with the exception of Ft. Yukon, where a random 50% sample of the community will be surveyed. Surveys are one page instruments and will include questions about species and amounts utilized, gear types, harvest timing, basic demographic information, and initial social networking patterns (patterns of sharing and distribution within communities).

The final objective is addressed through a pilot survey estimating size, age composition, and growth of northern pike inhabiting Birch Creek. The funding for the biological component of this project (Objective 3) is addressed under a separate challenge cost-share agreement, but a brief description of it is included here to demonstrate the scope of the entire project. The goal of this baseline study is to assess and compare the composition and growth of northern pike populations and environmental parameters from reaches in upper and lower Birch Creek. Specific component objectives include estimating the age, sex and length (ASL) composition of northern pike in Birch Creek; estimating the weight of northern pike in Birch Creek; determining and comparing growth rates and of northern pike populations from upper and lower Birch Creek; and measuring and comparing environmental factors important to northern pike from upper and lower Birch Creek.

This project is designed to build capacity between ADFG, FWS, BLM, and CATG by fostering interdisciplinary research opportunities. The project will begin in April 2006 to allow preparation time for the first biological field season in summer 2006 and Analysis and write-up of biological data, TEK, and harvest survey will be completed by August 2008 for review and final deadline of September 30, 2008.

Partnerships/Capacity Building

One of the primary strengths of this project is the cooperation of four organizations representing two Federal agencies, one State agency and one Alaska Native organization. CATG staff will work in collaboration with tribal councils, BLM, USFWS, and ADFG Division of Subsistence in designing survey instruments (modeled on existing projects), identifying and training local technicians for survey

work, ethnographic interviewing, and biological sampling. As designed, this project relies on information provided by local experts. Further, this project relies on collaboration with, and the participation of, local people, both in terms of identifying and working with local experts, and also in terms of recording and preparing TEK and harvest data. Local residents will also be hired and trained to assist with the biological sampling component. USFWS, CATG, ADFG, and BLM researchers will cooperate in completing the TEK work, with ADFG leading the interviews and CATG organizing mapping sessions. Principal investigators will encourage local participation in Federal or State regulatory meetings (AC, RAC, BOF, and FSB) to express their concerns about Birch Creek subsistence resources, especially in light of any potential research findings. Partners will work cooperatively to screen and analyze the data, and the final report will be written collaboratively by all partners.

06-253
Traditional Ecological Knowledge and Harvest Survey of Non-Salmon Fish in the Middle Yukon River Region.

Geographic Area: Middle Yukon River area: Ruby, Tanana, Galena, Kaltag, and Nulato

Information Type: Harvest monitoring/traditional ecological knowledge (HM/TEK)

Principal Investigator: Caroline Brown
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Co-Investigators: Ms. TygJules SkyWatcher, Louden Tribal Council
Mike Koskey, PhD., ADFG, Division of Subsistence

Cost:	2006	2007	2008
	$76,819	$53,716	$20,125

Issue

This research proposes to collect Traditional Ecological Knowledge (TEK) and contemporary harvest figures to address local concerns about resident freshwater fish species in the middle Yukon River region, including the impact on subsistence harvesting in light of decreasing salmon stocks and other environmental factors. This project will complement two existing FIS projects (01-100 and 02-037) to present a comprehensive picture of subsistence non-salmon harvests for a significant stretch of the Yukon River and Koyukuk River drainages. The Western and Eastern Interior Regional Advisory Councils identified the need for comprehensive data on fish populations, life histories, and the range of subsistence uses. More specifically, members of the Western Interior Alaska Regional Advisory Council identified middle Yukon villages as a significant area for this research at their October 2004 meeting in Anvik.

This project also addresses the need for more meaningful capacity building on the local level. Coordination between state agencies, tribal councils, and local school officials and high school students is a significant contribution to capacity building. By structuring meaningful participation of a community's youth in an integrated biological and social scientific research project on locally important resources, this study will encourage future interest in the biological and social sciences as potential professional and technical careers.

Objectives

1. Estimate the subsistence harvest and percentage of households using, harvesting, giving away, and receiving resident freshwater fish species (non-salmon) for the calendar year 2007 by species and by season for the five communities along the Middle Yukon.
2. Document local knowledge related to traditional and contemporary patterns of subsistence non-salmon harvest including:
   i) species utilized and local names used with introductory taxonomic analysis

ii) fish ecology, including information about habitat, spawning and seasonal movements
iii) contemporary and traditional methods and timing of harvest
iv) contemporary and traditional methods of preparation and preservation
v) spatial mapping of harvest areas and other significant habitats by species and season
vi) traditional management practices and the effects on fish populations
vii) fish-related place-names

3. Develop guidelines for working with local students on TEK and harvest monitoring projects.

Methods

This research focuses on the resource use patterns by residents of Galena, Ruby, Tanana, Nulato, and Kaltag along the middle portion of the Yukon River and involving the Tozitna, Nowitna, Nulato, Melozitna Rivers and Kalakaket Creek among other waterways.

In the first year of this project, the partners will work with the science/math and social science/english teachers at the participating high schools to design class projects involving ethnographic and harvest survey approaches to data collection on non-salmon fish. Prior to data collection, ADFG and Louden Traditional Council staff will work with teachers to train students on harvest survey methods and interviewing methods. This training will cover topics such as research objectives, designing survey instruments, designing interview questions, focusing interviews, the relationship between research and natural resource management, and practical issues in conducting face-to-face surveys and interviews (equipment, timing, preparedness, ethics, etc.) The partners will design training manuals to assist in these trainings and to be used as references by teachers and students.

Students and local research assistants will work with the partners to collect harvest data through in-person household surveys. The sampling goal will be 100% of each of the participating communities, with the exception of Galena, where a 50% random sample will be conducted because of the community's size. The one-page survey includes questions about ten (10) non-salmon fish species, including five (5) species of whitefish and spaces for additional species not listed on the form but harvested in the area. The form also includes questions about different activities including use, harvest, receiving, and giving away fish to track the sharing patterns characteristic of subsistence activities, as well as a worksheet to document actual harvests by species and month for one calendar year. Finally, the form collects basic demographic information, observations about long-term trends in stock size, and a comment section.

TEK interviews constitute the second component of data collection for this project. These interviews will focus on information regarding local taxonomy, life history/biology information including habitat, spawning, and seasonal movements, traditional/contemporary harvest methods, including harvest timing, gear types used, mapping of harvest areas, and fish-related place names, traditional/contemporary preparation and preservation methods, uses, including human food, dog food, bait, etc., and relative abundance and population trends. Interviews will also attempt to isolate traditional management practices employed by local fishermen and the effects on fish populations. Investigators anticipate interviewing approximately 4-5 individuals in each community for a total of 20-25 total interviews.

Partnerships/Capacity Building

ADFG staff will work collaboratively with tribal councils to design survey instruments, train local students and research assistants for survey work, and in conducting the TEK interviews. As designed, this project relies on collaboration with, and the participation of, local people in several capacities: a.) identifying and working with local non-salmon fish experts; b.) working through the Galena school

to identify high school age students to assist with the harvest survey and TEK work, and c.) working with tribal councils on all aspects of the project. By incorporating school age community members into the research design, data collection, and data analysis, ADFG and LTC hope to increase capacity by exposing kids to potential career fields in fisheries science and the social sciences, instill a sense of community ownership in the process, and to support the process of generational transmission of knowledge. Additionally, students will get first hand experience in research that contributes directly to natural resource management. ADFG will screen and analyze the data, and the final report will be written collaboratively by ADFG and LTC staff.

06-303
Migratory Behavior of Broad and Humpback Whitefish in the Kuskokwim River Watershed.

Geographic Area: Kuskokwim River

Information Type: Stock Status and Trends

Principal Investigator: Ken Harper
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Co-Investigator: David Orabutt
Kuskokwim Native Association

Cost:	2006	2007	2008
	$ 162,693	$173,090	$172,062

Issue

The study of non-salmon species is listed as an important issue for the 2006 Fisheries Resource Monitoring program. Kuskokwim River whitefish are a heavily exploited resource, and comprise a significant year round source of protein for local users. There are little or no regulations governing harvests in the Kuskokwim River. Kuskokwim River residents have noted changes and have reported a decline in size and numbers of humpback and broad whitefish. The lack of biological information on whitefish populations in the Kuskokwim River however prevents the development of sustainable harvest guidelines.

Objectives

1. Locate spawning aggregates of humpback and broad whitefish.
2. Determine migratory timing of mature broad and humpback whitefish to spawning, over wintering, and feeding grounds.
3. Map at least one spawning area (aggregates of one species identified in objective #1) by determining the reach of river for which 90% of the spawning occurs for that aggregate of fish.
4. Estimate the youngest age and age of full recruitment to a spawning ground identified for one species in objective #1.
5. Estimate the size at which all fish are mature.
6. Determine multiple year PIT tag retention through operation of PIT tag interrogation system at the outlet of Whitefish Lake.

Methods

Whitefish will be captured in several tundra rivers and lakes below Bethel using gillnets and seines. Otoliths will be collected for age and microchemistry analysis. Approximately 90 whitefish will be

captured during the spring of 2006, 2007, and 2008 and implanted with radio tags and PIT tags to track movements of individual fish to spawning, wintering and spring feeding areas. An additional 250-500 PIT tags will be implanted in whitefish in the lower Kuskokwim River each year. Movements will be monitored using 7 fixed radio receiver stations located between Bethel and Medfra. Boat and aerial surveys will be conducted below Tuntatuliak to Nicholi, encompassing over 1000 river kilometers. Spawning grounds identified in year one and two will be surveyed in the second and third years to determine area of spawning habitat, and spawner age, length at maturity, sex, and current year spawner composition. Fish sampled on the spawning grounds will be scanned for PIT tags and examined for floy tags. The remote PIT tag interrogator system used at the outlet of Whitefish Lake (FIS 05-301) will be operated to detect multiple year returns of tagged fish to the lake. Spawning grounds will be assessed for deployment of a PIT tag reader.

Partnerships/Capacity Building

This project directly promotes interaction between KNA, USFWS, Coastal Villages and ADFG and supports a positive working relationship between major user groups. We will build upon the partnership and collaboration between the USFWS and KNA, developed over the past four years of whitefish studies. Coastal Villages Development Corp has also been approached for support. The study platform used in this study will be integrated into ADFG's proposed sheefish study. This project has been discussed and supported by the Kuskokwim Fisheries Resource Coalition.

06-305
Spawning Distribution and Migratory Timing of Kuskokwim River Sheefish Using Radiotelemetry.

Geographic Area: Kuskokwim River

Information Type: Stock Status and Trends (SST).

Principal Investigators: Steve Stroka and John Chythlook
ADFG, Division of Sport Fish
Fairbanks, AK
Phone: (907) 459-7351
Email: steve_stroka@fishgame.state.ak.us

Cost:	2006	2007	2008
	$ 52,267	$ 118,639	$ 43,323

Issue

Sheefish (inconnu) are a highly migratory, long-lived species and are important to both the Kuskokwim River subsistence and sport fishers. Although these large, piscivorous (fish eating) fish are found throughout the drainage, few specifics are known regarding the location, number, and size of spawning stocks, the timing and extent of seasonal migrations, or areas used for feeding and overwintering. In order to understand the impacts the fisheries have on these stocks, an understanding of these characteristics is needed.

Objectives

This project is being proposed as a three-year (2006-2008) study. The primary goal of the project is to:

1. Document spawning stocks and spawning locations of sheefish in the Kuskokwim River drainage.

Secondary goals of the project are to:

2. determine the migratory timing of mature sheefish to their spawning, overwintering, and feeding areas;
3. identify specific summer feeding areas used by known spawning stocks; and,
4. collect tissue samples from all radio-tagged sheefish for future genetic stock identification analysis.

Methods

This study will provide biological baseline information on spawning aggregations (stocks) of sheefish in the Kuskokwim River which is needed to design future studies to investigate size and maturity, distribution, stock composition of the harvest, and stock abundance, all of which are needed to determine sustainable levels of harvest of inconnu stocks in the Kuskokwim River drainage. The study will be conducted over a 3 year period (2006-2008). The purpose and scope of sampling will differ for each year, as follows.

Sampling in Year 1 (2006) will focus on fish of known spawning status in the upper portion of the drainage. Prespawning sheefish will be caught and radio-tagged from approximately August 22 through September 10. Sheefish will be captured near the village of McGrath as they migrate toward their spawning areas. Approximately 30 prespawning sheefish >750 mm FL will be tagged with long duration (~2 years) radio tags surgically inserted into the fish. Radio-tagged fish will be tracked as they travel to their upriver spawning areas and as they migrate back downriver after spawning to determine timing of travel as well as to identify spawning areas in the upper Kuskokwim River drainage.

The purpose of Year 2 (2007) sampling will be to radio tag fish in the lower portion of the drainage to document any spawning areas that may be present downstream of McGrath. To account for uncertainty in fish distribution and behavior, a two-tiered sampling approach will be used to ensure that both migratory and nonmigratory components of the population are tagged. This will be accomplished by capturing and radio-tagging 30 sheefish in the mainstem Kuskokwim River near Bethel as they move upriver to feeding areas as soon as the river is clear of ice (approximately mid-May), and secondly by capturing and radio-tagging 60 sheefish in summer feeding areas in tributaries between Sleetmute and Bethel. A combination of set and drift gillnets and hook and line gear will be used to capture sheefish. Radio tagged sheefish will be tracked throughout the summer and fall to identify: 1) spawning areas, 2) summer feeding areas, and, 3) timing of the spring and fall migrations.

The purpose of the Year 3 (2008) work will be to continue to track the Year 1 and 2 fish to determine summer feeding and spawning areas. Movements and locations of radio-tagged sheefish in all 3 years of the study will be determined with use of ground-based receiving stations and by aerial tracking.

Partnerships/Capacity Building

The proposed study will be performed in cooperation with the Tanana Chiefs Council (TCC) and Kuskokwim Native Association (KNA). This project directly promotes interaction between TCC, KNA, and ADFG and supports a positive working relationship between major user groups and the primary management agency on the Kuskokwim River. Pete Snow assisted with the preliminary sheefish work in 2004, and is willing to assist with the future capture and tagging of sheefish from his set gillnet site near McGrath. Pete and/ or another local resident(s) will be hired to assist with fishing and tagging operations in Year 1 of the study. A local hire from KNA will be used to assist with fishing and tagging operations in Year 2 of the study. The local hire experience is intended to teach new skills, expose the individual to the field of fisheries biology and encourage local participation in fisheries research projects. This project is supported by the Kuskokwim Fisheries Resource Coalition.

This study is intended to be a cooperative project with proposed Office of Subsistence Management study: 06-303: Telemetry studies of humpback and broad whitefish in the lower Kuskokwim River. This proposed sheefish study will rely on their stationary tracking array on the Kuskokwim River and the two projects will share aerial survey costs.

FIS 06-306
Kuskokwim River Salmon Inseason Subsistence Catch Monitoring

Geographic Area: Kuskokwim River

Information Type: Stock Status and Trends

Principal Investigator: Michael Martz
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Co-Investigators: Greg Roczicka, Orutsararmiut Native Council
Doug Bue, ADFG, Division of Commercial Fisheries

Cost:	2006	2007	2008
	$ 33,873	$ 36,041	$ 39,964

Issue

Inseason information from subsistence salmon fishers in the Bethel area can be used in combination with other information to assess salmon run timing and relative abundance. Together these sources of information assist fishery managers in making decisions to achieve salmon escapement goals, to provide fishers subsistence opportunity to harvest and to provide opportunity for fisheries other than subsistence if enough salmon are available. Additionally, this program provides timely insight into the progress of the subsistence fishery, a relative index of catches based on those interviewed, and very importantly, allows an avenue for local user input into the management process. Inseason interviews of subsistence fishers have been conducted in the Bethel area since 2001. Summaries of this information have contributed to effective management of the fishery. Comparisons of inseason interview responses can be made among weeks, within a year, and among years to help identify gross differences in salmon run timing, abundance, and gain insight into the fishery (gear usage or inseason harvest indices). Summaries of interview responses are presented to the Kuskokwim River Salmon Management Working Group, (hereafter called the Working Group) at each meeting. Fishery managers and the Working Group will utilize these summaries in the decision-making process for the Kuskokwim River subsistence salmon fishery.

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 usage 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 salmon subsistence 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 ADFG and USFWS projects for up to two weeks.

Methods

The Kuskokwim River salmon inseason subsistence catch monitoring project relies on voluntary participation of local subsistence fishers. Most participants are life-long residents of the Kuskokwim Area and represent the most experienced and knowledgeable fishers in the Bethel area. Nearly all participants are interviewed at seasonal fishing locations (fish camps) that have been maintained across generations. Most participants are of Alaska Native descent with a long tradition of practicing subsistence as a way of life.

Each year, the project will consist of hiring and training one fisheries technician by the Orutsararmiut Native Council project investigator in consultation with ADFG project investigators to begin field season preparations the third week in May and subsistence catch monitoring interviews three days later. This technician will work in partnership with the Orutsararmiut Native Council technician hired for FIS 05-306. The list of interviewees from the previous year (FIS 05-307) and developed since 2001 will form the initial list for 2006. In 2004, 51 subsistence fishing families were identified at fish camps in the areas of Gweek River, Church Slough, Steamboat Slough, Straight Slough, Old Bethel Airport, Oscarville Slough, Napaskiak Slough, the main Kuskokwim River and Bethel. The goal will be to interview these 51 families supplemented with opportunistic encounters with fishers at the Bethel boat ramp or travel to these areas, during which additional families wishing to participate will be added. Based on the success in past years, the same member of a fish camp is interviewed each week. The technician will travel by boat to outlying fish camps and contact Bethel fishers by phone at home. The technician will conduct interviews beginning Thursday of every subsistence fishing period (Wednesday through Saturday) or week (when fishing seven-days per week) through July 15th with subsistence fishers in Bethel and vicinity fish camps. The interviewer will ask questions in order to complete a two page interview form. Interview question responses will be entered into an Excel spreadsheet and summarized across each calendar or weekly fishing period. Summary tables will be provided to ADFG for distribution to USFWS, Regional Advisory Council members, Working Group members, and the public at Working Group meetings. A brief report will be added to capture fisher's comments and concerns expressed during the interview.

Partnership/Capacity Building

This project will enhance the ability of local individuals and agencies to be involved in obtaining inseason subsistence catch monitoring information. Staff from Orutsararmiut Native Council will conduct this project in consultation with staff from ADFG, Division of Commercial Fisheries. This (2006) will be the sixth year of subsistence interviews and Orutsararmiut Native Council staff responsible for the field work will be trained by the Orutsararmiut Native Council principal investigator. ADFG, Division of Commercial Fisheries staff will review forms for completeness and train Orutsararmiut Native Council staff to prepare weekly summaries. The Orutsararmiut Native Council project investigator will draft the performance report and coauthor the final report.

FIS 06-307
Inseason Support for Cooperative Management of the Kuskokwim River Subsistence Fishery

Geographic Area: Kuskokwim River

Information Type: Stock Status and Trends

Principal Investigator: John C. Linderman
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Co-Investigators: Michael Martz, ADFG, Division of Commercial Fisheries

Cost:	2006	2007	2008
	$31,010	$32,271	$33,610

Issue

This project supports the coalescing and dispersal of run assessment information needed for cooperative management of the Kuskokwim River subsistence salmon fishery. The fishery is cooperatively managed by the Alaska Department of Fish and Game and U.S. Fish and Wildlife Service, in coordination with the Kuskokwim River Salmon Management Working Group. The Working Group serves as a preseason, in-season, and post-season public forum for Federal and State fisheries managers to meet with local users of the salmon resource and review run assessment information and reach a consensus on how to proceed with management of Kuskokwim River salmon fisheries, especially as it affects subsistence fishing. Agency staff, advisory council members, and the public alike need to view and discuss inseason information in a timely manner. The discussion and decisions made at those meetings need to be noted and reported. Working Group and Regional Council members have asked the Department to provide accurate and timely reporting of these meetings so that information can be more widely distributed to stakeholders and to regulatory bodies including the Alaska Board of Fisheries and Federal Subsistence Board.

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 USFWS, Regional Advisory Council members, ADFG 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 (pre-season) and to summarize (post-season) the fishing season.
4. Report the discussion and decisions made during the cooperative management process.

Methods

Project objectives will be met in support of the Kuskokwim River Salmon Management Working Group process. A Fisheries Biologist I will function as the Working Group coordinator, but will be assisted by ADFG Bethel administrative staff and ADFG management and research biologists. This project is a continuation of FIS 01-116 and seeks funding to support cooperative management of Kuskokwim River subsistence fisheries through the Working Group process. ADFG will coalesce and disperse (1) pre-season run assessment and fishing schedule information, (2) inseason run assessment project results, and (3) harvest assessment information to participants of the cooperative management process. ADFG will also take the lead to document and report Working Group actions by taking minutes and drafting summaries of each meeting for distribution to participants and the public. This project would provide funding for Working Group members outside of Bethel to travel to meetings on an opportunistic basis, including larger scale travel to the post season meeting in September or October. It also provides travel money for a Working Group representative to attend relevant Alaska State Board of Fisheries, Federal Subsistence Board, State and Federal Advisory Council, or ADFG post- and pre-season interagency meetings. Funds will also be used for participants in the cooperative management process to meet by teleconference, receive information by FAX, and to assist in the purchase of meeting supplies and consumables.

Partnership/Collaboration

Local organizations that are involved with the Working Group process include area village governments, Orutsararmuit Native Council, Association of Village Council Presidents, Kwethluk IRA Council, Kuskokwim Native Association (KNA), and the Native Village of McGrath. The Working Group is composed of twelve member organizations or constituencies. These members represent: two Elders (Downriver and Upriver), three Subsistence Fishers (Lower, Middle, and Upper River), one Fish Processor, one Commercial Fisher, one Sport Fisher, one Western Interior Alaska Regional Advisory Council member, one YK Delta Regional Advisory Council member, one member-at-large, and an ADFG Commercial Fisheries Division designee. Each member of the Working Group designates a representative and an alternate in the event the representative is unable to attend a meeting. Other ADFG and USFWS staff attend Working Group meetings as do members of the public.

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

06-351
Lower Kuskokwim Non-Salmon Harvest Survey and Local Knowledge Project

Geographic Area: Kuskokwim River Region

Information Type: Harvest monitoring/traditional ecological knowledge (HM/TEK)

Principal Investigator: Tracie Krauthoefer
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Co-Investigator: Jennifer Hooper, Association of Village Council Presidents

Cost:	2005	2006	2007
	$86,140	$91,831	$0

Issue

Communities in the Johnson River, Kialik River, and Eek River areas are highly dependent, both contemporarily and historically, on freshwater fish. These communities are located off the main stem of the Kuskokwim River, close to rivers and large tundra lakes containing numerous freshwater fish species. Previous research indicates freshwater fish comprise the largest portion of the total subsistence fish diet of residents of Nunapitchuk, and that 100% of households report annually participating in the harvest (Andrews 1989). This dependence is likely to increase should current declines in Kuskokwim salmon stocks persist. There has been little documentation of ecological knowledge regarding population dynamics, life histories and critical habitat of freshwater species within this region. This project would collect harvest data on non-salmon species from Tuntutuliak, Eek, and Nunapitchuk, as well as TEK on traditional harvest patterns and use of non-salmon, non-salmon life histories, changing fish populations, health, abundance, distribution, and availability. The primary species of interest will be pike, broad whitefish, humpback whitefish, least cisco, Bering cisco, burbot, anadromous and non-anadromous lamprey, blackfish, rainbow trout, Dolly Varden, and sheefish. Key respondents will also be asked to provide information on beaver and non-salmon fish interactions and ecology.

Objectives

1. Identify, recruit, and train 1-2 technicians in each village (Nunapitchuk, Tuntutuliak, and Eek) to conduct harvest surveys.
2. Conduct non-salmon harvest surveys in Nunapitchuk, Tuntutuliak, and Eek to quantify subsistence harvest of non-salmon fish and document harvest methods, gear, and timing.
3. Interview 15-20 local experts from Nunapitchuk, Eek, and Tuntutuliak about non-salmon subsistence harvest and use patterns, life histories, patterns of seasonal movement, changes in abundance and distribution, location of key aggregation sites, and contemporary and traditional self-management practices.

4. Develop a geospatial database indexing local non-salmon subsistence harvest land use patterns and mapped environmental knowledge of Nunapitchuk, Tuntutuliak, and Eek residents.

Methods

For the harvest assessment, investigators will hire local researchers to conduct census design household surveys in each village and to assist as translators in key respondent interviews. Households will be surveyed annually for two years using standard subsistence division harvest assessment methodology to obtain information about harvest levels, timing, methods, gear and more. Traditional ecological knowledge will be documented through 15-20 key respondent interviews, mapping, and participant observation conducted during the first full year of the project.

Partnerships/Capacity Building

Capacity building with the communities of Nunapitchuk, Tuntutuliak, and Eek and AVCP is a central dimension of this project. Through cooperative agreements between ADFG and the Traditional Councils in all study communities, technical staff will be hired by the Traditional Councils to conduct household surveys in all communities and to assist with translating during interviews. The partnership between ADFG and AVCP will result in increased capacity for AVCP to conduct social science research and ADFG Division of Subsistence staff will benefit through greater understanding of the biological aspects of non-salmon fishery.

06-502
Estimate the Inriver Abundance of Copper River Sockeye Salmon

Geographic Area: Cook Inlet-Gulf of Alaska (Southcentral)

Information Type: Stock Status and Trends (SST)

Principal Investigator: Keith van den Broek
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Co-Investigators: Michael R. Link and Jason J. Smith, LGL Alaska Research Associates
Dr. John H. Clark, ADFG, Division of Commercial Fisheries

Cost:	2006	2007	2008
	$90,897	$0	$0

Issue

Copper River sockeye salmon sustain large and important subsistence fisheries under Federal jurisdiction; and subsistence, commercial and sport harvests are significant in comparison to abundance. Management of Copper River sockeye salmon is complex due to inter-annual variation in the size and timing of stocks, fisheries that target a mixture of stocks and difficulties in estimating abundance due to the physical characteristics of the drainage. Recently, returns of sockeye salmon to several tributaries of the upper Copper River basin (e.g., Gulkana Hatchery, Tanada Creek weir) have been lower than expected given the acoustic-based estimates of abundance obtained from the Miles Lake sonar site. To further confound certainty in the abundance estimates provided by the Miles Lake sonar, the Alaska Department of Fish and Game (ADF&G) is currently upgrading their Bendix acoustic system with a newer and much different acoustic system (dual frequency identification sonar – DIDSON). The management system and management plans for Copper River sockeye salmon have been built around the old Bendix sonar counts. The degree of comparability of the old and new acoustic systems is uncertain and the efficacy of the original Bendix acoustic counter has never been independently validated with an alternative technique.

We propose to use an independent technique to validate estimates provided by the new acoustic system and to the extent it remains, the Bendix-based estimates at Miles Lake. The purpose of this project is to use mark-recapture methods to estimate the weekly abundance of sockeye salmon returning to the Copper River above Miles Lake and compare these estimates to those provided by the Miles Lake sonar gear. The information collected from this project can be used by fishery managers to better manage the subsistence fishery for individual stocks, which ultimately could lead to increased subsistence harvest opportunities.

Objectives

1. To estimate the inriver abundance of sockeye salmon returning to the Copper River in 2006 such that the estimate is within 25% of the true value 95% of the time.

Methods

This project will use two-event mark-recapture methods to estimate the weekly abundance of sockeye salmon at Baird Canyon in 2006. For the first event, sockeye salmon will be spaghetti-tagged daily at two or three fish wheels operated in Baird Canyon (rkm 66) from mid May to mid August. These fish wheels will be located upstream of the Miles Lake sonar site and downstream of any inriver fisheries and major spawning tributaries. The second event will consist of fish examined for tags at two fish wheels located near Canyon Creek (rkm 157), located 12 km downstream of Chitina, AK. The fishing sites at Baird Canyon and Canyon Creek have been used successfully by the project team for these purposes since 2002. In 2005, a feasibility study funded by ADF&G headquarters will be conducted to assess whether digital video-recording (DVR) technology can be used to examine large numbers of fish for external tags during the upstream recovery event at Canyon Creek. If successful, the DVR systems will significantly reduce the amount of effort required to handle and sample fish at the fish wheels, thereby making this entire effort feasible.

Partnerships/Capacity Building

This project gives the Native Village of Eyak an opportunity for meaningful inclusion in the research and long-term management of Copper River sockeye 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. The Native Village of Eyak 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 interaction between a major subsistence group (Native Village of Eyak) and fisheries management agencies (ADF&G Division of Commercial Fisheries). 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 amongst 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.

06-601
Neva Lake Sockeye Stock Assessment

Geographic Area: Southeastern Alaska

Information Type: Stock Status and Trends

Principal Investigator: Ben Van Alen
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Co-Investigators: David Belton, Hoonah Indian Association
Meg Cartwright and Jan Conitz, ADFG, Division of Commercial Fisheries

Cost:	2006	2007	2008
	$28,125	$29,035	$31,991

Issue

The escapement of sockeye salmon into Neva Lake was estimated in 2002–2004 through funding provided by the Fishery Resource Monitoring Program. This was a cooperative project involving Hoonah Indian Association, ADFG, and the Forest Service. Project personnel operated a weir on the outlet of Neva Lake and used weir counts and mark-recapture methods to estimate the escapement of adult and jack sockeye salmon. Annual escapements were larger than anticipated – 4,951; 11,099; and 9,515 sockeye escaped in 2002, 2003, and 2004. These were the first estimates on record of the escapement of sockeye salmon into the system.

Project results have helped in raising the subsistence harvest limits from 10 sockeye per household per year to 25 fish in 2003 and 40 fish in 2004. The 2004 season was also extended from the end of July to mid-August once we learned that the run extended through September. Subsistence and sport effort appears to be increasing and stock assessment must be commensurate with the intensity of use.

Over the past three years we've observed a two-fold range in escapement and decrease in percent of jack (one-ocean) sockeye salmon from 24% to 16% to 3%. The high percent of jacks in 2002 was probably a good predictor of the large 2003 run. Likewise, the low percent of jacks in 2004 indicates that the 2005 run will probably be smaller but we will never know unless we continue weir operations. Additional years of escapement and age composition data are needed to reliably assess the health of the Neva sockeye run and assure that the production is not limited by escapement. The low cost of this weir project is possible since weir materials are on site, local hire reduces housing, food, and transportation expenses, and the salary for the Forest Service project leader is already covered.

Objectives

1. Estimate the total escapement of sockeye salmon into Neva Lake using a weir and mark-recapture so that the estimated coefficient of variation is less than 20 percent.

2. Estimate the age, length, and sex composition of the sockeye escapement into Neva Lake from a representative sample of 600 fish.

Methods

A weir will be operated from mid-June through late-September each year. Upstream migrating salmon and trout will be counted as they are passed out of a trap on the face of the weir. Separate counts will be kept for adult and jack sockeye salmon. Project personnel will visit the weir two or more times each day to pass fish so that their migration into the lake is not delayed by the weir. Weir counts, stream temperature and depth measurements, and any field observations will be recorded on data forms.

A mark-recapture study will be done to validate weir counts or estimate the total escapement if we find that sockeye salmon have passed through the weir uncounted. A running average of 20 percent of the sockeye counted through the weir will be finclipped. A unique finclip will be given for each historical third of the run. Finclips will be left axillary, left ventral, and dorsal (clip base of last four fin rays). Sockeye salmon will be examined for these weir marks in the main inlet stream and beach spawning areas on two or more occasions in August and September. More sampling trips will be done if the marking fraction is less than that applied at the weir.

Six hundred sockeye salmon will be sampled at the weir for scale (age), sex, and length data. The weekly sampling goals will be based on the historical weekly proportion of escapement in 2002, 2003, and 2004. Scale sampling and processing methods will follow standard ADFG procedures.

Project personnel will keep records of the subsistence and sport fishing effort and harvest in the Neva Creek and South Creek area. This harvest monitoring will primarily be done when traveling to and from the weir site each day.

Partnerships/Capacity Building

The weir technician will be hired by, and an employee of, the Hoonah Indian Association. The Hoonah Indian Association succeeded in filling all of their positions on the 2002-2004 Neva, Pavlof, and Hoktaheen Lake sockeye stock assessment project with local hires and I anticipate that Hoonah Indian Association will hire locally for this project as well.

06-602
Kutlaku Lake Sockeye Stock Assessment

Geographic Area: Southeast Alaska

Information Type: Stock Status and Trends

Principal Investigators: Meg Cartwright and Jan Conitz
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Co-investigators: Mike Jackson and Dawn Jackson, Organized Village of Kake
Robert Larson, USDA Forest Service

Cost:	2006	2007	2008
	$50,992	$0	$0

Issue

In December 2000, the Federal Subsistence Board passed a regulation, submitted as a proposal by the Organized Village of Kake, to exclude non-Federally qualified users in Federal jurisdiction for Kutlaku Lake drainage. Non-Federally qualified users can be excluded from areas if a conservation concern exists. ADFG asked the Federal Subsistence Board twice to reconsider this restriction for the Kutlaku Lake area. The Department argued that a conservation concern was not clear especially after an additional year of research estimated about 8,500 sockeye spawned in Kutlaku Lake in 2003. The Federal Subsistence Board reaffirmed its commitment to retaining the exclusion of other users in Bay of Pillars in their January 2005 meeting. Clearly, having only one year of good information on this system leaves the results prone to several different interpretations.

Objectives

1. In Kutlaku Lake, estimate the number of sockeye spawners in the study areas on the spawning grounds so that the estimated coefficient of variation is less than 15%.
2. Develop an index ratio between the sum of the observed counts and mark-recapture estimates in the study areas to be used to expand counts to whole lake estimates.
3. Describe the size, sex and age distribution of sockeye salmon adults returning to Kutlaku Lake.

Method

Objective 1: The mark-recapture study will take place on the spawning grounds at Kutlaku Lake in two study areas—one in the inlet stream and one on the beach near the outlet. The crew will make 5–7 trips in the season marking during the first sampling event and counting the number of marked and unmarked fish caught in the second sampling event. For the data analysis, a pooled Petersen estimate will be used in the inlet stream study and a modified Jolly-Seber will be used to estimate the number of spawners in the beach study area.

Objective 2: To estimate the number of spawners along the beach, the crew of three will individually count the number of spawners observed inside and outside the beach study area and calculate an average on each sampling trip. The count within the study area compared with the total lake count will give an average proportion of spawners within the study area, weighted by estimated escapement in the study area per sampling occasion; this will be the estimate of catchable proportion over the entire spawning period. The mark-recapture escapement estimate for the study area will then be multiplied by the inverse of the catchable proportion, to obtain an expanded estimate of escapement for the whole lake.

Objective 3: Approximately 600 scales, matched with sex and length data, will be collected from adult sockeye salmon at the on the spawning grounds in Kutlaku Lake to ensure that we have at least 400 readable scales to age so that we can compare age and length distribution between years.

Partnerships and Capacity Building

The Organized Village of Kake is a co-investigator and directly funded to provide seasonal field staff and administrative oversight of the budget and hiring. The use of tribal technicians in field continues to be a valuable component of the project, contributing to the overall success of the project and improving communication between government managers and the local communities. Organized Village of Kake representatives are very active in the local, regional, and state-wide Federal planning and regulatory agency processes as well as community meetings with ADFG managers and research biologists.

06-651
Southeast Alaska Survey of Customary Trade in Seafood Products

Geographic Area: Southeast Alaska/Tongass National Forest

Information Type: Harvest Monitoring/Traditional and Ecological Knowledge

Principal Investigator: Gordon Jackson
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Co-Investigator: Steve Langdon, University of Alaska Anchorage

Cost:	2006	2007	2008
	$83,655	$222,619	$108,641

Issues

The data gap in the area of customary trade in salmon southeast Alaska on which the research will provide information; the role of the resource (sockeye salmon and its products) through customary trade in meeting cultural needs and requirements will be clarified.

Objectives

1. Identify and describe customary patterns of salmon distribution and exchange based on elder interviews and written documents.
2. Identify levels of subsistence harvest of sockeye salmon for project villages in the past five years.
3. Characterize the distribution process for subsistence sockeye salmon harvests for use and processing within each community.
4. Identify the sockeye salmon products (fresh, frozen, smoked, kippered, nayeeti, dry fish, plain jarred, salted, etc), which enter barter and customary trade networks.
5. Characterize the distribution, barter and customary trade of the various products in terms of practice (i.e., exchange for goods, for services, for money, for ceremonial occasions, for other foods, out of respect) and quantity for each community.
6. Estimate the quantities of sockeye salmon products entering customary trade from each project community and the locations to which various products are sent.
7. Estimate the proportion of subsistence production of sockeye salmon that enters the customary trade sector for each project community.
8. Estimate the value of the customary trade in sockeye salmon products for each project community.
9. Identify the cultural significance of customary trade for ceremonial activities, traditional and contemporary, as well as social and political processes and relations.

Methods

1. Review of documentary sources on customary trade of salmon by Tlingit and Haida in order to provide qualitative information only on species, connections, contexts and
2. Collect Alaska Department of Fish and Game data concerning subsistence harvests of sockeye salmon will be acquired for each project village.
3. Observation of facilities, processing methods and products for subsistence sockeye salmon in the three communities.
4. Interviewing will be a primary data collection technique: formal interviews conducted with elders to obtain information on customary and traditional trading practices in salmon, and interviews with tribally identified experts (3-5) in each community to acquire information about significant contemporary local practices associated with subsistence sockeye production and trade.
5. Members of the producer/processor/trader cohort in each village will be interviewed weekly by tribal researchers in each community who will begin tabulation beginning June 10 and concluding two weeks after the end of the sockeye harvest period.
6. Urban household survey: Tlingit and Haida households in Juneau will be surveyed by use of a standardized questionnaire on their acquisition of sockeye salmon through customary trade and barter.

Partnerships/Capacity Building

The investigators intend to hire three researchers and three research assistants in each of the three project villages. The hires will be made in consultation with the local tribes. Investigators and village researchers will consult with the Division of Subsistence, Alaska Department of Fish & Game. The Central Council of Tlingit and Haida Indian Tribes of Alaska will coordinate this project, providing this regional tribal organization with a continuing role in research and collaboration with the Alaska Department of Fish & Game and with tribal organizations in the four villages. Professor Langdon will develop protocols for conducting the research at the village level, and to do so will collaborate with local tribes, resident elders and identified high harvesters. This study also provides an opportunity for village residents to work in an information-gathering project of direct relevance to their communities.

06-701
Mixed-stock Analysis of Dolly Varden within the Togiak National Wildlife Refuge

Geographic Area: Inter-regional

Information Type: Stock Status and Trends

Principal Investigator: Mark Lisac
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Co-Investigators: Penny Crane, U.S. Fish and Wildlife Service
Kyle Belleque, Bristol Bay Native Association

Cost:	2006	2007	2008
	$49,380	$47,460	$0

Issue:

This proposal addresses information needs identified by the Office of Subsistence Management regarding "the collection of baseline information, including harvest assessment and TEK, for important non-salmon fish species" and "studies of freshwater species important to subsistence uses in the Kuskokwim Region." Most of the waters and subsistence fisheries in this study occur within Togiak and Yukon Delta (YDNWR) National Wildlife Refuges.

Dolly Varden is an important subsistence resource throughout Bristol and Kuskokwim bays in southwest Alaska. Dolly Varden is targeted in subsistence and sport fisheries when populations are mixed during spring and fall migrations and when wintering in freshwater. Dolly Varden abundance in the Togiak Refuge is monitored through subsistence catch data from the Togiak River and through weir counts on the Kanektok and Goodnews rivers. However, without stock specific information, it is impossible to interpret these data because returns of local stocks may be masked by contributions from non-local stocks. In the proposed study, genetic data would be collected from spawning or juvenile Dolly Varden sampled from rivers in southwestern Alaska to expand the existing baseline and test it for use in mixed stock analysis of samples from Togiak, Goodnews, and Kanektok rivers, which account for about 85% of Dolly Varden production in the Togiak Refuge. Results would provide fishery managers with information on Dolly Varden population structure in southwestern Alaska, and potential use of mixed stock analysis for examining harvests and wintering aggregations in this area.

Objectives:

1. Collect tissue from spawning Dolly Varden in tributaries in the Goodnews, Kanektok, and Togiak Rivers and assay genetic variation in these and archived samples from these rivers (N=600 total);

2. Collect tissue from spawning Dolly Varden or juvenile Dolly Varden from two rivers in the Yukon Delta National Wildlife Refuge and from a tributary of the Nushagak River (N=450-600).

3. Evaluate the baseline for mixed-stock analysis using traditional maximum likelihood methods and new methods developed to handle missing baseline.

Methods

Dolly Varden adults would be sampled from spawning sites within the Togiak, Goodnews, and Kanektok rivers, two locations within Yukon Delta National Wildlife Refuge (for example, Eek, Kwethluk, or Tuluksak rivers), and one location in the Nushagak River drainage (Koktuli River). If it is not possible to sample 100-200 adults from each spawning site, juveniles would be sampled with baited minnow traps at several sites within a tributary or during multiple years. Archived samples from prespawning or spawning Togiak River adults (Kashaiak River, Ongivinuk River, and Trail Creek) would also be added to the baseline.

Samples would be genotyped at 10-12 microsatellite loci to assay genetic variation. Each locus and sample would be tested for conformity to Hardy-Weinberg equilibrium and for genotypic disequilibrium, and each sample would be tested to ensure it was taken from a single population. The proportion of variation due to an among-population component would be estimated, allelic heterogeneity between all pairs of collections would be determined, and spatial relationships among populations would be assessed. Maximum likelihood estimates of artificial mixtures would be used to determine which populations or population aggregates could be estimated in mixtures. Using a newly developed mixed stock analysis technique, each population or population aggregate would be treated as a mixture, with remaining populations used as the baseline, to determine how the mixture proportion is allocated among missing and baseline populations.

Partnerships/Capacity Building

To develop this plan, the investigators consulted with Alaska Department of Fish and Game, Yukon Delta National Wildlife Refuge, and Village of Quinhagak. Togiak Refuge has a strong working relationship with the villages of Togiak, Goodnews Bay and Quinhagak, and several residents have served as Refuge employees, interns, or volunteers. Prior to conducting this study, consultations would be held with Village Councils and local Elders. The Togiak Refuge Information Technician, a Togiak resident, would supervise a locally hired technician to conduct fieldwork for this study, and the Bristol Bay Native Association Fisheries Biologist and student interns would be involved in consultations and sampling. The Conservation Genetics Laboratory would work with both Regional Community Development Quota Program groups within the study area (Bristol Bay Economic Development Corporation and Coastal Villages Region Fund) to develop a semester college student internship.

2005

FISHERIES RESOURCE MONITORING PLAN

FEDERAL SUBSISTENCE MANAGEMENT

CONTENTS

INTRODUCTION

Background

On October 1, 1999 and under the authority of Title VIII of ANILCA, the Federal government assumed management responsibility for subsistence fisheries on Federal public lands in Alaska. This imposed substantive new informational needs for the Federal system.

Section 812 of ANILCA directs the Departments of Interior and Agriculture, cooperating with the State of Alaska and other Federal agencies, to research fish and wildlife and subsistence uses on Federal public lands. The challenge posed by dual management of fisheries, coupled with the need to collect more and better information, prompted creation of the Fisheries Resource Monitoring Program (Monitoring Program) within the Office of Subsistence Management (OSM).

> ***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 program, five Federal agencies (U.S. Fish and Wildlife Service, Bureau of Land Management, National Park Service, Bureau of Indian Affairs, and USDA Forest Service) work with the Alaska Department of Fish and Game, Regional Advisory Councils, Alaska Native and other organizations to identify research priorities and select projects to meet information needs.

Monitoring Plan Development

Based on identified research priorities, an annual request for proposals is made. An inter-agency Technical Review Committee (TRC) evaluates all proposals and selects the ones that should be developed into investigation plans. The TRC is composed of representatives from each of the five Federal agencies and three representatives from Alaska Department of Fish and Game. It is chaired by the Chief of FIS and supported by FIS staff. The TRC reviews the investigation plans that are submitted and recommends which ones should be included in the annual monitoring plan. Public review of the draft monitoring plan occurs at the Regional Advisory Council meetings during which the Council's recommendations on the plan are made. An inter-agency Staff Committee reviews all recommendations, and attempts to reconcile any differences between the recommendations of the TRC and Councils. The Federal Subsistence Board (Board) then considers these recommendations before approving the final monitoring plan.

Project Evaluation

Four factors are applied to the evaluation and selection of studies:

1. Strategic Priorities

To be considered for funding under the Monitoring Program, there must be, at a minimum, a Federal *nexus*, or interest. Proposed studies must have a direct association to a subsistence

fishery, and either the subsistence fishery or fish stocks in question must occur in waters within or adjacent to Federal public lands. Studies that can establish a Federal *nexus* are then further evaluated for strategic importance within the region in question by assessing:

- ➢ Conservation Mandate – Risk to the conservation of species and populations that support subsistence fisheries and risk to conservation unit purposes.
- ➢ Allocation Priority – Risk of failure to provide a priority to subsistence uses and risk that subsistence harvest needs will not be met.
- ➢ Data Gaps – Amount of information available to support subsistence management. A higher priority is given where a lack of information exists.
- ➢ Role of Resource – Importance of a species to a subsistence harvest (e.g. number of subsistence users affected, quantity of subsistence harvest), and qualitative significance (e.g. cultural value, unique seasonal role).
- ➢ Local Concern – Level of user concern over subsistence harvests (e.g. allocation, competing uses, changes in fish size).

2. Technical-Scientific Merit

Technical quality of the study design must meet accepted standards for information collection, compilation, analysis, and reporting. Studies must have clear objectives, appropriate sampling design, correct analytical procedures, and specified reporting.

3. Past Performance-Administrative Expertise

Investigators and their organizations must have demonstrated technical and administrative expertise to complete prior studies, or have co-investigators or appropriate partnerships with other organizations to meet all requirements of the study. Studies must not duplicate existing projects.

4. Partnership-Capacity Building

Studies must include appropriate partners and contribute to the capacities of rural organizations, local communities, and residents to participate in fisheries resource management. Investigators must have completed appropriate consultations about their study with local villages and communities in the area where the study is to be conducted. Investigators and their organizations should be able to demonstrate the ability to maintain effective local relationships and a commitment to capacity building.

Policy and Funding Guidelines

Several policies have been developed to aid in implementing funding.

- A minimum of 60% of the Monitoring Program funding is dedicated to non-Federal sources.

- Activities not eligible for funding under the Monitoring Program include: a) habitat protection, restoration, and enhancement; b) hatchery propagation, restoration, enhancement, and supplementation; and c) contaminant assessment, evaluation, and monitoring. These activities would most appropriately be addressed by the land management agencies.

- Proposals may be funded for up to three years duration.

Finances and Guideline Model for Funding

The Monitoring Program was first implemented in 2000, with an initial investment of $5 million. Since 2001, a total of $6.25 million is annually allocated for the Monitoring Program. The Department of Interior, through the U.S. Fish and Wildlife Service, annually provides $4.25 million. The Department of Agriculture, through the USDA Forest Service, annually provides $2 million. On an annual basis, this budget funds both continuation of existing studies (year-2 or 3 of multi-year projects), and new study starts. Budget guidelines were established by geographic region and data type (**Table 1**).

Table 1. Current Board guidelines for funding by region for the 2005 Monitoring Program.

Region	Values in 1,000's					
	Dept of the Interior		Dept of Agriculture		Total	
	%	$	%	$	%	$
Northern	17.0%	$244			11.6%	$244
Yukon River	29.0%	$416			19.8%	$416
Kuskokwim River	29.0%	$416			19.8%	$416
Southwest	15.0%	$215			10.3%	$215
Southcentral	5.0%	$ 72	32.5%	$215	13.7%	$286
Southeast Alaska	0.0%	$ 0	62.5%	$413	19.7%	$413
Inter-regional	5.0%	$ 72	5.0%	$ 33	5.0%	$105
TOTALS	100.0%	**$1,433**	100.0%	**$661**	100.0%	**$2,094**

Proposals are solicited according to the following two data types:

1. Stock Status and Trends Studies (SST).

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

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

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

2005 Fisheries Resource Monitoring Plan

In November of 2003, a request for proposals was issued. Fifty-nine proposals were received in February of 2004. Of these proposals, the TRC recommended 37 for development into investigation plans. Thirty-one investigation plans were received in June of 2004; twenty-one were in the SST category and 10 in the HM-TEK category. The TRC recommended funding 24 of the 31 projects at a cost of $1.9 million. The Regional Advisory Councils supported the TRC's recommendations for 29 of the 31 investigation plans. The two projects the Councils disagreed with the TRC's recommendation were: 05-306 Kuskokwim Inseason Subsistence Salmon Harvest Data Collection and 05-403 Lake Clark Whitefish Assessment.

The FSB reviewed the draft 2005 Fisheries Resource Monitoring Plan in January 2005. The Board selected 24 projects for inclusion in the monitoring plan. Based on this plan, the Monitoring Program funding allocations would be: State agencies (55%), Federal agencies (10%), Alaska Native Organizations (31%), and other non-government organizations (4%) (**Figure 1**).

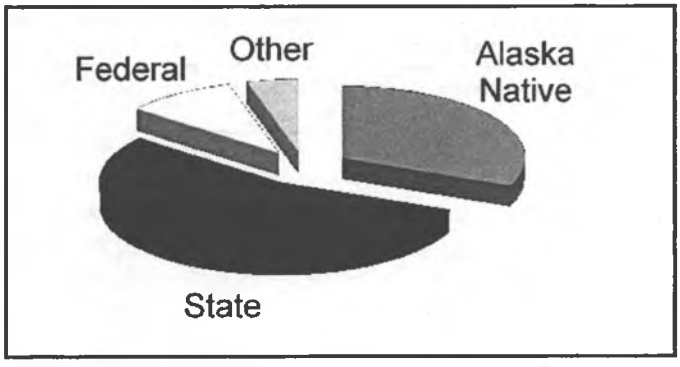

Figure 1. Percent 2005 funding distributed to Alaska Native, Federal, State and other organizations.

Tables summarizing the 2005 Fisheries Resource Monitoring Plan are provided on pages 5-8. More detail descriptions of the projects included in the plan can be found on pages 9-58.

SUMMARY TABLES

Number of projects funded for the 2005 Fisheries Resource Monitoring Plan. Project type includes stock status and trends (SST) and harvest monitoring and traditional ecological knowledge (HM-TEK).

Geographic Region	SST	HM-TEK	Total
Northern	1	0	1
Yukon River	4	1	5
Kuskokwim River	5	2	7
Southwest	3	1	4
Southcentral	2	1	3
Southeast	3	0	3
Inter-regional	1	0	1
Total	19	5	24

Cost of projects funded for the 2005 Fisheries Resource Monitoring Plan. Project type includes stock status and trends (SST) and harvest monitoring and traditional ecological knowledge (HM-TEK).

	Cost ($000)		
Geographic Region	SST	HM-TEK	Total
Northern	$104	$0	$104
Yukon River	$335	$34	$369
Kuskokwim River	$381	$135	$516
Southwest	$130	$77	$207
Southcentral	$262	$85	$347
Southeast	$371	$0	$371
Inter-regional	$30	$0	$30
Total	$1,613	$331	$1,944

Northern Alaska stock status and trends projects funded in 2005.

Project #	Title	Cost ($000) 2005	2006	2007
05-101	Coho Salmon Distribution and Abundance in Unalakleet River	$104	$68	$0
Total		$104	$68	$0

Yukon River region stock status and trends projects funded in 2005.

Project #	Title	Cost ($000) 2005	2006	2007
05-203	Coho Salmon Genetics, Yukon River	$22	$28	$0
05-208	Anvik River Sonar	$59	$59	$59
05-210	Tanana River Fall Chum Salmon Abundance	$172	$167	$162
05-211	Henshaw Creek Weir	$82	$79	$81
Total		$335	$332	$302

Yukon River region harvest monitoring and traditional ecological knowledge projects funded in 2005.

Project #	Title	Cost ($000) 2005	2006	2007
05-254	Yukon River Inseason Salmon Harvest Assessment	$34	$30	$30
Total		$34	$30	$30

Kuskokwim River region stock status and trends projects funded in 2005.

Project #	Title	Cost ($000) 2005	2006	2007
05-301	Whitefish PIT Tags	$40	$0	$0
05-302	Inriver Abundance of Chinook Salmon	$118	$346	$0
05-304	George and Takotna River Weirs	$72	$79	$89
05-305	Genetic Stock ID of Chinook Salmon on Kuskokwim River	$106	$73	$19
05-306	Kuskokwim Inseason Subsistence Salmon Harvest Data Collection	$45	$45	$45
Total		$381	$543	$153

Kuskokwim River region harvest monitoring and traditional ecological knowledge projects funded in 2005.

Project #	Title	Cost ($000) 2005	2006	2007
05-353	Nunivak Island Subsistence Fisheries	$61	$45	$0
05-356	Kuskokwim Area Postseason Subsistence Harvest Survey	$74	$74	$74
Total		$135	$119	$74

Southwest Alaska stock status and trends projects funded in 2005.

Project #	Title	Cost ($000) 2005	2006	2007
05-402	Lake Clark Sockeye Salmon Escapement	$44	$44	$45
05-403	Lake Clark Whitefish Assessment	$71	$101	$62
05-405	Perryville-Chignik Coho Salmon and Late-Run Sockeye Salmon Aerial Surveys	$15	$29	$29
Total		$130	$174	$137

Southwest Alaska harvest monitoring and traditional ecological knowledge projects funded in 2005.

Project #	Title	Cost ($000) 2005	2006	2007
05-452	Non-salmon Harvests and TEK in Togiak, Manokotak, and Twin Hills	$77	$29	$0
Total		$77	$29	$0

Southcentral Alaska stock status and trends projects funded in 2005.

Project #	Title	Cost ($000) 2005	2006	2007
05-501	Spawning Distribution and Run Timing of Copper River Sockeye Salmon	$225	$225	$225
05-502	Abundance, Timing and Distribution of Copper River Steelhead	$37	$37	
Total		$262	$262	$225

Southcentral Alaska harvest monitoring and traditional ecological knowledge projects funded in 2005.

Project #	Title	Cost ($000) 2005	2006	2007
05-553	Changes in Subsistence Salmon Harvests on Copper River	$85	$0	$0
Total		$85	$0	$0

Southeast Alaska stock status and trends projects funded in 2005.

Project #	Title	Cost ($000) 2004	2005	2006
05-601	Kook Lake Sockeye Salmon Assessment	$79	$80	$82
05-603	Klawock Lake Sockeye Salmon Stock Assessment	$164	$168	$0
05-604	Prince of Wales Steelhead	$128	$137	$157
Total		$371	$384	$239

Alaska Inter-regional stock status and trends projects funded in 2005.

Project #	Title	Cost ($000) 2005	2006	2007
05-702	Genetic Species Markers in Whitefish	$30	$30	$0
Total		$30	$30	$0

05-101
Estimation of Coho Salmon Abundance and Spawning Distribution in the Unalakleet River

Geographic Area: Northern Alaska

Information Type: Stock Status and Trends

Principal Investigator: Phil Joy and Audra Brase
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Fairbanks, AK
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philip_joy@fishgame.state.ak.us, audra_brase@fishgame.state.ak.us

Co-Investigator: Mike Scott, Bureau of Land Management
Meryl Towarak, Native Village of Unalakleet

Cost:	2005	2006	2007
	$103,665	$68,055	$ 0

Issue

The Unalakleet River supports the largest population of coho salmon *Oncorhynchus kisutch* in Norton Sound. This population is harvested by subsistence, commercial and recreational users. Little is known about coho salmon distribution in the Unalakleet River drainage. A counting tower is operated on North River, but coho salmon estimates from North River may not be an accurate index of total Unalakleet River escapement. Aerial surveys to count coho salmon in Unalakleet River are often ineffective due to poor weather conditions.

Objectives

1. Estimate the proportions of the total coho salmon escapement migrating up the mainstem Unalakleet, North, Chiroskey, Old Woman, North Fork Unalakleet rivers, and into all waters designated Federal Wild and Scenic River;
2. Estimate the abundance of coho salmon escaping into the Unalakleet River drainage by proportional expansion of the North River tower count estimate;
3. Estimate the abundance of coho salmon migrating through the Federal Wild and Scenic River portion of the Unalakleet River;
4. Estimate the age, sex, and length composition of the coho salmon escapement into the Unalakleet and North rivers; and
5. Document the locations of coho salmon spawning areas throughout the Unalakleet River drainage, including the Federal Wild and Scenic River portion of the river.

Methods

Two-hundred radio tags would be fitted to individual coho salmon captured using set and drift gillnets at a site approximately 5 km upstream from the mouth of the Unalakleet River. Tags would be deployed in proportion to coho salmon abundance throughout the run, from mid-July through September. Coho salmon fitted with radio tags would also be marked with an external "spaghetti" tag so they can be easily identified if recaptured. Migrating coho salmon fitted with radio tags would be tracked using four remote tracking stations: one located below the tagging site, one between the North and Chirosky rivers on the mainstem of the Unalakleet River, one at the North River counting tower site, and one above the mouth of the Chiroskey River (the boundary of the Federal Wild and Scenic River portion of the Unalakleet River). Aerial tracking would be used to determine spawning locations of all radio-tagged coho salmon.

Partnerships/Collaboration

This project would be performed in cooperation with Bureau of Land and Management, Alaska Department of Fish and Game's Commercial Fisheries Division, and the Village of Unalakleet. The Bureau of Land Management would provide $35,000 each year to purchase radio tags. This project would promote interactions and develop working relationships between stakeholders and a primary management agency. Rural residents would be introduced to potential fisheries careers by working as technicians and hosting them as high school and college interns on the project.

05-203
Yukon River Coho Salmon Genetics

Geographic Area: Yukon River

Information Type: Stock Status and Trends (SST)

Principal Investigators: Blair Flannery, Penny Crane, Jeffery Olsen, and John Wenburg
USFWS, Conservation Genetics Laboratory (CGL)
Anchorage, AK
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Email: blair_flannery@fws.gov

Cost:	2005	2006
	$ 22,106	$ 27,814

Issue

Coho salmon are an important Yukon River subsistence fishery, comprising 10% of the salmon subsistence harvest. However, little is known about the biology of the Yukon River coho salmon. With the recent decline in Yukon River chum and Chinook salmon, demand for coho will continue to rise, emphasizing the need for a better understanding of this resource. Further, the Regional Advisory Councils for the Yukon River identified the need to identify the contribution of individual or geographically similar populations of Yukon River salmon to mixed-stock fisheries. In this project, we will provide estimates of population structure and genetic diversity of coho salmon within the Yukon River to assist in conservation and management of this species; this work is a necessary precursor for future mixed-stock analysis and harvest allocation.

Objectives

1) Evaluate patterns of genetic diversity within and among nine putative coho salmon populations distributed throughout the Yukon River drainage;

2) Provide preliminary estimates of the power of genetic data for use in various mixed-stock analyses (MSA) of Yukon River coho salmon.

Methods

The population structure and genetic diversity for Yukon River coho salmon will be evaluated using samples collected from the following locations: Archuelinguk, Andreafsky, Anvik, Kaltag, Kantishna, Nenana-Otter Creek, Nenana-17 mile slough, Delta Clearwater, and Fishing Branch. These samples will be assayed for genetic variation at 9 microsatellite loci currently in use for coho salmon research. The data will be tested to determine if sufficient variation exists for mixed-stock analysis applications.

Partnerships/Collaboration

In this project, we will work closely with YRDFA, BSFA, ADF&G, and USGS. In addition, we intend to hire Howard Beans from Mountain Village to sample coho salmon from the Archuelinguk.

05-208
Anvik River Sonar Project

Geographic Area: Yukon River

Information Type: Stock Status and Trends (SST)

Principal Investigators: Carl T. Pfisterer
ADFG
Fairbanks, AK
Phone: (907) 459-7323
Email: carl_pfisterer@fishgame.state.ak.us

Co-Investigators: Roger Dunbar
ADFG

Cost:	2004	2005	2006
	$ 58,589	$ 58,589	$ 58,744

Issue

This project addresses Stock Status and Trends concerns by continuing to monitor summer chum escapement to one of the most important and longest running (began in 1979) summer chum salmon project in the Yukon River. Because of its longevity, this project has been important in setting escapement goals for managing summer chum salmon stocks in the Yukon River drainage. In a larger context, continuation of the Anvik River sonar project will enhance comprehensive research efforts examining this mixed stock fishery and the relative contributions from various tributaries of the Yukon River.

Objectives

The purpose of this project is to monitor escapement of summer chum salmon to the Anvik River and to assess age and sex composition of the escapement. The two primary objectives of this project are to:

1. Estimate daily summer chum salmon escapement passing the Anvik River sonar site during the target operation dates of June 20 through about July 25.

2. Estimate age and sex composition of the summer chum salmon spawning escapements by collecting samples from 152 summer chum during each of 4 stratum throughout the summer.

Methods

Split-beam sonar data will be collected 24-hours per day, 7 days a week for the duration of the study. Data will be collected for thirty minutes, alternating between each bank providing a total of 12 hours of data per day per bank. Counts will be expanded for the fraction of the day sampled to estimate daily passage.

The number of scales required for age-sex-length sampling this season are based on obtaining 152 summer chum salmon for each of the following time strata: June 17-30; July 1-7; July 8-14; and July 15-30. A sample size of 450 fish per stratum is needed for Chinook salmon assuming three major age classes with minor ages pooled and a 14% unageable rate when 3 scales per fish are collected, though attaining this number of samples is not a goal of the beach seining activities associated with the sonar project. Chinook salmon samples are collected during carcass sampling activities immediately after the sonar program terminates.

Partnerships/Collaboration

Daily passage estimates will be shared at with other agencies and organizations at weekly Yukon River Drainage Fisherman's Association meetings and used in making management decisions.

05-210
Estimation of Tanana River Fall Chum Salmon Abundance Using Mark-Recapture Techniques

Geographic Area: Yukon River

Information Type: Stock Status and Trends (SST)

Principal Investigators: Bonnie Borba and Pete Cleary
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peter_cleary@fishgame.state.ak.us

Co-Investigators: Hollis Twitchell, Gates of the Arctic National Park and Preserve
Karen Gillis, Bering Sea Fishers's Association
Jill Klein, Yukon River Drainage Fisheries Association

Cost:	2005	2006	2007
	$172,073	$167,062	$162,311

Issue

There is a need to document the abundance and run timing of fall chum salmon within the Tanana River in the upper Yukon River area. This data gap was identified and the initial tagging project began in 1995 for the Tanana River. The addition of the Tanana River abundance project represents a significant improvement in data that was used for in-season assessment, total run reconstructions, and establishment of Biological Escapement Goals for larger drainages. Severe declines in Yukon River drainage fall chum salmon runs have resulted in restrictions and closures in attempts to provide for escapement and the first priority use of subsistence harvest. The Tanana River stocks represent greater than 30 percent of the Yukon River fall chum salmon. However, fall chum salmon bound for the Tanana River pass through mixed stock fisheries along the migration route. The estimates of fall chum salmon in the Tanana River in combination with upper main stem Yukon River project provide a check to the estimates provided by Pilot Station sonar and the information is used for in-season fishery management as well as reconstruction the run post season.

Objectives

1. Estimate abundance *in-season* of fall chum salmon in Upper Tanana and Kantishna River drainages with relative precision (coefficient of variation) of 30%.

2. Estimate stock timing of fall chum salmon in Upper Tanana and Kantishna Rivers and migration rates between capture and recapture sites.

3. Estimate the total abundance of fall chum salmon in Upper Tanana and Kantishna River drainages with relative precision (coefficient of variation) of 20%.

4. Provide managers an assessment of total run based on in-season abundance estimates.

Methods

Alaska Department of Fish and Game (ADF&G), Bering Sea Fishers's Association (BSFA), Yukon River Drainage Fisheries Association (YRDFA) and National Park Service (NPS) propose to provide abundance estimates of fall chum salmon utilizing mark-recapture techniques. Chum salmon will be captured in fish wheels equipped with live boxes, tagged with spaghetti (Floy) tags and released from one site in each of the Tanana and Kantishna Rivers. The tagged chum salmon are subsequently recaptured in tag recovery fish wheels located 76 km upstream on the Tanana River, 113 km upstream on the Toklat River and 139 km upstream on the Upper Kantishna River. Data is relayed to Fairbanks ADF&G office daily during operations from August 15 to September 30. The in-season abundance estimates are typically based on the Bailey model with associated 95% confidence bound.

Partnerships/Collaboration

Operations and maintenance of fish wheels used in the mark-recapture are contracted to four local fishers. The state contracts the Tanana tagging and the Nenana recovery fish wheels since 1995. BSFA funds the Kantishna tagging fish wheel (1999 to present), NPS funds the Upper Kantishna recovery fish wheels (2000 to present), and YRDFA will provide a technician to assist in tagging salmon (2005 to 2007). Freight is barged to the ADF&G camp with the assistance of a local resident in Nenana annually. United States Fish and Wildlife Service assists with technical support for video monitoring at one site.

05-211
Abundance and Run Timing of Adult Salmon in Henshaw Creek, Kanuti National Wildlife Refuge, Alaska

Geographic Area: Yukon River

Information Type: Stock Status and Trends (SST)

Principal Investigators: Jeff Adams
USFWS, Fairbanks Fish and Wildlife Field Office (FFWFO)
Fairbanks AK
Phone: (907) 456-0203; Fax: (907) 456-0208
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Co-Investigators: Kimberly Elkin, Tanana Chiefs Conference, Inc.

Cost:	2005	2006	2007
	$ 82,107	$ 78,500	$ 80,597

Issue

Declines in run sizes of Yukon River salmon, especially Chinook *Oncorhynchus tshawytscha* and chum *O. keta* salmon have resulted in subsistence fishing restrictions and, in some cases, users not meeting their subsistence needs. To manage these stocks in-season, managers need information from throughout the drainage. This project provides in-season information to federal and state managers as an indicator for Koyukuk River salmon stocks.

Objectives

(1) Determine daily escapement and run timing of adult salmon;

(2) Estimate the age, sex and length composition of adult salmon;

(3) Determine the number of resident fish passing the weir;

4) Serve as a training platform for Tanana Chiefs Conference, Inc. (TCC) Natural Resource Program and its FIS Partners program fisheries biologist.

Methods

Investigators will install a resistance board weir across Henshaw Creek 1.5 km upstream from its mouth. The weir, live trap, and passing chute will allow investigators to count fish (by species) as they pass through the live trap. Fish sampling will include measuring length (MEL), determining

sex, collecting scales, and examining fish for floy and radio tags and secondary marks. TCC and FFWFO will partner to incorporate TCC into weir operation including pre- and post-season coordination and planning. TCC will be fully engaged through this funding cycle so that it will be fully capable of administering and conducting all aspects of weir operation after 2007.

Partnership/Collaboration

The FFWFO has worked with TCC to strengthen the capacity building component of this project. Consultation has occurred with Mr. Mike Smith, TCC, Wildlife and Parks, to develop the proposed approach and the integration of TCC in the project and the future of assumption of operations by TCC. The FFWFO staff has established a positive rapport with villages, hired local residents, participated in YRDFA meetings and seminars, and utilized the Kanuti National Wildlife Refuge for local logistical support.

05-254
Yukon River In-season Salmon Harvest Assessment

Geographic Area: Yukon River

Information Type: Harvest Monitoring and Traditional Ecological Knowledge (HM/TEK)

Principal Investigators: Russ Holder and Jonathon Gerken
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Co-Investigators: Geoff Beyersdorf, Koyukuk/Nowitna NWR Complex
Jill Klein, Yukon River Drainage Fisheries Association

Cost:	2005	2006	2007
	$ 34,000	$ 30,000	$ 30,000

Issue

Timely subsistence salmon harvest information is needed for in-season fishery management by state and federal fishery managers on the Yukon River. Two key partners, Alaska Department of Fish and Game (ADF&G) and YRDFA, plus the Federal Regional Advisory Councils, have requested assistance from the U.S. Fish and Wildlife Service (USFWS) in obtaining timely qualitative in-season salmon harvest information from rural villages. By conducting in-season salmon harvest surveys there is direct link from subsistence user to managers allowing managers to assess whether subsistence harvests in villages along the Yukon River are consistent with managers perception of the salmon run. These surveys are weekly face to face meetings with local fishers conducted by local technicians that have been hired by nongovernment, tribal, or agency personnel. When fisheries managers know how people are progressing toward meeting their subsistence needs they have more information with which to adjust subsistence schedules, provide for commercial openings, and adjust for liberalization of the fishing schedule.

Objectives

(Local surveyors *at this time* are primarily RITs with some tribal organization representation. Long term objective is to potentially turn in-season salmon surveys over to tribal organizations).

1. Increase involvement and participation of tribal organizations in initiating in-season harvest assessment surveys.

2. Involve local people in fisheries management by having them collect and share information used for in-season fishery management decisions.

3. Train local villagers on in-season salmon harvest survey techniques.

4. Local surveyors weekly will collect qualitative in-season subsistence salmon harvest data in a standardized format from active fishing households.

5. Summarize weekly survey data and provide it to state and federal managers *prior* to the weekly YRDFA teleconferences so it can be used when making management decisions.

6. Local surveyors will present survey summaries and receive information on the YRDFA teleconferences.

7. Broadcast weekly YRDFA teleconference summaries via the local Galena public radio station to keep resource users in the Middle Yukon informed of management decisions.

8. Opportunistically collect age, sex, and length samples from Chinook and chum salmon in coordination with and support of ADF&G.

Methods

The USFWS and YRDFA propose to collect weekly qualitative in-season subsistence salmon harvest data from active fishing households in Emmonak, Holy Cross, Nulato, Huslia, Galena, and Beaver specific to Chinook, summer chum, fall chum, and coho salmon. USFWS RITs and Emmonak/Louden Tribal council local hire surveyors will conduct interviews on participating fishing households between June and September. Sampling for age, sex, and length information will occur opportunistically with subsistence surveys.

Partnerships/Collaboration

This proposal is a collaborative effort between YRDFA, the Emmonak and Louden Tribal Council, Fairbanks Fish and Wildlife Field Office, and several National Wildlife Refuges. The local hire emphasis will promote involvement of local resource users as active participants of the federal and state in-season fisheries management decision process. Local hiring may also help identify individuals interested in the natural resources and help them decide if they have an interest for further study and career selection. A long-term vision for this pilot project is that it could be managed by the USFWS Partner participants (CATG, AVCP, TCC, and/or local tribal organizations) and allow local administration of harvest assessment. Conducting these surveys and using them in management decisions establishes communication and promotes interaction between subsistence users, tribes, organizations, communities, and agencies.

05-301
Using PIT Tags to Monitor Movements of Kuskokwim River Whitefish.

Geographic Area: Kuskokwim River

Information Type: Stock Status and Trends

Principal Investigator: Ken Harper
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Co-Investigator: David Cannon, Kuskokwim Native Association

Cost:	2005	2006	2007
	$ 95,000	$ 0	$ 0

Issue

This proposed project evaluates using PIT (Passive Interrogator Transponder) tag technology to gather information on the distribution, movement, abundance and life history of whitefish in the Kuskokwim River drainage. Whitefish are an important subsistence resource in the Kuskokwim River drainage, yet little is known about the status and life history of the stocks. Information on movement patterns from brackish water rearing areas to upstream subsistence harvest areas such as Whitefish Lake and other large tundra lakes is unknown. This proposed project will develop techniques to use this technology to gather information needed to fill the existing data gap. PIT tag interrogation technology has been found to be more appropriate than radio telemetry as a monitoring tool for some fish populations and life history stages. PIT tags are less invasive to implant, less expensive and last longer (indefinitely) than radio tags allowing long term monitoring of individual fish. The use of this technology will improve our knowledge of whitefish movements in the Kuskokwim River. These data will be used by fishery managers and subsistence users to formulate actions required to maintain or rebuild these populations.

Objectives

1) Evaluate capture techniques including mobile Merwin nets, tangle nets, and gill nets to capture live whitefish in multiple habitats.

2) Evaluate PIT tag use in whitefish.

3) Develop and evaluate pit tag interrogator systems for use at the outlet of Whitefish Lake and on the Middle Kuskokwim River salmon mark and recapture fish wheels near Kalskag.

Methods

The Kenai FWFO and Kuskokwim Native Association propose to evaluate the use of PIT tags to monitor movements of Whitefish in the Kuskokwim River drainage. The first year of the project will consist of evaluating capture methods for obtaining large samples of whitefish from multiple habitats including Whitefish Lake, other lakes and riverine systems. Efficient methods and means to implant PIT tags in whitefish will be evaluated, coupled with tag retention and fish survival. PIT tag reader antennas will be constructed and tested in Kenai and shipped to Whitefish Lake. Antennas and antenna placements will be tested for detection efficiency at the outlet of Whitefish Lake. In addition we will use an existing sampling platform, the Middle Kuskokwim River fish wheels operated by ADF&G located near Kalskag to test detection efficiencies.

Partnerships/Collaboration

The U.S. Fish and Wildlife Service and the Kuskokwim Native Association (KNA) have been cooperatively conducting the Whitefish Lake study for the past three years. KNA has shown a keen interest in learning more about whitefish since local fishers have been concerned about the loss of broad whitefish from their traditional Whitefish Lake harvest area. Consultations have been ongoing with ADF&G about installing the PIT tag readers on the Kalskag and Birch Tree fish wheels.

05-302
Inriver Abundance of Chinook Salmon in the Kuskokwim River, 2005-2006

Geographic Area: Kuskokwim River

Information Type: Stock Status and Trends

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Co-Investigator: Audra Brase
ADFG, Division of Sport Fish

Cost:	2005	2006
	$349,000[a,b]	$346,211[b]

Issue

The amount of information provided from current Kuskokwim River escapement monitoring and run assessment projects provide limited information to manage the Chinook salmon runs for sustained yield. An estimate of total inriver Chinook salmon abundance is needed to evaluate harvest strategies and effectively manage the Kuskokwim River fisheries to ensure subsistence needs are met.

Objectives

1. Estimate the abundance of Chinook salmon in the Kuskokwim River for all waters upstream of Kalskag; and,

2. Estimate age, sex, and length compositions of Chinook salmon in the Kuskokwim River upstream of Kalskag.

3. Estimate the abundance of Chinook salmon escaping into the Holitna River drainage by proportional expansion of the Kogrukluk River weir count.

[a] Budget for 2005 does not include $231.4 from the Holitna River study (FIS 04-306) that could be redirected to this project (see cover letter). If included, costs for 2005 would be reduced to $117.6 K.

[b] Costs for 2005 and 2006 include funds for personnel from this project to independently operate fish wheels near Kalskag. These costs may be reduced if the current mark-recapture study performed by Commercial Fisheries Division continues through 2006 (see cover letter).

4. Document Chinook salmon spawning locations within the Kuskokwim River drainage.

Methods

This study will estimate the inriver abundance of Chinook salmon on the Kuskokwim River upstream of Kalskag using mark-recapture techniques. In this type of mark-recapture experiment there are two events: 1) the marking event, when fish are captured and tagged; and 2) the recapture event, when fish are sampled again to identify the ratio of tagged to untagged fish. During the marking event of this study, Chinook salmon will be captured using large-mesh drift gillnets and fish wheels at sites near Kalskag. Approximately 500 Chinook salmon will be radio-tagged (marked) with electronic transmitters. Radio-tagged fish will be secondarily marked with an external plastic "spaghetti" tag to facilitate identification of the radio-tagged fish. The tagged Chinook salmon will be tracked by a series of stationary radio-tracking stations positioned on various tributaries and along the mainstem river. Radio-tagged fish will also be located through aerial-tracking surveys of the drainage. The recapture portion of this study will be made up of Chinook salmon passing through the weirs on the George, Kogrukluk, Tatlawiksuk, and Takotna rivers. All migrating Chinook salmon (marked and unmarked) will be counted through the weirs by ADF&G and Kuskokwim Native Association (KNA) staff. Radio-tagged fish migrating through the weirs will be identified from tracking stations positioned at each weir. A sample of the Chinook salmon passing through each weir will be sampled for age, sex, and length data to aid in performing statistical analyses. After all data is collected, it will be edited for accuracy and statistical tests will be performed to accomplish project objectives.

Partnerships/Collaboration

The proposed study will be performed in cooperation with the KNA and ADF&G Commercial Fisheries Division. This project directly promotes interaction between KNA and ADF&G and supports a positive working relationship between a major user group and the primary management agency on the Kuskokwim River. To expose more rural residents to the career field of fisheries biology; a local resident will be hired as a fisheries technician and the project will host local high school and college interns throughout the season.

05-304
George and Takotna River Weirs

Geographic Area: Kuskokwim River

Information Type: Stock Status and Trends

Principal Investigator: Douglas B. Molyneaux
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Co-Investigators: Sara Gilk and Rob Stewart
ADFG, Division of Commercial Fisheries

Cost:	2005	2006	2007
	$ 71,979	$ 78,973	$ 89,257

Issue

Salmon populations of the George and Takotna Rivers contribute to subsistence fisheries within the Yukon Delta National Wildlife Refuge. Weak runs in recent years have resulted in the classification of Kuskokwim River Chinook and chum salmon as Stocks of Concern by the Alaska Board of Fisheries. George and Takotna River weirs are part of an array of projects developed in recent years to monitor the distribution, abundance, and quality of salmon escapements in the Kuskokwim River drainage. Information collected at these weirs is used for in-season management of Kuskokwim River subsistence, commercial, and sport fisheries. Development of Donlin Creek mine is expected to intensify subsistence and recreational use of George River salmon populations. Takotna River weir is the only weir project in the upper Kuskokwim River area used for assessing escapement of these genetically distinct salmon stocks.

Objectives

1. Determine daily and total annual escapements of Chinook, chum, and coho salmon to the Takotna River upstream of the community of Takotna during the target operational period of 24 June to 20 September.

2. Determine daily and total annual escapements of Chinook, chum, and coho salmon to the George River during the target operational period of 15 June to 20 September.

3. Estimate age-sex-length (ASL) composition of total Chinook and chum salmon escapements to Takotna and George Rivers from a minimum of three pulse samples collected from each third of the run, such that simultaneous 95% confidence intervals of age composition in each pulse are no wider than 0.20 ($\alpha = 0.05$ and $d = 0.10$);

4. Estimate age-sex-length (ASL) composition of total coho salmon escapements to Takotna and George Rivers from a minimum of three pulse samples collected from each third of the run, such that simultaneous 95% confidence intervals of age composition in the total annual escapements are no wider than 0.20 ($\alpha = 0.05$ and $d = 0.10$);

5. Serve as platform to collect data for related fisheries projects

Methods

Resistance-board fish weirs will be operated on the George and Takotna Rivers to monitor salmon escapement into spawning grounds upstream. A live trap, incorporated into each weir will allow crews to collect age, sex, and length samples from migrating salmon, and recover tag data in support of *Kuskokwim River Salmon Mark/Recapture Project*. Provisions will also be made to allow for boat passage over the weir and for safe downstream passage of fish. Local technicians hired by Kuskokwim Native Association (KNA) and Takotna Tribal Council (TTC) will operate the weirs along with ADF&G/CF biologists and technicians funded under this proposal.

Partnership/Collaboration

Both the George and the Takotna River weirs are established cooperative projects involving ADF&G/CF, KNA and TTC.

05-305
Genetic Stock Identification of Kuskokwim River Chinook Salmon

Geographic Area: Kuskokwim River

Information Type: Stock Status and Trends

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Cost:	2005	2006	2007
	$105,952	$ 73,151	$ 18,663

Issue

Kuskokwim River Chinook salmon have been identified as a "stock of concern" due to the chronic inability to maintain expected harvest above escapement needs despite the use of specific management and conservation measures. However the efficacy of these measures is uncertain without knowing the harvest of Kuskokwim River stocks in subsistence and commercial fisheries in the entire Kuskokwim Management Area (KMA). Previous investigation of the genetic population structure of Chinook salmon within the KMA, using three different types of genetic markers found patterns of population divergence and identified at least four groups: 1) Goodnews/Kanektok, 2) Lower Kuskokwim (from the Eek River upstream to the Hoholitna River), 3) Middle Kuskokwim (the Stony, Cheeneetnuk and Tatlawiksuk rivers), and 4) Upper Kuskokwim (the Takotna River and Pitka Fork). Genetic stock identification methods can provide information concerning the origins of fish harvested in the KMA; critically important information for an effective, sustainable management program. The existing baseline of genetic markers provides adequate coverage of the spawning aggregates within the Kuskokwim River, but only moderate coverage of the populations outside of the river. We propose to refine our analyses by increasing sample sizes and geographic coverage of the genetic baseline and to begin mixed stock identification applications in KMA fisheries.

Objectives

1. To increase sample sizes and expand collections of Chinook salmon in the KMA.
2. To expand the set of genetic loci to include additional microsatellite and SNP (single nucleotide polymorphism) markers.
3. To analyze the genetic population structure and refine mixed stock analysis.

4. To conduct a pilot study of salmon harvested in mixed stock fisheries, specifically the Bethel test fishery, the subsistence fishery in the Bethel area and the W-4 commercial fishery.

Methods

Baseline tissue sampling will partner with existing projects in the KMA to collect samples. Chinook salmon will be sampled at weirs on the Takotna, Tatlawiksuk, Kogrukluk, George, Tuluksak, Kwethluk, Kanektok and Goodnews rivers. Sampling from radio-tagged Chinook salmon will provide additional baseline samples from locations that do not have weirs. In addition, samples will be taken by subsistence fishers on the Little Tonzona, Eek, and Kisaralik rivers, and on Pitka's Fork, by volunteers on the Arolik River, and by sport fishers on the mainstem Goodnews River. Target sample sizes are set to provide baseline sample sizes of 200 individuals when combined with previously collected samples. Approximately 15 of the most information microsatellite loci developed for the Yukon River and the Pacific Salmon Commission coastwide baseline will be surveyed as well as additional SNP loci developed by ADF&G. Population structure will be investigated using standard population genetics techniques, and mixture analyses will be refined through simulation. Mixture samples will be collected from the Bethel Test Fishery, the Bethel subsistence fishery, and the District W-4 commercial fishery to estimate region of origin.

Partnerships/Collaborations

Samples will be taken at weirs in the KMA in cooperation with the following government and local organizations: ADF&G, Kuskokwim Native Association, Native Village of Kwinhagak, Organized Village of Kwethluk, Orutsaramuit Native Council, Takotna Tribal Council, Tuluksak Tribal Council, and USFWS. Chinook salmon will be sampled from subsistence harvest on the Little Tonzona, Eek, and Kisaralik rivers and the Pitka Fork of the Salmon River. The Arolik River will be sampled by Willard Church (Native Village of Kwinhagak) and the mainstem of the Goodnews River will be sampled by area sportfish guides. Chinook salmon will be sampled as part of the radio telemetry tagging projects and fisheries technicians from ADF&G and ONC will sample the Bethel test fishery. The college intern/technician position in the ADF&G Gene Conservation Laboratory will continue in coordination with KNA.

05-306
Kuskokwim River In-season Subsistence Salmon Harvest Data Collection Continuation

Geographic Area: Kuskokwim River

Information Type: Stock Status and Trends

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Co-Investigators: Greg Roczicka
Orutsararmuit Native Council
Tracie Krauthoefer
ADFG, Subsistence Division
David L. Folletti
ADFG, Division of Commercial Fisheries

Cost:	2005	2006	2007
	$ 73,079	$ 79,177	$ 88,017

Issue

The *Kuskokwim River In-season Subsistence Salmon Harvest Data Collection* project has two components:

1. In-season interviews with subsistence salmon fishers to assess their progress towards achieving harvest needs; and

2. Collection of biological information from subsistence caught Chinook salmon to characterize the unique age, sex and length (ASL) composition of the subsistence harvest, which is a specific subset of the total Chinook salmon run to the Kuskokwim River.

Fishery managers will use the in-season subsistence salmon harvest data when assessing stock status and making in-season management decisions concerning the commercial and subsistence fisheries. The age sex and length (ASL) composition of the subsistence Chinook harvest is a

unique subset of the ASL composition of the Chinook salmon run, which differs from the ASL compositions of the escapement due to the selectivity of the harvest methods.

Objectives

1. Conduct weekly interviews with Bethel Area subsistence salmon fishers in June, July and early August to determine the adequacy and quality of the harvest.

2. Characterize the annual ASL composition of Chinook salmon in the Kuskokwim River subsistence harvest.

3. Characterize and compare the annual ASL composition of Chinook salmon in the Kuskokwim River subsistence harvest by geographic area (lower, middle and upper Kuskokwim River).

4. Characterize the annual ASL composition of Chinook salmon in the Kuskokwim River subsistence harvest by gear type (e.g., gillnets with mesh of 6 inches or smaller, gillnets with mesh between 6 and 8 inches, gillnets with mesh of 8 inches or larger, rod and reel, fishwheel).

5. Characterize and compare the annual ASL composition of Chinook salmon in the lower Kuskokwim River subsistence harvest by temporal strata (i.e., fish harvested for the early, middle and late portions of the run).

Methods

Orutsararmuit Native Council (ONC) will hire two fisheries technicians in consultation with Alaska Department of Fish and Game (ADF&G) staff to conduct weekly in-season interviews with subsistence fishers in the Bethel Area. The information will be used along with other information to guide in-season management decisions.

In addition, the ONC technicians and ADF&G staff will recruit subsistence fishers from throughout the Kuskokwim River drainage to collect ASL data from their subsistence harvest of Chinook salmon. The data will be used to estimate the ASL composition of the Chinook salmon harvest of the Kuskokwim River subsistence fishery.

Partnerships/Collaboration

This project is a collaborative effort between ONC, ADF&G/CF, ADF&G/SD.

05-353
Nunivak Island Subsistence Cod, Red Salmon and Grayling Fisheries – Past and Present

Geographic Area: Kuskokwim River

Information Type: Harvest Monitoring and Traditional Ecological Knowledge

Principal Investigator: Robert M. Drozda
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Co-Investigator: Howard T. Amos
Nuniwarmiut Piciryarata Tamaryalkuti, Inc.

Cost:	2005	2006	2007
	$ 61,000	$ 45,000	$ 0

Issue

Information on the traditional and customary use of Pacific cod, red salmon and Arctic grayling by Nunivak Islanders as well as availability and locations of these subsistence resources is poorly documented. The Yukon-Kuskokwim Regional Advisory Council has identified long term trends and sources of variation of important subsistence species as an information need. This project addresses these concerns and will provide baseline data for comparative future studies.

Objectives

1. Accurately record and map 11 traditional cod fishing areas.
2. Survey fish campers regarding codfish catch at various locations.
3. Survey commercial halibut fishers who use the Mekoryuk fish plant regarding cod by-catch.
4. Conduct literature/internet search relevant to Nunivak Pacific cod, red salmon and grayling.
5. Review Nunivak oral history records, develop context for cod, grayling and red salmon.
6. Identify archives and museums with holdings relevant to Nunivak Island.

7. Conduct interviews and/or surveys with key informants on the historic and contemporary use of the Pacific cod, red salmon and grayling subsistence economy of Nunivak Island.

8. Write a narrative report including a comprehensive bibliography.

9. Publish results and report project design and progress on NPT, Inc website (www.nunivak.org).

10. Prepare draft text for local school natural/cultural resource curriculum.

Methods

Conduct background research using standard library, archival and internet search procedures. Develop survey questionnaire in consultation with subsistence specialists and fisheries biologists. Survey fishers at fish camps and Mekoryuk processing plant. Travel by boat to fishing locations and document sites with GPS and depthfinder. We will partner with the UAF Kuskokwim Campus, NIMA Corporation and USFWS Yukon Delta Refuge at the Ellikarrmiut (Nash Harbor) Science camp in developing research that is useful to students and scientists is successive years.

Partnerships/Collaboration

This project will proceed with the endorsement of the Native Village Mekoryuk IRA Council. Interviews and/or surveys will be conducted by local residents and shared with community members. Results of the study will be distributed to the University of Alaska Rasmuson Library for public access and via the world wide web. Work will be conducted in conjunction with ongoing village based cultural, natural history and Native language preservation projects and will partner with University of Alaska Kuskokwim Campus, Lower Kuskokwim School District, NIMA Village Corporation, and commercial fishery corporations operating in the Bering Sea.

05-356
Kuskokwim Area Post-Season Subsistence Salmon Harvest Surveys, 2005-2007

Geographic Area: Kuskokwim River

Information Type: Harvest Monitoring and Traditional Ecological Knowledge

Principal Investigator: Tracie Krauthoefer
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Co-Investigators: Greg Roczicka
Orutsararmuit Native Council
Dwayne Hoffman
Kuskokwim Native Association, Aniak

Cost:	2005	2006	2007
	$ 74,206	$ 74,206	$ 74,316

Issue

This project will continue the annual subsistence salmon harvest surveys in the Kuskokwim Fisheries Management Area for the year 2005, 2006, and 2007.

Objectives

1. Determine the total number of households in the Kuskokwim Fisheries Management Area and identify the number of households that harvested salmon as well as the number of households that did not harvest salmon for subsistence use. Update the community household lists and mail households salmon harvest calendars the following season.

2. Estimate the total number of Chinook, sockeye, chum, and sockeye salmon harvested for subsistence use by residents in communities throughout the Kuskokwim Area and also non-salmon species harvested by residents of Aniak and Bethel

3. Identify the types of fishing gear used by residents and collect qualitative information that will be helpful in identifying how fishers characterize subsistence fishing success for the 2004 season.

Methods

Methods used for carrying out this work will follow procedures established by the ADFG/SD to conduct subsistence fish harvest surveys in the Kuskokwim Area during 2002 and 2003. Currently ADF&G is working to revise methods, to move from a census to a stratified sample design. A new operational plan will be written and submitted to FIS when the revision is complete.

Partnerships/Collaboration

The ADFG/SD, KNA and ONC have cooperated to successfully complete this project during 2002 and 2003 and are accustomed to working together to collect subsistence fisheries information using the methods described in this investigation plan. This project continues the joint efforts to collaborate to collect critical subsistence fisheries information and encourages ongoing involvement by local tribal entities.

05-402
Lake Clark Sockeye Salmon Escapement and Population Monitoring

Geographic Area: Southwest – Bristol Bay area

Information Type: Stock Status and Trends (SST)

Principal Investigator: Dan Young
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Co-Investigators: Mary McBurney, National Park Service
Dr. Carol Ann Woody, U.S. Geological Survey

Cost:	2005	2006	2007
	$ 44,042	$ 44,502	$ 44,968

Issue

Continued decline in the number of sockeye salmon returning to the Kvichak River is a priority concern to subsistence fishers, the National Park Service and the Alaska Department of Fish and Game. Sockeye salmon bound for Lake Clark comprise 7 to 30% of the total Kvichak River escapement and provide the communities of Newhalen, Iliamna, Nondalton, and Port Alsworth with up to 75% of their total subsistence needs. This project will provide information on daily and annual Lake Clark escapements, return time, age structure, and size composition, all of which will aid in construction of brood tables and trend analysis. This information is needed to define the relationship between Kvichak and Lake Clark sockeye salmon stocks as well as for in- and post-season management decisions.

Objectives

1. Estimate sockeye salmon escapement to Lake Clark.

2. Determine age and size structure of the Lake Clark escapement.

Methods

Sockeye salmon will be counted and sampled as they ascend the Newhalen River. Standard Alaska Department of Fish and Game counting tower protocols will be used to enumerate fish. Age and size data will be collected from sockeye salmon in collaboration with the communities of Newhalen-Iliamna and Nondalton. Locally hired technicians, trained through the National

Park Service-University of Alaska Fairbanks Biotechnician Training Program, will lead or assist salmon escapement and sampling efforts.

Partnerships/Collaboration

This project has an established history of partnerships and capacity building. U.S. Geological Survey has successfully administered projects 01-095 (Population monitoring of sockeye salmon from Lake Clark and the Tazimina River) and 00-042 (Population Assessment of Lake Clark Sockeye Salmon) in collaboration with the Kijik Corporation, Nondalton Tribal Council and villagers, Iliamna-Newhalen villagers, and the Universities of Alaska, Montana, and Washington. Local youths have been trained as technicians and future project leaders through an intern program initiated in 2000.

05-403
Distribution, Seasonal Movement, and Life History of Humpback Whitefish in the Lake Clark Watershed

Geographic Area: Southwest – Bristol Bay area

Information Type: Stock Status and Trends (SST)

Principal Investigators: Julie Meka, Carol Ann Woody
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Co-Investigators: Dan Young, National Park Service
John Chythlook, Bristol Bay Native Association

Cost:	2005	2006	2007
	$ 71,006	$100,969	$ 62,100

Issue

Study of Lake Clark whitefish populations was listed as an important issue for the 2005 Fisheries Resource Monitoring Program. Both subsistence fishers and resource managers are concerned about whitefish population health. Local residents reported a decline in whitefish harvests during fall subsistence gill-net fisheries in the Lake Clark-Lake Iliamna region, and voiced concerns to the Bristol Bay Native Association and Regional Advisory Council. Humpback whitefish *Coregonus pidschian* are the primary harvest target and are typically captured using gill nets in spring and fall. Continued declines in sockeye salmon abundance in the region may have affected whitefish populations by reducing nutrient inputs from salmon carcasses, and increasing subsistence harvest pressure. Lack of basic biological information on whitefish populations in Lake Clark National Park prevents development of sustainable harvest guidelines.

Objectives

1. Determine basic life history characteristics of Lake Clark National Park humpback whitefish populations including age and size, age at maturity, fecundity, and anadromy.
2. Determine seasonal migration patterns and habitat use of Lake Clark National Park humpback whitefish populations.

Methods

Whitefish will be captured during the summers of 2005 and 2006 using seines, and during fall subsistence fisheries using gill-nets. Age, sex, size, and fecundity data will be collected from samples of whitefish captured at various locations. Otoliths will be collected from subsistence-caught whitefish for aging and microchemistry analysis to detect anadromy. About 80 whitefish

captured during the summer of 2006 will be fitted with a radio tag and tracked, using shore-based stationary as well as boat- and aerial-based mobile receivers, through late fall of 2007. Tracking data will be used to identify spawning, feeding, and overwintering habitats. Methods and findings should be transferable to whitefish populations in other Bristol Bay systems.

Partnerships/Collaboration

This project addresses subsistence fisheries monitoring stock status and trends issues in the Bristol Bay region. It will provide local economic benefits through education and regional employment opportunities (2 jobs) as part of the research project.

05-405
Estimation of Coho Salmon Escapement in Streams Adjacent to Perryville and Sockeye Salmon Escapement in Chignik Lake Tributaries, Alaska Peninsula National Wildlife Refuge

Geographic Area: Southwest Alaska – Chignik area

Information Type: Stock Status and Trends

Principal Investigators: Jim Larson
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Cost:	2005	2006	2007
	$ 14,700	$ 29,400	$ 29,400

Issue

Coho salmon *Oncorhynchus kisutch* runs to the Kametolook, Three Star, and Long Beach rivers near Perryville have declined and residents can no longer meet their subsistence needs in those rivers. These residents now harvest coho salmon from streams outside the immediate vicinity of Perryville. With fishing effort spread out to other streams, we need to ensure escapements are maintained to meet Perryville residents' subsistence needs and to sustain these small stocks.

Subsistence fishers in the Chignik area have had difficulty harvesting sockeye salmon *Oncorhynchus nerka* in the Chignik watershed, and are concerned that runs have declined and may be over-exploited by the commercial fishery. We need to monitor late-run sockeye and coho salmon escapement in the Chignik watershed to ensure these runs are sustained and subsistence needs are met.

Objectives

1. Obtain information on spawning distributions and minimum numbers of coho salmon in streams near the village of Perryville.

2. Obtain information on spawning distributions and minimum numbers of spawning late-run sockeye salmon in the Clark River.

Methods

The investigator would use low-level aerial surveys, conducted from a helicopter, to estimate coho and sockeye salmon escapements into streams near Perryville and in the Clark River. Two

aerial surveys would be conducted annually, one in late September and one in mid October. Flights would be coordinated to minimize sampling error by avoiding periods of turbid flow and inclement weather. Survey reaches are considered to be index areas, and counts are considered minimum estimates of coho and sockeye salmon abundance. Periodic aerial counts would provide a minimum index of coho and sockeye salmon escapement. Due to the inclement weather and "flashy" nature of the streams in this region during late fall, getting more precise estimates of salmon escapement is neither logistically feasible nor cost effective.

Partnerships/Collaboration

The project would develop partnerships between King Salmon Fish and Wildlife Field Office and the villages of Perryville, Chignik Lake, Chignik Lagoon, and Chignik Bay through annual meetings that would share project results and solicit additional input from village residents. Perryville residents have knowledge of where fishing pressure has shifted since closure of local rivers, and where monitoring is necessary to ensure escapement needs are met. In-season communication with local village residents would also be necessary to determine if coho and sockeye salmon escapements were sufficient for subsistence uses in each survey stream.

05-452
Non-salmon Fish Harvests and Traditional Knowledge in Togiak, Manokotak, and Twin Hills

Geographic Area: Bristol Bay, Southwest Alaska, Togiak National Wildlife Refuge (TNWR)

Information Type: Harvest Monitoring and Traditional Ecological Knowledge

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Co-Investigator: Laura Jurgensen, Natural Resources Department
Bristol Bay Native Association

Cost:	2005	2006	2007
	$ 77,225	$ 29,113	$ 0

Issue

Subsistence harvests of non-salmon fish in the TNWR communities of Togiak, Twin Hills, and Manokotak are not monitored annually. Since the last studies in 1995 and 2000, several factors have likely influenced the subsistence fisheries in these communities, including the decline of the commercial salmon fishery and developing recreational fisheries. This study will update harvest and use information and will document any changes in harvest quantities, species used, gear types, and location of harvests. Interviews with key respondents will identify economic, cultural, and environmental factors influencing the characteristics of subsistence harvests and uses.

Objectives

1. Approximately 10 to 15 key respondent interviews about subsistence harvests and uses of non-salmon fish, such as methods and means; changes in the fishery; environmental and other habitat changes; and potential impacts of the sport and commercial fisheries of the Togiak District on subsistence harvests and uses.

2. Estimates of harvests of nonsalmon fish for the calendar year 2005.

3. Maps of locations of harvests nonsalmon fish in 2005 by cultural/biological unit, as mapped in previous research in these study communities.

4. An update of the traditional knowledge database *From Neqa to Tepa.*

Methods

This project involves key respondent interviews and subsistence harvest surveys for nonsalmon fish in three communities within the TNWR: Togiak, Twin Hills, and Manokotak. The first project phase will consist of approximately 10 to 15 key respondent interviews concerning non-salmon TEK. These interviews will be recorded on audiotape and will be conducted in English and Yup'ik depending upon the respondents' preferences and abilities. These interviews will focus on economic, cultural, and environmental factors that are influencing subsistence harvests of nonsalmon fish, and provide guidance for potential questions for the subsequent household survey. The second phase will consist of systematic household surveys in January 2006 documenting the non-salmon fish harvests of 2005. The survey will collect data to estimate subsistence harvests by species and area and gear type, the total number of households that subsistence fished in the study year, and local residents' observations and concerns. The third phase will consist of data analysis and preparation of a final report and an update to the TEK database "From Neqa to Tepa," using the AskSam software program

Partnerships/Collaboration

This project will be a collaboration between the Division of Subsistence of ADF&G and BBNA. Letters of support will be solicited from the tribal council presidents of each of the proposed study communities by BBNA staff, and surveys will include the employment of individuals from each of the communities to assist with interviewing.

05-501
Spawning Distribution and Run Timing of Copper River Sockeye Salmon

Geographic Area: Copper River

Information Type: Stock Status and Trends

Principal Investigator: Keith Van Den Broek, Native Village of Eyak
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Co-Investigator: Jason Smith, LGL Alaska Research Associates, Inc.
James Savereide, Alaska Dept of Fish and Game, Div of Sport Fish

Cost:	2005	2006	2007
	$225,126	$225,126	$225,166

Issue

The purpose of this project is to estimate the run timing and spawning distribution of sockeye salmon stocks returning to the Copper River. Currently, there is limited information on the stock-specific migration rates of sockeye salmon traveling from the Copper River District (and Miles Lake sonar site) through the inriver fisheries, particularly as related to environmental factors such as stage height. Information from this project can be used by fishery managers to better manage the subsistence fishery for individual stocks, which ultimately could lead to increased subsistence harvest opportunities on healthy stocks. This project addresses subsistence fisheries-monitoring issues for Copper River sockeye salmon as outlined by the Federal Subsistence Regional Advisory Council.

Objectives

1. Estimate the proportions of sockeye salmon returning to the major spawning tributaries of the Copper River (Chitina, Tonsina, Klutina, Tazlina, Gulkana and Upper Copper rivers).

2. Describe the stock-specific, migratory timing profile of sockeye salmon.

Methods

This study will estimate the proportion of spawning sockeye salmon in each of six major spawning tributaries of the Copper River and describe the migratory timing profiles for each stock. To achieve this objective, 500 sockeye salmon will be radio tagged each year at

two fishwheels located in Baird Canyon (rkm 66) and tracked throughout the basin using a combination of fixed-station receivers and aerial surveys.

Partnerships/Collaborations

This project will promote the interaction between a major subsistence group (NVE) and various management agencies (USDA Forest Service, U.S. Fish and Wildlife Service, Alaska Department of Fish and Game). The study design will engage tribal organizations from different regions of the Copper River drainage in discussions on the project and promote interactions amongst subsistence users. The Native Village of Eyak will continue to work with their Tribal Council, staff, consultants and government agencies to identify key personnel to help carry on a long-term fisheries-monitoring program.

05-502
Relative Abundance, Migratory Timing, and Overwintering and Spawning Distribution of Steelhead in the Copper River Drainage

Geographic Area: Southcentral

Information Type: Stock Status and Trends

Principal Investigator: Klaus Wuttig
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Co-Investigator: Bruce Cain, Native Village of Eyak
Eric Veach, National Park Service Wrangell/St. Elias
Elijah Waters, Bureau of Land Management

Cost:	2005	2006
	$ 36,500	$ 36,769

Issue

This study will gather information to address stock status and trends issue #1 from the 2005 Issues and Information Needs of the Southcentral Copper River Region. The objectives are designed to estimate and describe the distribution (spawning and overwintering), relative abundance, and migratory timing of steelhead *Oncorhynchus mykiss* in the Copper River drainage using radiotelemetry. Attaining a measure of total run size is needed to assess the vulnerability of these stocks to overexploitation and the need for greater conservation measures such as more restrictive fishing seasons or methods (e.g. no subsistence fishing during the out-migration period of adult steelhead in late May, the inclusion of live boxes on fishwheels, or the closure of sport fisheries). Documentation of significant spawning and overwintering locations throughout the drainage is necessary to adequately manage and protect these critical habitats.

Objectives:

1. Estimate the proportion of Copper River steelhead that migrate to both the Dickey Lake and Hanagita Lake spawning areas such that all estimates are within 10 percentage points of the true values 95% of the time.

2. Describe the migratory timing profile (upriver and downriver) of the steelhead return in the Copper River at the point of capture and investigate potential stock-specific differences in run timing.

A secondary task will be to document significant steelhead aggregations in the Copper River drainage during spawning and overwintering periods.

Methods

This study will use radiotelemetry to determine the relative size of the total return of steelhead to the Copper River drainage. This will be accomplished by estimating the relative contribution of the Dickey and Hanagita lake stocks, for which abundance information has been attained, to the drainage-wide steelhead spawning escapement. Steelhead will be captured using a fish wheel and dip nets located on the east and west banks of the Copper River near Chitina from approximately 20 August to 10 October in 2005 and 2006. Each year, 130 radio tags will be distributed in proportion to fish passage. Run-timing information and documentation of significant spawning and overwintering locations will be attained using a network of 9 ground-based tracking stations positioned strategically throughout the drainage and aerial surveys conducted at biologically meaningful periods (e.g. spawning and overwintering).

Partnerships/Collaboration

Financial consultations have been ongoing with Eric Veach of the NPS and Elijah Waters of the BLM, Glennallen office. Both organizations have agreed to provide financial and in-kind support to help in the project's success. The Native Village of Eyak (NVE) supports this study and their level of involvement depends on the proposed Copper River sockeye salmon study (FIS 05-502). If this proposal is funded and if the Copper River sockeye salmon proposal is funded, funding will be provided to NVE for extending their upriver fishwheel operations for 4-6 weeks to capture and radio-tag steelhead. NVE, NPS, and BLM will be involved in the data collection, analysis, and reporting of results.

05-553
Factors Contributing to Changes in Subsistence Salmon Harvests in the Copper River Basin

Geographic Area: Southcentral

Information Type: Harvest Monitoring and Traditional Ecological Knowledge

Principal Investigator: Dr. William E. Simeone
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Phone: (907) 267-2309

Erica McCall, Partners for Fisheries Monitoring Program
Native Village of Eyak
Phone: (907) 424-3847

Co-Investigators: Katherine Martin, Mentasta Tribal Council
Julie Bator, Tazlina Tribal Council
JoeNeal Hicks, Cheesh'na Tribal Council
Bry Claw, Gulkana Tribal Council

Cost:	2004	2005	2006
	$ 84,819	$0	$0

Issue

In their final report, the Subsistence Fisheries Harvest Assessment Working Group recommended collecting "contextual information that would assist managers in evaluating and interpreting subsistence harvest data" (Fall and Shanks 2000). The justification for collecting this type of data was that there is "little contextual information available for managers and users to understand changes in harvests from year to year" (Fall and Shanks 2000). In addition, leaders from most of the Ahtna communities have expressed concern that quantitative harvest data does not represent the complete story of how local people's lives have changed and what influences sometimes influence traditional subsistence harvest pursuits. The goal of this project is to provide a context for Copper River subsistence harvest data, and is therefore, a direct response to recommendations of the Harvest Assessment Working Group, as well as issues and information needs identified by OSM-FIS, and Copper River Basin Ahtna leaders. This project will provide information useful in evaluating current subsistence fishery regulations, regulatory proposals, and fisheries management actions, as well as, a tool for understanding trends in the subsistence salmon harvest.

Objectives

1. To determine, using all available quantitative harvest data, if there has been a change, over the last 125 years, in the subsistence harvest of salmon by federally qualified users in the communities of Mentasta, Chistochina, Gulkana, and Tazlina.
2. To hypothesize possible factors that explain observed changes in the subsistence harvests and to test those explanations against quantitative measures, when possible, and against interview data collected from residents of the study communities.
3. To develop comprehensive explanations for changes in the subsistence salmon harvest and to predict likely outcomes of current and potential regulations (completed by October 30, 2006.

Methods:

Methodology includes the collection and assessment of quantitative harvest data, demographic, and economic data, and interviews with local subsistence users about changes in their harvest.

Partnerships/Collaboration

This project is a collaborative effort between the Division of Subsistence, the Tribal entities of the Copper River Basin, and the Partners for Fisheries Monitoring Program Southcentral Regional Social Scientist. The Tribal entities will share in the work by helping develop interview protocols, conducting key respondent interviews, and assisting in the review the final report. The partnerships and capacity development aspects of this project are numerous.

05-601
Kook Lake Sockeye Stock Assessment

Geographic Area: Southeast

Information Type: Stock Status and Trends

Principal Investigator: Ben Van Alen,
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Co-Investigators: Raynelle Jack, Angoon Community Association
Meg Cartwright, ADFG, Division of Commercial Fisheries
Jan Conitz, ADFG, Division of Commercial Fisheries

Cost:	2005	2006	2007
	$ 78,620	$ 79,578	$ 81,644

Issue

The current status of the Kook Lake (Basket Bay) sockeye run is poorly understood and of concern. We do not know if annual sockeye escapements are a few hundred fish or several thousand fish. Escapement survey counts and subsistence harvest estimates show declining trends; however, the usefulness of this information is questioned. Few sockeye salmon were marked and recaptured the past three seasons as part of Fishery Resource Monitoring Program project FIS01-126. Project personnel did not see many sockeye salmon in the system and deep water and logs made it difficult to seine fish in beach spawning areas. A weir project now appears to be the best method to measure escapements into this system.

Objectives

1. Estimate the total escapement of sockeye salmon into Kook Lake 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 Kook Lake sockeye escapement so that the estimated coefficient of variation is less than 10%.

3. Clear debris from the cavern entrances on the outlet stream.

Methods

An Angoon Community Association crew will install and operate an adult salmon weir on the outlet of Kook Lake from late-June through early-September of 2005, 2006, and 2007. Weir counts of sockeye salmon will be validated with a mark-recapture study. The age, sex, and length composition of sockeye salmon will be estimated.

Partnerships/Collaboration

Crew members will be hired and employed by ACA. This cooperative ACA/USDA-FS/ ADF&G project will promote public support for our subsistence management program.

05-603
Klawock Lake Subsistence Sockeye Salmon Project

Geographic Area: Southeast

Information Type: Stock Status and Trends

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Co-Investigators: Klawock Cooperative Association
Jeff Reeves, US Forest Service

Cost:

2005	2006
$164,238	$167,798

Issue

Investigators will collect data on returning sockeye salmon to Klawock Lake and interview the subsistence fishers in the bay to assist fishery managers in ensuring that escapement and subsistence opportunities are adequate.

Objectives

1. Count the number of sockeye salmon returning to Klawock Lake through the weir.
2. Estimate the annual adult and jack sockeye escapement into Klawock Lake with mark-recapture methods, using the weir as a marking platform and the major spawning grounds as the recapture sites, so that the estimated coefficient of variation is less than 10%.
3. Estimate the spawning population in Three-Mile, Half-mile and Inlet streams using mark-recapture methods so that the estimated coefficient of variation is less than 15%.
4. Describe the size, sex and age distribution of sockeye salmon adults and jacks returning to Klawock Lake.

Methods

The primary focus of this research will be to estimate the number of sockeye salmon adults returning to spawn in Klawock Lake. Standard multi-event mark-recapture statistical methods

will be used to estimate sockeye escapement. Sockeye adults will be marked at the weir. Seven or eight recapture events at the inlet streams will be conducted during the spawning season.

Partnerships/Collaborations

Personnel from the three cooperating agencies, ADF&G, USDA-FS and Klawock Cooperative Association (KCA) have worked closely to ensure the success of the project through training, assistance in the field, and project and budget planning since 2000. Local residents and tribal governments are consulted on a regular basis. ADF&G staff will hold a community meeting in Klawock to describe the study, present the results of first year and get feedback from the community. The ADF&G project leaders and KCA staff communicate on a regular basis about personnel issues, project and budget planning, field expediting and natural resource issues.

Total Project Costs: (Dollars are shown in thousands)

	State	Federal	Non-Agency (KCA)	Total
2005	135.1	–	29.1	164.2
2006	135.7	–	32.1	167.8

Local Hire Costs (these costs are included in the Total Project Costs, above)

	State	Federal	Non-Agency (KCA)	Total
2005	16.8	–	24.9	41.7
2006	16.8	–	27.3	44.1

The Southeast Sustainable Salmon Fund (SSSF) will contribute $32,000 in Federal FY05 and FY06 towards ADF&G permanent staff that oversee this project.

05-604
Adult Steelhead Population Assessments on Prince of Wales Island

Geographic Area: Southeast

Information Type: Stock Status and Trends

Principal Investigator: Glenn Chen
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Co-Investigators: Richard Peterson and Cathy Needham, Organized Village of Ka'saan
Roger Harding and Randy Mullen, ADFG, SE Sportfish Research Division
Steve Hoffman and Steve McCurdy, ADFG, SE Sportfish Research Division
Sheila Jacobsen and Jeff Reeves, USDA Forest Service, Craig Ranger District
Susan Howell, USDA Forest Service, Thorne Bay Ranger District

Cost:	2005	2006	2007
	$127,708	$136,908	$156,921

Issue

Steelhead (*Oncorhynchus mykiss*) comprise an important subsistence fishery for rural residents of Prince of Wales Island (southeast Alaska region). Contemporary subsistence steelhead harvest by PWI residents estimated across all 12 PWI communities was 770 fish, with most of this harvest being taken by rod and reel, and occurring primarily among residents of Craig, Klawock, and Hydaburg. Analysis of this data suggests that a total annual harvest of about 600 fish occurs on Federal lands on Prince of Wales Island. Proposed regulations that established a limited Federal subsistence fishery for this species were approved by the Federal Subsistence Board in December 2002.

Little historical information is available to document population sizes, age/sex/length characteristics, run timing, and/or spatial distribution of steelhead on the majority of Prince of Wales Island (PWI) streams. There are 74 drainages known to contain steelhead on Prince of Wales Island. At present, each system is being managed according to categories of "small" (<150) or "large" (>150) numbers of adult spawners. Lack of more recent and accurate data has hampered efforts to assess the potential effects of subsistence fishing and/or catch-and-

release sport angling, and prevents the refinement of regulations that would ensure adequate conservation of steelhead, while allowing for expanded harvest opportunities.

In contrast to other Pacific anadromous salmonids, there are unique aspects of steelhead life history and ecology that make this species more difficult to study. Biologists continue to be concerned that low to moderate levels of harvest on PWI streams could potentially create conservation concerns, in a number of these systems. At present, a proposal has been submitted to the Federal program to expand subsistence harvest opportunities for steelhead across the entire Region. Given that quantitative population data for these fish are unavailable for the majority of stocks in southeast Alaska, there is an urgent need to develop and test alternative enumeration methodologies that are cost-effective, efficient, and that can yield data with the precision sufficient for management by State and Federal agencies.

This project will provide much needed quantitative data on adult spawning populations, run timing, and age/sex/length characteristics within a subset of PWI streams that support steelhead harvests by local subsistence users, and provide research/development on alternatives to full duration weir studies. It addresses an important southeast Alaska region Federal subsistence fishery monitoring issue, identified by the SERAC during the fall 2002 meetings, and listed in their current Issues and Information Needs.

Objectives

1. Estimate the abundance of returning adult spring steelhead in a sub-set of seven to nine Prince of Wales Island streams, representing management categories of "large" (N > 150) versus "small" (N < 150) populations of fish.

2. Quantitatively estimate the sex and length compositions, and incidence of repeat spawning, of spring-run adult steelhead in the selected sub-set of PWI streams.

Methods

This project is being proposed as a 3-year study (FY 2005 - 2007) to obtain quantitative information on the abundance of spring adult steelhead stocks in seven (7) freshwater stream systems on Prince of Wales Island (representing 10% of the Island's steelhead systems). If funded, it will also expand upon a pilot effort that has been initiated in by ADF&G and USDA-FS on the Island in spring 2004, in 12-Mile Creek.

STEELHEAD ABUNDANCE

STEELHEAD ABUNDANCE will focus on the collection of population data in an annual subset of PWI stream systems that support spring runs of adult steelhead. Selected streams will be stratified based on **management categories** based on population size and **accessibility**, with selection selected based on their importance to subsistence users. Weirs will be operated in each study stream for a limited, 8-week period corresponding to the main run timing for spring returning adult steelhead. These counts will serve as a "minimum" population estimate for each of the study streams, and are anticipated to provide information of sufficient resolution to address subsistence management issues on Prince of Wales Island. Channel-spanning, aluminum

and steel tripod/bipod weirs with fixed or floating center panel sections will be constructed and operated for 8 weeks (April 1st through May 31st), to enumerate upstream migrating steelhead spawners. These counts will serve as a "minimum" population estimate for each of the streams, and are anticipated to provide information of sufficient resolution to address subsistence management issues on Prince of Wales Island.

Results from the Spring 2004 Pilot Study

USDA Forest Service and Alaska Department of Fish and Game biologists conducted a pilot study during March – May 2004, to evaluate the effectiveness of a mark-recapture study design for assessing steelhead populations on the streams of Prince of Wales Island. This work was conducted on 12 Mile Creek, a system that is typical of many small to moderate-sized streams on PWI. The 2004 pilot study on 12 Mile Creek indicated that mark-recapture using only seines and angling methods was largely unsuccessful, inefficient, and ineffective. When these techniques are combined with visual sightings as a re-capture method, the resulting population estimates had large variances and low precision.

While visual sightings via snorkeling were found to be successful for "re-captures", a weir proved to be necessary for tagging a sufficient number of fish during the initial marking sessions to obtain a reliable population estimate. After the initial investment in supplies and materials is made, however, the costs of operating a weir are equivalent to, or less than, that required for a mark-recapture efforts (in fact, more personnel are needed to operate seines). For adult steelhead, tag loss was high and affected population estimates as well. In addition, the resulting stress associated with increased handling in a mark-re-capture study with angling or seining must also be considered, especially given that steelhead numbers in most PWI systems are small (the loss of a few individuals due to handling mortality may be significant for such populations). Based on these results, the principal investigators do not recommend that mark-re-capture techniques be utilized for addressing this study objective in the proposed research.

SEX, LENGTH, and INCIDENCE OF REPEAT SPAWNING

SEX, LENGTH, and INCIDENCE OF REPEAT SPAWNING will be collected from a sub-set of adult steelhead captured in the study streams. Steelhead length will be determined by measurements from mideye to forkofcaudalfin to the nearest 5 mm. Sex will be determined by observing external characteristics. The incidence of repeat spawning and saltwater age at initial spawning will be determined from scale pattern analysis. Scale samples will be cleaned and mounted on gum cards to facilitate making triacetate impressions of the scales. Samples will be stored and archived by ADF&G, and scale analysis will be conducted by Department in 2007.

Partnerships/Collaboration

This project will promote and enhance working relationship among the State and Federal agencies, and the local communities on Prince of Wales Island. The Organized Village of Kasaan is a principal investigator and will receive funds and the responsibility for employing of up to 4 fisheries technicians, to assist the State and Federal biologists in conducting the field work associated with this study. Priority will be given to local hire of qualified. The proposed study will help to expand OVK's capacity for fisheries resource monitoring.

PWI Native organizations, represented by the Hydaburg Cooperative Association, Craig Community Association, Klawock Community Association, and OV Kasaan were consulted. Each of these groups have expressed strong support for this project. ADF&G local managers, and line officers/natural resources staff members at the USDA Forest Service offices in Craig, Thorne Bay, and Ketchikan have indicated that they also fully support the proposed study and will be contributing in-kind contributions of salaries, travel, and helicopter transportation costs.

05-702
Genetic Species Markers and Population Structure in Alaskan Whitefish

Geographic Area: Inter-Regional

Information Type: Stock Status and Trends

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Co-Investigators: Randy Brown, USFWS, Fairbanks Fish and Wildlife Field Office (FFWFO)
Ken Harper, USFWS, Kenai Fish and Wildlife Field Office (KFWFO)

Cost:	**2005**	**2006**
	$ 30,188	$30,188

Issue

There is a large and growing need for information on whitefish (for the purpose of this proposal, the term 'whitefish' includes all Alaskan *Coregonus*, *Presopium* and *Stenodus* species, except where specifically noted) as it relates to management of subsistence fisheries throughout Alaska. Furthermore, across Alaska, residents have expressed concern about the status of whitefish resources. A critical initial step in properly addressing whitefish biology and management in Alaska is to characterize their genetic population structure. Currently, there are little or no population genetic data available for whitefish in Alaska. It is believed that there are relatively few whitefish spawning areas, even in large systems like the Yukon River, and there is little or no information on how populations are structured genetically. In order to properly manage whitefish (e.g., assess abundance, stock structure, distribution, movement patterns, life history and reasons for potential declines) we must be able to determine the geographic scale at which their populations are structured.

Furthermore, current management for whitefish in Alaska is imprecise as it is based on a 'whitefish group' where species are not distinguished. Juvenile whitefish bear little resemblance to the adult forms, since many of their morphometric characteristics are not fully developed or easily recognizable, and hybridization appears to be widespread. Even "pure" adults can be difficult to reliably identify morphologically, depending on the local experience of the biologist. A genetic method to distinguish between species will allow us to 1) verify the species status of individual samples; 2) assess the extent and importance of hybridization between species; and 3) is the first step in developing a reliable field identification key for adults and juveniles.

Objectives

1. Apply a set of 10 microsatellite loci (described below) to assess large scale population structure to 100 humpback whitefish from each of five geographic regions across Alaska.
2. Apply a set of 10 microsatellite loci (described below) to assess small scale population structure within the Yukon River to 38-100 humpback whitefish from each of eight previously determined spawning sites as given in Objective 1.
3. Develop diagnostic genetic markers to discriminate among Alaskan whitefish species: inconnu (*Stenodus leucichthys*), broad whitefish (*Coregonus. nasus*), humpback whitefish complex (*C. pidschian*), Bering cisco (*C. laurettae*), least cisco (*C. sardinella*), round whitefish (*P. cylindraceum*), and pygmy whitefish (*P. coulteri*).

Project Description

Objectives 1 and 2) Collections to be analyzed in the project were chosen to represent a mix of proximate and distant collections, in order to identify the geographic boundaries of populations and the connectivity between them. Tissues collected between 1998 and 2003 are archived in the CGL (N = 469; Figure 1). We will attempt to collect additional samples from the Coleville, Copper, Selawik and Kuskokwim Rivers during the summer of 2004 (target N = 200-400; Figure 1).

Objective 3) Tissue samples from 2-10 adults of seven whitefish species reliably identified by experienced field biologists were collected from 1998 to 2004 and archived at CGL. The geographic range of the samples extended from Alaska to Montana, and included some putative hybrids. In collaboration with the University of Montana, we will use PINE (paired interspersed nuclear elements) nuclear molecular markers (Spruell et al. 2001) in an attempt to describe diagnostic species markers.

Partnerships/Collaboration

This project involves significant collaboration with faculty and graduate students at the University of Laval and the University of Montana. Furthermore, we have discussed this project with the Council Athabascan Tribal Governments Natural Resources Department (CATGNR) management team. The CATGNR represents a consortium of ten Gwich'in and Koyukon Athabascan tribes located throughout the Yukon Flats. The CATGNR agrees to the merit and need for this study and further development. This project will, to the extent possible, hire local residents of the Yukon Flats to assist with netting to capture whitefish at various locations.

2004 Fisheries Resource Monitoring Plan

Number of projects funded for the 2004 Fisheries Resource Monitoring Plan. Project type includes stock status and trends (SST) and harvest monitoring and traditional ecological knowledge (HM-TEK).

Geographic Region	SST	HM-TEK	Total
Northern	5	3	8
Yukon	9	8	17
Kuskokwim	11	4	15
Southwest	7	3	10
Southcentral	5	1	6
Southeast	6	2	8
Inter-regional	2	1	3
Total	45	22	67

Cost of projects funded for the 2004 Fisheries Resource Monitoring Plan. Project type includes stock status and trends (SST) and harvest monitoring and traditional ecological knowledge (HM-TEK).

	Cost ($000)		
Geographic Region	SST	HM-TEK	Total
Northern	$547	$169	$716
Yukon	$1,029	$353	$1,382
Kuskokwim	$1,291	$302	$1,593
Southwest	$754	$179	$933
Southcentral	$561	$90	$651
Southeast	$684	$162	$846
Inter-regional	$99	$78	$177
Total	$4,965	$1,333	$6,298

Northern Alaska stock status and trends projects funded in 2004.

Project #	Title	Cost ($000) 2004	2005	2006
04-101	Selawik Refuge Inconnu Abundance	$225	$207	$0
04-102	Selawik Whitefish Radio Telemetry	$99	$93	$31
04-103	North Slope Dolly Varden DIDSON Assessment	$53	$183	$108
04-105	Pikmiktalik River Salmon Escapement	$116	$113	$0
04-109	Wulik River Dolly Overwintering Stocks	$54	$35	$26
Total		$547	$631	$165

Northern Alaska harvest monitoring and traditional ecological knowledge projects funded in 2004.

Project #	Title	Cost ($000) 2004	2005	2006
04-151	Customary Trade of Fish on Seward Peninsula Area	$83	$95	$58
04-153	Pre-commercial Subsistence Fisheries Baseline Data	$48	$0	$0
04-157	Exploring Approaches to Sustainable Fish, NW Arctic	$38	$42	$48
Total		$169	$137	$106

Yukon River region stock status and trends projects funded in 2004.

Project #	Title	Cost ($000) 2004	2005	2006
04-206	Tozitna River Weir	$66	$66	$66
04-208	E. Fork Andreafsky River Weir	$80	$85	$90
04-209	Gisasa River Weir	$80	$83	$86
04-211 [a]	Henshaw Creek Weir	$25	$0	$0
04-217	Rampart Rapids Fall Chum Salmon Abundance	$296	$304	$317
04-228	Yukon River Chum Salmon GSI	$78	$107	$0
04-229 [b]	Lower Yukon River Salmon Drift Test Fishing	$105	$17	$53
04-231	Yukon River Chinook Telemetry	$296	$301	$301
04-234	Kaltage Chinook Salmon ASL Sampling	$3	$3	$3
Total		$1,029	$966	$916

Yukon River region harvest monitoring and traditional ecological knowledge projects funded in 2004.

Project #	Title	Cost ($000) 2004	2005	2006
04-251	Traditional Ecological Knowledge Camp in Fort Yukon	$51	$57	$0
04-253	Upper Tanana Subsistence Fisheries Traditional Ecological Knowledge Study	$54	$82	$61
04-255	Tradtional Ecological Knowledge of Upper Yukon River Salmon	$23	$27	$0
04-256	Tanana Conservation Outreach	$26	$26	$0
04-263	Yukon River Salmon Management Teleconferences	$15	$15	$15
04-265	Traditional Ecological Knowledge of Customary Trade of Subsistence Fish, Yukon River	$39	$29	$0
04-268	Hooper Bay Subsistence Monitoring Project	$36	$0	$0
04-269	Traditional Ecological Knowledge and Radio Telemetry Study of Whitefish, Kanuti NWR	$109	$84	$36
Total		$353	$320	$112

[a] Approved as an out-of-cycle project by OSM.

[b] FY2004 funding includes support for Year 1 and partial support for Year 2 activity.

Kuskokwim River region stock status and trends projects funded in 2004.

Project #	Title	Cost ($000) 2004	2005	2006
04-301	Kwethluk River Weir	$131	$131	$131
04-302	Tuluksak River Weir	$120	$120	$120
04-304	Whitefish Lake Telemetry of Whitefish	$110	$110	$0
04-305	Kanektok River Weir	$129	$131	$131
04-306	Holitna River Chinook and Chum Salmon Telemetry	$231	$240	$0
04-307	Kuskokwim ASL Sampling Program	$85	$88	$88
04-308	Kalskag Mark Recapture Study	$141	$145	$145
04-309	KNA Internship Program	$23	$23	$23
04-310 [a]	Tatlawiksuk River Weir	$200	$42	$122
04-311	Kuskokwim Coho Salmon Genetic Mixed Stock Assessment	$66	$0	$0
04-312 [a]	Goodnews River Weir Coho Salmon Extension	$55	$0	$28
Total		$1,291	$1,030	$788

Kuskokwim River region harvest monitoring and traditional ecological knowledge projects funded in 2004.

Project #	Title	Cost ($000) 2004	2005	2006
04-351	Kuskokwim Bay Traditional Ecological Knowledge and Oral History	$49	$0	$0
04-353	Bethel Area Inseason Subsistence Salmon Data Collection	$62	$0	$0
04-355	Middle Kuskokwim River Inseason Salmon Harvest Survey	$32	$0	$0
04-359	Kuskokwim Area Postseason Subsistence Harvest Surveys	$158	$0	$0
Total		$301	$0	$0

[a] FY2004 funding total includes support for two years of activity.

2004 Fisheries Resource Monitoring Plan

Southwest Alaska stock status and trends projects funded in 2004.

Project #	Title	Cost ($000) 2004	2005	2006
04-401	Ungalikthluk River Rainbow Trout Assessment	$51	$0	$0
04-402	Mortensens Creek Sockeye and Coho Salmon Escapement	$95	$93	$96
04-403	McLees Lake Sockeye Salmon Escapement	$79	$76	$79
04-411 [a]	Lake Clark Sockeye Salmon Run Timing	$137	$10	$75
04-412 [b]	Afognak Lake Sockeye Salmon Assessment	$152	$0	$69
04-414 [b]	Buskin River Sockeye Salmon Escapement	$129	$0	$66
04-415	Tazimina River Rainbow Trout Assessment	$111	$0	$0
Total		$754	$179	$385

Southwest Alaska harvest monitoring and traditional ecological knowledge projects funded in 2004.

Project #	Title	Cost ($000) 2004	2005	2006
04-454	Bristol Bay Sharing, Bartering and Trade	$74	$98	$27
04-456	Salmon Harvest Assessment & Traditional Ecological Knowledge - Aleutian Is	$44	$20	$0
04-457	Subsistence Harvest Assessment & Traditional Ecological Knowledge - Kodiak	$61	$53	$19
Total		$179	$171	$46

[a] FY2004 funding total includes support for Year 1 and partial support for Year 2 activity.

[b] FY2004 funding total includes support for two years activity.

Southcentral Alaska stock status and trends projects funded in 2004.

Project #	Title	Cost ($000) 2004	2005	2006
04-501	Long Lake Sockeye Salmon Escapement	$18	$18	$18
04-502	Tanada Creek Sockeye Salmon Escapement	$63	$63	$63
04-503	Copper River Chinook Salmon Abundance	$297	$334	$334
04-506	Copper River Sockeye Salmon Assessment	$68	$59	$66
04-507	Copper River Stock Assessment of Chinook Salmon	$115	$115	$51
Total		$561	$589	$532

Southcentral Alaska harvest monitoring and traditional ecological knowledge projects funded in 2004.

Project #	Title	Cost ($000) 2004	2005	2006
04-553	Traditional Ecological Knowledge Long Term Changes in Salmon Runs, Copper River	$90	$117	$0
Total		$90	$117	$0

Southeast Alaska stock status and trends projects funded in 2004.

Project #	Title	Cost ($000) 2004	2005	2006
04-604	Klawock Lake Sockeye Salmon Escapement Assessment	$171	$0	$0
04-605	Angoon Area Sockeye Salmon Escapement Assessment	$85	$89	$95
04-606	Hetta Lake Sockeye Salmon Escapement Assessment	$92	$94	$96
04-607	Kake Area Sockeye Salmon Escapement Assessment	$130	$136	$146
04-608	Salmon Lake Sockeye Salmon & Coho Salmon Escapement Assessment	$92	$115	$115
04-609	Klag Lake Sockeye Salmon Escapement Assessment	$114	$117	$118
Total		$684	$551	$570

Southeast Alaska harvest monitoring and traditional ecological knowledge projects funded in 2004.

Project #	Title	Cost ($000) 2004	2005	2006
04-651	Traditional Ecological Knowledge and Subsistence Salmon Monitoring	$79	$146	$89
04-652	Subsistence Traditional Ecological Knowledge Database	$83	$88	$98
Total		$162	$234	$187

Alaska Interregional stock status and trends projects funded in 2004.

Project #	Title	Cost ($000) 2004	2005	2006
04-701	Develop Shared Fishery Database	$75	$31	$31
04-703	Hatching Success of Eulachon Eggs	$24	$19	$0
Total		$99	$50	$31

Alaska Interregional harvest monitoring and traditional ecological knowledge projects funded in 2004.

Project #	Title	Cost ($000) 2004	2005	2006
04-751	Subsistence Harvest Database Update/ Report Preparation	$78	$77	$76
Total		$78	$77	$76

2003 Fisheries Resource Monitoring Plan

Number of projects funded for the 2003 Fisheries Resource Monitoring Plan. Project type includes stock status and trends (SST) and harvest monitoring and traditional ecological knowledge (HM-TEK).

Geographic Region	SST	HM-TEK	Total
Northern	2	1	3
Yukon River	7	2	9
Kuskokwim River	7	0	7
Southwest	5	0	5
Southcentral	3	2	5
Southeast	3	1	4
Total	27	6	33

Cost of projects funded for the 2003 Fisheries Resource Monitoring Plan. Project type includes stock status and trends (SST) and harvest monitoring and traditional ecological knowledge (HM-TEK).

	Cost ($000)		
Geographic Region	SST	HM-TEK	Total
Northern	$159	$45	$204
Yukon River	$300	$44	$344
Kuskokwim River	$407	$0	$407
Southwest	$195	$0	$195
Southcentral	$284	$165	$449
Southeast	$277	$40	$317
Total	$1,622	$294	$1,916

Northern Alaska stock status and trends projects funded in 2003.

		Cost ($000)		
Project #	Title	2003	2004	2005
02-020	Pikmiktalik River Salmon Escapement	$97	$0	$0
03-012	Kaktovik Lagoons Cisco & Dolly Varden Assessment	$62	$53	$52
Total		$159	$53	$52

Northern Alaska harvest monitoring and traditional ecological knowledge projects funded in 2003.

		Cost ($000)		
Project #	Title	2003	2004	2005
03-016	Selawik River Harvest of Spring & Fall Fish	$45	$0	$0
Total		$45	$0	$0

Yukon River region stock status and trends projects funded in 2003.

Project #	Title	Cost ($000) 2003	2004	2005
00-023	Migration Patterns and Critical Habitats of Radio-Tagged Humpback Whitefish in the Upper Tanana River Drainage	$43	$0	$0
00-025	Abundance and Run Timing of Adult Salmon in the Henshaw Creek, Kanuti NWR	$74	$0	$0
03-009	Abundance and Run Timing of Adult Salmon in the Tozitna River	$27	$0	$0
03-013	Abundance and Run Timing of Adult Salmon in the Gisasa River, Koyukuk NWR	$70	$0	$0
03-034	East Fork Andreafski River Weir	$53	$0	$0
03-038	Yukon River Sub-district 5-A Test Fishwheel Project	$33	$0	$0
Total		$300	$0	$0

Yukon River region harvest monitoring and traditional ecological knowledge projects funded in 2003.

Project #	Title	Cost ($000) 2003	2004	2005
00-022	Hooper Bay Subsistence Salmon Monitoring Project	$26	$0	$0
03-015	Phenotypic Characterization of Chinook Salmon in the Subsistence Harvest	$18	$0	$0
Total		$44	$0	$0

2003 Fisheries Resource Monitoring Plan

Kuskokwim River region stock status and trends projects funded in 2003.

Project #	Title	Cost ($000) 2003	2004	2005
00-007	Tatlawiksuk River Weir Operations	$87	$0	$0
00-019	Kwethluk River Weir	$112	$0	$0
00-027	Extend Goodnews Weir Operations to Count Coho Salmon	$27	$0	$0
01-117	Kuskokwim Salmon Age-Sex-Length Assessment	$37	$0	$0
03-030	Kuskokwim River Chum, Sockeye, and Coho Salmon Stock Assessment	$50	$0	$0
03-041	Preliminary Assessment of Genetic Variation Among Coho Salmon Populations	$39	$0	$0
03-931[a]	KFRC - BSFA Partnership to Develop Gap Analysis and Science Plan for Salmon Resources - Kuskokwim Region	$55	$0	$0
Total		$407	$0	$0

[a] Approved as an out-of-cycle project by OSM.

Southwest Alaska stock status and trends projects funded in 2003.

Project #	Title	Cost ($000) 2003	2004	2005
00-032	Stock Assessment of Sockeye Salmon from the Buskin River	$58	$0	$0
01-095	Escapement Estimates and Population Monitoring of Lake Clark Sockeye Salmon	$77	$0	$0
03-043[a]	Estimation of Coho Salmon Escapement in Streams Adjacent to Perryville, Alaska Peninsula NWR	$0	$11	$11
03-046	Fisheries Biotechnician Training Program	$22	$0	$0
03-047	Stock Assessment of Afognak Lake Sockeye Salmon	$38	$0	$0
Total		$195	$11	$11

[a] Work will not start until October 2003, no funds projected for FY2003.

Southcentral Alaska stock status and trends projects funded in 2003.

Project #	Title	Cost ($000) 2003	2004	2005
00-013	Abundance and Run Timing of Adult Salmon in Tanada Creek; Evaluation of Lake Productivity of Tanada Lake	$60	$0	$0
03-001	Stock Status and Population Biology of the Copper River Steelhead	$61	$0	$0
03-033	Stock Assessment of Salmon in Billy's Hole Lake, Prince William Sound	$163	$80	$0
Total		$284	$80	$0

Southcentral Alaska harvest monitoring and traditional ecological knowledge projects funded in 2003.

Project #	Title	Cost ($000) 2003	2004	2005
03-010	GIS Atlas of Customary and Traditional Subsistence Fish Harvests in the Upper Copper River	$55	$0	$0
03-045	Cook Inlet Customary and Traditional Subsistence Fisheries Assessment	$110	$0	$0
Total		$165	$0	$0

Southeast Alaska stock status and trends projects funded in 2003.

Project #	Title	Cost ($000) 2003	2004	2005
01-125	Investigation Plan for Falls, Gut Bay, and Kutlaku Lakes (Kake Tri-Lake) Subsistence Sockeye Salmon Stock Escapement	$137	$0	$0
01-128[a]	Klag Bay Subsistence Sockeye Stock Assessment Project	$82	$0	$0
03-007	Eek Lake Sockeye Salmon Stock Assessment	$58	$0	$0
Total		$277	$0	$0

[a] The FRMP will fund one-half of the total cost of these projects in FY03. The remaining money will be provided by the Southeast Sustainable Salmon Fund.

	FY 2003		
Study	FRMP	SE SSF	TOTAL
01-125	$137.1	$138.0	$275.1
01-128	$81.5	$83.2	$164.7

Southeast Alaska harvest monitoring and traditional ecological knowledge projects funded in 2003.

Project #	Title	Cost ($000) 2003	2004	2005
01-105	Klawock River and Sarkar Lake Sockeye Salmon Harvest Use Patterns; Addition of *Prince of Wales Island Steelhead/Rainbow Trout Harvest Use Patterns* to Study	$40	$0	$0
Total		$40	$0	$0

2002 Fisheries Resource Monitoring Program

Number of projects funded for the 2002 Fisheries Resource Monitoring Plan. Project type includes stock status and trends (SST) and harvest monitoring and traditional ecological knowledge (HM-TEK).

Geographic Region	SST	HM-TEK	Total
Northern	1	3	4
Yukon River	4	4	8
Kuskokwim River	1	1	2
Southwest	2	2	4
Southcentral	1	3	4
Southeast	2	3	5
Inter-regional	1	1	2
Total	12	17	29

Cost of projects funded for the 2002 Fisheries Resource Monitoring Plan. Project type includes stock status and trends (SST) and harvest monitoring and traditional ecological knowledge (HM TEK).

	Cost ($000)		
Geographic Region	SST	HM-TEK	Total
Northern	$20	$182	$202
Yukon River	$252	$128	$379
Kuskokwim River	$177	$15	$192
Southwest	$68	$122	$191
Southcentral	$229	$98	$327
Southeast	$273	$151	$424
Inter Regional	$32	$28	$59
Total	$1,051	$723	$1,774

Northern Alaska stock status and trends projects funded in 2002.

Project #	Title	Cost ($000) 2002	2003	2004
02-020	Pitmiktalik River Salmon Counting Site Surveys	$20	$0	$0
Total		$20	$0	$0

Northern Alaska harvest monitoring and traditional ecological knowledge projects funded in 2002.

Project #	Title	Cost ($000) 2002	2003	2004
02-023	*Qaluich Nigingnaqtuat:* Fish That We Eat	$48	$0	$0
02-040	Traditional Ecological Knowledge of Whitefish in Kotzebue Sound	$66	$66	$0
02-050	Anaktuvuk Pass Subsistence Fish Harvest Assessment	$68	$67	$15
Total		$182	$133	$15

Yukon River region stock status and trends projects funded in 2002.

Project #	Title	Cost ($000) 2002	2003	2004
02-009	Technician Support for Pilot Station Sonar	$20	$0	$0
02-011	Delayed Mortality of Tagged Fall Chum Salmon	$45	$0	$0
02-097	Sex-ratios of Juvenile and Adult Chinook Salmon in the Kuskokwim and Yukon Rivers	$14	$12	$0
02-121	Run Timing, Migratory Patterns, and Harvest Information of Chinook Salmon Stocks within the Yukon River	$173	$228	$160
Total		$252	$240	$160

Yukon River region harvest monitoring and traditional ecological knowledge projects funded in 2002.

Project #	Title	Cost ($000) 2002	2003	2004
02-006	Monitoring Subsistence Harvest of Fishes from Old John Lake, Arctic Village	$47	$0	$0
02-037	Harvest Monitoring and Traditional Ecological Knowledge of Subsistence Non-Salmon Fish in the Lower Yukon River	$60	$150	$89
02-084	Review of Oral History Tapes on the Traditional Ecological Knowledge of Subsistence Harvests and Fishes, Old John Lake and Surrounding Water Bodies, Arctic Village, Alaska	$9	$0	$0
02-122	Inseason Subsistence Harvest Assessment of Yukon River Chinook and Chum Salmon	$12	$0	$0
Total		$128	$150	$89

Kuskokwim River region stock status and trends projects funded in 2002.

Project #	Title	Cost ($000) 2002	2003	2004
02-046	Kuskokwim River Chinook Salmon Stock Assessment	$177	$71	$92
Total		$177	$71	$92

Kuskokwim River region harvest monitoring and traditional ecological knowledge projects funded in 2002.

Project #	Title	Cost ($000) 2002	2003	2004
02-036	Aniak Area Subsistence Fishery Post-Season Harvest Surveys	$15	$0	$0
Total		$15	$0	$0

Southwest Alaska stock status and trends projects funded in 2002.

Project #	Title	Cost ($000) 2002	2003	2004
02-098	Estimate Coho Salmon Escapement and Carrying Capacity in the Kametalook River, Alaska Peninsula NWR	$24	$34	$27
02-099	Estimation of Late Run Sockeye and Coho Salmon Escapement in the Clark River, Alaska Peninsula NWR	$44	$29	$8
Total		$68	$63	$35

Southwest Alaska harvest monitoring and traditional ecological knowledge projects funded in 2002.

Project #	Title	Cost ($000) 2002	2003	2004
02-032	Subsistence Fisheries Harvest Assessment and Traditional Ecological Knowledge, Lower Alaska Peninsula and Aleutian Islands	$91	$64	$0
02-034	Subsistence Fisheries Assessment: Kvichak River Watershed Resident Species	$31	$43	$0
Total		$122	$107	$0

Southcentral Alaska stock status and trends projects funded in 2002.

Project #	Title	Cost ($000) 2002	2003	2004
02-015	Migratory Timing and Spawning Distribution of Chinook Salmon in the Copper River	$229	$185	$185
Total		$229	$185	$185

Southcentral Alaska harvest monitoring and traditional ecological knowledge projects funded in 2002.

Project #	Title	Cost ($000) 2002	2003	2004
02-028	Chugach Region Resource Data Layers as a Template for Traditional Ecological Knowledge Delineation	$58	$29	$29
02-075	Eulachon Subsistence Harvest Opportunities	$25	$25	$0
02-077	Increasing GIS Capabilities in the Upper Copper River	$15	$0	$0
Total		$98	$54	$29

Southeast Alaska stock status and trends projects funded in 2002.

Project #	Title	Cost ($000) 2002	2003	2004
02-012	Neva Creek Sockeye Salmon Stock Assessment and Restoration	$72	$76	$80
02-017	Redfish Bay/Tumakof Lake Sockeye Salmon Stock Assessment	$201	$192	$201
Total		$273	$268	$281

Southeast Alaska harvest monitoring and traditional ecological knowledge projects funded in 2002.

Project #	Title	Cost ($000) 2002	2003	2004
02-038	Southeast Alaska Subsistence GIS Database	$40	$40	$0
02-049	Wrangell Subsistence Salmon Harvest Use Pattern	$31	$34	$0
02-104	Hoonah and Klawock Salmon Survey s	$80	$25	$0
Total		$151	$99	$0

Alaska Interregional stock status and trends projects funded in 2002.

		Cost ($000)		
Project #	Title	2002	2003	2004
02-069	Develop Shared AYK Fishery Database	$32	$0	$0
Total		$32	$0	$0

Alaska Interregional harvest monitoring and traditional ecological knowledge projects funded in 2002.

		Cost ($000)		
Project #	Title	2002	2003	2004
02-043	Alaska Subsistence Fisheries Database GIS Integration	$28	$0	$0
Total		$28	$0	$0

2001 Fisheries Resource Monitoring Plan

Number of projects funded for the 2001 Fisheries Resource Monitoring Plan. Project type includes stock status and trends (SST) and harvest monitoring and traditional ecological knowledge (HM-TEK).

Geographic Region	SST	HM-TEK	Total
Northern	3	2	5
Yukon River	14	8	22
Kuskokwim River	9	9	18
Southwest	5	4	9
Southcentral	3	3	6
Southeast	6	4	10
Inter Regional	1	3	4
Total	41	33	74

Cost of projects funded for the 2001 Fisheries Resource Monitoring Plan. Project type includes stock status and trends (SST) and harvest monitoring and traditional ecological knowledge (HM-TEK).

	Cost ($000)		
Geographic Region	SST	HM-TEK	Total
Northern	$596	$169	$765
Yukon River	$1,094	$428	$1,522
Kuskokwim River	$1,462	$414	$1,876
Southwest	$564	$264	$828
Southcentral	$564	$166	$730
Southeast	$817	$198	$1,015
Inter Regional	$107	$456	$563
Total	$5,204	$2,095	$7,299

Northern Alaska stock status and trends projects funded in 2001.

Project #	Title	Cost ($000) 2001	2002	2003
01-113	Eastern North Slope Dolly Varden Genetic Stock Identification and Stock Assessment	$254	$463	$35
01-136 [a]	Northwestern Alaska Dolly Varden and Arctic Char Genetics	$123	$41	$0
01-137 [b]	Northwestern Alaska Dolly Varden Spawning Stock Assessment	$219	$341	$0
Total		$596	$845	$35

Northern Alaska harvest monitoring and traditional ecological knowledge projects funded in 2001.

Project #	Title	Cost ($000) 2001	2002	2003
01-101 [c]	Eastern North Slope (Kaktovik) Subsistence Fish Harvest	$134	$0	$0
01-224	Nome Sub-district Subsistence Salmon Survey	$35	$35	$0
Total		$169	$35	$0

[a] FY 2001 funding total includes support for two years of activity for the ADF&G portion and one year of activity for the USFWS portion of study 01-136. Actual budget will decrease with requested removal of work on Arctic char in lakes from this study.

[b] FY 2001 funding total includes full support for the first and partial support for the second year of activity.

[c] FY 2001 funding total includes support for two years of activity.

Yukon River region stock status and trends projects funded in 2001.

Project #	Title	Cost ($000) 2001	2002	2003
01-018	Pilot Station Sonar Technician Support	$13	$0	$0
01-026	East Fork Andreafsky River Weir	$31	$68	$0
01-029	Nulato River Weir	$21	$31	$31
01-032	Rampart Rapids Tagging Study	$100	$100	$100
01-038	Kateel River Weir	$125	$60	$25
01-048	Innoko River Drainage Weir Site Survey	$6	$0	$0
01-050	Kaltag Middle Yukon River Chinook Salmon Sampling	$1	$0	$0
01-058	East Fork Andreafsky River Weir Replacement Panels	$35	$0	$0
01-122	Lower Yukon Cooperative Salmon Drift Test Fishing	$134	$187	$33
01-140	Yukon Flats Northern Pike	$292	$55	$30
01-177	Rampart Rapids Tagging Extension I	$211	$170	$173
01-197	Rampart Rapids Summer CPUE Video Monitor	$36	$14	$14
01-200	Effects of *Ichthyophonus* Yukon River Chinook Salmon	$89	$88	$0
01-238 [a]	Working Group on Subsistence/Recreational User Conflicts in Grayling-Anvik-Shagaluk-Holy Cross (GASH) Area	$0	$17	$0
Total		$1,094	$790	$406

Yukon River region harvest monitoring and traditional ecological knowledge projects funded in 2001.

Project #	Title	Cost ($000) 2001	2002	2003
01-003	Traditional Ecological Knowledge of Old John Lake Near Arctic Village, Alaska	$52	$0	$0
01-011	Monitoring Subsistence Harvest of Fishes from Old John Lake, Arctic Village, Alaska	$33	$0	$0
01-014 [b]	Salmon Management Teleconferences	$11	$5	$5
01-015	Yukon River Salmon Traditional Ecological Knowledge	$53	$0	$0
01-100 [c]	Traditional Ecological Knowledge and Contemporary Subsistence Uses of Non-salmon Fish in the Koyukuk River	$205	$0	$0
01-199	Tanana Fisheries Conservation Outreach	$9	$9	$9
01-211	Upper Yukon, Porcupine, and Black River Salmon Traditional Ecological Knowledge Evaluation	$65	$0	$0
01-238 [a]	Working Group on Subsistence/Recreational User Conflicts in Grayling-Anvik-Shagaluk-Holy Cross (GASH) Area	$0	$17	$0
Total		$428	$31	$14

[a] Councils recommended using both stock status and trends funding and harvest monitoring and TEK funding from this region tc support a working group to resolve subsistence-recreational user conflicts in GASH area.

[b] 01-014 Approved as an out-of-cycle project by OSM.

[c] FY 2001 funding total includes support for three-years of activity.

Kuskokwim River region stock status and trends projects funded in 2001.

Project #	Title	Cost ($000) 2001	2002	2003
01-052	Whitefish Studies in Whitefish Lake	$147	$120	$128
01-053	Tuluksak River Weir	$200	$130	$138
01-070	Genetic Diversity of Kuskokwim Chinook Salmon	$125	$164	$10
01-086	Kuskokwim River Sonar Project Technician	$14	$14	$14
01-088 [a]	Natural Resource Internship Program	$97	$0	$0
01-116	Kuskokwim River Salmon Working Group Support	$21	$104	$0
01-117	Stock Assessment Research Capacity Building	$57	$98	$37
01-118	Kanektok River Weir	$123	$132	$130
01-141 [a,b]	Holitna River Salmon Escapement Monitoring	$678	$0	$0
Total		$1,462	$762	$457

Kuskokwim River region harvest monitoring and traditional ecological knowledge projects funded in 2001.

Project #	Title	Cost ($000) 2001	2002	2003
01-019	Four Sub-Regional Planning Session Meetings in the AVCP Region	$47	$0	$0
01-023	Upper Kuskokwim Inseason Subsistence Salmon Harvest Data and Chinook ASL Collection	$21	$31	$12
01-024	Bethel Area Post-Season Subsistence Salmon Harvest Household Surveys	$32	$32	$32
01-112	Aniak River Subsistence Fishery Studies	$66	$52	$0
01-132	Bethel Area In-season Subsistence Salmon Harvest Data Collection	$46	$55	$38
01-147	Survey of Sport Fisheries in the Aniak River	$114	$0	$0
01-225	Middle Kuskokwim Inseason Subsistence Salmon Data Collection	$47	$46	$38
01-226	Subsistence Fisheries Research Capacity Building	$32	$48	$0
01-235	Lake Minchumina, Telida, and Nikolai Community Fisheries Harvest Assessment Program	$9	$20	$0
Total		$414	$284	$120

[a] FY 2001 funding total includes support for three years of activity.

[b] Investigator added $25.0 per year to original study 01-141 budget for chum salmon monitoring at request of Technical Review Committee.

Southwest Alaska stock status and trends projects funded in 2001.

Project #	Title	Cost ($000) 2001	2002	2003
00-042 [a]	Population Assessment of Lake Clark Sockeye Salmon	$129	$0	$0
01-059	Estimation of Sockeye Salmon Escapement into McLees Lake, Unalaska Island	$89	$77	$81
01-095	Escapement Estimates for Lake Clark Sockeye Salmon	$117	$112	$0
01-204	Estimation of Coho Salmon Escapement in the Ugashik Lakes System, Alaska Peninsula Refuge	$108	$107	$111
01-206	Estimation of Sockeye and Coho Salmon Escapement in Mortenson Creek, Izembek National Wildlife Refuge	$121	$86	$84
Total		$564	$382	$276

Southwest Alaska harvest monitoring and traditional ecological knowledge projects funded in 2001.

Project #	Title	Cost ($000) 2001	2002	2003
01-047	Togiak River Subsistence Harvest Monitoring	$59	$45	$45
01-075	Collection of Traditional Ecological Knowledge on Sockeye Salmon Harvest Patterns in Nondalton, Alaska	$32	$0	$0
01-109	Traditions, Knowledge and Customs of the Alaska Peninsula/Becharof National Wildlife Refuge Complex and Naknek River Subsistence	$40	$70	$0
01-173 [b]	Harvest Assessment of the Recreational Fishery for Salmon in the Alagnak River	$133	$0	$0
Total		$264	$115	$45

[a] Approved for continued funding in FY 2001.

[b] FY 2001 funding total includes support for two years of activity.

Southcentral Alaska stock status and trends projects funded in 2001.

Project #	Title	Cost ($000) 2001	2002	2003
01-020	Feasibility of Monitoring Chinook Salmon Escapement in Copper River	$238	$299	$241
01-021	Develop Inseason Abundance Estimate in Lower Copper River	$158	$180	$172
01-148	Stock Status of Copper River Steelhead	$168	$129	$0
Total		$564	$608	$413

Southcentral Alaska harvest monitoring and traditional ecological knowledge projects funded in 2001.

Project #	Title	Cost ($000) 2001	2002	2003
01-035	Copper River Steelhead Harvest Monitoring	$9	$9	$9
01-110 [a]	Harvest and Use of Non-Salmon Fish in the Copper River	$121	$47	$39
01-217	Workshop to Build Capacity Among Copper River Groups	$36	$0	$0
Total		$166	$56	$48

[a] Study 01-096, Upper Copper River Drainage Mapping, was combined with study 01-110.

Southeast Alaska stock status and trends projects funded in 2001.

Project #	Title	Cost ($000) 2001	2002	2003
01-125	Gut, Kook, Hoktaheen Lakes Sockeye Salmon Escapement	$160	$141	$0
01-127	Thoms, Salmon Bay, Luck Lakes Sockeye Salmon Escapement Monitoring	$130	$115	$119
01-128	Klag Bay Sockeye Salmon Stock Assessment	$153	$149	$0
01-130	Hetta Lake Sockeye Salmon Stock Assessment	$72	$74	$78
01-175	Salmon Lake Sockeye and Coho Salmon Stock Assessment	$198	$152	$170
01-179	Virginia Lake Sockeye Salmon Escapement Monitoring	$104	$81	$87
Total		$817	$712	$454

Southeast Alaska harvest monitoring and traditional ecological knowledge projects funded in 2001.

Project #	Title	Cost ($000) 2001	2002	2003
01-091	East Alsek River Salmon Historical Use and Traditional/Local Knowledge	$25	$0	$0
01-103	Continuing Management and Development of Southeast Subsistence Fisheries GIS Database	$29	$0	$0
01-104	Kake Subsistence Sockeye Salmon Harvest Use Patterns	$71	$0	$0
01-105	Klawock River and Sarkar Lake Sockeye Salmon Harvest Use Patterns	$73	$0	$0
Total		$198	$0	$0

Alaska Interregional stock status and trends projects funded in 2001.

Project #	Title	Cost ($000) 2001	2002	2003
01-154	Fisheries Data Indentification and Access	$107	$0	$0
Total		$107	$0	$0

Alaska Interregional harvest monitoring and traditional ecological knowledge projects funded in 2001.

Project #	Title	Cost ($000) 2001	2002	2003
01-010	Regulatory History of Yukon-Kuskokwim Subsistence Salmon Fisheries Regulations	$33	$3	$0
01-106 [a]	Methods	$161	$0	$0
01-107 [a]	Implementation of Statewide Subsistence Fisheries Harvest Asssessment Strategy	$262	$0	$46
Total		$456	$3	$46

[a] FY 2001 funding total includes support for two years of activity.

2000 Fisheries Resource Monitoring Plan

Number of projects funded for the 2000 Fisheries Resource Monitoring Plan. Project type includes stock status and trends (SST) and harvest monitoring and traditional ecological knowledge (HM-TEK).

Geographic Region	SST	HM-TEK	Total
Northern	2	1	3
Yukon	9	2	11
Kuskokwim	6	2	8
Southwest	5	2	7
Southcentral	4	2	6
Southeast	2	2	4
Inter-regional	1	1	2
Total	29	12	41

Cost of projects funded for the 2000 Fisheries Resource Monitoring Plan. Project type includes stock status and trends (SST) and harvest monitoring and traditional ecological knowledge (HM-TEK).

	Cost ($000)		
Geographic Region	SST	HM-TEK	Total
Northern	$93	$70	$163
Yukon	$480	$69	$549
Kuskokwim	$301	$56	$357
Southwest	$177	$82	$259
Southcentral	$200	$210	$410
Southeast	$296	$198	$494
Inter-regional	$28	$207	$235
Total	$1,575	$892	$2,467

Northern Alaska stock status and trends projects funded in 2000.

Project #	Title	Cost ($000) 2000	2001	2002
00-001	NW Alaska Char Stock Identification	$51	$41	$0
00-002	E. North Slope Char Abundance and Distribution	$42	$0	$0
Total		$93	$41	$0

Northern Alaska harvest monitoring and traditional ecological knowledge projects funded in 2000.

Project #	Title	Cost ($000) 2000	2001	2002
00-020	Kotzebue Winter Sheefish Harvest	$70	$0	$0
Total		$70	$0	$0

2000 Fisheries Resource Monitoring Plan

Yukon River region stock status and trends projects funded in 2000.

Project #	Title	Cost ($000) 2000	2001	2002
00-003	Effects of *Ichthyophonus* on Chinook Salmon	$83	$0	$0
00-004	Humpback Whitefish/Beaver Interactions	$46	$0	$0
00-005	Tanana River - Upper Kantishna River Wheel	$12	$11	$0
00-018	Pilot Station Sonar Technology Upgrade and Study	$149	$163	$0
00-021	Dall River Northern Pike Studies	$24	$0	$0
00-022	Hooper Bay Test Fishing	$30	$27	$32
00-023	Humpback Whitefish in Upper Tanana	$60	$41	$41
00-024	Pilot Station Staff Support	$16	$0	$0
00-025	Henshaw Creek Salmon Weir	$60	$60	$60
Total		$480	$302	$133

Yukon River region harvest monitoring and traditional ecological knowledge projects funded in 2000.

Project #	Title	Cost ($000) 2000	2001	2002
00-006	Traditional Ecological Knowledge of Beaver/Whitefish Interactions	$39	$0	$0
00-026	Traditional Ecological Knowledge of Salmon and Other Fish in Circle and Eagle	$30	$0	$0
Total		$69	$0	$0

Kuskokwim River region stock status and trends projects funded in 2000.

Project #	Title	Cost ($000) 2000	2001	2002
00-007	Tatlawiksuk River Weir Operations	$30	$30	$30
00-019	Kwethluk River Weir	$205	$113	$117
00-027	Extend Goodnews River Weir Operations	$25	$25	$25
00-028	Extend Kanektok River Weir Operations	$3	$2	$0
00-029	Documentation/Communication on Floating Weirs	$11	$0	$0
00-030	Kuskokwim Salmon Project Site Surveys	$27	$0	$0
Total		$301	$170	$172

Kuskokwim River region harvest monitoring and traditional ecological knowledge projects funded in 2000.

Project #	Title	Cost ($000) 2000	2001	2002
00-008	Bethel Inseason Subsistence Harvest Data	$24	$0	$0
00-009	Bethel Postseason Harvest Monitoring	$32	$0	$0
Total		$56	$0	$0

2000 Fisheries Resource Monitoring Plan

Southwest Alaska stock status and trends projects funded in 2000.

Project #	Title	Cost ($000) 2000	2001	2002
00-010	Togiak River Salmon Weir	$16	$50	$50
00-011	Stock Identification of Togiak River Char	$27	$8	$0
00-031	Alagnak River Sockeye Salmon Escapement	$38	$119	$119
00-032	Sockeye Salmon Escapement in the Buskin River	$18	$90	$40
00-042	Population Assessment of Lake Clark Sockeye Salmon	$78	$0	$0
Total		$177	$267	$209

Southwest Alaska harvest monitoring and traditional ecological knowledge projects funded in 2000.

Project #	Title	Cost ($000) 2000	2001	2002
00-012	Traditional Ecological Knowledge of Fish in Bristol Bay Area	$40	$0	$0
00-033	Alagnak River Fishing Effort Estimates	$42	$0	$0
Total		$82	$0	$0

Southcentral Alaska stock status and trends projects funded in 2000.

Project #	Title	Cost ($000) 2000	2001	2002
00-013	Abundance/Timing of Salmon in Tanada Creek	$46	$45	$44
00-034	Miles Lake Sonar Improvement	$90	$0	$0
00-035	Extend Coghill Lake Escapement Weir Operations	$25	$26	$27
00-038	Extend Cooper Creek Weir	$39	$0	$0
Total		$200	$71	$71

Southcentral Alaska harvest monitoring and traditional ecological knowledge projects funded in 2000.

Project #	Title	Cost ($000) 2000	2001	2002
00-040	Copper River Subsistence Salmon Fishery Evaluation	$160	$0	$0
00-041	Eulachon Subsistence Use	$50	$62	$34
Total		$210	$62	$34

2000 Fisheries Resource Monitoring Plan

Southeast Alaska stock status and trends projects funded in 2000.

Project #	Title	Cost ($000) 2000	2001	2002
00-043	Klawock Lake Sockeye Salmon Stock Assessment	$164	$198	$208
00-044	Falls Lake Sockeye Salmon Stock Assessment	$132	$140	$146
Total		$296	$338	$354

Southeast Alaska harvest monitoring and traditional ecological knowledge projects funded in 2000.

Project #	Title	Cost ($000) 2000	2001	2002
00-015	Subsistence Fishery Database Development	$48	$0	$0
00-045	Traditional Subsistence Territory Mapping of Southeast Tribes	$150	$150	$150
Total		$198	$150	$150

Alaska Interregional stock status and trends projects funded in 2000.

		Cost ($000)		
Project #	Title	2000	2001	2002
00-016	Information Access of AYK Fishery Data	$28	$35	$0
Total		$28	$35	$0

Alaska Interregional harvest monitoring and traditional ecological knowledge projects funded in 2000.

		Cost ($000)		
Project #	Title	2000	2001	2002
00-017	Statewide Subsistence Harvest Strategy	$207	$0	$0
Total		$207	$0	$0