

**Alaska Sustainable Salmon Fund
Statement of Work**

Revision #3: Revise ADF&G budget table for indirect

I. Project Title: Caswell and Lucille Creeks Fish Passage Restoration

II. Project Number: 44213

III. Principal Investigator

Gillian O’Doherty
Alaska Department of Fish and Game
Division of Sport Fish, RTS
333 Raspberry Road,
Anchorage, AK 99518
907-267-2146
gillian.odoherty@alaska.gov

Co-Principal Investigators

Jim Jensen, O&M Division Manager
Matanuska-Susitna Borough
Department of Public Works
Operations and Maintenance
350 Dahlia Ave.
Palmer, AK 99645
907-745-9817
james.jenson@matsugov.us

Heather Hanson, P.E., Fish Passage Engineer
U.S. Fish and Wildlife Service
4700 BLM Road
Anchorage, AK 99507
907-271-6647
heather_hanson@fws.gov

IV. Project Period: 4/1/17 - 11/30/19

V. AKSSF Objective: 1B-2 **PCSRF Objective:** HP&R

VI. Project Description

1. Synopsis

This project is a partnership between the Alaska Department of Fish and Game (ADF&G), the Matanuska-Susitna Borough (MSB), the Mat-Su Salmon Partnership, and the U.S. Fish and Wildlife Service (USFWS) to replace five fish passage barriers in the Matanuska-Susitna Valley with fish-friendly culverts. Four of the barriers are on the Caswell Lakes system and collectively block both juvenile and adult salmon from passing upstream; the remaining culvert is on Lucille Creek, an important spawning and rearing

tributary to Meadow Creek, which is a partial barrier to the upstream movement of juveniles and likely adults and the downstream movement of juveniles. In total, the project will restore or improve access to 13.74 km of stream habitat, including 3.6 km of catalogued anadromous habitat, and 17 hectares of lake habitat encompassing 3.54 km of shoreline.

2. Introduction

The MSB is one the most populous and rapidly growing areas of Alaska. Between 2000 and 2005, the MSB grew by 25 percent and exceeded 80,000 residents by 2007. ADF&G identified and assessed over 580 road-stream crossing sites for fish passage throughout the MSB between 2009 and 2011 through AKSSF project 45878, *Mat-Su Basin Fish Passage Inventory*. Approximately 52% of these culverts were rated as red, or likely barriers to juvenile fish passage, and 18% as gray, or partial barriers. Culverts impede access to an estimated 1,019 km of upstream habitat, including 344 km of catalogued anadromous waters and 2,670 ha of lakes.

Most fish passage barriers in the MSB primarily affect the movement of juvenile fish, but development in the Caswell subdivision has also prevented adult fish access to the Caswell Lakes for decades. ADF&G trapping efforts in 2009, 2011, and 2015 and USFWS trapping in 2016 did not find any salmonids above Caswell Lakes Road. A project in 2012 replaced the lowest barrier at Hidden Hills Road (ADFG site #20501464) and adult coho were observed to move into the newly opened habitat that fall. Juvenile salmonids were observed by ADF&G and USFWS biologists the following fall immediately below the next barrier in the system. At this time there are four remaining culverts that collectively impede access to 10.14 km of stream habitat and two lakes (ADFG site #20501520 at Silver Salmon Drive, #20501461 at Caswell Lakes Road, and #20501514 and #20501515 on Shaman Road). The lowest culvert at Silver Salmon Drive (#20501520) appears to pass adults at some flows, as juvenile coho were found above it on one occasion. No salmon have been found above Caswell Lakes Road (#20501461). This project will remove and replace all of those crossing structures with stream simulation structures.

In addition, this project will replace a culvert on Lucille Creek (ADFG site #20501154) that impedes both upstream and downstream movement of juvenile and adult fish. Lucille Creek is a tributary to Meadow Creek/Big Lake and provides important spawning and rearing habitat. During an April 2016 site visit, ADF&G biologists trapped juvenile coho and Chinook salmon at the site, suggesting they overwinter in the system. This culvert is undersized and was installed using smooth pipe which is particularly hard for fish to pass. It has been observed to go dry or almost dry in the summer months. The upper reaches of Lucille Creek were observed to be dry in 2015 by ADF&G staff and dead juvenile salmonids were observed. Improving connection to perennial wetlands and flowing stream reaches downstream will increase the ability of these fish to survive and smolt. In addition, there is an ATV crossing that impacts the channel and adjacent wetlands at the site.

The MSB, USFWS, and ADF&G selected the sites and developed the project. The MSB will contract the engineering, project management, and construction and USFWS and

ADF&G will review and approve designs. ADF&G will provide post-project monitoring including monitoring fish use of newly opened areas and will collect and disseminate information on the projects to the public via the ADF&G Fish Resource Monitor website at <http://extra.sf.adfg.state.ak.us/FishResourceMonitor/?mode=awc> and public workshops.

3. Locations

Caswell sites:

- South Silver Salmon Drive and Caswell Creek tributary, ADF&G site #20501520: 61.99387, -149.96294
- Caswell Lakes Road and Caswell Creek tributary, ADF&G site #20501461: 62.00057, -149.95615
- Shaman Road and Caswell Creek tributary, ADF&G site #20501514: 62.01782, -149.94847
- Shaman Road and Caswell Creek tributary, ADF&G site #20501515: 62.01909, -149.94826

Lucille Creek and Foothills Blvd., ADF&G site #20501154: 61.56167; -149.57139

4. Related Projects

N/A

VII. Objectives

Replace five fish passage barriers with stream simulation crossings at the following locations:

Road	Stream	ADF&G site ID	Kilometers upstream to next barrier	Lake hectares upstream to next barrier	Kilometers of lake shoreline
South Silver Salmon Drive	Caswell Creek tributary	20501520	0.8	13	2.25
Caswell Lakes Road	Caswell Creek tributary	20501461	2.08	4	1.29
Shaman Road	Caswell Creek tributary	20501514	5.26		
Shaman Road	Caswell Creek tributary	20501515	2		
Foothills Blvd.	Lucille Creek	20501154	3.6		
	Total		13.74	17	3.54

VIII. Methods

At each of the selected sites, detailed engineering drawings will be developed and reviewed by the MSB, USFWS, and ADF&G. Upon approval of the engineering design, all permit applications necessary for project implementation will be submitted for review and approval by the MSB. Concurrently, a request for project bids and quotations will be developed from which a contractor will be hired by the MSB. The contractor will remove the existing culvert, install the stream simulation culvert to achieve the identified objective, and complete any stream bank stabilization work needed. ADF&G and USFWS will carry out site visits during

construction to determine compliance to the original design plan and post-project monitoring to document fish utilization of the new culvert. ADF&G will also carry out post-project monitoring to observe recolonization of areas currently unoccupied by salmon.

All culvert designs will be stream simulation, a method of constructing crossings that mimics natural channel dimensions and processes through the culverted reach in order to maintain similar passage conditions to those in the nearby channel. A variety of guidelines for stream simulation type crossings have been produced in recent years; this project will largely follow the guidelines within the USFS stream simulation publication "An ecological approach to providing passage for aquatic organisms at road-stream crossings" (USFS 2008). This approach is based on selecting an appropriate reference reach and basing the design on specific measurements taken there.

To the extent practical, the final designs will conform to the following guidelines:

- **Size:** The diameter of the culvert will be at least 20% greater than the stream's natural ordinary high water width. For narrow channels with wide floodplains, additional overflow culverts will be considered.
- **Gradient:** The culvert gradient will be within 1% of the natural stream gradient.
- **Embeddedness:** Culverts will be embedded no less than 20% below the naturally projected bed scour depth and no more than 40% of the diameter of the culvert.
- **Substrate:** Culverts will be back-filled with the same size and size fraction of sediment as the naturally occurring stream sediment, but be dynamically stable up to the 50-year event.
- **Low Flow Channel:** Care will be given to mimic stream conditions during low flow conditions such that the low flow channel within the culvert has similar depth and velocity to the natural stream. Often this requires utilizing substrate to mimic the stream bank lines within the culverts.
- **Capacity:** The culverts will pass a 100-year storm flow at less than 100 percent of the culvert's height. This allows for passage of other watershed products (large wood, debris, and substrate) during extremely high flows.
- **Channel:** The project will maintain or construct stable stream banks upstream and downstream of the crossing to prevent scour and sedimentation.

After construction, ADF&G staff will survey the sites using its standard criteria for assessing juvenile passage at stream crossings. The criteria for a stream simulation type crossing are based on the hydrologic characteristics of the stream through the road prism being consistent with the natural stream conditions in adjacent reaches. ADF&G bases the classification primarily on three criteria used to rank the crossings for passage:

- (1) **Slope:** Channel slope through the crossing should be +/- 1% of natural stream gradient
- (2) **Perch:** No perch (or fall at culvert outlet)
- (3) **Constriction:** At ordinary high water there should be no constriction of the stream channel by the crossing.

ADF&G will post all post-construction monitoring data on the Fish Resource Monitor along with information on the design and construction of the replacement project to aid other

practitioners. This includes design drawings and other project specific information and the results of fish sampling.

IX. Benefits

This project will restore free and clear movement of juvenile and adult salmonids at five road crossings, increasing the overall amount of habitat available to salmon in the Matanuska-Susitna Borough by 13.74 km of stream habitat and 17 hectares of lake habitat; one crossing will also improve downstream access to productive habitats (including wetlands) for rearing juveniles. Appropriately sized culverts will also pass debris and sediment as well as water at the 100-year flood which will greatly reduce the likelihood of catastrophic road failures introducing large volumes of sediment into streams. Stream simulation crossings are also more stable and less prone to bank scour, channel incision, or sediment accretion at a rate greater than the rest of the channel, thereby maintaining salmonid habitat.

X. Products, Milestones, and Timelines

- May 2016 - December 2016: Carry out survey work; select project engineering consultant; prepare engineering plans, drawings, and contractor bid package (funded separately)
- October 2016 - March 2017: Initiate project permit reviews (U.S. Army Corps of Engineers (COE), Alaska Department of Natural Resources (DNR), MSB) and coordinate project review (right of way, permitting, maintenance, and engineering) for the first year of construction (funded separately)
- May - July 2017: Carry out construction at Foothills Blvd. and both Shaman Road culverts; carry out survey and design work on remaining culverts
- September 2017 - March 2018: Initiate project permit reviews (COE, DNR, MBS) and coordinate project review (right of way, permitting, maintenance, and engineering) for the second year of construction
- May - July 2018: Complete construction; monitor for fish use of previously unoccupied habitats and locations
- August 1 – September 30, 2018: Continue post-construction surveys
- October 1, 2017 – November 2018: Complete post-construction monitoring; update ADF&G’s Fish Resource Monitor; add information on design and construction to ADF&G’s website
- December 2018: Provide final report to AKSSF

XI. Budget

Revision #3 reduces line 100 and increases line 600 in the ADF&G budget to accommodate a change in indirect policy.

Summary Budget	Total
100 Personnel	\$6,506
200 Travel	\$0
300 Contractual	\$355,000
400 Supplies	\$0
500 Equipment	\$0

Subtotal	\$361,600
600 Indirect	\$1,480
Total	\$362,986

This project funds the following entities:

- ADF&G SF: \$7,986
- MSB: \$355,000

ADF&G SF Budget

ADF&G SF Budget	Total
100 Personnel	\$6,506
200 Travel	\$0
300 Contractual	\$0
400 Supplies	\$0
500 Equipment	\$0
Subtotal	\$6,506
Expenses not subject to indirect	\$0
600 Indirect	\$1,480
Total	\$7,986

ADF&G SF Budget Narrative:

Line 100: Personnel (\$6,506)

Mark Eisenman, Habitat Biologist II, will perform post-project monitoring fish surveys and update ADF&G's website: 1 month @ \$6,600/month = \$6,600.

Line 600: indirect (\$1,480) *Revised with Revision #3*

ADF&G's federally negotiated indirect rate through June 30, 2018, is 22.74% on salaries and wages including fringe benefits; this rate will be claimed through June 30, 2019 per ADF&G policy.

MSB Budget

MSB Budget	Total
100 Personnel	\$0
200 Travel	\$0
300 Contractual	\$355,000
400 Supplies	\$0
500 Equipment	\$0
Total	\$355,000

MSB Budget Narrative:

Line 300: Contractual (\$355,000)

Fish passage construction per the table below:

- FY17 (through June 30, 2017): \$300,000
- FY18 (July 1, 2017 - June 30, 2018): \$55,000

ADFG #	Culvert	Road	Cost
20501520	Caswell Creek tributary	Silver Salmon Dr.	\$30,000
20501461	Caswell Creek tributary	Caswell Lakes Rd.	\$140,000
20501514	Caswell Creek tributary	Shaman Rd.	\$30,000
20501515	Caswell Creek tributary	Shaman Rd.	\$30,000
20501154	Lucille Creek	Foothills Rd.	\$125,000
Total			\$355,000

XII. Match Budget

MSB Match Budget	Total
100 Personnel	\$0
200 Travel	\$0
300 Contractual	\$127,046
400 Supplies	\$0
500 Equipment	\$0
Total	\$127,046

MSB Match Budget Narrative:

Line 300: Contractual (\$127,046)

Fish passage construction per the table below:

- FY17 (through June 30, 2017): \$127,046

ADFG #	Culvert	Road	Cost
20501520	Caswell Creek tributary	Silver Salmon Dr.	
20501461	Caswell Creek tributary	Caswell Lakes Rd.	\$100,000
20501514	Caswell Creek tributary	Shaman Rd.	
20501515	Caswell Creek tributary	Shaman Rd.	
20501154	Lucille Creek	Foothills Rd.	\$27,046
Total			\$127,046

XIII. References

United States Forest Service (USFS). 2008. "Stream Simulation: An Ecological Approach to providing passage for aquatic organisms at road-stream crossings." United States Forest Service Stream-Simulation Working Group in partnership with the US Dept of Transportation, Federal Highway Administration

Coordinated Federal Lands Highway Technology Implementation Program,
National Technology and Development Program, San Dimas, CA.