

Alaska Sustainable Salmon Fund Statement of Work

*Revision #1: Revise budget to account for FY15 change to ADF&G indirect base
of line 100 only at 21%*

I. Project Title: Invasive Northern Pike Suppression – Phase 2

II. Project Number: 44910

III. Principal Investigator

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IV. Project Period: 3/1/14 – 11/30/16

V. AKSSF Objective: ID-3 **PCSRF Objective:** HP&R

VI. Project Description

1. Synopsis

The northern pike is an invasive predatory fish in Southcentral Alaska and is responsible for the loss of several fisheries across the region. Alexander Creek in the Susitna River basin is one of the most heavily impacted systems. This project will continue to restore the quality of salmon rearing habitat by annually reducing the number of northern pike spawners in the slow backwaters of Alexander Creek. Research projects will also be conducted to better understand movement patterns of juvenile northern pike in Alexander Creek and evaluate the success of the suppression effort in increasing salmon productivity within the system. *This project continues work begun in AKSSF project 44617.*

2. Introduction

Northern pike *Esox lucius* pose a significant threat to salmon habitats in Southcentral Alaska. Some of the most severely affected areas include Alexander Lake and Alexander Creek, a tributary of the Susitna River that was once highly productive for Chinook salmon *Oncorhynchus tshawytscha*. Today, northern pike are widespread throughout the system, which is shallow and densely vegetated, making it ideal northern pike habitat. Northern pike established in the lower river of Alexander Creek in the 1990s, and Chinook salmon abundance decreased to less than 185 returning adults, well below the sustainable escapement goal of 2,100-6,000 fish. Other salmonid species in Alexander Creek have similarly declined. Currently, all fisheries are closed to harvest, and the Alaska Board of Fisheries has declared Alexander Creek Chinook salmon as a Stock of Concern.

In an effort to restore salmon productivity within Alexander Creek, the Alaska Department of Fish and Game (ADF&G) initiated an invasive northern pike suppression program in 2011. This program was funded through Alaska Sustainable Salmon Fund project 44617, *Invasive Northern Pike Suppression – Phase 1*, and the Alaska State Legislature and involves intensively gillnetting side-channel sloughs of Alexander Creek annually during the northern pike spawning period. Since the inception of this project, more than 11,000 northern pike have been removed. Additionally, ADF&G conducted radio telemetry studies to determine if there were significant movements of northern pike from Alexander Lake to the creek. Results suggest minimal movement, and those that did migrate from the lake to the creek were captured in gillnets. Had it been determined that northern pike moved extensively from the lake to the creek, it would be necessary to expand suppression efforts to Alexander Lake, which is a far more costly endeavor. Results of the telemetry study are encouraging and suggest that ADF&G's current strategy of gillnetting in side-channel sloughs is sufficient, spatially, to reduce northern pike abundance in Alexander Creek. In addition to the gillnetting and radio telemetry components of the project, ADF&G began monitoring juvenile salmonid populations in the creek with minnow trap surveys to measure the success of pike suppression efforts in increasing salmonid survival and, hence, their abundance. Based on salmonid life cycles, ADF&G anticipates observing significant increases by 2016.

3. Location

Site: Upper Alexander Creek

Latitude: 61.731380 N Longitude: 150.860760 W

Site: Middle Alexander Creek

Latitude: 61.620260 N Longitude: 150.678660 W

Site: Lower Alexander Creek

Latitude: 61.544490 N Longitude: 150.617580 W

VII. Objectives

- Reduce the number of northern pike in 67 side-channel sloughs of Alexander Creek between May and June (during the pike spawning season) such that the final daily catch in each slough is $\leq 15\%$ of the peak daily catch or such that the catch remains at less than two pike for three consecutive days
- Reduce the number of northern pike in 20 side-channel sloughs of Alexander Creek between August and September for 3-5 days each until the final daily catch in each slough is $< 15\%$ of the fall peak daily catch
- Calculate the catch per unit effort (CPUE) of young of the year and 1-year-old northern pike captured in fyke nets downstream of the outlet of Alexander Lake and track their movements into Alexander Creek sloughs using Passive Integrated Transponder (PIT) tags
- Calculate relative abundance and mean CPUE of juvenile salmonids from minnow trap surveys between June and September each year in Alexander Creek for long-term evaluation of the northern pike suppression effort

VIII. Methods

Northern Pike Suppression

Beginning in May of 2014, ADF&G will continue the large-scale gillnetting operation in the side-channel sloughs of Alexander Creek that was carried out in 2011-2013. Northern pike will be targeted with 75 gillnets while congregated for spawning in side channel sloughs from approximately May 7 (ice-out) to June 7. Three field camps will be set up along the mainstem of Alexander Creek. Two technicians will be assigned to each field camp and will be responsible for gillnetting their corresponding section of creek. In each section of creek, ~22 side-channel sloughs will be targeted for a total of 67 sloughs. Sloughs furthest downstream in each river section will be fished first until all sloughs are set. Netting will cease for a particular slough once a day's (24-hour period) catch is equal to or less than 15% of the peak day's catch. Beginning in 2014, ADF&G will try to increase catch rates by using backpack electroshockers to herd northern pike into the gill nets. Beginning in August of 2014, ADF&G will add a fall gillnetting period for each year of the project to further suppress northern pike abundance in Alexander creek. Northern pike will be targeted with 75 gillnets from approximately August 15 through September 20. The fall gillnetting period will be scaled down from the spring period since most of the sloughs will be smaller in extent that late in the season. This decrease in the spatial extent of the sloughs will also facilitate northern pike capture because the fish will be much more concentrated in these areas. Two technicians will conduct a roving gillnet operation in each of the sloughs, and each gillnet will be fished for 3-5 days.

Juvenile Northern Pike Movement Assessment

The next component of this project will determine if juvenile northern pike (YOY and 1-year old fish) are emigrating from Alexander Lake to rear in side-slough channels of the creek. A radio telemetry study of adult pike in AKSSF project 44617 showed that few pike move out of Alexander Lake and into the creek, but it is currently unknown if movement patterns of juvenile northern pike between the lake and creek are similar to those exhibited by larger fish. If it is discovered that juvenile northern pike are moving out of Alexander Lake, ADF&G will need to consider the much more costly endeavor of initiating northern pike suppression in Alexander Lake. To address this question, a field crew will attempt capturing juvenile northern pike from the outlet of Alexander Lake with two fyke nets. The net leads will be positioned to surround the submerged macrophytes that juvenile northern pike would be moving through and using for cover. Nets will be checked at least twice a day. The CPUE of juvenile northern pike, itself, will be an indicator of whether there is emigration of these cohorts out of Alexander Lake. To study the movements of fish that are found to move out of the lake, the field crew will implant all captured fish with Passive Integrated Transponder (PIT) tags. Once implanted, the fish can be detected using a portable scanner which receives the tag frequency and registers the unique ID number. Beginning in 2015, all netting crews will have PIT tag scanners and will quickly scan all fish captured in gillnets during the suppression efforts. The location of the gill net in which the pike is recovered will indicate how far and, within what time frame, the fish moved. This will be critical information for understanding if northern pike suppression efforts in Alexander Lake should be implemented to meet the overall goal of increasing salmonid productivity within the Alexander Creek drainage.

Salmonid Monitoring Protocol

The third component of this project involves collecting data needed for long-term monitoring of salmon abundance to evaluate the success of the northern pike suppression efforts. Several metrics will be included to monitor salmonid recovery in the Alexander system including annual minnow trap surveys of juvenile salmonids and an investigation of temporal shifts in northern pike diets. The minnow trap monitoring protocol will serve to answer the question of whether CPUE of juvenile salmonids increases with each year of northern pike suppression. Increases in juvenile salmonid abundance from previous suppression work will likely be observable in the timeframe of this project; therefore, this project will continue and expand on the long-term data set begun in 2011. Eight bimonthly minnow trap sampling events will take place annually from June through September at fixed sampling locations. Each of the three creek sections will contain 24 sample sites, 12 in the mainstem of Alexander Creek and 12 in side-channel sloughs. Five minnow traps will be set in each of the sample sites. Therefore, the field crews will be responsible for setting and sampling 120 minnow traps for a total of 360 traps per overall sampling event. Trends in CPUE and relative abundance of all captured species will be monitored over time. Northern pike suppression will be considered successful if large, significant increases in salmonid CPUE and relative abundances, specifically among Chinook and coho juveniles, can be observed by 2016. Another compliment to the juvenile salmonid minnow trap monitoring will be to investigate shifts in northern pike diet over time as the suppression efforts continue. All of the northern pike that are removed in gillnets during the suppression project will be dissected to enumerate prey species in their stomach contents. Stomach contents will be recorded in the field and then sent to ADF&G's genetics laboratory for confirmation of species ID.

IX. Benefits

This project will continue efforts to restore favorable salmon rearing habitat in the Alexander Creek drainage by continuous removal of an invasive predator. Over time, the density of northern pike will decrease, which will improve habitat quality for rearing salmonids and increase their overall productivity and abundance.

X. Products, Milestones, and Timelines

- March-April 2014: Purchase supplies and field camp gear; hire personnel
- May 2014: Establish field camps; begin gillnet suppression, northern pike stomach content analysis, and juvenile pike trapping and marking
- June 2014: Conclude spring gillnet suppression event and juvenile pike trapping and marking; begin minnow trap sample events
- Mid-August 2014: Begin fall gillnet suppression event
- Mid-September 2014: Conclude fall gillnet suppression event; order replacement gillnets
- Late September 2014: End minnow trap sampling events
- April 2015: Purchase supplies and field camp gear
- May 2015: Establish field camps; begin gillnet suppression, juvenile pike trapping and marking, and northern pike stomach content analysis
- June 2015: Conclude spring gillnet suppression event and juvenile pike trapping and marking; begin minnow trap sample events
- Mid-August 2015: Begin fall gillnet suppression event

- Mid-September 2015: Conclude fall gillnet suppression event; order replacement gillnets
- Late-September 2015: End minnow trap sampling events
- April 2016: Purchase supplies and field camp gear
- May 2016: Establish field camps; begin gillnet suppression, juvenile pike trapping and marking, and northern pike stomach content analysis
- June 2016: Conclude spring gillnet suppression event and juvenile pike trapping and marking; begin minnow trap sample events
- Mid-August 2016: Begin fall gillnet suppression event
- Mid-September 2016: Conclude fall gillnet suppression event; order replacement gillnets
- Late-September 2016: End minnow trap sampling events
- December 2016: Analyze data; write project report (ADF&G Fishery Data Series)

XI. Project Budget

Revision #1 revises the budget to account for the FY15 change to ADF&G's indirect base of line 100 only at 21%.

The original project budget table is retained in this document as Appendix A.

ADF&G SF Budget	Total
100 Personnel	\$273,741
200 Travel	\$0
300 Contractual	\$49,915
400 Supplies	\$178,685
500 Equipment	\$0
Subtotal	\$502,341
600 Indirect	\$61,617
Total	\$563,958

Budget Narrative:

Line 100: Personnel (*not updated with **Revision #1***)

The State of Alaska salary calculator was used to calculate all personnel costs.

- A long-term, non-permanent Research Fishery Biologist II (TBD) will supervise all field logistics, assist with reports, and plan for the next field season:
 - o FY14: 3 months @ \$8,120/month = \$24,360
 - o FY15: 8 months @ \$8,444/month = \$67,558
 - o FY16: 8 months @ \$8,767/month = \$70,157
 - o FY17: 2 months @ \$9,095/month = \$18,189

- A Fish and Wildlife Technician III (PCN 11-4130; TBD), will conduct spring and fall gillnetting and minnow trap surveys throughout the summer and early fall (rates include 25 hours overtime):
 - o FY15: 4 months @ \$5,665/month = \$22,660
 - o FY16: 4 months @ \$5,877/month = \$23,508
- A Fish and Wildlife Technician III (PCN 11-4286; TBD), will conduct spring and fall gillnetting and minnow trap surveys throughout the summer and early fall (rates include 25 hours overtime):
 - o FY15: 4 months @ \$5,300/month = \$22,660
 - o FY16: 4 months @ \$5,877/month = \$23,508

Line 300: Contractual (\$49,915; *updated with Revision #1*)

- Land lease: 3 seasons @ \$2,083/season = \$6,250
- Outboard motor repair: 3 seasons @ \$1,460/season = \$4,380
- Airboat repair: \$4,000
- Genetic analysis of pike stomach contents: 600 samples @ \$31.50/sample = \$18,900
- Supply charter flights: 19 flights @ \$730/flight = \$13,870
- Project cell phone charges: 3.5 seasons @ \$185/season = \$640
- Satellite phone charges: 3 seasons @ \$625/season = \$1,875

Line 400: Supplies (\$178,685; *updated with Revision #1*)

- Outboard motor and boat repair parts: \$6,880
- Gillnets: 50 nets/season @ \$312/net x 3 seasons = \$46,800
- Fyke nets: 2 nets @ \$1,200/net = \$2,400
- Minnow traps: 240 traps @ \$12.25/trap = \$2,940
- Bait: 3 seasons @ \$1,560/season = \$4,680
- Electric fence (bear protection): 3 fences @ \$800/fence = \$2,400
- Sampling gear (tapes, knives, etc.): \$1,566
- Field supplies (measuring boards, batteries, sample bags, etc.): 3.5 seasons @ \$2,000/season = \$7,000
- Waders and gloves for technicians: 3 seasons @ \$2,080/season = \$6,240
- GPS: 2 units @ \$750/unit = \$1,500
- PIT tags: 1,200 tags @ \$4.37/tag = \$5,244
- PIT tag injectors: 3 injectors @ \$36.70/injector = \$110
- PIT tag readers: 3 readers @ \$550/reader = \$1,650
- Galvanized boat trailer: \$2,300
- Food for biologists and technicians in remote field camps (\$20/person/day) = 3.5 seasons @ \$8,750/season = \$30,625
- Propane: 263 gallons @ \$3.80/gallon x 3.5 seasons = \$3,500
- Boat fuel: 3,333 gallons @ \$3.9/gallon x 3.5 seasons = \$45,500
- Vehicle fuel: 538.5 gallons @ \$3.9/gallon x 3.5 seasons = \$7,350

Line 600: Indirect (*updated with Revision #1*)

ADF&G's federally negotiated indirect rate through June 30, 2014, was 14.93% excluding equipment and pass-through funds; however, indirect was recovered at a reduced rate of 14% for this project (indirect collected through FY14 totals \$8,256.11). The indirect rate effective July 1, 2014, is 21% on line 100 only (estimated indirect from July 1, 2014, through the remainder of the project is \$53,360.89).

XII. Match Budget (*not changed with Revision #1*)

ADF&G SF Match Budget (35%)	Total
100 Personnel	\$197,386
200 Travel	\$0
300 Contractual	\$0
400 Supplies	\$0
500 Equipment	\$0
Total	\$197,386

ADF&G Sport Fish Match Budget Narrative:

Line 100: Personnel

The State of Alaska salary calculator was used to calculate all personnel costs.

- Cody Jacobson, Research Fishery Biologist I, will assist with field logistics, manage field camps, supply transport, and assist with gillnetting and data collection (rates include 40 hours overtime):
 - o FY15: 2.71 months @ \$7,743/month = \$21,016
 - o FY16: 3 months @ \$8,023/month = \$24,070
- A Fish and Wildlife Technician III (PCN 11-4130; TBD) will conduct spring and fall gillnetting and minnow trap and fyke net surveys throughout the summer and early fall (rates include 25 hours overtime):
 - o FY14: 1.5 months @ \$5,706/month = \$8,560
 - o FY15: 1 month @ \$6,120/month = \$6,120
 - o FY16: 1 month @ \$6,330/month = \$6,330
 - o FY17: 1 month @ \$6,540/month = \$6,540
- A Fish and Wildlife Technician III (TBD; PCN 11-4286) will conduct spring and fall gillnetting and minnow trap and fyke net surveys throughout the summer and early fall (rates include 25 hours overtime):
 - o FY14: 1.5 months @ \$5,706/month = \$8,560
 - o FY15: 1 month @ \$6,120/month = \$6,120
 - o FY16: 1 month @ \$6,330/month = \$6,330
 - o FY17: 1 month @ \$6,540/month = \$6,540
- A Fish and Wildlife Technician II (PCN 11-4139l; TBD) will conduct spring gillnetting and minnow trapping (rates include 50 hours overtime):
 - o FY14: 1.5 months @ \$5,206/month = \$7,810

- o FY15: 1.5 months @ \$5,400/month = \$8,100
 - o FY16: 1.5 months @ \$5,593/month = \$8,390
- A Fish and Wildlife Technician II (PCN 11-5278; TBD) will conduct spring gillnetting and minnow trapping (rates include 50 hours overtime):
 - o FY14: 1.5 months @ \$5,206/month = \$7,810
 - o FY15: 1.5 months @ \$5,400/month = \$8,100
 - o FY16: 1.5 months @ \$5,593/month = \$8,390
- A Fish and Wildlife Technician II (PCN 11-4212; TBD) will conduct spring gillnetting and minnow trapping (rates include 50 hours overtime):
 - o FY14: 1.5 months @ \$5,206/month = \$7,810
 - o FY15: 1.5 months @ \$5,400/month = \$8,100
 - o FY16: 1.5 months @ \$5,593/month = \$8,390
- A Fish and Wildlife Technician II (PCN 11-4288; TBD) will conduct spring gillnetting and minnow trapping (rates include 50 hours overtime):
 - o FY14: 1.5 months @ \$5,206/month = \$7,810
 - o FY15: 1.5 months @ \$5,400/month = \$8,100
 - o FY16: 1.5 months @ \$5,593/month = \$8,390

Appendix A: Original Project Budget Table

Original ADF&G SF Budget	Total
100 Personnel	\$272,600
200 Travel	\$0
300 Contractual	\$45,915
400 Supplies	\$176,185
500 Equipment	\$0
Subtotal	\$494,700
600 Indirect @ 14%	\$69,258
Total	\$563,958