PROJECT DESCRIPTION

LOCATION

The Goat Lake Hydroelectric Project is located approximately 6.5 miles northeast of Skagway, Alaska. The lake is situated in a perched cirque valley at El 2925. The lake lies east and south of the Skagway River. The drainage basin for Goat Lake and Pitchfork Falls Creek includes 4.2 square-miles. The lake is fed by a glacier at its south end. The glacier covers about 1.7 square miles, contributing approximately 80-85% of its runoff to the lake. The glacier terminates near the south end of the lake in a coarse rubble moraine, consisting principally of large angular granitic blocks. The lake outlet, located about 300 feet north of the end of the moraine, flows through a bedrock notch and contributes the major portion of the water flow in Pitchfork Falls. After the falls this same water then joins the Skagway River.

PROJECT DESCRIPTION

The Goat Lake Hydroelectric Project is a storage project with a 4.0 MW capacity that is usually block loaded, but sometimes operated as load following. The lake is used as a reservoir without any dam. The lake continues to have an uncontrolled spillway using the original outlet. A siphon intake extends into the lake a horizontal distance of 369-feet to obtain 185-feet of submergence, or an elevation of 2740, potentially drawing the lake down to the approximate elevation 2885 at peak use, during the winter. The intake, consisting of a v-shaped wedgewire screen assembly, is connected to the siphon pump by a 30-inch-diameter high density polyethylene chloride (HDPE) penstock which changes to a 28-inch-diameter steel penstock approximately 82-feet before the siphon house. The siphon pump connects with a valve house via a 704-foot-long, 30-inch-diameter HDPE penstock. A catchbasin located at approximately 2,885-feet above mean sea level (msl) catches runoff from the glacier moraine that bypasses the lake. The catchbasin is connected to a pumpback house via an 18-inch-diameter HDPE penstock. The pumpback house draws water from the catchbasin and pumps the water back to the lake via a 16-inch-diameter, 640-foot-long HDPE penstock by using four pumps of various horsepower (HP). The valve house also has a 16-inch bypass flow pipe for when additional water is needed in Pitchfork Falls Creek at certain times of the year. A minimum of 8.5 cfs is required for visual concerns from May 15 – September 30 for 12 hours each day. This is operated via a SCADA system that measures flows and releases or stops releases when required. The valve house also has a 28-inch-diameter HDPE penstock to approximately the 2,610 foot elevation where the penstock transitions to a 24-inch-diameter steel pipe to the powerhouse. At the 990-foot elevation the penstock crosses under the historic White Pass & Yukon Route Railroad (WP&YR-RR) via an approximately 40-foot-long pipe conduit. At the 777-foot elevation the penstock passes through a 48-inch-diameter pipe conduit over the Skagway River, to the west bank, to the powerhouse, at 769-feet above msl.

The powerhouse contains one horizontal shaft Pelton turbine and associated 4.0 MW synchronous generator for a total installed capacity of 4.0 MW. A tailrace transports the turbine discharge approximately 70 feet to the Skagway River. A small substation is located adjacent to the powerhouse. A pole mounted 34.5 kV transmission line begins at the substation and parallels the Skagway River, following the west side for approximately 4,538 feet to a point across from Clifton and ascends to the distribution line from Skagway serving the U.S. Custom's Border Station on the Klondike Highway.

ENVIRONMENT

The lake was stocked with grayling in 1994 by the Alaska Department of Fish & Game, the same year we filed a license application to the Federal Energy Regulatory Commission. After conducting a population survey in 2001-2002 we are currently monitoring the graylings access to their spawning stream to determine if the lake drawdown exposes any barriers to their movement into the stream to spawn. This (2005) is the third year of the five year study. To this point grayling have been observed in the spawning stream every year, indicating there is not a barrier to their movement when the lake is drawn down. Anadromous fish do not get closer than several miles downstream of the project tailrace due to a barrier falls. The penstock offers adequate measures to allow wildlife to move over or under it along its length. No species were considered to be impacted by the construction and operation of this project.

TABLE 2
SUMMARY OF PROJECT FEATURES

Name of Project	Goat Lake Hydroelectric Project, FERC Project No. 11077	
Project Location	Sections 10, 11, 14, 15, and 16; T27S, R60E, CRM. 6.5 miles Northeast of Skagway, Alaska; located in Southeast Alaska. Approximate latitude 59 degrees, 32' and longitude 135 degrees 11'.	
Intake	Submerged wedge wire screen at elevation 2740.	
Reservoir	Name:	Goat Lake
	Surface Elevation:	2925 (elevation as referenced in Commission correspondence of March 28, 1997)
	Surface Area:	204 Acres
	Storage Capacity:	
	Net:	5460 Acre Feet
	Operation:	The net storage will be utilized by siphoning the reservoir down 40 feet to a minimum elevation of 2885.
Siphon	418-foot-long, 30-inch-diameter HDPE penstock and 82-foot-long, 28-inch-diameter Steel penstock with a vacuum pump assembly.	
Catchbasin	8-foot-high by 37-foot-long concrete retaining wall at approximate elevation 2885; impounds 0.014 acre-feet of water.	
Pumpback House	Pump assembly to pump moraine flows back to the lake for regulated storage. 8-foot by 40-foot building will house four pumps of various horsepower. A 640-foot-long by 16-inch-diameter HDPE pipe extends from the pump house to Goat Lake.	
Valve House	8-foot by 20-foot valve house connected with the siphon via a 30-inch-diameter HDPE penstock.	
Penstock	Total Length:	6578 feet
	Diameter and Type:	30-inch HDPE for 704 feet 28-inch HDPE for 959 feet 24-inch Steel for 4,915 feet
Powerhouse	Size:	36-foot by 48-foot by 24 feet high
	Number of Units: One	
	Type of Turbine:	Horizontal Twin-Jet Pelton
	Turbine Rating:	6000 HP
	Flow:	32 cfs
	Head:	
	Gross:	2149
	Friction Loss: 94	Net: 2055
	Power:	6000 HP
	Generator Rating:	4 Megawatts
	Voltage:	4.16 kV
Distribution Line	Voltage:	34.5 kV
	Length:	4,538 feet
	Type:	Overhead on wooden poles
Access	Road from Klondike Highway to the powerhouse	
	Length:	2,990 feet
	Width:	30 feet
Average Annual Energy Production	12,701,000 KWH	

April 14, 2003

FINAL GOAT LAKE HYDRO PROJECT
5-YEAR GRAYLING MONITORING PLAN

Article 409

The licensee shall file with the Commission, for approval, a plan to monitor the lake elevations, inlet stream temperatures, and grayling recruitment for the first 5 years of operation at the authorized 40-foot drawdown (elevation 2, 885 feet mean sea level). The purpose of the plan is to determine if fish passage measures are necessary for providing access for grayling to the inlet stream to Goat Lake.

Plan

- Monitoring of lake elevation is continuously recorded throughout a 24 hour period, 365 days per year.

- A temperature gauge will be installed in the inlet stream, above the normal lake elevation, each spring (May-June) after ice is off of the stream.

- Starting in late June, observations of grayling in the inlet stream, above high water (a full lake), will be made. Once one fish is observed in the inlet stream above high water, observations may cease as the purpose of the monitoring is to determine if they are making it to the inlet stream, or not. Some form of record, i.e. photography or video, will be used to document that a fish has reached the inlet stream spawning area. Observations will also be made to see if any obstructions have developed, or potentially developed, in the inlet stream alluvial channel.

- By October 1, each year of the 5-year monitoring program, a report of the lake elevation correlated with inlet stream temperature and fish observation will be made to USF&WS, USFS, and ADF&G for a 45 day review.

- By the end of each year, of the 5-year monitoring program, the results of the monitoring with agency comments and recommendations will be submitted to the Commission.

- If logistical problems, such as weather or scheduling, prevent the licensee from observing grayling in the inlet stream, the lake will be sampled for young-of-the-year the following spring.

- If fish are not observed on any given year despite field trips to conduct the survey, or if fish passage barriers are observed along with no observations of fish, the licensee shall file with the Commission a fish passage restoration plan developed in consultation with the agencies listed above. This plan shall be filed with the Commission, for approval, within 1 year from when the fish migration problem is identified. Documentation of agency consultation, including recommendations and specific descriptions of how the agencies' comments are accommodated by the plan will be included with the plan.

STATE OF ALASKA

FRANK H. MURKOWSKI, GOVERNOR

DEPARTMENT OF FISH AND GAME

HABITAT AND RESTORATION DIVISION
SOUTHEAST REGIONAL OFFICE

802 3rd street
P.O. Box 240020
Douglas Alaska 99824-0020
Phone 907-465-4289
Fax 907-465-4215

April 8, 2003

Mr. Glen D. Martin
Goat Lake Hydro, Inc.
P.O. Box 222
191 Otto Street
Port Townsend, WA 98368

Dear Mr. Martin:

Re: Goat Lake Hydroelectric Project, FERC Project No. 11077

The Alaska Department of Fish and Game (ADF&G) has reviewed Goat Lake Hydro, Inc.'s (GLHI) March 10, 2003, proposed 5-year grayling monitoring plan. This plan was required pursuant to a February 7, 2003, amendment to the Federal Energy Regulatory Commission (FERC) license for the project (FERC No. 11077). The license amendment allows GLHI to fluctuate Goat Lake stage between elevations 2,925 feet and 2,885 feet mean sea level, a 10-foot greater lake drawdown than previously permitted. We offer the following comments on the draft plan.

Except for the following condition, the proposed plan is consistent with FERC's February 7, 2003, license amendment and conditions recommended by ADF&G, which are contained in the January 24, 2003, supplemental clarification to the final Alaska Coastal Management Program consistency determination.

> "If logistical problems, such as weather or scheduling, prevent the licensee from observing grayling in the inlet stream, the lake will be sampled for young-of-the-year fish the following spring."

We recommend that this condition and contingency procedures for its implementation be included in the Goat Lake monitoring plan. Additionally, please provide copies of the annual reports to the Northern Southeast Area Sport Fish Biologist.

Randy Ericksen
Alaska Department of Fish and Game
Division of Sport Fish
Mile 1 Haines Highway
P.O. Box 330
Haines, Alaska 99827-0330

If you have questions please call Kevin Brownlee (907-465-4276) or the Area Sport Fish Biologist in Haines, Randy Ericksen at 907-766-3638.

Sincerely,

Clayton Hawkes
Hydro-Project Review Coordinator

cc: B. Hanson, H&R-Douglas *
R. Holmes, SF-Douglas *
C. Estes, SF-RTS-Anchorage *
B. Kirkpatrick, H&R-Douglas *
J. Klein, SF-RTS-Anchorage *
K. Brownlee, SF-RTS-Douglas *
R. Ericksen, SF-Haines *
L. Marshall, DGC *
J. Dunker, DNR *
Secretary Salas, FERC-Washington, D.C.
M. Henry, FERC Portland
D. Martin, USFS-Juneau *
S. Brockmann, USFWS-Juneau
R. Enriquez, USFWS-Juneau
S. Selmer, AP&T

* e-mail

GOAT LAKE HYDRO, INC.
A subsidiary of Alaska Power & Telephone Company.
AP&T

December 7, 2005

Magalie R. Salas
Office of Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, D.C. 20426

Re: Goat Lake Hydro Project
Project No. 11077-022
3rd Year Results of 5 Year Grayling Monitoring Plan

Dear Ms. Salas:

This e-filing is to provide the results from the Goat Lake grayling monitoring that occurred this summer for the Goat Lake Hydroelectric Project, No.11077. As a part of the license amendment of February 7, 2003, and license Article 409, we are to monitor the grayling for five years to make sure they continued to successfully access the inlet stream they spawn in. This is the third year of the five year monitoring. These results were submitted to the resource agencies on October 27, 2005 (cover letters enclosed). No comments were received.

Enclosed is a chart showing lake elevation in relation when fish were observed in the inlet stream. Another chart shows the water temperature throughout the period of the 2005 survey. Also enclosed are photos of the grayling in the stream. Although present in the inlet stream, no attempt to catch fish was made.

Respectfully Submitted,

Glen D. Martin

Glen D. Martin
Project Compliance Manager
360-385-1733 x122

PORT TOWNSEND: (800) 982-0136 • (360) 385-1733 • Fax: (360) 385-7538 • Post Office Box 222 • Port Townsend, WA 98368
SKAGWAY : (907) 983-2808 • Fax: (907) 983-3119 • Post Office Box 459 • Skagway, AK 99840

GOAT LAKE HYDRO PROJECT
5-YEAR GRAYLING MONITORING PLAN

THIRD YEAR REPORT (2005)

Attached are two charts, (1) lake elevation at time of fish observations; (2) "Inlet Stream" temperatures during the summer and early fall. A notation is provided for when fish were observed in the "Inlet Stream" on the lake elevation chart. Also attached are photos of the grayling in the "Inlet Stream." No effort was made to fish for the grayling this year. Field notes are below:

On June 28, 2005: Lake level -5.0 feet. Two temperature loggers were installed in the Goat Lake "Inlet Stream," one at the second large pool upstream from the lake and the other 50-feet from the rock cliff upstream. (Both these locations the same as last two years.) No fish were observed in the stream at that time, however the helicopter pilot over-flew the stream while flying in, which may scare fish into hiding.

On August 12, 2005: Lake level -0.37 feet. The lake temperature, measured one foot below surface, was at 59.5°F. The "Inlet Stream" temperature was 47.0°F at the second large pool upstream from the lake. Water temperature in the "Inlet Stream" 50 feet from the rock cliff was 44.5°F.

Fourteen grayling were observed in the stream above full lake level from where you first see open water in the "Inlet Stream" to approximately 50 feet from the rock cliff. The stream was clear providing good visibility. No attempt was made to catch fish with rod & reel, either in the lake or in the stream. The fish were skittish and the "Inlet Stream" was lower than expected in the warm temperatures. Of the fourteen grayling, five of the fish were adults ranging from 12-15" in length and nine were probably 2nd year fish with lengths ranging from 5-7". Ambient air temperature at the lake was 56°F.

On October 3, 2005: Lake level -0.15 feet. The stream temperature in the second pool from the mouth was 36°F. There were two 6" grayling in the Inlet Stream above full lake level. Temperature dataloggers were collected at this time.

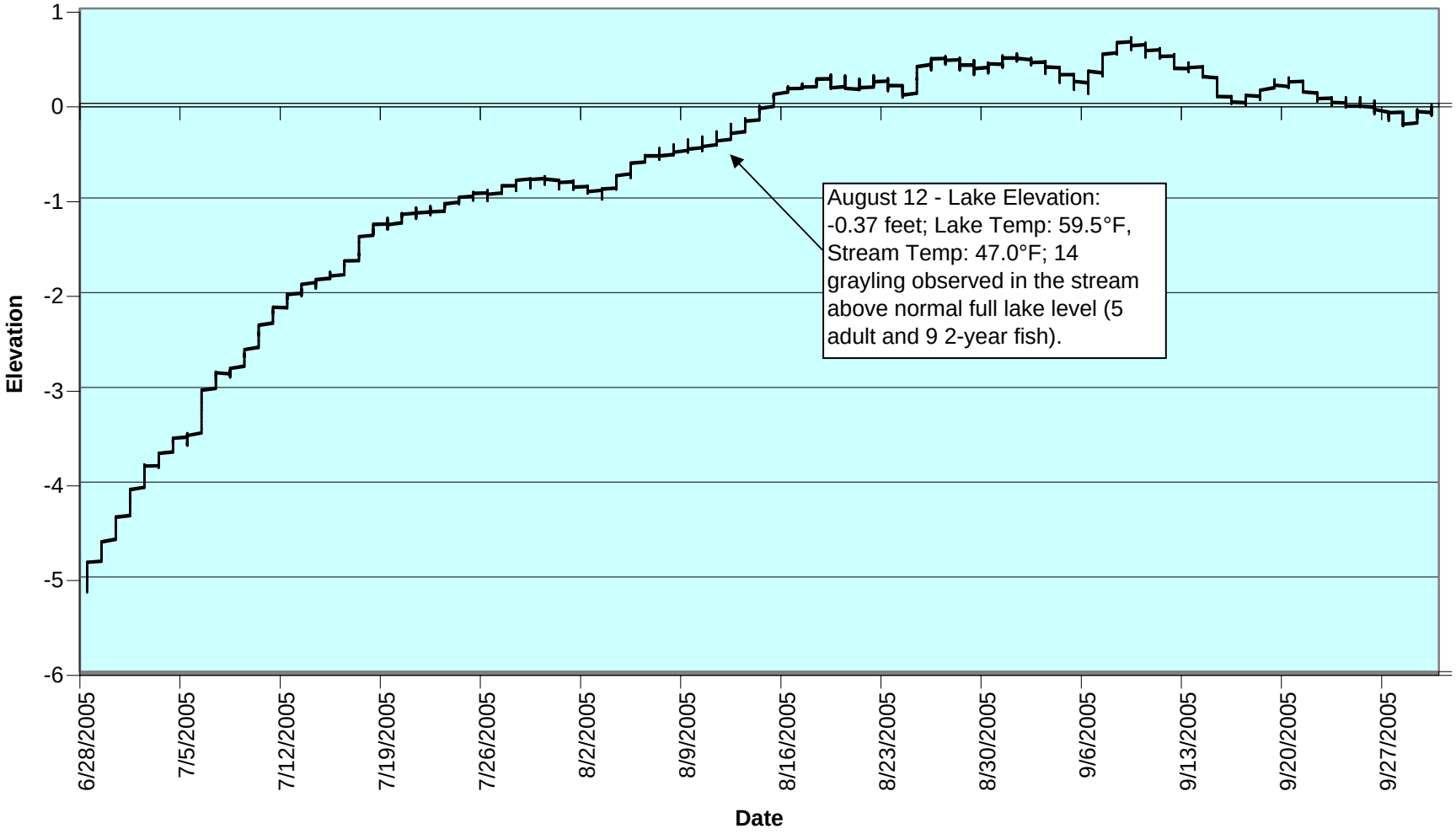
No obstructions in the inlet stream noted during surveys.

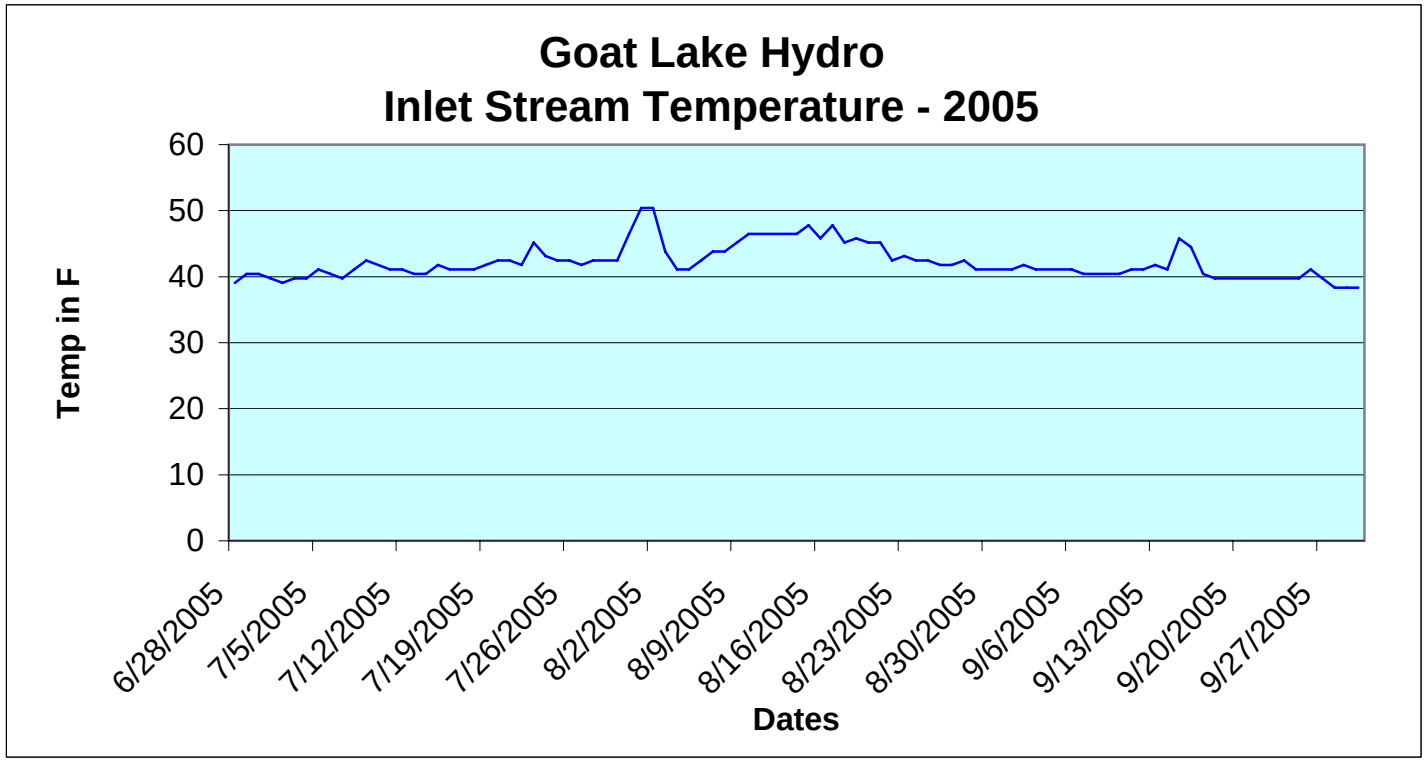
August 12, 2005: Grayling in Inlet Stream (circled here for visibility)

August 12, 2005: Inlet Stream Looking Upstream (lake would be to the left)

June 13, 2002: Photo of Inlet Stream looking West at Goat Lake (for reference).

2005 Goat Lake Elevation & Stream Temperature




Goat Lake Hydro
Inlet Stream Temperature - 2005
Temp in F
60
50
40
30
20
10
0
6/28/2005
7/5/2005
7/12/2005
7/19/2005
7/26/2005
8/2/2005
8/9/2005
8/16/2005
8/23/2005
8/30/2005
9/6/2005
9/13/2005
9/20/2005
9/27/2005
Dates