

Regional Information Report No. 3A11-07

**A Program for Improving Fisheries Management and
Research in the Arctic-Yukon-Kuskokwim (AYK)
Region**

by

Jan M. Conitz

October 2011

Alaska Department of Fish and Game

Division of Commercial Fisheries



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Weights and measures (metric)		General		Mathematics, statistics	
centimeter	cm	Alaska Administrative Code	AAC	<i>all standard mathematical signs, symbols and abbreviations</i>	
deciliter	dL	all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.	alternate hypothesis	H_A
gram	g	all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.	base of natural logarithm	e
hectare	ha	at	@	catch per unit effort	CPUE
kilogram	kg	compass directions:		coefficient of variation	CV
kilometer	km	east	E	common test statistics	(F, t, χ^2 , etc.)
liter	L	north	N	confidence interval	CI
meter	m	south	S	correlation coefficient	
milliliter	mL	west	W	(multiple)	R
millimeter	mm	copyright	©	correlation coefficient (simple)	r
		corporate suffixes:		covariance	cov
Weights and measures (English)		Company	Co.	degree (angular)	$^\circ$
cubic feet per second	ft ³ /s	Corporation	Corp.	degrees of freedom	df
foot	ft	Incorporated	Inc.	expected value	E
gallon	gal	Limited	Ltd.	greater than	>
inch	in	District of Columbia	D.C.	greater than or equal to	≥
mile	mi	et alii (and others)	et al.	harvest per unit effort	HPUE
nautical mile	nmi	et cetera (and so forth)	etc.	less than	<
ounce	oz	exempli gratia	e.g.	less than or equal to	≤
pound	lb	(for example)		logarithm (natural)	ln
quart	qt	Federal Information Code	FIC	logarithm (base 10)	log
yard	yd	id est (that is)	i.e.	logarithm (specify base)	log ₂ , etc.
		latitude or longitude	lat. or long.	minute (angular)	'
Time and temperature		monetary symbols (U.S.)	\$, ¢	not significant	NS
day	d	months (tables and figures): first three letters	Jan, ..., Dec	null hypothesis	H_0
degrees Celsius	°C	registered trademark	®	percent	%
degrees Fahrenheit	°F	trademark	™	probability	P
degrees kelvin	K	United States (adjective)	U.S.	probability of a type I error (rejection of the null hypothesis when true)	α
hour	h	United States of America (noun)	USA	probability of a type II error (acceptance of the null hypothesis when false)	β
minute	min	U.S.C.	United States Code	second (angular)	"
second	s	U.S. state	use two-letter abbreviations (e.g., AK, WA)	standard deviation	SD
Physics and chemistry				standard error	SE
all atomic symbols				variance	
alternating current	AC			population	Var
ampere	A			sample	var
calorie	cal				
direct current	DC				
hertz	Hz				
horsepower	hp				
hydrogen ion activity (negative log of)	pH				
parts per million	ppm				
parts per thousand	ppt, ‰				
volts	V				
watts	W				

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ABSTRACT

The Arctic-Yukon-Kuskokwim (AYK) region covers a vast area encompassing the entire drainage areas of the Yukon and Kuskokwim Rivers and northern rivers and coastal waters of the Bering, Chukchi, and Beaufort Seas. The region is characterized by small villages within the traditional territories of Inupiaq, Yup'ik, and Athabascan people, whose residents depend today, as they have for countless generations, on subsistence fishing for a major portion of their livelihood. Throughout more recent history, commercial fisheries for salmon, crab, whitefish, and other species also sustain local economies and are economically intertwined with subsistence fisheries for many families. Fisheries management in this region is extremely challenging due to the mixed stock origin of most fisheries, the remoteness, complexity, and vast size of the major river drainages, U.S./Canada Treaty agreements for the Yukon River, and the interdependence of subsistence and commercial fisheries. The suite of proposed projects in this report would provide necessary research and support management activities within the region. For the Arctic area, five salmon projects, one crab-related project, and two general management support projects are proposed. For the Yukon area, four research projects are proposed to improve understanding of chum and coho salmon, whitefish, and lamprey populations important for commercial and subsistence fisheries. For the Kuskokwim area, 13 projects for salmon and whitefish assessments and two general support projects are proposed, many of which would extend ongoing research and management activities in need of more stable sources of funding.

Key words Yukon River, Kuskokwim River, Kuskokwim Bay, Norton Sound, Port Clarence, Kotzebue Sound, AYK region, subsistence fishery, commercial fishery, test fishery, fisheries management, Pacific salmon, whitefish, lamprey, weir, radiotelemetry, age-sex-length, ASL, federal funding, state funding.

INTRODUCTION

The Arctic-Yukon-Kuskokwim (AYK) region encompasses the coastal waters of, and rivers and streams draining into, the Bering, Chukchi, and Beaufort Seas. This vast area extends from Cape Newenham, at the boundary of the Bristol Bay area, to the Canadian border on the Arctic Ocean and inland. The entire U.S. drainage area of the Yukon River and its tributaries, including the Koyukuk, Tanana, and Porcupine Rivers; the entire Kuskokwim River drainage, which extends from the Alaska Range near Mt. McKinley to the Bering Sea; and the large rivers of northwestern Alaska flow through this region. Outside the population centers of Fairbanks, Nome, and Bethel, this is a remote region characterized by small villages only accessible by air or water. These villages are within the traditional territories of Athabascan, Yup'ik, and Inupiaq people, who have relied on the region's fish, wildlife, and marine mammal resources for countless generations. Subsistence fishing still predominates throughout the region, and is economically intertwined with commercial fisheries for most rural village residents. In both subsistence and commercial fisheries, salmon are the largest resource, followed by crab, whitefish, and herring (State of Alaska, Department of Fish and Game (ADF&G) website, <http://www.adfg.alaska.gov/index.cfm?adfg=fishingCommercialByArea.interior>).

ARCTIC AREA

The Arctic area includes Norton Sound, Port Clarence, and Kotzebue Sound and encompasses all waters from Point Romanof, in southern Norton Sound, to Point Hope, as well as St. Lawrence Island. This area of over 65,000 square miles has a coastline longer than that of California, Oregon, and Washington combined. Approximately 16,000 people live in the area, in the hub communities of Nome and Kotzebue, or in one of over 26 small villages scattered along the coast and major river systems. The majority of these residents are Alaskan Natives of Inupiaq and St. Lawrence Island Yupik origin.

Commercial and subsistence fisheries in the area target five species of Pacific salmon (*Oncorhynchus* spp.), Pacific herring (*Clupea pallasii*), red and blue king crab (*Paralithodes camtschaticus* and *P. platypus*), inconnu or sheefish (*Stenodus leucichthys*), other whitefish

(*Coregonus* spp. and *Prosopium cylindraceus*), and Dolly Varden (*Salvelinus malma*). Other species harvested for subsistence and occasional commercial sale include northern pike (*Esox lucius*), Arctic grayling (*Thymallus arcticus*), burbot (*Lota lota*), saffron cod (*Eleginus gracilis*), rainbow smelt (*Osmerus mordax*), capelin (*Mallotus villosus*), Pacific halibut (*Hippoglossus stenolepis*), yellowfin sole (*Pleuronectes vetulus*), and flounders (*Platichthys* spp.). Of the salmon species, chum *O. keta* and pink *O. gorbuscha* are the most abundant, followed by coho *O. kisutch*, sockeye *O. nerka*, and Chinook *O. tshawytscha* salmon. Although Chinook, chum, and pink salmon are found as far north as Barrow, they are uncommon north of Kotzebue Sound (Menard et al. 2011).

Subsistence fishing is vital to the sustenance and livelihood of people throughout the area, as it has been for centuries. The importance of fishing to life in this area is illustrated in the archeological record dating to at least 2,000 years ago. As in the rest of the Arctic-Yukon-Kuskokwim region, subsistence and commercial fishing have historically been and continue to be economically interdependent for residents of the area. Salmon are harvested from small skiffs with hand-pulled gillnets or beach seines in the main rivers and in coastal marine waters. The major portion of fish taken during the summer months is air dried or smoked for later consumption by villagers or occasionally for their dogs. Other subsistence fish are harvested by jigging, longlining, or rod and reel fishing, throughout the year and through the ice in winter. Subsistence king crab fishing is conducted on the near-shore ice in winter, when fishermen travel by snow machine to set and retrieve crab pots or handlines, and to a much lesser extent by boat in open water in summer. In the 2009-2010 winter season, 90 subsistence permits were fished, and the total winter subsistence harvest was 6,421 red king crabs (J. Bell, Commercial Fisheries Biologist, ADF&G; personal communication).

Commercial salmon fisheries occur in coastal waters of the Norton Sound, Port Clarence, and Kotzebue districts, although fishing in Port Clarence has been very limited in recent years. All salmon fishing in the area is conducted from open skiffs with hand-pulled set gillnets. Low abundance of Chinook salmon returning to rivers in the area has prevented directed commercial fishing of this species since 2000. Currently, chum and coho salmon are the primary target species; pink salmon may be harvested depending on market availability, and sockeye salmon from the Pilgrim River and Salmon Lake system have been targeted in Port Clarence in years of sufficient abundance. Markets for commercially caught salmon have been sporadic in the area, but have been available to support commercial fisheries in recent years in Norton Sound and Kotzebue. The Norton Sound commercial crab fishery operates in waters to the south and southeast of Nome, in both a summer and a winter fishery. In the 2009-2010 winter season, 10 permits were fished and 4,834 red king crabs were harvested. In the 2010 summer season, 25 permits were fished and the total harvest was about 139,000 crabs (J. Bell, Commercial Fisheries Biologist, ADF&G; personal communication).

YUKON AREA

The Yukon Management Area encompasses the entire U.S. portion of the Yukon River drainage and coastal waters from Point Romanof, northeast of Kotlik, to the Naskonat Peninsula. The Yukon River is the largest river in Alaska and has the fifth largest drainage area in North America. Originating in British Columbia, Canada within 30 miles of the Gulf of Alaska, it flows over 2,300 miles to the Yukon Delta, where it splits into three mouths emptying into the Bering Sea. It drains an area of approximately 330,000 square miles, approximately 35% of the state.

The Yukon River drainage supports Chinook, chum, coho, pink, and sockeye salmon, although sockeye salmon are uncommon in this system. The chum salmon return consists of two temporally and genetically distinct populations: early (summer chum) and late (fall chum). Other species of freshwater fish occurring within the Yukon River drainage include whitefish and cisco, sheefish or inconnu *Stenodus leucichthys*, Arctic grayling, Arctic char *Salvelinus alpinus*, Alaska blackfish (*Dallia pectoralis*), burbot, and Arctic lamprey *Lampetra camtschatica*.

Human populations within the U.S. portion of Yukon River drainage include approximately 98,000 people living in and around Fairbanks, Alaska's second largest city, and approximately 22,000 people living in some 43 small, remote villages scattered along the river, its major tributaries, and the coastal area. The rural populations are predominately Alaska Native, the Yup'ik cultural group occupying the coast, Yukon Delta, and lower river areas, and several different Athabaskan cultural groups occupying the interior regions. Outside of the urban area of Fairbanks, most people in the Yukon Area depend on fish and game resources for a substantial part of their livelihoods.

Subsistence fishing activities are usually based from a fish camp or home community, with extended family groups often working together to harvest and process salmon for subsistence use. Permits are not required for subsistence fishing in more isolated areas outside of road systems, but are required for subsistence or personal use fishing in the Tanana River and parts of the Yukon River that are accessible by road. The area around Fairbanks is defined as a nonsubsistence area, where only personal use and sport fisheries are allowed. Participation and harvest in all subsistence and personal use fisheries are estimated by an intensive postseason survey program and returned permits. In 2010, approximately 1,500 households in the Yukon Area harvested over 44,000 Chinook, 88,000 summer chum, 71,000 fall chum, and 14,000 coho salmon (D. Jallen, Commercial Fisheries Biologist, ADF&G; personal communication).

Commercial salmon fishing is allowed along the entire 1,200 mile length of the mainstem Yukon River in Alaska and throughout the lower 225 miles of the Tanana River. Management of salmon stocks that spawn in the Canadian portion of the Yukon River drainage, primarily Chinook and fall chum salmon, is coordinated between the U.S. and Canada according to the Yukon River Salmon Agreement, an annex to the Pacific Salmon Treaty. The Yukon River Panel makes recommendations to management agencies in Alaska and Canada. Management of the Yukon River salmon fishery is complex due to the difficulty of determining stock specific abundance and timing, overlapping multi-species salmon runs, the increasing efficiency of the fishing fleet, U.S./Canadian management and Treaty negotiations, allocation issues, and the immense size of the Yukon River drainage. Salmon fisheries within the Yukon River drainage may harvest stocks that are up to several weeks and over a thousand miles from their spawning grounds. Since the Yukon River commercial fishery is a mixed stock fishery, some tributary populations may be under or over harvested in relation to their actual abundance.

In part due to conservation measures for fall chum stocks in 2010, Yukon fall fisheries in 2010 were below the average for the previous 10 years, 2000-2009. A total harvest of 2,550 fall chum salmon (U.S. portion of the drainage) yielded total sales of \$8,000 and a total harvest of 3,750 coho salmon yielded total sales of \$21,000, with 94 permit holders participating (ADF&G Division of Commercial Fisheries News Release dated October 20, 2010). Directed Chinook salmon fishing in the Yukon River has been strictly curtailed in recent years due to low abundance, and in 2011 even sale of incidentally caught Chinook salmon was prohibited through most of the season. The 2011 summer chum fishery, on the other hand, exceeded the average for 2001-2010. Most of the harvest was taken in the lower Yukon River (districts 1 and 2), where a preliminary total of 266,510 fish

was harvested by 403 permit holders and valued at \$3,221 per permit holder (preliminary estimate; ADF&G Division of Commercial Fisheries News Release dated September 30, 2011).

KUSKOKWIM AREA

The Kuskokwim Area includes the Kuskokwim River drainage basin and all waters of Alaska that flow into the Bering Sea between Cape Newenham and the Naskonat Peninsula, plus Nunivak and St. Matthew Islands. Large runs of Chinook salmon are prized in the subsistence fishery where they comprise the largest subsistence Chinook harvest in the state, and secondarily sockeye, chum, and coho salmon are also harvested for subsistence use. Commercial fisheries are targeted on Chinook, chum, sockeye, and coho salmon. Pink salmon are abundant but seldom targeted in either subsistence or commercial fisheries. Other fish resources utilized in the area include herring in marine waters and whitefish, inconnu or sheefish, and miscellaneous species including Dolly Varden and burbot in freshwater.

Approximately 17,000 people live in the area, including 6,080 in the hub community of Bethel, and the remainder in some 37 small villages scattered along the length of the river and its tributaries and the adjacent coastline. Alaska Natives, predominantly of Yup'ik origin, represent over 80% of the total population in the area. About 65% of Bethel residents are Alaska Native (Alaska Department of Commerce, Community, and Economic Development, Alaska Community Database, September 2011).

The subsistence salmon fishery in the Kuskokwim Area is one of the largest subsistence fisheries in the state and in North America (Bavilla et al. 2010). According to recent estimates, between 2,000 and 2,300 households in the Kuskokwim area annually harvest salmon for subsistence use, and many other households not directly involved in catching salmon assist family and friends with processing fish (Holly Carroll, Commercial Fisheries Biologist, ADF&G; personal communication). Subsistence harvests of whitefish occur year round, including some harvest in winter under the ice. Regulations do not limit the number of freshwater fish that may be harvested for subsistence, and harvest data for these species are only collected incidentally with salmon harvest surveys. Nearly all local residents depend to varying degrees on fish and game resources for their sustenance and livelihood.

Commercial salmon fishing is managed in four districts in the area: two in Kuskokwim Bay, Quinhagak (W-4), and Goodnews Bay (W-5), one in the lower Kuskokwim River (W-1), and one in the middle Kuskokwim River (W-2). In 2010, a total of 530 permit holders harvested 523,870 salmon, of which 43% were chum and 39% were sockeye salmon; the total ex-vessel value of the catch was \$2,894,590 (ADF&G Division of Commercial Fisheries News Release dated 7 October 2010). Management of the Kuskokwim Area salmon fishery is challenging because of the size and complexity of the Kuskokwim River system. Most fisheries within the Kuskokwim Area occur on overlapping, mixed-stock, and multi-species salmon runs that can be several weeks and hundreds of miles from their spawning grounds. As in other areas of the state, general fisheries management goals are to sustain production of the resource, maintain a subsistence priority, and allow harvest of remaining surpluses. Fishery schedules are designed as much as possible to distribute harvest over the runs and reduce the potential for over harvesting or under harvesting specific stocks or populations.

Kuskokwim Area commercial herring fisheries have been inactive in recent years, mainly because low prices and high operational costs have eliminated market interest in the area. ADF&G Division of Commercial Fisheries continued to monitor area herring stocks and issue

forecasts and outlooks through the 2011 season (e.g. ADF&G Division of Commercial Fisheries News Releases, 23 March 2010 and 16 October 2010). However, because of the lack of commercial activity in recent years, the Kuskokwim Area herring budget was cut in FY2012 to address budget shortfalls. Sporadic commercial fishing for whitefish occurs in the area, primarily for local markets through small scale local catcher-seller operations.

PROPOSED PROJECTS

The suite of proposed projects presented in this section would provide necessary research and support management activities in each management area. Additionally, one project is proposed to support salmon age determination throughout the region. For the Arctic area, five salmon projects, one crab-related project, and two general management support projects are proposed. For the Yukon area, four research projects are proposed to improve understanding of chum and coho salmon, whitefish, and lamprey populations important for commercial and subsistence fisheries. For the Kuskokwim area, 13 projects for salmon and whitefish assessments are proposed, many of which would extend ongoing research and management activities in need of more stable sources of funding. Additionally, two general support projects are proposed for the Kuskokwim area.

Table 1.–Summary of AYK Region projects and estimated costs in thousands of dollars.

	Annual or Total Cost	Duration
Arctic area projects		
Unalakleet Subdistrict Chinook salmon test fishery	\$88.0	Long term
Tracking salmon movement in Norton Sound	\$900.0	3 Years
Coho salmon escapement at Unalakleet River weir	\$30.0 yr1; \$20.0 /yr	Long term
Noatak River sonar	\$280.0 yr1; \$80.0 /yr	Long term
Glacial Lake sockeye salmon smolt enumeration	\$15.0	3 Years
Benthic mapping for crab habitat	\$450.0	3 Years
Norton Sound subsistence surveys and management supplement	\$30.0 /yr	Long term
Kotzebue Sound management budget supplement	\$15.0 /yr	Long term
Yukon area projects		
Yukon River summer chum radiotelemetry mark–recapture	\$1,869.0	3 Years
Yukon River coho radiotelemetry mark–recapture	\$1,923.0	3 Years
Yukon River whitefish monitoring and assessment	\$38.0	Long term
Yukon River lamprey assessment	\$57.0 yr1, \$47.0 /yr	Long term
Kuskokwim area projects		
Kuskokwim River postseason salmon ASL analysis	\$70.0 /yr	Long term
Telaquana Lake sockeye salmon escapement enumeration ¹	\$100.0 /yr	Long term
Salmon River (Aniak R.) escapement enumeration	\$85.0 /yr	Long term
Bethel test fishery ASL and genetic sampling	\$30.0 /yr	Long term
Kuskokwim River chum salmon abundance	\$900.0	3 Years
Kuskokwim River whitefish ASL collection	\$50.0 /yr	Long term
Kanektok River Chinook salmon radiotelemetry study	\$550.0	3 Years
Middle Fork Goodnews River coho salmon escapement	\$40.0 /yr	Long term
Arolik River weir	\$300.0 yr1; \$100.0 /yr	Long term
Goodnews River drainage Chinook and sockeye	\$250.0 yr1; \$150.0 /yr	Long term

radiotelemetry study		
Commercial harvest ASL sampling at Platinum plant	\$80.0 /yr	Long term
Kuskokwim gillnet mesh size study	\$140.0	2 Years
Chinook and coho run reconstruction sensitivity analyses	\$10.0	1 Year
Permanent full time staff funding	\$50.0 /yr	Long term
Bethel Facility Maintenance	\$70.0	1 Year
Region-wide projects		
AYK salmon aging quality assurance and control	\$30.0 /yr	Long term

¹ Start-up costs could be avoided if this ongoing project can be continued without a break in funding.

ARCTIC AREA

Proposed salmon projects for the Arctic Area are designed to support salmon fishery management by providing more information on run timing and in-season abundance, improve salmon monitoring at poorly monitored sites, and gain understanding of sockeye salmon dynamics in the Glacial Lake/Pilgrim River system. Other projects include benthic habitat mapping to better understand crab habitat needs, and budget supplements to support annual subsistence permit collection, surveys, and program support in the Kotzebue office (Table 2).

I. Arctic Area Salmon Projects

Project I-A: Unalakleet Subdistrict Chinook salmon test fishery

Project location

Powers Creek, 2.5 miles north of the village of Unalakleet.

Primary objective

Conduct a test fishery for Chinook salmon in the marine waters north of Unalakleet to develop an early season index of Chinook salmon abundance to help better manage fisheries directed on Chinook salmon.

Project description

Subdistricts 5 and 6 Chinook salmon were designated a yield stock of concern by the Alaska Board of Fisheries in 2004 and sport and subsistence fisheries within these districts are intensively managed. Currently, management decisions for Chinook harvest in the marine waters and lower Unalakleet River are based on Chinook salmon counts at the North River counting tower. However it can take 10 days to 2 weeks for Chinook salmon to migrate past the counting tower so management decisions for subsistence harvest in the marine waters and lower Unalakleet River must be conservative to ensure Chinook salmon escapement objectives are met. Additionally, opening the commercial chum salmon fishery may be delayed to minimize incidental catch of Chinook salmon.

A near-shore test fishery would provide a daily index of abundance and movement of Chinook salmon into the Unalakleet Subdistrict. These standardized catch statistics would be used as an early indicator of Chinook salmon run strength and timing thus allowing more timely management decisions to ensure escapement goals are achieved and harvest is maximized.

This project will be conducted in the month of June in the marine waters just north of the village of Unalakleet using a variable mesh set gill net. The nets will be 50 fathoms in length made up of four 75-foot variable mesh panels (8", 7 ½", 7'", and 6 ½") to capture Chinook salmon greater than 660 mm in length. Age, sex, and length data collected from the project will be compared with ASL data collected at the Unalakleet River weir to evaluate possible effects of harvest practices on escapement composition. Salmon caught will be given to local subsistence users; any chum salmon refused by subsistence users for human consumption or dog food will be sold to Norton Sound Seafood Products for use as crab hanging bait.

Project duration

Long term

Estimated costs

\$22,000 per year

Project I-B: Tracking salmon movement in Norton Sound

Project location

Near-shore waters of Norton Sound and major salmon spawning rivers within the Norton Sound region.

Primary objective

Tag adult salmon in the marine waters of Norton Sound and track their movements and migration patterns into local rivers.

Project description

There is increasing concern in the village of Shaktoolik that residents are not able to take full advantage of salmon bound for the Shaktoolik River because management of Shaktoolik salmon fisheries is based on data collected from Unalakleet River stock assessment projects. To remedy this Norton Sound Economic Development Corporation has commenced a sonar project to collect escapement information about Shaktoolik River salmon. However, this is a new project still in the feasibility stage and its utility as a management tool is limited until consistent and accurate data are collected over several years.

Advances in acoustic tag technology would make it possible to follow tagged salmon to their rivers of origin. Tag recoveries could lead to harvest apportionment estimates of marine subsistence and commercial salmon harvests, which has important implications for establishing new escapement goals, re-evaluating existing escapement goals, and re-evaluating the extent of mixed-stock salmon fisheries throughout Norton Sound.

Salmon will be captured in the marine waters with variable mesh gillnets. Salmon will be tagged with acoustic tags and immediately released. Receiver arrays will be placed in streams to monitor migration patterns. This project concept can be altered by salmon species and subdistrict depending on funding availability and questions being addressed.

Project duration

Three years

Estimated costs

\$300,000 per year

Project I-C: Coho salmon escapement at Unalakleet River weir

Project location

Unalakleet River weir.

Primary objective

Provide funding to modify and operate the Unalakleet River weir through the coho salmon run.

Project description

The Unalakleet River is the largest producer of coho salmon within Norton Sound yet the majority of the run is uncounted because it returns later than the operating period of the Unalakleet River weir. Currently the weir operates from mid-June to July 31 and to effectively capture the coho salmon run, weir operations should be extended to mid-September.

At the inception of the Unalakleet River weir project, concern was expressed about hindering movement of boaters on the river, specifically during moose hunting season. To accommodate this ADF&G pulls the weir before hunting season begins. Additionally, the weir was equipped with a boat gate making travel over the weir simpler than expected. The addition of this boat gate makes it possible to keep the weir in place though the coho salmon run. However, a light source will need to be added to the boat gate so it is useable at night.

Project duration

Long term

Estimated costs

\$30,000 for first year, and \$20,000 per year for subsequent years

Project I-D: Noatak River sonar

Project location

Noatak River, approximately 15 miles north of Kotzebue.

Primary objective

Estimate the daily and seasonal chum passage and run timing.

Project description

The Kotzebue area is poorly monitored; there is one test fishery project on the Kobuk River and aerial surveys are the primary assessment tool. Historically there have been attempts to monitor salmon movement in the Noatak River using sonar. Begun in 1980 it operated intermittently until 1994 when it was shut down because of lack of qualified personnel.

This site can be re-established with a high likelihood for success because the original site on the Noatak River was confined to a V-shaped bedrock channel so there is little possibility of a channel profile change and counts would be primarily on a single species.

Project duration

Long term

Estimated costs

\$280,000 start-up, and \$80,000 per year for subsequent years

Project I-E: Glacial Lake sockeye salmon smolt enumeration

Project location

Glacial Lake, approximately 45 miles northwest of Nome.

Primary objective

Provide funding to enumerate sockeye salmon smolt emigration from Glacial Lake. This research will continue assessment work previously conducted by U.S. BLM.

Project description

This project will enumerate sockeye salmon smolt as they leave Glacial Lake. Smolt emigration and timing, and diel migration patterns will be monitored. In addition, smolt size and condition will be documented during the emigration. Limnological sampling will be conducted in Glacial Lake throughout the ice-free season to measure chemical, nutrient, and physical parameters and zooplankton will be sampled for composition, density, and biomass. Data collected during this research will be evaluated for relationships between environmental variables and smolt condition. This information will be used to compare growth and survival of sockeye salmon populations in the Sinuk River drainage to the Pilgrim River drainage to help evaluate sustainable escapement goals for both stocks.

Project duration

Long term

Estimated costs

\$50,000 per year

II. Arctic Area Invertebrate Projects

Project II-A: Benthic mapping for crab habitat

Project location

Near-shore waters of eastern Norton Sound.

Primary objective

Use side-scan sonar to map local bottom habitat within eastern Norton Sound.

Project description

Adult red king crab migrate depending on life history stage; they move to near-shore waters for breeding in late winter and spring and offshore waters for feeding and molting in summer and fall. In addition to this migration, adult red king crab may be driven to follow sea ice patterns as adults are typically less tolerant of fresh water than juvenile crabs. Based on movement patterns of adult red king crab, near-shore areas may be refuges for juvenile red king crab seeking to escape predation by conspecifics. Further, near shore areas may contain complex habitat structure capable of providing consistent food resources and increased protection from predators.

Historically, trawl surveys have been conducted every three years to assess red king crab abundance within Norton Sound. However there are areas within Norton Sound that are not suitable for trawling. Typically these areas are located near-shore and make up a large portion of the shoreline in eastern Norton Sound, i.e., east of Cape Nome. In addition to trawl surveys, a number of pot surveys have been conducted in both winter and summer but have generally been limited to waters around Nome. Harvest has shifted eastward over the last 15 years, and the shift in harvest to eastern Norton Sound suggests red king crab are coming from near-shore areas within eastern Norton Sound. The management strategy is based on the premise commercially caught red king crab originate in waters directly inshore of the harvest, but because the near-shore area contains sections unsuitable for trawling, abundance information is limited.

Near-shore areas have been closed to commercial red king crab fishing to protect subsistence harvest and also to protect critical habitat and minimize handling rates of sublegal and female red king crab. A closure line was established in 1981, which prohibits commercial fishing within 15 miles of the north shore of Norton Sound. Again, large portions of the closure area are unsuitable for trawling thus little is known about the age and size composition of red king crab within the area and most of the area has not been evaluated for critical habitat.

A recently funded project is deploying small mesh crab pots in the near-shore waters between Topkok Head and Cape Darby to obtain indices of juvenile and female red king crab relative abundance. To supplement this research, side-scan sonar would be used to map the benthic habitat in these locations, and look for correlations between crab abundance and habitat type. This work can serve as a pilot study for research identifying essential habitat for juvenile red king crab within Norton Sound. Establishing essential habitat type will enable fishery managers to make informed decisions about use of the closure line.

Project duration

Three years

Estimated costs

\$150,000 per year

III. Miscellaneous Arctic Area Projects

Project III-A: Norton Sound subsistence surveys and management supplement

Project location

Nome Area.

Primary objective

Provide needed funds to determine subsistence harvest.

Project description

The supplement would provide funding for Norton Sound management to cover duties and expenses that have been shifted to the management budget due to project budget cuts. In recent years budgets have been zeroed for Norton Sound restoration and for an RSA to Subsistence Division for salmon surveys. Additionally, the management budget now covers the costs incurred from issuing and retrieving subsistence salmon permits in five northern Norton Sound villages and from conducting subsistence salmon surveys in four southern Norton Sound villages. Direct costs include personnel, travel, printing, phone, and mail costs. Indirect cost includes data analysis. Proposed funding would be used to cover these expenses and return management funds for their intended purposes.

Project duration

Long term

Estimated costs

\$30,000 per year

Project III-B: Kotzebue Sound management budget supplement

Project location

Kotzebue Area.

Primary objective

Provide needed funds to program management.

Project description

The supplement would provide funding for Kotzebue Sound management to cover the costs of program management cut when a Fishery Biologist II position was eliminated in Kotzebue. Present Norton Sound management funds pay two months of Program Technician time in Kotzebue. Additionally, management funds cover office expenses split under the CAP arrangement at Fish & Game offices. Finally, management covers the costs for travel to Kotzebue and for truck and boat expenses. Proposed funding would be used to cover these expenses and return Norton Sound management funds for their intended purposes.

Project duration

Long term

Estimated costs

\$15,000 per year

YUKON AREA

Yukon Area proposals are directed towards improving information on summer chum and coho salmon, as well as whitefish and lamprey (Table 3). For salmon species the focus is on obtaining drainage-wide run abundance and escapement estimates (2 projects). For non-salmon species, basic run timing and relative abundance estimates are sought, which would support management of small scale fisheries on these species (2 projects).

I. Yukon River Salmon Assessments

Project I-A: Yukon River Summer chum salmon radiotelemetry studies

Location

Yukon River Drainage

Primary objective

To provide migratory characteristics and escapement distribution of summer chum salmon among major tributaries in the Yukon River drainage.

Description

Implementation of this program would greatly assist in the conservation and management of Yukon River summer chum salmon by collecting more precise information on stock composition, run timing, movement patterns, and spawning distribution. Summer chum salmon are harvested in important subsistence, commercial and personal use fisheries throughout the majority of the Yukon River drainage.

Radiotagged fish migrating upriver will be recorded by remote tracking stations located at approximately 37 sites along important migratory routes and spawning tributaries. Recorded information for each tagged fish will produce migration rates and movement patterns of the

different stocks tagged during the run. This work would be complemented by the stock identification project conducted annually on chum salmon for inseason fishery management.

Aerial tracking surveys will be flown to determine the status of radiotagged fish in non-terminal reaches of the basin, and obtain detailed movement and distribution information in spawning tributaries. From these procedures, the distribution of summer chum salmon within major tributaries can be determined with particular emphasis on the Anvik, Koyukuk, and Tanana river stocks.

Summer chum salmon will be captured with drift gillnets and marked at Dogfish (old village) near Russian Mission. Marked fish will receive a primary spaghetti tag, secondary external mark, and internal radio tag transmitter; and other biological data will be collected (age, length, and genetics sample). Marked fish will be recovered opportunistically at various run assessment sites and from harvests within the fisheries.

Project duration

Three years, with full scale tagging and recovery fieldwork during years 1 and 2; dismantling or powering down receiver system, analysis and reporting during year 3.

Estimated costs

Total 1,869,000 for three years: \$1,025,000 in year-1 (includes cost of purchasing tags for both years of field work); \$563,000 for year-2; and \$281,000 for year-3 (includes shutdown and report writing).

Project I-B: Yukon River coho salmon radiotelemetry studies

Location

Yukon River Drainage.

Primary objective

To provide migratory characteristics and escapement distribution of coho salmon among major tributaries in the Yukon River drainage.

Description

Implementation of this program would greatly assist in the conservation and management of Yukon River coho salmon by collecting more precise information on run timing, movement patterns and spawning distribution, and stock composition. Currently coho salmon are harvested in subsistence, commercial, personal use, and sport fisheries yet little is known about the abundance and distribution of the Yukon River stocks.

Radiotagged fish migrating upriver will be recorded by remote tracking stations located at approximately 37 sites along important migratory routes and spawning tributaries. Recorded information for each tagged fish will produce migration rates and movement patterns of the different stocks tagged during the run.

Aerial tracking surveys will be flown to determine the status of radiotagged fish in non-terminal reaches of the basin, and obtain detailed movement and distribution information in spawning

tributaries. From these procedures, the distribution of coho salmon within major tributaries can be determined.

Coho salmon will be captured with drift gillnets and marked at Russian Mission. Marked fish will receive a primary spaghetti tag, secondary external mark, and internal radio tag transmitter, and other biological data will be collected (age, length, and genetics sample). Marked fish will be recovered opportunistically at various run assessment sites and from subsistence and commercially captured fish.

Project duration

Three years, with a feasibility study in year 1, full scale tagging and recovery in year 2, and system power down, data analysis, and reporting in year 3.

Estimated costs

Total \$1,922,000 for three years: \$903,000 in year 1 (includes cost of purchasing tags for year 2); \$738,000 for year 2 (includes cost for an additional tagging crew); and \$281,000 for year 3 (includes shutdown and report writing).

II. Yukon River Non-Salmon Species Assessments

Project II-A: Yukon River whitefish monitoring and assessment program

Location

Lower Yukon River.

Primary objectives

To monitor commercial fishing and determine the run timing, relative abundance, biological characteristics (e.g. ages, sex ratios, lengths, maturity), and distribution of whitefish stocks in the Lower Yukon River.

Project description

Little is known about the life histories and adaptive strategies employed by the five species of whitefish common to the Yukon River delta. This project would employ test fishing with gillnets with 3.5 inch mesh size or less from late July until the end of the whitefish migration, which may last until after the river has frozen in mid-October or November. Currently, there is an effort to expand a commercial freshwater whitefish fishery in the lower river, which since 2005 has been prosecuted with a commercial harvest cap of around 10,000 lbs. Additionally, the project would employ staff on site to monitor the commercial fishery and obtain harvest and effort data. More information on the five species of whitefish common to the Yukon River delta needs to be collected and analyzed before any expansion from the current commercial harvest levels may occur.

Project duration

Long term

Estimated annual costs

\$38,000

Project II-B: Yukon River lamprey assessment**Location**

Lower Yukon River.

Primary objectives

To determine the run timing and relative abundance of lamprey in the Lower Yukon River.

Project description

Little is known or documented about the distribution or abundance of lamprey common to the Yukon River. While a small commercial lamprey fishery in the lower Yukon River has been prosecuted in recent years, more information on lamprey needs to be collected before any changes in the commercial harvest can be considered. This project will provide an estimate of lamprey abundance that could be examined across years to understand the population cycle, derive escapement goals, and to establish harvest guideline ranges.

This project will utilize a Dual Frequency Identification Sonar (DIDSON) to count lamprey migrating under the ice at two communities in the lower Yukon River (e.g. Marshall and Grayling). Currently, DIDSON sonar is successfully used at multiple sites across Alaska to count salmon, and preliminary work conducted in 2005 was successful in detecting swimming lamprey. Anecdotal evidence suggests the duration of the lamprey run is typically short, lasting from less than an hour to 10 days during approximately the middle of November. Based on communication with lower river villages, two biologists will travel to the lower Yukon River, deploy sonar on one bank, and count lamprey over the duration of the run at two separate villages. The duration of the field work is estimated to be about 14 days.

Project duration

Long term

Estimated costs

\$57,000 initial startup; \$47,000 per year for subsequent years

KUSKOKWIM AREA

On the Kuskokwim River, six projects are proposed for salmon abundance estimation and escapement monitoring and biological and genetic sampling of salmon and whitefish. For rivers draining into Kuskokwim Bay, four projects are proposed for salmon abundance estimation and escapement monitoring. Three additional projects are proposed to support data collection and analyses necessary for abundance and escapement estimation throughout the area. Support is also proposed to meet ongoing staffing and facility maintenance needs (2 projects; Table 4).

I. Kuskokwim River Salmon and Whitefish Assessments

Project I-A: Kuskokwim River postseason salmon age-sex-length analysis

Location

Kuskokwim River.

Primary objective

Provide processing and assessment of salmon age-sex-length data for use in the management of Kuskokwim Area subsistence and commercial fisheries.

Description

The monitoring platform in place along the Kuskokwim River collects thousands of ASL samples that contribute in many ways to management and overall understanding of escapement and harvest patterns. This project would provide salary for a FWT IV/FBI program coordinator and a FWT II/III (4 months) trained to analyze age-sex-and length information from the salmon stock assessment projects and fisheries in the Kuskokwim River. Currently this staffing need is being provided through grants with the USFWS Office of Subsistence Management, which require periodic renewal.

Duration

Long term

Estimated annual cost

\$70,000

Project I-B: Telaquana Lake weir and Kuskokwim River sockeye salmon escapement enumeration

Location

Kuskokwim River

Primary objective

Use a weir to count sockeye salmon migrating into Telaquana Lake, in conjunction with genetic mark recapture methods to estimate total inriver abundance of Kuskokwim River sockeye salmon.

Description

Sockeye salmon have been an important subsistence resource along the Kuskokwim River for generations. More recently there has been increasing interest in harvesting Kuskokwim sockeye salmon commercially. Understanding the variability in total abundance and stock composition is critical to successful management of sockeye salmon. This project would be a continuation of a project funded by a short-term grant only through the 2012 season, which monitors sockeye salmon migrating into Telaquana Lake. Telaquana Lake supports the majority of the lake type sockeye salmon that spawn and rear the Kuskokwim River drainage. Genetic characteristics of

the Telaquana Lake population appear to be distinct from other sockeye populations within the Kuskokwim watershed. The feasibility of using genetic markers for the Telaquana Lake population in a drainagewide genetic mark-recapture study is currently being assessed. The initial sample for the mark-recapture study would be collected in the Bethel test fishery, to determine the number and proportion of Telaquana Lake sockeye salmon. The count of sockeye salmon at the Telaquana Lake weir would constitute the second sample for the mark-recapture study.

Duration

Long term

Estimated annual cost

\$100,000

Startup costs will be avoided if this project can be continued without a break when grant funding expires in FY2013.

Project I-C: Salmon River (Aniak R.) escapement enumeration

Location

Aniak River drainage within the Kuskokwim River system.

Primary objectives

Enumerate escapement of salmon species into the Salmon River, a tributary to the Aniak River.

Description

Aniak River is one of the largest producers of salmon in the Kuskokwim watershed. However, estimating salmon escapement into the Aniak River has been difficult. Sonar methods have been used to count salmon entering the Aniak River for a number of years, but counts are not apportioned to species and have been used primarily as an index of chum salmon escapement. The proposed weir site on Salmon River was used in the past as a recapture site for tagged Chinook and coho salmon. The weir performed well and data collected there indicated that a large number of Chinook salmon spawn in Aniak River drainage. A consistent proportion of Chinook and coho salmon appear to return to the Salmon River, compared with the whole Aniak River drainage. An escapement counting weir on the Salmon River will help resolve chum salmon apportionment in the Aniak River sonar count, and provide an annual index of escapement for all salmon species in the Aniak River.

Duration

Long term

Estimated annual cost

\$85,000

Project I-D: Bethel test fishery ASL and genetic sampling

Location

Kuskokwim River Drainage.

Primary objectives

Provide additional staff salary for one FWTII (3 months) and to cover additional cost of ASL and genetic sampling from the Bethel test fishery.

Description

Salmon age, sex, and length data have been collected from the Bethel test fishery intermittently over the past 20 years. Consistent collection of this information would allow for analysis of mesh size selectivity and long-term monitoring of salmon age and size composition. Additionally, genetic identification of sockeye salmon stocks has been proposed to develop a river-wide mark–recapture estimate (see Project I-B).

Duration

Long term

Estimated annual cost

\$30,000

Project I-E: Kuskokwim River chum salmon abundance

Location

Kuskokwim River

Primary objective

Estimate chum salmon escapement using mark–recapture and newly developed modeling techniques.

Description

Chum salmon are the dominant species of salmon in the Kuskokwim River and provide a consistent commercial opportunity that can enhance local economies. In order to maximize harvest opportunities, reliable escapement estimates are needed but there are currently no drainage-wide escapement estimates for chum salmon. Improvements in tagging and modeling methods present an opportunity to obtain an estimate of total Kuskokwim River chum salmon escapement. In addition to providing ongoing annual escapement estimates, a reliable, drainage-wide escapement estimate can also be applied to a retrospective run reconstruction model to estimate abundance and escapement back to 1988.

Duration

Three years

Estimated annual cost

\$300,000

Project I-F: Kuskokwim River whitefish age-sex-length collection

Location

Kuskokwim River.

Primary objectives

Obtain age-sex-length (ASL) samples from subsistence caught whitefish in the Lower Kuskokwim River.

Description

Whitefish are an important subsistence species in the Kuskokwim area and small scale catcher-seller whitefish and non-salmon commercial fisheries have occurred sporadically in the Kuskokwim River. Until recently, little information was available about Kuskokwim River whitefish populations. The U.S. Fish and Wildlife Service and ADGF&G Division of Subsistence have initiated programs in recent years to determine life history and subsistence harvest patterns of Kuskokwim River whitefish populations. This project seeks to extend an existing subsistence salmon harvest ASL collection program to whitefish. In the current program, subsistence fishers are recruited to collect and document scales and sex and length information from salmon in their subsistence catch. Subsistence samplers are compensated on a per sample basis. Proposed funding would be used to additionally compensate subsistence samplers for whitefish samples, and for staff time and logistics costs associated with these collections.

Duration

Long term

Estimated annual cost

\$50,000

II. Kuskokwim Bay Salmon

Project II-A: Kanektok River Chinook and chum salmon radiotelemetry study

Location

Kanektok River, District W-4.

Primary objective

Estimate the proportion of Chinook and chum salmon that spawn below the Kanektok River weir using radiotelemetry methods.

Description

The Kanektok River is the main spawning stream in the District 4 commercial fishery. The Kanektok River also supports important subsistence and sport fisheries. The Kanektok River

weir is located approximately 42 miles upstream from Kuskokwim Bay, the primary site of the District 4 commercial fishery. A significant number of salmon likely spawn below the weir, preventing the complete assessment of escapement. The proposed initiative seeks to develop a 3-year radiotelemetry study that will provide information on the proportion of salmon spawning below the weir. This study would likely be a cooperative venture between the Commercial Fisheries Division of ADF&G, the Native Village of Quinhagak (NVK), and the U.S. Fish and Wildlife Service.

Duration

Three years

Estimated costs

\$250,000 first year, and \$150,000 per year for the following two years

Project II-B: Middle Fork Goodnews River coho salmon escapement enumeration

Location

Middle Fork Goodnews River, District W-5.

Primary objectives

Monitor coho escapement by extending the operation of the Middle Fork Goodnews River Weir through September.

Description

The Goodnews River drainage is the main spawning drainage for the District 5 commercial salmon fishery. The drainage also supports important subsistence and sport fisheries on returning salmon. Currently, these fisheries are managed by monitoring salmon escapement at the Middle Fork Goodnews River weir. However, the department does not fund operation of the weir during the coho season. Since 1997, the U.S. Fish and Wildlife Service has provided soft money funding to extend the operation of the weir into August and September. The initiative has been successful and allows for a complete assessment of coho salmon escapement, run timing, and the collection of other biological data. The extension also allows for the complete assessment of pink salmon escapement and the enumeration of migrating of Dolly Varden, an important subsistence and sport fishing species. This proposed initiative seeks long term and stable state operating funds for the extended operation of the Middle Fork Goodnews River weir.

Duration

To be of value, this project needs to be long term with a stable funding source.

Estimated annual cost

\$40,000

Project II-C: Arolik River weir

Location

Arolik River, District W-4.

Primary objectives

Use a weir to estimate annual escapement of Chinook, chum, sockeye, and coho salmon.

Description

The Arolik River is the second largest contributing spawning stream in the District 4 commercial fishery. The Arolik weir would be located approximately 8 miles upstream from Kuskokwim Bay. Five species of pacific salmon spawn in significant numbers in the Arolik River contributing to important subsistence, commercial, and sport fisheries annually and would give ADF&G the ability to assess salmon escapement. This project would likely be a cooperative venture between the Commercial Fisheries Division of ADF&G and the Native Village of Quinhagak (NVK).

Duration

Long term

Estimated costs

Start up \$300,000 for first year; approximately \$100,000 per year for subsequent years

Project II-D: Goodnews River drainage sockeye and Chinook salmon radiotelemetry study

Location

Goodnews River, District W-5

Primary objective

Estimate the proportion and distribution of sockeye and Chinook salmon that spawn in the North and South Fork Goodnews River Drainage using radiotelemetry methods to develop a drainage wide escapement estimate.

Description

The Goodnews River Drainage is the main spawning stream in the District 5 commercial fishery. The Goodnews River Drainage supports important subsistence, commercial and sport fisheries. The Middle Fork Goodnews River weir is located approximately 10 miles upstream from Goodnews Bay and is the primary site of the District 5 commercial fishery. Numbers of salmon spawning in the North and South Fork Goodnews River are unknown but probably substantial; this lack of information prevents the complete assessment of escapement in the Goodnews River. The proposed initiative seeks to develop a 3-year radiotelemetry study that will provide information on the proportion of salmon spawning in the North and South Fork Goodnews River. This would allow complete assessment of salmon escapement, as needed for the development of escapement goals in accordance with the Escapement Goal Policy adopted by the Alaska Board

of Fisheries. This study would likely be a cooperative venture between ADF&G Division of Commercial Fisheries Division and the U.S. Fish and Wildlife Service.

Duration

Three years

Estimated costs

\$250,000 first year, and \$150,000 per year for the following two years

III. Kuskokwim Area Salmon

Project III-A: Commercial harvest age-sex-length sampling at Platinum plant

Location

Platinum

Primary objectives

Establish a sampling program based in Platinum for collecting ASL data from Kuskokwim Area commercial harvests.

Description

The goal of this project is to support local economies and provide economic opportunity for many rural residents in one of the poorest areas of the state. One of the primary responsibilities of the Division of Commercial Fisheries is the documentation and assessment of commercial harvests, including information about the age, sex, and length composition of harvested stocks. In the face of incomplete or uncertain data, Kuskokwim Area salmon fisheries must be managed more conservatively, which increases the potential for foregone harvest and economic opportunity. Since 2009, the majority of annual Kuskokwim Area commercial salmon harvest has been processed at a new and remote fish processing plant located at the village of Platinum in Kuskokwim Bay. Salmon delivered to Platinum are unavailable for sampling by staff based in Bethel. Existing budgets were not developed for, nor are they adequate, to cover the increased costs of commercial sampling in such a remote location. This program will provide salary for a two person crew based in Platinum for three months and partial funding for a Technician IV that oversees Kuskokwim Area ASL sampling programs. Remaining funds will cover housing, logistical, and materials costs associated with annual ASL sample collection in Platinum.

Duration

Long term

Estimated annual cost

\$80,000

Project III-B: Kuskokwim gillnet mesh size study

Location

Bethel

Primary objectives

Investigate the harvest composition of multiple gillnet mesh sizes.

Description

The commercial and subsistence fisheries of the Kuskokwim River utilize different gillnet mesh sizes which result in different harvest compositions. The size and sex selectivity of the large mesh subsistence fishery has caused concern about possible effects on the quality of escapement. The proposed project would investigate size selectivity of a range of mesh sizes; data will be used to evaluate harvest practices and allowable gear under current regulations.

Duration

Two years

Estimated costs

\$80,000 startup; \$65,000 for second year

Project III-C: Run reconstruction model sensitivity analysis

Location

Anchorage

Primary objectives

Assess Chinook and coho salmon run reconstruction models to determine the effects of estimates from individual projects on the total abundance estimates.

Description

Chinook and coho salmon run reconstruction models have provided estimates of total returns of each species to Kuskokwim River. Estimates of escapement from weir projects are required for data input to the models. There is concern that federal grant funding currently used to support escapement weir projects on Kuskokwim River may be reduced in the near future. The proposed project will assess the effect of each project on the total estimate, so that the importance the projects can be ranked for priority in funding.

Duration

One year

Estimated costs

\$5,000 for each species

IV. Kuskokwim Area Infrastructure and Staffing

Project IV-A: Permanent full-time staff funding

Location

Kuskokwim area

Primary objectives

Shift funding for permanent full time Kuskokwim Area staff from partial soft money to 100% general funds

Description

Several permanent full time Biologist positions have been partially funded by soft monies for several years. This project seeks to stabilize permanent full time salaries in light of recent funding cuts at granting agencies and the uncertain nature of the grant funding process.

Duration

Long term

Estimated annual cost

\$75,000

Project IV-B: Bethel facility maintenance

Location

Bethel, Kuskokwim River and Kuskokwim Bay.

Primary Objectives

Maintenance and improvement of the State properties located in Bethel.

Description

Upgrade the ADF&G residential duplex waste lines. With the exception of existing floor penetrations, underground lines leading up to and including the existing septic tanks shall be removed and replaced with standard code compliant waste line material and new septic holding tanks with easily accessible pumping opening/connections. New holding tanks shall be placed in a more accessible area (from the back of building to the front) replacing the old tank with 1500 gallon septic tanks. Toilets and bath tubs will be raised and all lines insulated to prevent freezing.

Duration

One Year

Estimated costs

\$70,000

REGION-WIDE PROJECTS

One region-wide project is proposed, to help ensure adequate quality assurance and control for the regional salmon age-sex-length (ASL) program.

AYK Region Salmon Age-Sex-Length Data Collection Program Overview

ADF&G has been collecting age, sex, and length (ASL) data from adult salmon in the AYK Region since 1961. The majority of the samples are currently collected from escapement projects, followed by commercial harvests, test fisheries, and subsistence harvests. Over the last decade, the volume of ASL data has increased considerably. The 2006-2010 average total sample size for the region was 60,000 salmon, of which approximately 20% were from Kotzebue/Norton Sound, and 40% each were from the Yukon and Kuskokwim areas. Consistency in aging is essential, as age data from multiple sources are used in analyses critical to fisheries management. Additionally, there has been concern in recent years about age and size composition of Chinook salmon populations returning to the region. Some evidence suggests that the proportion of older and larger Chinook salmon may be declining.

In 2006, a study was conducted to investigate the consistency of salmon ages determined by ADF&G staff using Yukon River Chinook salmon scale samples collected between 1964 and 2006. The conclusion was that Chinook salmon have been aged consistently, but discrepancies were identified for some specific age classes.

Salmon aging from scale samples is conducted by personnel in several offices across the region. Over the years, different readers have assigned ages with little investment in ensuring consistency between readers. Providing coordination among the agers and establishing a structured QA/QC process will contribute to more consistency and continuity in salmon age data throughout the region. Recently, salmon aging function has been coordinated under a regional stock biology program, but no funds have been allocated for QA/QC and associated travel.

Project: AYK salmon aging quality assurance and control (QA/QC)

Location

Entire AYK region.

Primary Objective

Standard application of age determination criteria and implementation of quality control among agers.

Description

This project would provide travel funds to allow training and oversight and promote consistent aging among Anchorage, Emmonak, Bethel, and Nome staff. The stock biology program would implement quality control procedures, such as having a second reader independently age a portion of another reader's scales. Age disagreements between the two readers would be reviewed, helping to reduce errors and bias. This project would improve interpretation of age determination criteria and techniques.

Project Duration

Long term

Estimated Annual Costs

\$30,000

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TABLES

Table 2.–Summary of Arctic area projects and estimated costs.

<i>Proposed projects for Arctic Area</i>	<i>Estimated Cost</i>		<i>Duration</i>
	<i>Start-up; first year</i>	<i>Annual; continuing</i>	
<i>I. Arctic area salmon projects</i>			
A. Unalakleet subdistrict Chinook salmon test fishery		\$22,000 annually	Long term
B. Tracking salmon movement in Norton Sound		\$300,000 annually	3 Years
C. Coho salmon escapement at Unalakleet River weir	\$30,000	\$20,000	Long term
D. Noatak River sonar	\$280,000	\$80,000	Long term
E. Glacial Lake sockeye salmon smolt enumeration		\$50,000 annually	Long term
<i>II. Arctic area invertebrate projects</i>			
A. Benthic mapping for crab habitat		\$150,000 annually	3 Years
<i>III. Miscellaneous Arctic area projects</i>			
A. Norton Sound subsistence surveys and management supplement		\$30,000 annually	Long term
B. Kotzebue Sound management budget supplement		\$15,000 annually	Long term

Table 3.–Summary of Yukon area projects and estimated costs.

<i>Proposed projects for Yukon area</i>	<i>Estimated Cost</i>		<i>Duration</i>
	<i>Start-up; first year</i>	<i>Annual; continuing</i>	
<i>I. Yukon River salmon assessments</i>			
A. Yukon River summer chum radiotelemetry mark-recapture	\$1,025,000	\$563,000 year 2, \$281,000 year 3	3 Years
B. Yukon River coho radiotelemetry mark-recapture	\$903,000	\$738,000 year 2, 281,000 year 3	3 Years
<i>II. Yukon River non-salmon species assessments</i>			
A. Yukon River whitefish monitoring and assessment		\$38,000 annually	Long term
B. Yukon River lamprey assessment	\$10,000 start-up	\$47,000 annually	Long term

Table 4.–Summary of Kuskokwim area projects and estimated costs.

<i>Proposed projects for Kuskokwim area</i>	<i>Estimated Cost</i>		<i>Duration</i>
	<i>Start-up; first year</i>	<i>Annual; continuing</i>	
<i>I. Kuskokwim River salmon and whitefish assessments</i>			
A. Kuskokwim River postseason salmon age-sex-length (ASL) analysis		\$70,000 annually	Long term
B. Telaquana Lake sockeye salmon escapement enumeration		\$100,000 annually ¹	Long term
C. Salmon River (Aniak R.) escapement enumeration		\$85,000 annually	Long term
D. Bethel test fishery ASL and genetic sampling		\$30,000 annually	Long term
E. Kuskokwim River chum salmon abundance		\$300,000 annually	3 Years
F. Kuskokwim River whitefish ASL collection		\$50,000 annually	Long term
<i>II. Kuskokwim Bay salmon assessments</i>			
A. Kanektok River Chinook salmon radiotelemetry study	\$250,000	\$150,000	3 Years
B. Middle Fork Goodnews River coho salmon escapement enumeration		\$40,000 annually	Long term
C. Arolik River weir	\$300,000	\$100,000	Long term
D. Goodnews River drainage Chinook and sockeye radiotelemetry study	\$250,000	\$150,000	3 Years
<i>III. Kuskokwim Area salmon data collection and analysis</i>			
A. Commercial harvest ASL sampling at Platinum plant		\$80,000 annually	Long term
B. Kuskokwim gillnet mesh size study	\$80,000	\$60,000	2 years
C. Chinook and coho run reconstruction sensitivity analyses	\$10,000		1 Year
<i>IV. Kuskokwim Area staffing and infrastructure</i>			
A. Permanent full time staff funding		\$50,000 annually	Long term
B. Bethel facility maintenance		\$70,000	1 Year

¹Start-up costs could be avoided if this ongoing project can be operated continuously without a break in funding.