

2006  
FISHERIES  
RESOURCE MONITORING PLAN



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FEDERAL SUBSISTENCE MANAGEMENT

## **C O N T E N T S**

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## 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-agency 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.

Region	\$ Values in 1,000's		\$ Values in 1,000's		\$ Values in 1,000's			
	Dept of the Interior %	\$	Dept of Agriculture %	\$	%	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
<b>TOTALS</b>	<b>100.0%</b>	<b>\$1,101</b>	<b>100.0%</b>	<b>\$149</b>	<b>100.0%</b>	<b>\$1,250</b>	<b>\$833</b>	<b>\$417</b>

### 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.

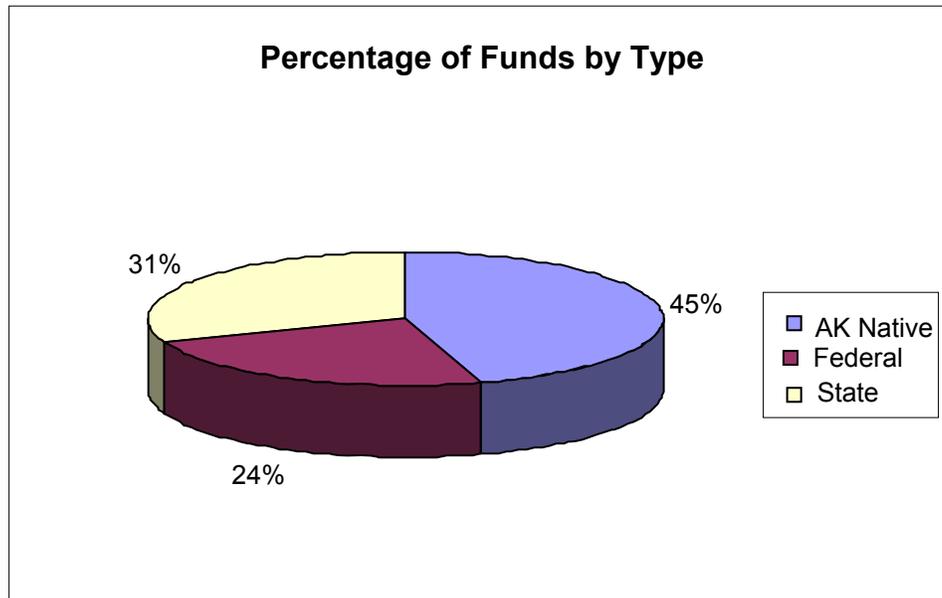


Figure 1. Percent of 2006 funding distributed to Alaska Native, Federal, State, and other organizations.

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
<b>Total</b>	<b>11</b>	<b>4</b>	<b>15</b>

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).

Geographic Region	Cost (\$000)		Total
	SST	HM-TEK	
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
<b>Total</b>	<b>\$759</b>	<b>\$344</b>	<b>\$1,103</b>

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

Summary Tables

Interregional Alaska stock status and trends project funded in 2006.

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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

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**06-101****Pikmiktalik River Chum Salmon Enumeration and Sampling****Geographic Area:** Northern Region**Information Type:** Stock Status and Trends

**Principal Investigator:** Karen Dunmall  
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**Co-Investigator:** Timothy Kroeker, Kawerak Incorporated  
 Natural Resources Division

<b>Cost:</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
	\$ 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

## Northern Region

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

<b>Cost:</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
	\$ 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

Northern Region

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  
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<b>Cost:</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
	\$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

Yukon Region

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. McSweeney, Bureau of Land Management  
 Wennona Brown, Yukon Flats, Kanuti, and Arctic NWRs  
 Bruce Thomas, Council of Athabaskan Tribal Governments  
 Caroline Brown, ADFG, Subsistence Division

<b>Cost:</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
	\$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

<b>Cost:</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
	\$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 Loudon 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

<b>Cost:</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
	\$ 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

## Kuskokwim Region

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  
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<b>Cost:</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
	\$ 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.

## Kuskokwim Region

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, Orutsarmiut Native Council  
 Doug Bue, ADFG, Division of Commercial Fisheries

<b>Cost:</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
	\$ 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

<b>Cost:</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
	\$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, Orutsarmuit 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

<b>Cost:</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>
	\$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  
 Native Village of Eyak  
 Cordova, AK  
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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

<b>Cost:</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
	\$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

<b>Cost:</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
	\$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

<b>Cost:</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
	\$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

<b>Cost:</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
	\$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

<b>Cost:</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>
	\$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);

## Inter-regional

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.