

# Alaska Sustainable Salmon Fund Statement of Work

*Revision #1: Extend end date to November 30, 2021*

**I. Project Title:** Instream Flow Protection: Southwest Alaska

**II. Project Number:** 51011

**III. Principal Investigator**

Ann Marie Larquier, Habitat Biologist III  
Alaska Department of Fish and Game  
Division of Sport Fish/RTS  
Instream Flow Program  
333 Raspberry Rd  
Anchorage, AK 99518-1599  
907-267-2311  
[ann.larquier@alaska.gov](mailto:ann.larquier@alaska.gov)

**IV. Project Period:** 3/1/19 – 11/30/21

**V. AKSSF Objective:** 1A-1      **PCSRF Objective:** P&A/HP&R

**VI. Project Description**

1. Synopsis

This project will quantify and protect instream flows for important salmon-producing rivers in Southwest Alaska (SW AK). Activities include hydrologic data collection and preparing and filing reservation of water applications within the Kuskokwim River watershed, specifically the Aniak River and tributaries. This project will benefit important subsistence fisheries by legally reserving instream flows needed to attain long-term protection and conservation of fish populations and their habitats in SW AK rivers.

2. Introduction

The rivers of SW AK support some of North America's most productive sport, commercial, and subsistence salmon fisheries. Salmon migration, spawning, rearing, and ultimately production in these waterbodies depend on sufficient seasonal quantities of water. Numerous state and federal mechanisms can be used to reserve and protect instream flows. The primary mechanism that will be used in this project is the Alaska Water Use Act (AS 46.15). The Alaska legislature amended this Act in 1980 in recognition of the economic, social, and other benefits of retaining water in rivers and lakes. This amendment provides the opportunity for government agencies, as well as non-governmental, private sector, and public entities or individuals, to legally secure reservations of water under Alaska Statute (AS 46.15.145) and regulation (11 AAC 93.141-147) to maintain instream flow rates in rivers or water levels in lakes in perpetuity for a variety of purposes, including the protection of fish and wildlife habitat, migration, and propagation.

The main activities of this project include collecting and analyzing the biological and hydrologic data needed to quantify the instream flow requirements of salmon in candidate water bodies and preparing reservation of water applications for filing and adjudication with the Alaska Department of Natural Resources (DNR).

Alaska water law is based on the doctrine of “prior appropriation”, giving the first appropriator of water from a given water source a priority of right over subsequent appropriators on a “first-in-time, first-in-right” basis. With an established water right (in this case, called a Certificate of Reservation), the permittee has a legal standing to assert that right against conflicting uses of water from others who do not have water rights or who are junior in priority. The priority date for reservation of water applications is based on the date they are accepted for filing by DNR. A Certificate of Reservation remains in effect in perpetuity unless DNR determines the purpose for which it was filed has changed or new information demonstrates that a lower amount of water would provide the same level of protection, at which time DNR can amend the reservation. No reservation of water applications have been filed in the Aniak River watershed.

3. Locations

This project will establish a streamgauge on the mainstem of the Aniak River and an additional discharge measurement station on the Doestock River (a tributary to the Aniak River). Two potential discharge measurement stations may be established on the Buckstock and Salmon rivers. The operation of a station on Buckstock River will depend on boat access and additional logistics following reconnaissance in the spring of 2019. The station on Salmon River is contingent on separate funding for the Native Village of Napaimute for continued operation of a salmon weir; if the weir is funded, weir staff will be able to take discharge measurements to contribute to this project.

- Aniak River Streamgauge: 61.4983333, -159.3713888
- Doestock River Discharge Measurement Station:  
61.5327777, -159.3922222
- Buckstock River Discharge Measurement Station (possible):  
61.3484022, -159.2243061
- Salmon River Discharge Measurement Station (possible):  
61.0627176, -159.1940722

Table 1. Summary of hydrologic measurement stations in the Aniak River watershed

<b>Name</b>	<b>Station Type</b>	<b>Status</b>
Aniak River	Streamgauge	Planned installation
Doestock River	Discharge Measurement Station	Planned installation
Buckstock River	Discharge Measurement Station	Anticipated if access and timing are feasible

Salmon River	Discharge Measurement Station	Anticipated contingent on separate funding for continued operation of salmon weir
--------------	-------------------------------	---

4. Related Projects  
None

**VII. Objectives**

1. Obtain the biological, hydrologic, and other information needed to quantify instream flow requirements of salmon in priority waterbodies
2. Prepare and file reservation of water applications to protect salmon habitat in priority waterbodies

**VIII. Methods**

Streamgaging

To collect the hydrologic data necessary for reservation of water applications, a streamgaging network will be established. A streamgaging network consists of an index streamgaging station that is operated continuously over a long period of time and an associated network of semi-permanent discharge measurement stations operated concurrently on nearby waterbodies that are hydrologically similar. The index streamgaging station will be in operation for at least five years (two funded through this project) during which time instantaneous discharge measurements will be collected concurrently at identified discharge measurement stations. Instantaneous discharge data collected at the discharge measurement stations will be regressed against corresponding discharge values from the index streamgaging station. For sites with robust correlations, a five-year record of continuous streamflow data will be estimated (Klein 2013).

Streamgages will be installed and operated by project staff in accordance with standard sampling protocols developed by the United States Geological Survey (USGS; Rantz et al. 1982) and ADF&G’s Instream Flow Program (Klein 2013) and through consultation with USGS staff and other hydrologists as applicable.

Preparing Reservation of Water Applications

DNR Reservation of Water application forms will be prepared to comply with state law (AS 46.15.145) and regulations (11 AAC 93.141-147) and following protocols established by ADF&G’s Instream Flow Program. Applications will include: maps and legal descriptions identifying the location of the water body to be reserved and gaging stations within the water body, a description of inter- and intra-annual variability in stream flows, fish distribution and periodicity data (seasonal use of habitat for migration, spawning, incubation, and rearing) by species and life stage, and the requested flows to be reserved during specified time periods accompanied by supporting documentation that justifies and describes the data and analyses used to develop the requested flows.

Fish distribution and periodicity data (seasonal use of habitat for migration, spawning, incubation, and rearing) by species and life stage will be compiled and summarized from the *Catalog of Waters Important for the Spawning, Rearing or Migration of Anadromous*

*Fishes* and its associated Atlas, input from biologists from ADF&G and other agencies, and the scientific literature. Requested flows will be based primarily on flow duration analyses (Annear et al. 2004). This approach provides a basis to mimic natural seasonal flows that fish are adapted to and depend upon (Estes and Orsborn 1986; Poff et al. 1997; Annear et al. 2004; Lytle and Poff 2004; Arthington et al. 2006).

How Project Success Will Be Evaluated

This project will be evaluated based on the number of reservation of water applications prepared, filed, and adjudicated, as well as on successfully collecting hydrologic data at each of the streamgage and discharge measurement stations.

**IX. Benefits**

The rivers of SW AK support some of North America’s most viable and productive salmon stocks. Salmon depend on sufficient quantities of water to meet their spawning, rearing, incubation, overwintering, and migration habitat requirements. This project will provide long-term habitat protection by legally reserving instream flows needed to conserve salmon habitat.

**X. Products, Milestones, and Timelines Revised with Revision #1**

- March 1, 2019 – May 31, 2019: Conduct reconnaissance trip to the Aniak River and its tributaries to assess potential streamgage location/logistics and discharge measurement station locations
- June 1, 2019 – July 15, 2019: Install Aniak River streamgage
- July 1, 2019 – November 30, 2021: Visit streamgage and discharge measurement stations approximately every two months to collect discharge measurements, survey pressure transducer and staff gage elevations, download transducer data, perform maintenance, and compute gage records
- June 30, 2021: Submit initial reservation of water applications to DNR

**XI. Project Budget**

ADF&G SF Budget	Total
100 Personnel	\$0
200 Travel	\$43,680
300 Contractual	\$10,000
400 Supplies	\$9,000
500 Equipment	\$29,400
Total	\$92,080

ADF&G SF Budget Narrative:

Line 200: Travel (\$43,680)

Ann Marie Larquier, Leah Ellis, Kevin Keith, and/or Joe Klein (3 participants, travelers may vary) will travel from Anchorage to Aniak to perform reconnaissance:

- Airfare: 3 tickets @ \$500/ticket = \$1,500
- Lodging: 3 nights @ \$200/night x 3 people = \$1,800
- Meals per diem: 4 days @ \$60/day x 3 people = \$720

Ann Marie Larquier, Leah Ellis, Kevin Keith, Joe Klein (3 participants, travelers may vary) will travel from Anchorage to Aniak to install the Aniak River gage:

- Airfare: 3 tickets @ \$500/ticket = \$1,500
- Lodging: 3 nights @ \$200/night x 3 people = \$1,800
- Meals per diem: 4 days @ \$60/day x 3 people = \$720

Ann Marie Larquier, Leah Ellis, Kevin Keith, and/or Joe Klein (3 participants each trip, travelers may vary) will travel from Anchorage to Aniak for gage maintenance seven times (5 open water trips and 2 winter trips):

- Airfare: 3 tickets/trip @ \$500/ticket x 7 trips = \$10,500
- Lodging: 2 nights/trip @ \$200/night x 3 people x 7 trips = \$8,400
- Meals per diem: 3 days/trip @ \$60/day x 3 people x 7 trips = \$3,780

Ann Marie Larquier, Leah Ellis, Kevin Keith, and/or Joe Klein (2 participants each trip, travelers may vary) will travel from Anchorage to Aniak for gage maintenance six times during open water:

- Airfare: 2 tickets/trip @ \$500/ticket x 6 trips = \$6,000
- Lodging: 2 nights/trip @ \$200/night x 2 people x 6 trips = \$4,800
- Meals per diem: 3 days/trip @ \$60/day x 2 people x 6 trips = \$2,160

Line 300: Contractual (\$10,000)

- Air charter for reconnaissance trip: \$1,000
- Boat rentals for reconnaissance, gage installation, and maintenance: 12 trips @ \$150/trip = \$1,800
- Snow machine rentals: 3 snow machines/trip @ \$100/machine x 4 trips = \$1,200
- Air freight for excess baggage: 15 trips @ \$400/trip = \$6,000

Line 400: Supplies (\$9,000)

- Pressure transducers: 2 transducers @ \$2,000/transducer = \$4,000
- Rugged reader for pressure transducer: \$800
- Water temperature logger: 2 loggers @ \$100/logger = \$200
- Boat and snow machine gas and oil: 20 uses @ \$150/use = \$3,000
- Field supplies (e.g. installation/repair tools, streamgage housing materials): \$1,000

Line 500: Equipment (\$29,400)

- Acoustic doppler current profiler (flow measurement instrument): \$29,400

## XII. Match Budget

ADF&G SF Match Budget	Total
100 Personnel	\$32,228
200 Travel	\$0
300 Contractual	\$0

400 Supplies	\$0
500 Equipment	\$0
Total	\$32,228

ADF&G SF Match Budget Narrative:

Line 100: Personnel (\$32,338)

- Ann Marie Larquier, Habitat Biologist III, will implement and administer the project; install and maintain streamgages; prepare, review, and adjudicate reservation of water applications; and prepare and review gaging operational plans and reports: 1.5 months @ \$8,237/month = \$12,356.
- Leah Ellis, Habitat Biologist I, will install and maintain stream gages; prepare and review reservation of water applications; and prepare and review gaging operational plans and reports: 3 months @ \$6,624/month = \$19,872.

### XIII. References

- Alaska Department of Natural Resources (DNR). 1988. Kuskokwim area plan for state lands. Division of Land and Water Management. May, 1988.
- Annear, T., I. Chisholm, H. Beecher, A. Locke, and 12 other authors. 2004. Instream flows for riverine resource stewardship, revised edition. Instream Flow Council. Cheyenne, WY.
- Arthington, A.H., S.E. Bunn, N.L. Poff, and R.J. Naiman. 2006. The challenge of providing environmental flow rules to sustain river ecosystems. *Ecological Applications* 16 :1311-1318.
- Estes, C. C., and J. F. Orsborn. 1986. Review and analysis of methods for quantifying instream flow requirements. *Water Resources Bulletin*. 22(3):389-398.
- Klein, J. 2013. Surface-water data manual for the statewide aquatic resources coordination unit. Alaska Department of Fish and Game, Special Publication No. 13-05, Anchorage.
- Lytle, D.A., and N.L. Poff. 2004. Adaptation to natural flow regimes. *Trends in Ecology and Evolution* 19:94-100.
- Poff, N.L., J.D. Allen, M.B. Bain, J.R. Karr, K.L. Prestergaard, B. Richter, R. Sparks, and J. Stromberg. 1997. The natural flow regime: a paradigm for river conservation and restoration. *Bioscience* 47:769-784.
- Rantz, S.E., and others. 1982. Measurement and Computation of Streamflow. USGS Water Supply Paper 2175.