

ALASKA POWER & TELEPHONE COMPANY

P.O. BOX 3222 – 193 OTTO STREET  
PORT TOWNSEND, WA 98368  
(360) 385-1733 – (800) 982-0136  
FAX (360) 385-5177

May 4, 2006

Low Impact Hydropower Institute  
Attn: Fred Ayer  
34 Providence Street  
Portland, ME 04103

Re: LIHC Application

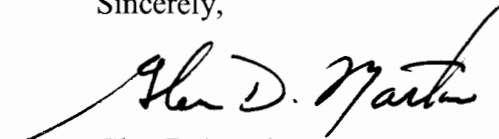
Dear Mr. Ayer:

Enclosed is an application for Low Impact Hydropower Certification for the 4.5 MW Black Bear Lake Hydroelectric Project located on Prince of Wales Island, Alaska.. Included on CD is the LIHI questionnaire and attachments to support our responses. Also included is a check in the amount of \$2,250.00. This fee is lower than your standard fee because we are submitting at this time three (3) applications. To look at our website, go to [www.aptalaska.com](http://www.aptalaska.com). You can look at annual reports on the website also.

If any response, including supportive information, does not appear to address the question, perhaps it is our misunderstanding of the meaning of the question. We would appreciate the opportunity to respond again to any question unanswered or incompletely responded to that will enable us to be more accurately considered for approval for Low Impact Hydropower Certification.

If you wish to contact me, please use the information provided below.

Sincerely,



Glen D. Martin  
Project Manager  
(360) 385-1733 x122  
(360) 385-7538 fax  
[glen.m@aptalaska.com](mailto:glen.m@aptalaska.com)

Enc. (as stated)

# LOW IMPACT HYDROPOWER INSTITUTE

34 Providence Street

Portland, ME 04103

Tel. (207) 773-8190 • Fax (206) 984-3086

[www.lowimpacthydro.org](http://www.lowimpacthydro.org)

## LOW IMPACT HYDROPOWER QUESTIONNAIRE

[Excerpted from Part VI, Section E of the Low Impact Hydropower Certification Program. Words in italics are defined in Part VI, Section C, and line-by-line instructions are available in Section D of the program, available on-line in PDF format at <http://www.lowimpacthydro.org>.

### E. LOW IMPACT HYDROPOWER QUESTIONNAIRE

Background Information	
1) Name of the <i>Facility</i> .	BLACK BEAR LAKE HYDROELECTRIC PROJECT
2) Applicant's name, contact information and relationship to the Facility. If the Applicant is not the Facility owner/operator, also provide the name and contact information for the Facility owner and operator.	ALASKA POWER & TELEPHONE COMPANY ATTN: GLEN MARTIN – PROJECT MANAGER 193 OTTO STREET P.O. BOX 3222 PORT TOWNSEND, WA 98368
3) Location of Facility by river and state.	BLACK BEAR LAKE, PRINCE OF WALES ISLAND, ALASKA
4) Installed capacity.	4.5 MEGAWATTS
5) Average annual generation.	23,000 MWh
6) Regulatory status.	FERC LICENSE NO. 10440; License expires in 2045.
7) Reservoir volume and surface area measured at the high water mark in an average water year.	3225 acre-feet that can be used as the Project has a maximum 15 foot drawdown; 215 surface acres

8) Area occupied by non-reservoir facilities (e.g., dam, penstocks, powerhouse).	Penstock = 2.25 acres; Powerhouse = 0.17 acres; Transmission Line = 19.4 acres; no dam.
9) Number of acres inundated by the Facility.	Natural lake and no dam was added to raise its level, so project does not inundate any land
10) Number of acres contained in a 200-foot zone extending around entire impoundment.	87 acres
11) Please attach a list of contacts in the relevant Resource Agencies and in non-governmental organizations that have been involved in Recommending conditions for your Facility.	List Attached in Attachment A.
12) Please attach a description of the Facility, its mode of operation (i.e., peaking/run of river) and a map of the Facility.	Project is a load following storage project using an alpine lake in which water is siphoned out. Description enclosed in Attachment B.
<b>Questions for For “New” Facilities Only:</b>  If the Facility you are applying for is “new” i.e., an existing dam that added or increased power generation capacity after August of 1998 please answer the following questions to determine eligibility for the program	N/A
13) When was the dam associated with the Facility completed?	
14) When did the added or increased generation first generate electricity? If the added or increased generation is not yet operational, please answer question 18 as well.	
15) Did the added or increased power generation capacity require or include any new dam or other diversion structure?	
16) Did the added or increased capacity include or require a change in water flow through the facility that worsened conditions for fish, wildlife, or water quality, (for example, did operations change from run-of-river to peaking)?	

17 (a) Was the existing dam recommended for removal or decommissioning by resource agencies, or recommended for removal or decommissioning by a broad representation of interested persons and organizations in the local and/or regional community prior to the added or increased capacity?		
(b) If you answered “yes” to question 17(a), the Facility is not eligible for certification, unless you can show that the added or increased capacity resulted in specific measures to improve fish, wildlife, or water quality protection at the existing dam. If such measures were a result, please explain.		
18 (a) If the increased or added generation is not yet operational, has the increased or added generation received regulatory authorization (e.g., approval by the Federal Energy Regulatory Commission)? If not, the facility is not eligible for consideration; and (b) Are there any pending appeals or litigation regarding that authorization? If so, the facility is not eligible for consideration.		
<b>A. Flows</b>	PASS	FAIL
1) Is the Facility in <i>Compliance with Resource Agency Recommendations</i> issued after December 31, 1986 regarding flow conditions for fish and wildlife protection, mitigation and enhancement (including in-stream flows, ramping and peaking rate conditions, and seasonal and episodic instream flow variations) for both the reach below the tailrace and all bypassed reaches?	YES = Pass, Go to B N/A = Go to A2  <b>YES; See Attachment C for details.</b>	NO = Fail
2) If there is no flow condition recommended by any Resource Agency for the Facility, or if the recommendation was issued prior to January 1, 1987, is the Facility in Compliance with a flow release schedule, both below the tailrace and in all bypassed reaches, that at a minimum meets Aquatic Base Flow standards or “good” habitat flow standards calculated using the Montana-Tennant method?	YES = Pass, go to B NO = Go to A3	
3) If the Facility is unable to meet the flow standards in A.2., has the Applicant demonstrated, and obtained a letter from the relevant Resource Agency confirming that demonstration, that the flow conditions at the Facility are appropriately protective of fish, wildlife, and water quality?	YES = Pass, go to B	NO = Fail

<b>B. Water Quality</b>	PASS	FAIL
1) Is the Facility either:  a) In Compliance with all conditions issued pursuant to a Clean Water Act Section 401 water quality certification issued for the Facility after December 31, 1986? Or  b) In Compliance with the quantitative water quality standards established by the state that support designated uses pursuant to the federal Clean Water Act in the Facility area and in the downstream reach?	YES = Go to B2  <b>YES; See Attachment D for details.</b>	NO = Fail
2) Is the Facility area or the downstream reach currently identified by the state as not meeting water quality standards (including narrative and numeric criteria and designated uses) pursuant to Section 303(d) of the Clean Water Act?	YES = Go to B3 NO = Pass <b>NO</b>	
3) If the answer to question B.2 is yes, has there been a determination that the Facility is not a cause of that violation?	YES = Pass	NO = Fail
<b>C. Fish Passage and Protection</b>	PASS	FAIL
1) Is the Facility in Compliance with <i>Mandatory Fish Passage Prescriptions</i> for upstream and downstream passage of anadromous and catadromous fish issued by Resource Agencies after December 31, 1986?	YES = Go to C5 N/A = Go to C2 <b>N/A; See Attachment E for more details.</b>	NO = Fail
2) Are there historic records of anadromous and/or catadromous fish movement through the Facility area, but anadromous and/or catadromous fish do not presently move through the Facility area (e.g., because passage is blocked at a downstream dam or the fish run is extinct)?  a) If the fish are extinct or extirpated from the Facility area or downstream reach, has the Applicant demonstrated that the extinction or extirpation was not due in whole or part to the Facility?  b) If a Resource Agency Recommended adoption of upstream and/or	YES = Go to C2a NO = Go to C3  <b>N/A; fish have never existed above the Project tailrace, so there are no fish passage issues, but Project is in compliance with all permits.</b>  YES = Go to C2b	NO = Fail

<p>downstream fish passage measures at a specific future date, or when a triggering event occurs (such as completion of passage through a downstream obstruction or the completion of a specified process), has the Facility owner/operator made a legally enforceable commitment to provide such passage?</p>	<p>N/A = Go to C2b</p> <p>YES = Go to C5</p> <p>N/A = Go to C3</p>	<p>NO = Fail</p>
<p>3) If, since December 31, 1986:</p> <p>a) Resource Agencies have had the opportunity to issue, and considered issuing, a Mandatory Fish Passage Prescription for upstream and/or downstream passage of anadromous or catadromous fish (including delayed installation as described in C2a above), and</p> <p>b) The Resource Agencies declined to issue a Mandatory Fish Passage Prescription,</p> <p>c) Was a reason for the Resource Agencies' declining to issue a Mandatory Fish Passage Prescription one of the following: (1) the technological infeasibility of passage, (2) the absence of habitat upstream of the Facility due at least in part to inundation by the Facility impoundment, or (3) the anadromous or catadromous fish are no longer present in the Facility area and/or downstream reach due in whole or part to the presence of the Facility?</p>	<p>NO = Go to C5</p> <p>N/A = Go to C4</p> <p><b>N/A;</b> there are no fish passage issues; the project is above the anadromous reach</p>	<p>YES = Fail</p>
<p>4) If C3 was not applicable:</p> <p>a) Are upstream and downstream fish passage survival rates for anadromous and catadromous fish at the dam each documented at greater than 95% over 80% of the run using a generally accepted monitoring methodology? Or</p> <p>b) If the Facility is unable to meet the fish passage standards in 4.a., has the Applicant demonstrated, and obtained a letter from the US Fish and Wildlife Service or National Marine Fisheries Service confirming that demonstration, that the upstream and downstream fish passage measures (if any) at the Facility are appropriately protective of the fishery resource?</p>	<p>YES = Go to C5</p> <p><b>N/A;</b> fish do not exist upstream, only downstream of the project tailrace. There is no man-made barrier to their moving upstream from the existing anadromous reach, but there are natural barriers below the project. See Attachment E for details.</p>	<p>NO = Fail</p>
<p>5) Is the Facility in Compliance with Mandatory Fish Passage Prescriptions for</p>	<p>YES = Go to C6</p>	<p>NO = Fail</p>

upstream and/or downstream passage of <i>Riverine</i> fish?	N/A = Go to C6 <b>N/A; See Attachment E</b>	
6) Is the Facility in Compliance with Resource Agency Recommendations for Riverine, anadromous and catadromous fish entrainment protection, such as tailrace barriers?	YES = Pass, go to D N/A = Pass, go to D <b>N/A; See Attachment E</b>	NO = Fail
<b>D. Watershed Protection</b>	<b>PASS</b>	<b>FAIL</b>
1 ) Is there a buffer zone dedicated for conservation purposes (to protect fish and wildlife habitat, water quality, aesthetics and/or low-impact recreation) extending 200 feet from the high water mark in an average water year around 50 - 100% of the impoundment, and for all of the undeveloped shoreline	YES = Pass, go to E and receive 3 extra years of certification	NO = go to D2 <b>NO, Project is at remote alpine lake; approximately ½ the lake is USFS property and the other is privately owned by native corporation. See enclosed Attachment F.</b>
2 ) Has the facility owner/operator established an approved watershed enhancement fund that: 1) could achieve within the project's watershed the ecological and recreational equivalent of land protection in D.1.,and 2) has the agreement of appropriate stakeholders and state and federal resource agencies?	YES = Pass, go to E and receive 3 extra years of certification	NO = go to D3 <b>NO; as described in D1</b>
3 ) Has the facility owner/operator established through a settlement agreement with appropriate stakeholders and that has state and federal resource agencies agreement an appropriate shoreland buffer or equivalent watershed land protection plan for conservation purposes (to protect fish and wildlife habitat, water quality, aesthetics and/or low impact recreation)	YES = Pass, go to E	NO = go to D4 <b>NO; as described in D1; USFS has a recreation cabin at south end of lake opposite the project headworks, but it is a fly-in destination except for a few hardy souls who hike in.</b>
4 ) Is the facility in compliance with both state and federal resource agencies recommendations in a license approved shoreland management plan regarding protection, mitigation or enhancement of shorelands surrounding the project.	YES = Pass, go to E <b>YES; See enclosed Attachment F.</b>	No = Fail
<b>E. Threatened and Endangered Species Protection</b>	<b>PASS</b>	<b>FAIL</b>
1) Are threatened or endangered species listed under state or federal Endangered Species Acts present in the Facility area and/or downstream reach?	YES = Go to E2 NO = Pass, go to F	<b>NO; See enclosed Attachment G.</b>

2) If a recovery plan has been adopted for the threatened or endangered species pursuant to Section 4(f) of the Endangered Species Act or similar state provision, is the Facility in Compliance with all recommendations in the plan relevant to the Facility?	YES = Go to E3 N/A = Go to E3 See enclosed Attachment G.	NO = Fail
3) If the Facility has received authority to incidentally <i>Take</i> a listed species through: (i) Having a relevant agency complete consultation pursuant to ESA Section 7 resulting in a biological opinion, a habitat recovery plan, and/or (if needed) an incidental Take statement; (ii) Obtaining an incidental Take permit pursuant to ESA Section 10; or (iii) For species listed by a state and not by the federal government, obtaining authority pursuant to similar state procedures; is the Facility in Compliance with conditions pursuant to that authority?	YES = Go to E4 N/A = Go to E5 See enclosed Attachment G.	NO = Fail
4) If a biological opinion applicable to the Facility for the threatened or endangered species has been issued, can the Applicant demonstrate that:  a) The biological opinion was accompanied by a FERC license or exemption or a habitat conservation plan? Or  b) The biological opinion was issued pursuant to or consistent with a recovery plan for the endangered or threatened species? Or  c) There is no recovery plan for the threatened or endangered species under active development by the relevant Resource Agency? Or  d) The recovery plan under active development will have no material effect on the Facility's operations?	YES = Pass, go to F See enclosed Attachment G.	NO = Fail
5) If E.2. and E.3. are not applicable, has the Applicant demonstrated that the Facility and Facility operations do not negatively affect listed species?	YES = Pass, go to F See enclosed Attachment G.	NO = Fail
<b>F. Cultural Resource Protection</b>	PASS	FAIL
1) If FERC-regulated, is the Facility in Compliance with all requirements regarding Cultural Resource protection, mitigation or enhancement included in the FERC license or exemption?	YES = Pass, go to G N/A = Go to F2 <b>YES</b> ; See enclosed Attachment H.	NO = Fail



2) If not FERC-regulated, does the Facility owner/operator have in place (and is in Compliance with) a plan for the protection, mitigation or enhancement of impacts to Cultural Resources approved by the relevant state or federal agency or <i>Native American Tribe</i> , or a letter from a senior officer of the relevant agency or Tribe that no plan is needed because Cultural Resources are not negatively affected by the Facility?	YES = Pass, go to G	NO = Fail
<b>G. Recreation</b>	PASS	FAIL
1) If FERC-regulated, is the Facility in Compliance with the recreational access, accommodation (including recreational flow releases) and facilities conditions in its FERC license or exemption?	YES = Go to G3 N/A = Go to G2 <b>YES;</b> There will be off-site recreation mitigation. A cabin is being constructed in Summer 2006 on Prince of Wales Island funded by this Project. See enclosed Attachment I.	NO = Fail
2) If not FERC-regulated, does the Facility provide recreational access, accommodation (including recreational flow releases) and facilities, as Recommended by Resource Agencies or other agencies responsible for recreation?	YES = Go to G3	NO = Fail
3) Does the Facility allow access to the reservoir and downstream reaches without fees or charges?	YES = Pass, go to H <b>YES</b>	NO = Fail
<b>H. Facilities Recommended for Removal</b>	PASS	FAIL
1) Is there a Resource Agency Recommendation for removal of the dam associated with the Facility?	NO = Pass, Facility is Low Impact <b>NO</b>	YES = Fail

**BLACK BEAR LAKE HYDROELECTRIC PROJECT**

**NO. 10440**

**ATTACHMENT 'A'**

**BLACK BEAR LAKE HYDRO**

**MAILING LIST**

### ***FEDERAL AGENCIES***

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

Patrick J. Regan, Regional Director  
Federal Energy Regulatory Commission  
Portland Regional Office  
101 S.W. Main Street, Suite 905  
Portland, OR. 97204

Bruce Halstead  
Field Supervisor  
U.S. Fish & Wildlife Service  
S.E. Alaska Ecological Services  
3000 Vintage Blvd., #201  
Juneau, AK. 99801-7100

Mark Voight  
U.S. Fish & Wildlife Service  
S.E. Alaska Ecological Services  
3000 Vintage Blvd., #201  
Juneau, AK. 99801-7100

J. Kurland  
Acting Chief  
Protected Resources Management  
National Marine Fisheries Service  
P.O. Box 21668  
Juneau, AK. 99802-1668

Sue Walker  
Protected Resources Management  
National Marine Fisheries Service  
P.O. Box 21668  
Juneau, AK. 99802-1668

Joan Darnell, Acting Team Leader  
Program Support Team  
Alaska Systems Support Office  
National Park Service  
240 West 5th Avenue  
Anchorage, AK 99501

Water Data Chief  
Dave Meyer  
U.S. Geological Survey  
4230 University Dr., Suite 201  
Anchorage, AK 99508-4664

### ***STATE AGENCIES***

Alan Austerman  
Office of the Governor  
Box 110001  
Juneau, AK 99811

Kevin C. Duffy, Commissioner  
Alaska Department of Fish & Game  
P.O. Box 25526  
Juneau, AK 99802-5526

Joe Donohue  
DNR - Office of Project Management and  
Permitting  
Alaska Coastal Management Program  
302 Gold St., Ste. 202  
Juneau, Alaska 99801-0030

John Dunker  
Water Resources Officer  
Department of Natural Resources  
Division of Mining and Water Management  
400 Willoughby Ave., 4<sup>th</sup> Floor  
Juneau, AK 99801-1796

Brady Scott, Land Officer  
Natural Resources Officer  
Department of Natural Resources  
Division of Mining, Land, and Water  
Management  
400 Willoughby Ave., 4<sup>th</sup> Floor  
Juneau, AK 99801-1796

Jim Powell  
Environmental Specialist  
Department of Environmental Conservation  
Southeast Regional Office  
410 Willoughby Ave., Suite 105  
Juneau, AK. 99801-1795

Jim Ferguson  
Hydro Coordinator  
Alaska Department of Fish & Game  
333 Raspberry Road  
Anchorage, AK 99518

Shawn Johnson  
ADF&G-Sport Fish / RTS  
P.O. Box 240020  
Douglas, AK 99824-0020

***FEDERAL AGENCIES (Continued)***

James Corless, Superintendent  
National Park Service  
Klondike Gold Rush National Historic Park  
P.O. Box 517  
Skagway, AK. 99840

Greg Killinger  
District Ranger  
U.S. Forest Service  
Craig Ranger District  
P.O. Box 500  
Craig, AK 99921-9998

Cassie Thomas  
Rivers, Trails, & Conservation Program  
National Park Service  
240 West 5th Avenue  
Anchorage, AK 99501

Tom Allen, State Director  
Bureau of Land Management  
222 W. 7<sup>th</sup> Ave., #13  
Anchorage, AK. 99513-7599

Steve Meyers, Chief, Southern Unit  
Permit Processing Section  
Regulatory Branch  
U.S. Army Engineering District, Alaska  
P.O. Box 898  
Anchorage, AK. 99506-0898

***STATE AGENCIES (Continued)***

Judith E. Bittner  
State Historic Preservation Officer  
Alaska Department of Natural Resources  
Office of History & Archaeology  
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Jackie Timothy  
Alaska Department of Natural Resources  
Office of Habitat Management & Permitting  
P.O. Box 240020  
Douglas, AK 99824-0020

Sheila Martin  
Alaska Department of Natural Resources  
Office of Habitat Management & Permitting  
P.O. Box 240020  
Douglas, AK 99824-0020

BLACK BEAR LAKE HYDROELECTRIC PROJECT

NO. 10440

**ATTACHMENT 'B'**

## **BLACK BEAR LAKE HYDRO PROJECT DESCRIPTION**

It took 5 years to license the Black Bear Lake Hydroelectric Project (BBL Hydro). Total project costs were approximately \$10 Million. The BBL Hydro project is a 4.5 MW hydroelectric project at Black Bear Lake on Prince of Wales Island, approximately 15 miles NE of Klawock. This lakes spill elevation is 1687 feet msl, with a surface size of 215 acres. With the licensed 15 foot drawdown, the lake provides approximately 3200 acre-feet of storage. The lake is used as a reservoir, rather than using a dam, which is accomplished by using a siphon. The project is load-following with the only restriction being that startups and stops cannot exceed 1 cfs per hour, but operations may follow load.

Because there are rainbow trout in the lake, a screened intake is used to prevent fish from going into the penstock. A siphon, which is set up on the crest of land at the edge of the lake, is used initially to draw water out of the lake. Once the siphon is established, water passes through both an HDPE and steel penstock to the valve house where flow can be turned on or shut off without losing the siphon. The valve house also has a bypass pipe for bypassing flows to the creek when additional water is needed in the anadromous reach below the powerhouse. When the valve is opened at the valve house, the water flows through approximately 4,900 feet of pipe, some of which is buried and other above ground, to the powerhouse and the turbine.

The water is pressurized by the amount of head the project has (i.e. 1,500 foot drop in elevation) and the small nozzle (needle) the water must pass through as it strikes the runner (a series of spoon-like protuberances on a wheel) in the turbine, which in turn turns the generator creating electricity. The electricity then goes to the substation where a step-up transformer adjusts the current to the voltage that is wanted on the electrical grid, in this case 34.5 kV. Switchgear in the powerhouse is located in the office where the operations are monitored and adjusted to meet load demand. Operations are also set up to monitor them from a remote location (i.e. one or more of our central offices).

As mentioned, there are rainbow trout in the lake that were stocked there in the 50's. ADF&G had been concerned that our annual drawdowns may be impacting the trout's sustainability by dewatering their spawning beds. Population surveys were conducted for 7 years and a habitat survey was conducted in 2002. The habitat survey found spawning habitat not just at the lake outlet but around the lake and at differing elevations, indicating that the lake trout spawn at other locations than just the lake outlet and are able to spawn when the lake experiences summer drawdowns. This proves the population is sustainable with project operations.

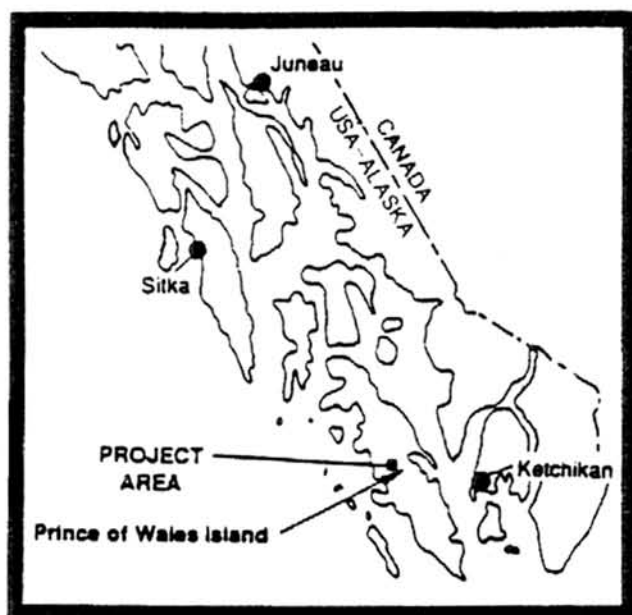
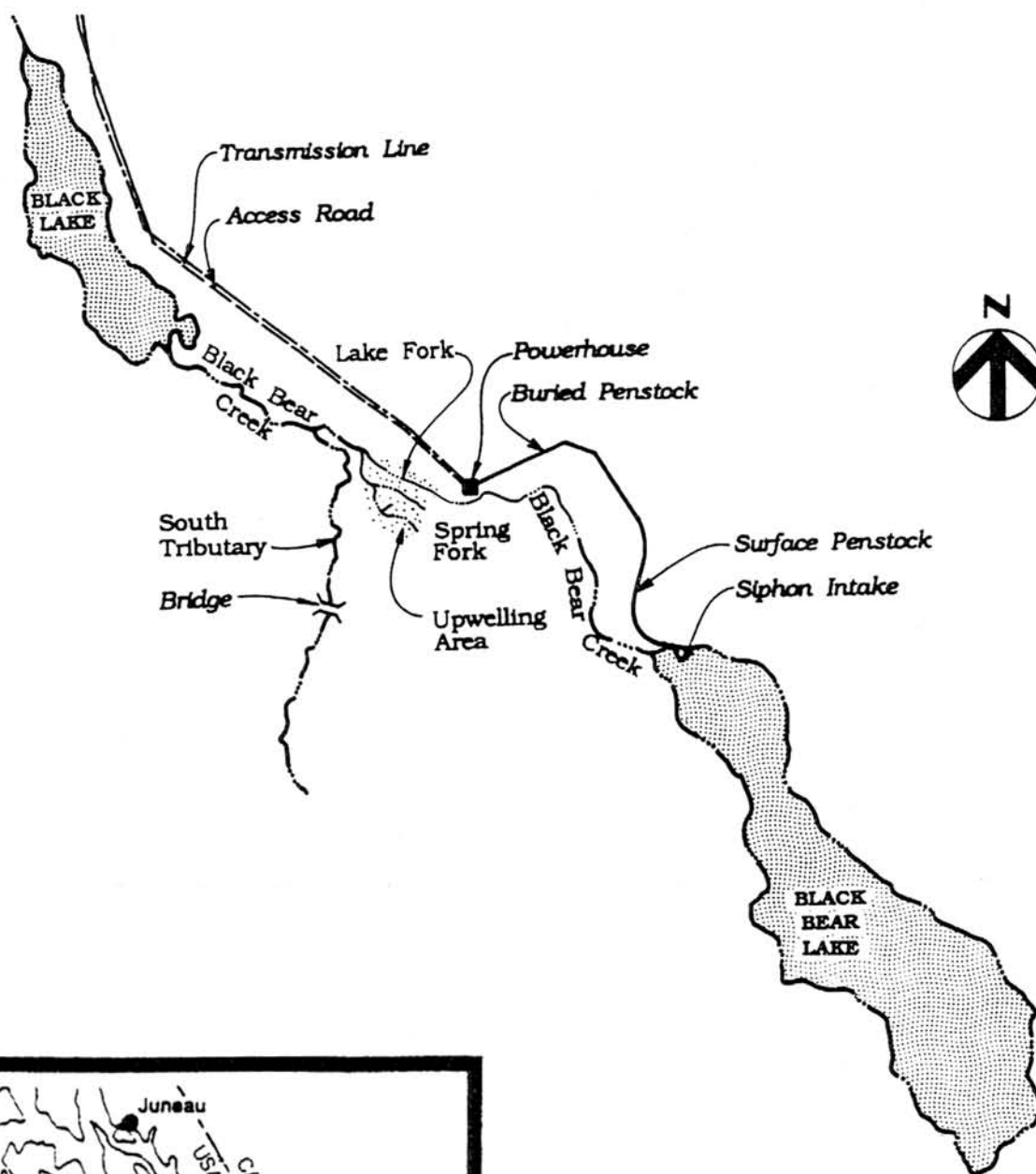
There are also salmonid species that use the creek below the projects tailrace, i.e. chum, pinks, sockeye, coho, and dolly varden. Because of this we are required to have a minimum flow in the creek that varies from month to month. Monitor of this anadromous reach was completed after five years in which no impacts were found from project operations.

Although, the original license required development of recreational facilities at Black Bear Lake with the U.S. Forest Service (FS), once the conceptual design was investigated on-site it was determined that it would be impractical. Presently, the FS has developed an off-site location for a recreation cabin on the Island that the licensee will fund through a contractual agreement of \$200,000, which was paid to the FS in January 2006.



# BLACK BEAR LAKE HYDRO FACT SHEET

Name of Project	Black Bear Lake Hydroelectric Project, FERC Project No. 10440	
Project Location	Sections 1 and 12; T73S, R82E, CRM. On Prince of Wales Island, Tongass National Forest; 8.6 miles east of Klawock in southeast Alaska. Approximate latitude 55°33' and longitude 132°53'.	
Intake	Submerged wedge wire screen at elevation 1,662.	
Reservoir	Name:	Black Bear Lake
	Surface Elevation:	1,687
	Surface Area:	215 Acres
	Storage Capacity:	
	Net:	3,200 Acre Feet
	Operation:	The net storage will be utilized by siphoning the reservoir down 15 feet to a minimum elevation of 1,672.
Siphon	Siphon 600-foot-long, 30-inch-diameter HDPE penstock with a vacuum pump assembly and structure at the high point elevation 1,695.	
Penstock	Total Length:	4,900 feet
	Diameter and Type:	30-inch HDPE and steel material
	Components:	820 feet buried intake and siphon
		1,930 feet supported on concrete saddles
		2,150 feet buried pipe to the powerhouse
Flow Continuation	24-inch diameter, 180-foot pipe to creek above falls	
Powerhouse	Size:	44 feet by 67 feet
	Number of Units:	2
	Type of Turbine:	Horizontal Twin-Jet Pelton
	Turbine Rating:	3,175 hp each; 6350 hp total
	Flow:	45 cfs
	Head:	
	Gross:	1,490
	Net:	1,440
	Generator Rating:	2.25 MW each; 4.5 MW total
	Voltage:	4,160 volts
Distribution Line	Voltage:	34.5 kV
	Length:	4.5 miles
	Type:	Overhead on wooden poles
Average Annual Energy Production	23,000 MWh	



# BLACK BEAR LAKE HYDROELECTRIC PROJECT

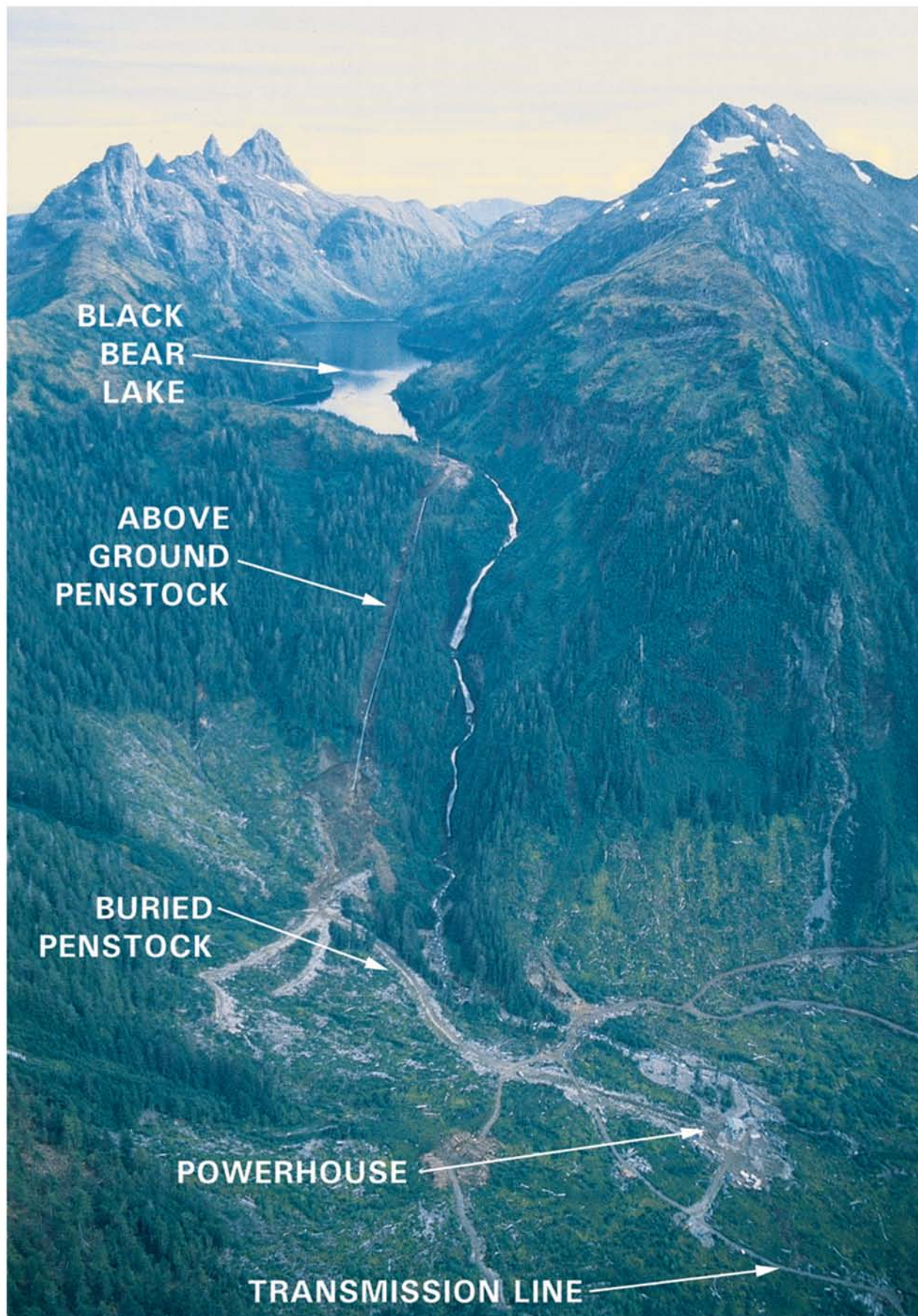
Prince of Wales Island, Alaska  
FERC NO. 10440

ALASKA POWER & TELEPHONE COMPANY  
Port Townsend, Washington

## LOCATION MAP

HR Engineering

FIGURE E1-1



**BLACK BEAR LAKE HYDRO JUST AFTER CONSTRUCTION; NOTE CLEARCUT.**





**POWERHOUSE (2001)**

**THIS AREA WAS CLEARCUT IN MID-80's TO EARLY 90's. VEGETATION IS MOSTLY ALDER WHICH SINCE THE PHOTO WAS TAKE NOW TOWERS AROUND THE POWERHOUSE.**



**CONFLUENCE OF SPRING FORK & LAKE FORK ON BLACK BEAR CREEK; NOTE SALMON IN CREEK AND SALMON CARCASSES ON TREES ACROSS CREEK FROM BEAR ACTIVITY.**





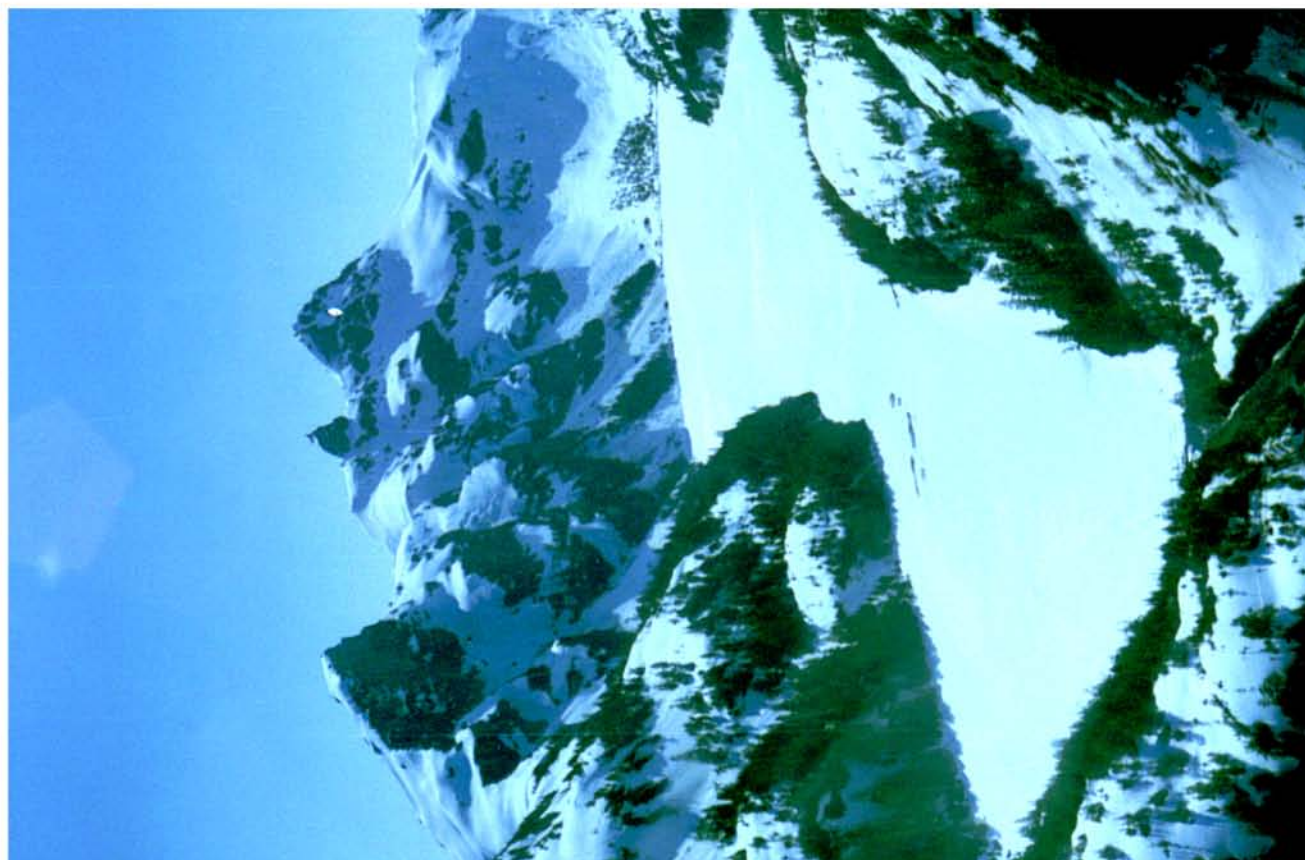
**BLACK BEAR LAKE IN SPRING THAW; VIEW FROM NORTH END AT LAKE OUTLET.**



**VIEW OF BLACK BEAR LAKE FROM NORTH LOOKING SOUTH.**



**VIEW OF BLACK BEAR LAKE FROM THE SOUTH END.**



**BLACK BEAR LAKE WITH ITS WINTER MANTEL FROM THE NORTH END**