



State of Alaska
Department of Fish and Game
Division of Sport Fish

Nomination Form
Anadromous Waters Catalog

Region Southcentral USGS Quad(s) Seward A-3
Anadromous Waters Catalog Number of Waterway 226-40-16670
Name of Waterway Evans Creek * Anderson ☐ USGS Name ☒ Local Name
☒ Addition ☐ Deletion ☐ Correction ☐ Backup Information

For Office Use

Nomination # <u>120321</u>	<u>[Signature]</u> Fisheries Scientist Date <u>11/2/12</u>
Revision Year: <u>2013</u>	<u>[Signature]</u> Habitat Operations Manager Date <u>11/2/12</u>
Revision to: Atlas _____ Catalog _____ Both <u>X</u>	<u>[Signature]</u> AWC Project Biologist Date <u>9/19/12</u>
Revision Code: <u>B-1</u>	<u>SP6</u> Cartographer Date <u>11/13/12</u>

OBSERVATION INFORMATION

Species	Date(s) Observed	Spawning	Rearing	Present	Anadromous
Coho Salmon (100)	7/14-15/2009		X		<input checked="" type="checkbox"/>
Dolly Varden	7/14-15/2009			X	<input type="checkbox"/>
					<input type="checkbox"/>
					<input type="checkbox"/>
					<input type="checkbox"/>

IMPORTANT: Provide all supporting documentation that this water body is important for the spawning, rearing or migration of anadromous fish, including: number of fish and life stages observed; sampling methods, sampling duration and area sampled; copies of field notes; etc. Attach a copy of a map showing location of mouth and observed upper extent of each species, as well as other information such as: specific stream reaches observed as spawning or rearing habitat; locations, types, and heights of any barriers; etc.

Comments

Add coho salmon Rearing to stream
HDR Alaska, Inc. conducted fish sampling to document fish presence in Evans Creek. The sampling was conducted to evaluate a proposed hydropower project for Chegega Corporation. See the October 2009 Report.

name changed per rev 12-174

Name of Observer (please print): Will Frost, Habitat Biologist
Signature: [Signature]
Agency: ADF&G, Division of Habitat
Address: 333 Raspberry Road
Anchorage, AK 99518

Date: 6/4/2012
8/30/2012

This certifies that in my best professional judgment and belief the above information is evidence that this waterbody should be included in or deleted from the Anadromous Waters Catalog.

Signature of Area Biologist: _____ Date: _____ Revision 05/08
Name of Area Biologist (please print): _____

*Chenega Bay
Hydroelectric Feasibility Study*

Reconnaissance Report

Prepared for:

**Chenega Corporation
3000 C Street, Suite 301
Anchorage, Alaska 99503**

Prepared by:



**HDR Alaska, Inc.
2525 C Street, Suite 305
Anchorage, Alaska 99503**

October 2009

1 Introduction

The Chenega Corporation contracted with HDR Alaska, Inc. to evaluate the feasibility of a small-scale hydroelectric project to service the village of Chenega Bay on Evans Island, Alaska (Figure 1.1). This reconnaissance report examines the viability of small-scale hydroelectric energy generation primarily at the creek that provides the water source for the community. A second site was evaluated during the reconnaissance but was not considered viable due to access constraints.

The scope of work defined for this project included:

- Data collection and review;
- Field reconnaissance and field reconnaissance memo;
- Evaluation of hydrology and collection of streamflow data;
- Development of conceptual project layout;
- Estimation of energy production and project costs;
- Permit assessment and wetlands evaluation;
- Preparation of this reconnaissance report.

This report should be considered a high-level overview intended to identify projects which demonstrate a basic measure of feasibility and to eliminate projects that have evident fatal flaws from an engineering and environmental perspective; this report also provides information to enable Chenega to determine the economic feasibility of a project and to pursue funding for future phases of the project.

1.1 Project Area

The project is located within the community of Chenega Bay Alaska (pop. 79). Chenega Bay is located on Evans Island at Crab Bay, 42 miles southeast of Whittier in Prince William Sound. It is 104 air miles southeast of Anchorage and 50 air miles east of Seward. It lies at approximately 60.065710 North Latitude and 148.010380 West Longitude (Sec. 24, T001S, R008E, Seward Meridian.)

The primary creek investigated for this project was a small creek that flows into Sawmill Bay at the community of Chenega Bay. This creek is locally known as Anderson Creek. Also investigated during the site reconnaissance was a small creek with a lake on the south side of Evans Island. This creek will be called South Lake Creek for the purposes of this report.

*Evans Creek
in AWC*

The Anderson Creek watershed drains steep terrain from the ridgeline of Evans Island, contains no lakes, and has no major tributaries. There is an existing water supply dam and intake approximately 0.6 miles upstream of the mouth of the creek at elevation 248 feet. This water system was constructed in 1984 by the U.S. Public Health Service (PHS) and the water treatment plant was recently renovated by the Alaska Native Tribal Health Corporation (ANTHC). The drainage area at the ANTHC intake is 0.45 square miles in area. Between the ANTHC intake and the community of Chenega there is a large waterfall and three abandoned timber dams constructed atop smaller natural falls. Between the community of Chenega and the mouth of the creek there is another small waterfall.

South Lake is at an elevation of approximately 600 feet above sea level and has a 0.54 square mile drainage area. The outlet creek that drains South Lake flows through steep terrain, primarily across bedrock, before reaching sea level, roughly one mile from the lake. A steep waterfall is located approximately 0.3 miles upstream from the mouth. A wetland complex is on the east side of the stream near the mouth. The South Lake watershed has no major tributaries.

1.2 Previous Studies

The hydroelectric potential at Chenega was evaluated in 1992 (Phukan Consulting Engineers and Associates for the Alaska Energy Authority). This investigation concluded that a project on Anderson Creek was technically feasible and would generate power at a unit cost of \$0.61 per kWh (1992 dollars). The main body (excluding photograph attachments) of the 1992 report is included in Appendix A.

The hydroelectric potential at South Lake was evaluated in 1982 (Alaska District, USCOE, Regional Inventory and Reconnaissance Study for Small Hydropower Projects Southcentral Alaska). This investigation estimated that a project on Section 22 Lake (South Lake) would generate power at a unit cost of \$0.72 per kWh (1982 dollars). The section of the 1982 report pertaining to Section 22 Lake is also included in Appendix A.

2 Field Reconnaissance

2.1 July Field Reconnaissance

A field reconnaissance was done on July 14-15, 2009. The purpose of the field reconnaissance was to evaluate the feasibility of constructing a small hydroelectric project to service the village of Chenega Bay. Reconnaissance was done for two sites that had been identified as potential project locations: Anderson Creek and the South Lake drainage. Anderson Creek drains into Sawmill Bay, while the South Lake drainage is located on the opposite side of the island and empties into Prince of Wales Passage. A separate memorandum, included in Appendix B describes the field reconnaissance and provides an overview map of the two areas visited.

The field team evaluated the following engineering aspects during the field reconnaissance:

- site access;
- potential intake and tailrace locations;

- existing and potential pipeline routes;
- potential powerhouse locations; and
- potential transmission line locations.

Fisheries-related aspects included recording existing fish passage barriers, documenting fish species presence and distribution, and characterizing general fish habitat within each system. The field team relied on minnow traps, hand nets, and visual observations to document fish presence.

2.1.1 Anderson Creek Reconnaissance Summary

Engineering Aspects. Constructing a small hydroelectric project at Anderson Creek appears to be technically feasible, mainly due to ease of access at the Chenega Bay site and existing infrastructure. Preliminary findings indicate the intake for the hydroelectric project could be located at the ANTHC water supply intake dam and the powerhouse could be located adjacent and to the north of the existing diesel powerhouse. A viable route to connect the powerhouse back to the stream (i.e., tailrace) was identified from this point to the adjacent stream channel. The primary technical challenge for the site will be the construction of the upper portion of the pipeline within the narrow confines of the creek ravine.

Fisheries Aspects. At a point approximately 0.1 miles upstream from its mouth, the stream flows through relatively steep bedrock, thereby creating a small bedrock cascade/waterfall. The field team observed young-of-the-year coho salmon (*Oncorhynchus kisutch*) in the lower portion of the stream, downstream from the bedrock falls. Dolly Varden char (*Salvelinus malma*) was the only fish species observed upstream from the bedrock falls. The small falls appears to preclude fish movement past this point; based on local knowledge, salmon have not been observed upstream from the falls (personal communication with Michael Vigil, July 14, 2009).

The field team walked the entire length (roughly 0.45 miles in length) of the creek between the intake and the tailrace. Multiple manmade dams (typically constructed at natural falls) and natural falls considered to be fish passage barriers were documented in the upstream portion of this reach. The most downstream fish passage barrier encountered was approximately 0.65 miles upstream from the mouth (i.e., approximately 0.2 miles upstream from the proposed tailrace or 0.25 miles downstream from the ANTHC intake).

The farthest upstream Dolly Varden was observed approximately 0.35 miles upstream from the mouth. Although not documented, the presence of Dolly Varden upstream from this point but downstream of the lowest manmade dam (noted above) is likely.

2.1.2 South Lake Reconnaissance Summary

Engineering Aspects. Constructing the pipeline/road corridor would be difficult due to the steep terrain in the area. Access is also complicated because of the lack of an existing connection to the village of Chenega Bay. Access or a pipeline would not be possible up the stream channel or to its west side, due to steep terrain. It may be possible to divert the lake water to the north and construct a route east of the creek, if the lake level was raised and a dam was constructed at the natural outlet channel. However, the terrain east of the creek may be too steep for an access road. Although constructing a small hydroelectric facility is possible in this location, our general

8 Environmental Considerations

The following presents a general overview of potential expected environmental considerations for a hydroelectric project at Anderson Creek. This section describes fish resources and wetlands which are considered to be the primary considerations.

For the purposes of this reconnaissance report, HDR Alaska did not conduct any environmental work beyond the two reconnaissance visits.

8.1 Fish Resources

Background and Purpose

Anderson Creek is listed by the Alaska Department Fish and Game (ADF&G) Anadromous Waters Catalog (AWC) as providing habitat for sockeye salmon (*O. nerka*) to a point approximately 0.45 miles upstream from its mouth (ADF&G 2009a). According to Mr. Vigil, a resident of the village¹, pink (humpy; *O. gorbuscha*) and chum salmon (dog; *O. keta*) spawn in the lower reaches of the creek; however, sockeye (red) salmon do not enter Anderson Creek. Mr. Vigil also indicated that salmon do not migrate upstream of a small waterfall approximately 0.1 miles upstream from the mouth and downstream of the road crossing (Figure 8.1).

The purpose of the fisheries-related reconnaissance level field surveys was to document fish species presence and distribution; record existing fish passage barriers, and characterize general fish habitat in Anderson Creek at the time of the survey. Information contained in this report is based on the reconnaissance level field work (July 14-15 and October 14-15, 2009); interviews with a local resident of Chenega Village (i.e., Michael Vigil); and correspondence with ADF&G biologists (i.e., Samuel Hochhalter and Steve Moffitt).

Study methods were reviewed by ADF&G and fish resource permit (FRP) SF2009-219d-1 was issued by ADF&G prior to the team conducting fieldwork. The sampling plan, FRP application, and FRP are provided in Appendix F.

Field Methods

The field team relied on minnow traps, hand nets, underwater observations, and visual (ground) observations to document fish presence. The field team set ¼-inch mesh minnow traps baited with commercially processed salmon eggs. Traps were set in Anderson Creek from its mouth upstream to the ANTHC intake structure. Traps were fished for varying periods of time, ranging from less than one hour to overnight. However, most traps were fished overnight.

The field team relied on visual observations and hand nets in areas where habitat conditions precluded the effectiveness of minnow traps and underwater observations (i.e., shallow areas). Polarized sunglasses were used to maximize the effectiveness of this approach. Captured fish were identified to species and counted before being returned live near the point of capture. The

¹ Personal communication with Michael Vigil, August 14, 2009.

field team also recorded fish fork lengths (i.e., fork of the tail to the nose) for most of the fish captured. The field team recorded global positioning system (GPS) locations for each sample site, and documented general habitat and stream channel characteristics. Field photographs representative of habitat conditions in Anderson Creek are shown in Figure 8.1.

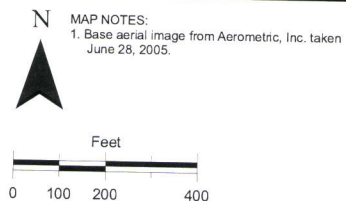
Results

In July, the field team set a total of 14 minnow traps in Anderson Creek and visually inspected the stream for fish presence from the mouth to the ANTHC intake site. Traps were fished from the mouth of Anderson Creek to just downstream of the proposed tailrace, and upstream of a fish barrier (Figure 3). The traps captured Dolly Varden char (n=39) and Sculpin (n=1) and the field team used hand nets to capture young-of-the-year coho salmon. All coho salmon (i.e., estimated n=100) and the Sculpin were observed in the downstream portion of Anderson Creek, near or within the limits of tidal influence. Dolly Varden fork lengths ranged from 76 mm to 170 mm (mean=124 mm). Fish capture results are presented in Appendix F. The team also identified probable fish passage barriers: one in the lower portion of Anderson Creek (i.e., downstream from the road crossing) and a series of falls between the tailrace and the intake, as discussed below.

In October, the field team returned to further assess fish presence within the reach between the intake and the tailrace, and to determine the upstream extent of fish presence in Anderson Creek. The team set a total of 21 traps within the reach between the intake and the tailrace. Traps were fished overnight in the vicinity of the tailrace site, upstream throughout the reach between the intake and the tailrace, and downstream and upstream of a series of manmade dams and natural falls (Figure 3). The traps captured Dolly Varden (n=84) exclusively. The field team measured Dolly Varden fork lengths; fork lengths ranged from 63 mm to 160 mm (mean=103 mm).

In the upstream portion of the reach between the intake and the tailrace, the team recorded GPS locations for a series of manmade dams (typically constructed at natural falls) and natural falls. The field team set traps upstream and downstream of each manmade dam and/or falls to confirm whether or not any of the falls act as passage barriers to fish; and to determine the upstream extent of fish use in Anderson Creek. The traps captured Dolly Varden char immediately downstream of the lower falls; however, no fish were captured in any of the traps (n=6) set upstream from this point in October. Additionally, no fish were captured from traps (n=8) set above this point in July.

The base of the downstream (i.e., nearest to the tailrace) falls and associated dam in the reach between the intake and the tailrace was found to be the upstream extent of fish in Anderson Creek (Figure 3). The natural falls and associated timber dam, measured to be approximately 14 feet high, is located approximately 0.65 miles upstream from the mouth (i.e., approximately 0.2 miles upstream from the tailrace or 0.25 miles downstream from the ANTHC dam).



- LEGEND**
- ✕ Fish passage barrier
 - Dolly Varden captured
 - No fish captured
 - overflow channel
 - Anadromous reach: coho salmon rearing
 - Dolly Varden char presence confirmed
 - Fish not present upstream of barriers 2 through 5
 - Proposed intake access road

Fisheries Resources

Chenega Bay Hydroelectric Project

Reconnaissance Report

Figure 3



STATE OF ALASKA
DEPARTMENT OF FISH AND GAME

P.O. BOX 115525
JUNEAU, ALASKA 99811-5525

Permit #: **SF2009-219**

Expires: **12/31/2009**

Collections Report Due: **1/31/2010**

FISH RESOURCE PERMIT
(For Scientific/Educational Purposes)

This permit authorizes **Erin Cunningham** (whose signature is required on page 2 for permit validation)
person

of **HDR Alaska Inc.** at **2525 C Street, Anchorage, AK 99501**
agency or organization address

to conduct the following activities from **July 14, 2009** to **December 31, 2009** in accordance with AS 16.05.930:

Purpose: To conduct an initial reconnaissance of the fisheries resources on target streams that are being considered for their hydroelectric potential.

Location: Evans Island in Prince William Sound

Species Collected: Local species

Method of Capture: Minnow trap, dip net, hook-and-line

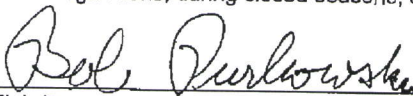
Final Disposition: ≤50 of each species at each site may be collected, identified and released.
All unintended mortalities must be recorded and returned to the capture site.

-Continued on Back-

COLLECTIONS REPORT DUE January 31, 2010. The report, using a data submission form furnished by ADF&G, shall include species, numbers, dates, and locations of collection (datum/GPS coordinates in the decimal degrees format (dd.ddddd)) and disposition, and if applicable, sex, age, and breeding condition, and lengths and weights of fish. It must also include the date/time the local biologist was contacted for final authorization to carry out collecting activities. A completion report (abstract, background, methods, data, analysis), if not submitted with the collection report described above, must be submitted to the department by: **June 2010**. Data from such reports are considered public information. The report shall also include other information as may be required under the permit stipulations section.

GENERAL CONDITIONS, EXCEPTIONS AND RESTRICTIONS

1. This permit must be carried by person(s) specified during approved activities who shall show it on request to persons authorized to enforce Alaska's fish and game laws. This permit is nontransferable and will be revoked or renewal denied by the Commissioner of Fish and Game if the permittee violates any of its conditions, exceptions or restrictions. No redelegation of authority may be allowed under this permit unless specifically noted.
2. No specimens taken under authority hereof may be sold or bartered. All specimens must be deposited in a public museum or a public scientific or educational institution unless otherwise stated herein. Subpermittees shall not retain possession of live animals or other specimens.
3. The permittee shall keep records of all activities conducted under authority of this permit, available for inspection at all reasonable hours upon request of any authorized state enforcement officer.
4. Permits will not be renewed until the department has received detailed reports, as specified above.
5. **UNLESS SPECIFICALLY STATED HEREIN, THIS PERMIT DOES NOT AUTHORIZE the exportation of specimens or the taking of specimens in areas otherwise closed to hunting and fishing; without appropriate licenses required by state regulations; during closed seasons; or in any manner, by any means, at any time not permitted by those regulations.**


Fish Resource Permit Coordinator
Division of Sport Fish


for Director
Division of Sport Fish

7-10-09
Date

• **SF2009-219 continued (page 2 of 2)**

Authorized Personnel: The following persons may perform collecting activities under terms of this permit:

Bob Butera, Eric Cunningham

Employees and volunteers under the direct supervision of, and in the presence of, one of the authorized personnel listed above may participate in collecting activities under terms of this permit.

Permit Stipulations:

- 1) The local Assistant Area Management Biologist (AMB), Sam Hochhalter (424-3212; Samuel.Hochhalter@alaska.gov) Cordova, must be notified prior to you engaging in any collecting activities. The time/date of this contact must be included in your collections report (using the "data submission form" furnished by ADF&G). This AMB has the right to specify methods for collecting, as well as limiting the collections of any species by number, time and location.
- 2) A valid Alaska sport-fishing license must be in the possession of any individual using hook-and-line gear.
- 3) Any instance of >25% unintended collecting mortality requires sampling to cease immediately and the AMB contacted.
- 4) Each piece of unattended sampling gear must be; 1) labeled with the permittee's name, telephone number, and permit number, 2) securely tied to substrate, 3) allowed to soak no more than twenty-four hours at a time, 4) located with GPS coordinates, and 5) accounted for/ removed at the conclusion of sampling.
- 5) Salmon eggs used as bait in traps must either be; sterilized commercial eggs or, if raw, be disinfected prior to use. A 10-minute soak in 1/100 Betadine solution or some other iodophor disinfectant is adequate.
- 6) If anadromous fish species new to permitted streams and rivers are found, the permit holder will work closely with ADF&G to see that information is included in the database for the *Catalog of Waters Important for Spawning, Rearing or Migration of Anadromous Fishes*. Anadromous fish include *Oncorhynchus* spp., Arctic char, Dolly Varden, sheefish, smelts, lamprey, whitefish, and sturgeon. Please direct questions to J. Johnson, 267-2337 or j.johnson@alaska.gov
- 7) Atlantic salmon and other non-native invasive aquatic species encountered should be killed. Contact the nearest AMB (**Stipulation #1**) immediately with species identification or description, capture or sighting location, number captured, size, and sex. Preserve/turn in the whole specimen to the nearest ADF&G office.
- 8) *A copy of this permit, including any amendments, must be made available at all field collection sites and project sites for inspection upon request by a representative of the department or a law enforcement officer.*
- 9) Issuance of this permit does not absolve the permittee from compliance in full with any and all other applicable federal, state, or local laws, regulations, or ordinances.
- 10) A report of collecting activities, referenced to this fish resource permit number, must be submitted to the Alaska Department of Fish and Game, Division of Sport Fish HQ, P.O. Box 115525, Juneau, AK 99811-5525, Attention: Bob Piorkowski (465-6109; Robert.Piorkowski@alaska.gov), and to the Biologist listed under Stipulation #1 within 30 days after the expiration of this permit. This report must summarize the number of fish captured by date, by location (provide GPS coordinates and datum), and by species, and the fate of those fish. Fish length, weight, sex, and age data should be included if collected. A completion report (abstract/background/methods /data/analysis), if not submitted with the collection report described above, must be submitted to the department within six months of the expiration of the permit. Data from such reports are considered public information. A report is required whether or not collecting activities were undertaken.

PERMIT VALIDATION requires permittee's signature agreeing to abide by permit conditions before beginning collecting activities:

Signature of Permittee

cc: Sam Hochhalter, Division of Sport Fish, Cordova
Dan Bosch, Division of Sport Fish, Anchorage
Bert Lewis, Division of Commercial Fisheries, Cordova
Mike Daigneault, Division of Habitat, Anchorage
Fish and Wildlife Protection, Palmer

add coho salmon rearing to 226-40-16670

COr

