2.0 PROPOSED ACTION AND ALTERNATIVES

In this section, we describe the alternatives evaluated in this final EIS. Section 2.1 describes the No-Action Alternative which is continued project operation under the terms and conditions of the existing license. We use this alternative to establish baseline environmental conditions for comparison with other alternatives. Section 2.2 describes the Proposed Action which is operation of the project in accordance with the Settlement Agreement. Section 2.3 describes modifications to the Proposed Action which includes the Staff Alternative. Section 2.4 discusses other alternatives that were considered, but were eliminated from detailed evaluation.

2.1 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, the project would continue to operate under the terms and conditions of the existing license, and no new environmental measures would be implemented. We use this alternative to establish baseline conditions for comparison with other alternatives.

2.1.1 Existing Project Facilities

The Baker River Project consists of two developments, Upper Baker and Lower Baker. The two developments adjoin one another over a distance of about 18 miles on the Baker River. The project has an installed capacity of 170.03 MW.[10]

2.1.1.1 Upper Baker Development

The Upper Baker Development, which begins at river mile (RM) 9.35, was constructed between June 1956 and October 1959. The development consists of the following facilities:

- a 312-foot-high, 1,200-foot-long concrete gravity dam incorporating an ogee-type spillway containing three radial gates that are each 25 feet wide and 30 feet high, a concrete gravity gated intake section with an intake fish baffle, three gravity-type concrete non-overflow sections totaling approximately 1,000 feet in length, and a 12-foot-wide roadway running along the top of the dam at

[10] In the remainder of this draft EIS, we round 170.03 MW to 170 MW.

elevation 735.77 feet mean sea level (msl) (North American Vertical Datum of 1988 [NAVD 88]); [11]

- a 115-foot-high, 1,200-foot-long earth and rock-fill dike (West Pass dike) with an adjacent auxiliary earth-fill dike;
- a 9-mile-long reservoir (Baker Lake) having a surface area of 4,980 acres and a total volume of 274,221 acre-feet at normal full pool elevation of 727.77 feet msl;
- a 0.7-mile-long pond (Depression Lake) adjacent to West Pass dike having a surface area of about 44 acres and a total volume of about 234 acre-feet at a full pool elevation of 698.77 feet msl, formed by a 3,000-foot-long, 22-foot-high earth-fill dike with a 44-foot-wide overflow spillway;
- a water recovery pumping station located at the southwest corner of Depression Lake containing two 54,000-gallon-per-minute vertical propeller recovery pumps and a discharge channel into Baker Lake;
- two 13.5-foot-diameter, 320-foot-long steel penstocks;
- a 122-foot-long, 59-foot-wide reinforced concrete and structural steel powerhouse at the downstream toe of the dam containing two turbine-driven generators with a combined authorized installed capacity of 90.7 MW;
- a step-up transformer bank containing three single-phase, 35,000-kilovolt ampere (kVA) transformers;
- downstream fish passage facilities (i.e., barrier net, floating surface collector [FSC], fish trap/sampling area, and fish transport system);
- artificial sockeye spawning beaches;
- juvenile fish rearing facility; and
- appurtenant facilities.

2.1.1.2 Lower Baker Development

The Lower Baker Development, which begins at RM 0.6, was constructed between April 1924 and November 1925. The dam was raised 33 feet to its current

[11] In the late spring of 2003, participants in the alternative licensing process (ALP) decided to reconcile datum discrepancies by converting elevations based on 1929 datum (NGVD 29) to GIS-based datum of 1988 (NAVD 88). The text notes any elevations that are still based on NGVD 29. If not otherwise noted, all elevations are based on the NAVD 88 datum.

elevation in 1927. In 1965, a landslide destroyed the 3-unit powerhouse. Turbine-generator Units 1 and 2 were abandoned, and a new powerhouse structure was built for Unit 3, which was refurbished and reinstalled. Unit 3 returned to service in September 1968. The development consists of the following facilities:

- a 285-foot-high, 550-foot-long concrete thick arch dam at RM 1.2 with two non-overflow sections and a centrally located spillway section containing 23 vertical slide spill gates that are each 14 feet high and 9.5 feet wide;
- a 7-mile-long reservoir (Lake Shannon) having a surface area of 2,278 acres and a total volume of 146,279 acre-feet at normal full pool elevation of 442.35 feet msl;
- a concrete intake equipped with trash racks and gatehouse located at the dam's left abutment;
- a 1,410-foot-long pressure tunnel, having a 905-foot-long, 22-foot-diameter concrete-lined section transitioning to a 505-foot-long, 16-foot-diameter steel-lined section;
- a 20-foot-diameter, 259-foot-high concrete surge chamber;
- a 90-foot-long, 66-foot-wide reinforced concrete and structural steel powerhouse located on the east bank of the Baker River at RM 0.9 containing a single turbine-generator with an authorized capacity of 79.3 MW;
- a single, three-phase, step-up transformer with a maximum continuous power production capability of 90.0 MW;
- a 750-foot-long, 115-kilovolt (kV) primary transmission line from the transformer to the Baker River substation;
- an upstream trap-and-haul fish passage facility (i.e., 150-foot-long barrier dam at RM 0.6, fish trap, holding ponds and fish lift) and downstream passage facilities (i.e., barrier net, FSC, fish trap/sampling area, and fish transport system);
- Lake Shannon net pens; and
- appurtenant facilities.

2.1.2 Current Project Operations

The Baker River Project is operated as a multi-purpose facility. The project is managed for hydropower generation, federal flood storage, recreation, and fisheries. Water levels in both reservoirs (Baker Lake and Lake Shannon) fluctuate seasonally in response to operational objectives including operations for flood storage, generation,

recreation and variations in natural inflows to the reservoirs. The current project license includes requirements for flood storage at Baker Lake and an 80 cubic feet per second (cfs) minimum flow for operation of the existing fish passage facilities. These are the only operational requirements contained in the current license.

2.1.2.1 Power Generation Operations

Puget generally operates the Baker River Project in coordination with its other power supply resources to meet the power needs of its customers, within the constraints of flood control restrictions at the Upper Baker Development. On a weekly basis, the demand for electricity is generally higher Monday through Friday than on weekends. On a daily basis, the demand for power peaks during the morning (6 a.m. to 10 a.m.) and early evening (5 p.m. to 9 p.m.). Typically, the project generates power on weekdays between 5 a.m. and 9 p.m. Depending on lake levels, inflows, weather forecasts, and system demand, the project may not generate evenings or weekends. During periods of high inflow, however, the project may generate continuously for several days or weeks.

Electricity demand in the Northwest is relatively high from October through March. During this period, Puget typically drafts the project's reservoirs during the daily and weekly peaks to provide power for meeting the higher demand. This drawdown also makes room in the reservoirs for flood control and to capture spring runoff from snowmelt. Due to snowmelt and lower regional electricity demand during the warmer months, the reservoirs are typically refilled to near full pool during the April-to-June period. With lower regional electricity demand in the summer and higher recreation demand, the reservoirs traditionally remain near full during the summer.

The two developments generally follow similar operational patterns, but Puget must generate power at the Lower Baker Development about 20 percent longer than at Upper Baker to avoid spill. This is a result of higher project inflows at Lower Baker coupled with a smaller reservoir and lower hydraulic capacity through the powerhouse. Consequently, Upper Baker has a historical plant capacity factor of approximately 38 percent, while that for Lower Baker is about 59 percent.

2.1.2.2 Flood Storage Operation

Article 32 of the current license requires Puget to provide up to 100,000 acre-feet of storage at the Upper Baker dam for flood control purposes if requested by the U.S. Army Corps of Engineers (Corps). Of this storage, Puget must provide 16,000 acre-feet

from November 1 to March 1 and up to an additional 84,000 acre-feet from about September 1 to April 15 each year.[12]

Of the 100,000 acre-feet of storage available under Article 32, the Corps requires Puget to provide a total of 74,000 acre-feet with 16,000 acre-feet provided from November 1 to March 1 and an additional 58,000 acre-feet provided from November 15 to March 1 each year. The amount of this storage and its timing was recommended by the Corps and approved by Congress in 1977. Specific flood control operations at the project are governed by an agreement between the Corps and Puget.

During a flood, the Corps operates the Upper Baker dam in coordination with its operation of Seattle City Light's Ross dam on the Skagit River to reduce flood peaks in the lower Skagit River valley.[13] Collectively, Baker and Ross Lake reservoirs control runoff from about 39 percent of the Skagit River basin upstream of Mt. Vernon. Baker Lake, alone, controls about seven percent of this basin.

Puget is not required to provide any storage at the Lower Baker dam under the current license. During a flood, Puget retains control of operations at the Lower Baker dam, but avoids operating in any way that would adversely affect the Corps flood control procedures.

2.1.2.3 Recreation Operations

When consistent with operational objectives, Puget seeks to maintain reservoir levels favorable for recreational activities during the recreation season. At Baker Lake, Puget maintains, when possible, reservoir elevations at or above 704.95 feet msl from June 1 through July 3 and at or above 718.77 feet msl from July 4 through the Labor Day weekend. At Lake Shannon, Puget maintains, when possible, reservoir elevations at or above 404.75 feet msl from April 15 through the Labor Day weekend.

2.1.2.4 Fishery Management Operations

Puget provides a continuous minimum flow of 80 cfs at the Lower Baker Development for the operation of the adult fish trap-and-haul facility located 0.3 mile downstream of the powerhouse. When the Lower Baker turbine-generator unit is shut down, Puget supplements approximately 55 cfs of dam leakage with a 25-cfs release

[12] Under Article 32, the Corps must compensate Puget for any storage it requires greater than 16,000 acre-feet.

[13] A flood is defined as an 8-hour forecast of an unregulated flow of 90,000 cfs at the Skagit River near Concrete gage.

through a 24-inch-diameter fish water release pipe that discharges into the Lower Baker tailrace.

Puget, when consistent with operational objectives and in a voluntary effort to reduce the potential for fish stranding, seeks to limit the average downramp rate in the Baker River downstream of the Lower Baker powerhouse to approximately 2,000 cfs per hour whenever the Skagit River flow falls below 18,000 cfs, as measured at the Skagit River near Concrete gage. This USGS gage (No. 12194000) is located on the Skagit River at RM 54.1 which is about 2.4 miles downstream of the confluence with the Baker River (RM 56.5).

2.1.2.5 Project Safety

The project has been operating for 50 years under the existing license (now under an annual license) and during this time, Commission staff has conducted operational inspections focusing on the continued safety of the structures, identification of unauthorized modifications, efficiency and safety of operations, compliance with the terms of the license, and proper maintenance. In addition, the project has been inspected and evaluated every five years by an independent consultant and a consultant's safety report has been submitted for Commission review. As part of the relicensing process, the Commission staff would evaluate the continued adequacy of the proposed project facilities under a new license. Special articles would be included in any license issued, as appropriate. Commission staff would continue to inspect the project during the new license term to assure continued adherence to Commission-approved plans and specifications, special license articles relating to construction (if any), operation and maintenance, and accepted engineering practices and procedures.

2.1.3 Current Environmental Measures

Currently, the Baker River Project provides facilities and programs related to fisheries, wildlife, and recreation. Refer to sections 3.3.4, Aquatic Resources, 3.3.5, Terrestrial Resources, and 3.3.8, Recreational Resources, respectively, for discussion of these facilities and programs.

2.2 PROPOSED ACTION

Under the Proposed Action, Puget would operate the project in accordance with the Settlement Agreement. The Settlement Agreement specifies the construction of a new auxiliary powerhouse at the Lower Baker Development, a modified reservoir and flow release regime, and various other environmental protection, mitigation, and enhancement measures as summarized below.

2.2.1 Project Facilities

To meet proposed ramping rates and to generate additional power with proposed minimum flows (see section 2.2.2, Project Operation), the Proposed Action includes partial rehabilitation of the original power generating facilities at the Lower Baker Development that were destroyed by the 1965 landslide. A new auxiliary powerhouse with two new 750-cfs turbine-generators would be installed on existing penstocks within the concrete foundation of the original 1925 powerhouse located adjacent to and immediately north (upstream) of the existing Lower Baker powerhouse. The powerhouse would be a 170-foot-long by 100-foot-wide reinforced concrete building.

To protect the new powerhouse against any potential landslide, a substantial concrete superstructure would be built to withstand the backfill and surcharge load resulting from a typical landslide. It would house the two new turbine-generators, two new 17,000-kVA transformers, and associated mechanical and electrical support equipment. The new auxiliary powerhouse would be connected to the existing Unit 3 powerhouse at its north end, and would include a connecting stairway. The new auxiliary powerhouse superstructure would extend the existing powerhouse profile and include a sloping roof ranging from 30 to 70 feet in height, and would have two steel roof hatches for access to the turbine-generators and the transformers. The roof and roof hatches would be capable of withstanding the external loads resulting from any landslide overburden. Crane rails for the existing overhead gantry crane at Unit 3 would be extended some 170 feet north for installation and maintenance of the new equipment. Additional access for construction, operation, and maintenance of the new facilities would be provided by a new access platform to be built adjacent to the west side of the auxiliary powerhouse foundation.

Two new 750-cfs, horizontal-shaft Francis turbine-generators would be connected to existing abandoned 7-foot diameter penstocks. The new turbines would have a stainless-steel runner diameter of 5.58 feet, rotate at 360 rpm, and produce 15 MW. A horizontal synchronous generator would be direct-connected to each turbine and provide an output voltage of 13.8 kV to the low voltage side of a step-up transformer. Each new turbine configuration would include a new 84-inch butterfly valve that would serve as a turbine guard valve. The new units would be configured to operate in synchronization with the existing Unit 3, enabling a continuous discharge at all times when the penstocks are watered up.

In conjunction with the proposed fish propagation and enhancement program (Proposed Article 101), Puget would make physical improvements to Spawning Beach 4 located at the Sulphur Creek facility just downstream of Upper Baker dam along Sulphur

Creek. Puget would eventually decommission Spawning Beaches 1, 2, and 3, located at the upper end of Baker Lake, and would construct a sockeye salmon hatchery. The improvements to Spawning Beach 4 would include isolating the water supply to each of the existing beach segments, installing concrete walls between segments, improving alarm systems, and protecting the water supply intake area. Decommissioning Spawning Beaches 1, 2, and 3 would involve removing the existing water intake structures in Channel Creek, configuring the ponds into a naturally meandering channel, removing existing structures, and restoring landscaping. The new salmon hatchery would be an expansion of the current rearing facility and would be located adjacent to Spawning Beach 4, in the already cleared and fenced area on the right bank of the Baker River near the Sulphur Creek confluence. Hatchery facilities would include adult holding facilities, artificial incubation facilities, a small concrete hatchery building, and starter ponds.

The upstream fish passage implementation plan (Proposed Article 103) would likely entail a combination of new facilities and renovations to existing facilities at the Lower Baker trap-and-haul facility. New or modified features could include, based on consultation with the resource agencies and tribes: a water supply pipe, pump station and fish screens, anesthetic tank, transport flume, sorting gate, pre-sorting raceways, water supply diffuser, crowding channel, loading hopper, brail pond, fish lock, and a new access road. Other than the access road, the new facilities could be immediately adjacent to the existing trap-and-haul facilities in already disturbed areas. An access road, approximately 240 feet long, could extend south from the loading hopper parallel to the river's edge and connect to existing asphalt below the administration building. In-water work during construction would involve installation of a temporary cofferdam upstream of the barrier dam on the left bank to facilitate installation of the new intake screens and intake pipe.

Under Proposed Article 104, Puget would initiate studies to determine whether segregated fish populations in Lake Shannon would use upstream passage facilities. If shown to be effective, these facilities would likely be located either in the Baker River or in Sulfur Creek and would consist of a channel approximately 20 feet wide with a concrete sill for a picket weir and a fish trap.

The downstream fish passage implementation plan (DFPIP; Proposed Article 105) calls for 500-cfs capacity FSCs (with possible subsequent expansion to 1,000-cfs capacity) at both Upper Baker and Lower Baker Developments. Both new facilities and the renovation of some existing works are anticipated. The surface collectors would include a guide net, a FSC, a transition structure between the guide net and FSC including a transportation conduit and a floating fish trap, transfer facilities, and stress-relief ponds. The stress-relief ponds would be sited at the Lower Baker compound area south of the administration building.

2.2.2 Project Operation

Under Proposed Article 106, Puget would operate the project in accordance with an Interim Protection Plan (IPP) for the first six years or until 2012 given the current relicensing schedule. Under the IPP, Puget would moderate flows in the Skagit River by limiting flow reductions attributable to the project and by capturing high flows or augmenting low flows in order to improve spawning conditions for Chinook salmon (see appendix B for a complete description of the IPP). Puget would also use best efforts to protect other species of salmonids by reducing the project's maximum generation from 4,100 to 3,200 cfs; by investigating ways and using best efforts to reduce ramping rates; and by limiting the amount of daily amplitude change and minimizing the difference between spawning and incubation flows.

Within six years of license issuance, Puget would install two new turbine-generators in the new auxiliary powerhouse giving Puget the operational flexibility to implement new minimum flows, maximum flows, and ramping rates specified in Aquatic tables 1 or 2 contained in Proposed Article 106.

Under Proposed Article 107(a), Puget would continue to provide up to 74,000 acre-feet of storage for flood control at the Upper Baker Development if requested by the Corps. Up to 16,000 acre-feet would be provided from October 15 to March 1 and up to an additional 58,000 acre-feet would be provided from about September 1 to April 15. These provisions would provide storage about two weeks earlier and about six weeks longer than current operations (if requested by the Corps).

Finally, Proposed Article 107(b) would provide up to 29,000 acre-feet of storage for flood control at the Lower Baker Development from October 1 to March 1 upon the Corps's request. This storage would be in addition to any storage provided at the Upper Baker Development. [14]

2.2.3 Proposed Environmental Measures

The Settlement Agreement includes other protection, mitigation, and enhancement measures in the form of 50 proposed license articles. Each proposed article is listed in table 2-1 below:

[14] Like Article 32, proposed Article 107(a) would require the Corps to compensate Puget for any storage it requires greater than 16,000 acre-feet at the Upper Baker Development. Proposed Article 107(b) would require the Corps to compensate Puget for the entire 29,000 acre-feet of storage at the Lower Baker Development.

Table 2-1. Proposed license articles.

Article	Measure	Elements
Aquatic Resources		
101	Fish Propagation	• Modify existing Spawning Beach 4. • Continue existing enhancement programs. • Decommission Spawning Beaches 1, 2, and 3. • Add new hatchery and adult holding facilities. • Fund nutrient enhancement of Baker Lake to improve sockeye production.
102	Aquatics Reporting	• Report for all aquatic articles. • Consult according to specified review periods. • File reports on specified dates.
103	Upstream Fish Passage	• Upgrade existing fish trap to state-of-the-art. • Add fish sorting capability. • Increase capacity to accommodate run growth. • Establish operations and coordination protocols.
104	Fish Connectivity between Reservoirs	• Initiate studies to determine whether segregated Lake Shannon fish populations would use upstream passage facilities. • Develop facilities and programs to reconnect segregated migratory fish species.
105	Downstream Fish Passage	• Provide juvenile Upper Baker FSC by 2008. • Provide Lower Baker FSC by 2012. • Develop stress-relief ponds. • Test to document performance of 95 percent passage and 98 percent survival.

Article	Measure	Elements
106	Flow Implementation	• Install new generation to permit variable instream flow regimes and ramping rates. • Increase minimum flows from 80 cfs to 1,000 cfs/1,200 cfs. • Operate according to new ramping rates meeting state guidelines. • Set reservoir rule curve to maximize recreational availability.
107	Flood Regulation	• Continue existing 74,000 acre-feet of flood storage at Upper Baker. • Up to an additional 29,000 acre-feet at Lower Baker subject to Corps request. • Initiate early start to flood control season. • Identify means and methods to provide additional drawdown in anticipation of impending floods.
108	Gravel Augmentation	• Track gravel aggradation in Skagit River. • Release gravel into Baker River to offset gravel interruption by project.
109	Large Woody Debris	• Develop plan to gather floating large woody debris (LWD) from project reservoirs and stockpile for habitat projects by others.
110	Shoreline Erosion	• Develop an Erosion Control Plan. • Provide funding to treat erosion sites.
Cultural and Historic Resources		
201	Programmatic Agreement	• Implement Programmatic Agreement and Historic Properties Management Plan including protection and enhancement of historic and traditional cultural properties, training, education, coordination, and artifact curation. • Report on activities and expenditures.

Article	Measure	Elements
Recreation and Aesthetics Resources		
301	Recreation Management Report	• Report on status of implementation. • Report status of Forest Service actions. • Compile recreation plans, schedule, and updates. • Report expenditures.
302	Aesthetics Management	• Develop and implement Aesthetics Management Plan. • Fund Forest Service vegetation management activities at specific sites.
303	Baker Lake Resort Redevelopment	• Develop plan to redevelop resort area to "Level 3" campground with 30 to 50 campsites. • Fund Forest Service to implement redevelopment.
304	Baker Reservoir Recreation Water Safety	• Develop Water Safety Plan. • Install buoys for swim areas. • Install bulletin boards for information. • Provide boating maps and other information.
305	Lower Baker Developed Recreation	• Acquire site for boat access on Lake Shannon, or other site. • Develop boat launch within 10 years. • Maintain site.
306	Upper Baker Visitor Information Services	• Fund Forest Service for visitors' information facility and parking development, staffing and operations, and seasonal support.
307	Upper Baker Visitor Interpretive Services	• Fund Forest Service for development and support of interpretive services in the project area and preparation of an Interpretation and Education Plan.
308	Dispersed Recreation Management	• Fund Forest Service for development and support in implementation of Dispersed Recreation Management Plan and in hardening 3 to 6 high-priority sites.

Article	Measure	Elements
309	Bayview Campground Rehabilitation	• Fund Forest Service for rehabilitation and reconstruction of Bayview site to "Level 4."
310	Upper Baker Trail and Trailhead Construction	• Fund Forest Service for development and support for up to 6 miles of new trails in project area.
311	Lower Baker Trail Construction	• Provide up to 2 miles of trails in the vicinity of the Town of Concrete.
312	Developed Recreation Monitoring	• Develop plan to monitor recreational site usage. • Monitor site usage and occupancy. • Provide data to Forest Service annually. • Fund site expansion when occupancy exceeds 60 percent of total available sites.
313	Upper Baker Developed Recreation Maintenance	• Fund Forest Service for operation and maintenance of specified facilities. • Adjust future funds based on expenditures formula and specified maintenance standard.
314	Upper Baker Trail and Trailhead Maintenance	• Fund Forest Service for development and support of trails and trailheads in Baker Lake vicinity.
315	Lower Baker Trails Maintenance	• Fund maintenance of Lower Baker Trail.
316	Forest Service Road Maintenance	• Fund Forest Service for routine maintenance of up to 25 miles of specific Forest Service roads serving project-related facilities. • Contribute to Forest Service paving FR 1106.
317	Access to Baker Lake	• Assure public access to east side of Baker Lake using FR 1106 across Upper Baker dam.
318	Law Enforcement	• Convene law enforcement entities to develop Law Enforcement Plan (LEP) for the Baker River basin. • File report on LEP. • Fund LEP development and implementation.
Water Quality		

Article	Measure	Elements
401	Water Quality	• Comply with Water Quality Certification. • Focus on temperature, dissolved oxygen, total dissolved gas, and turbidity. • Develop and implement Water Quality Monitoring Plan and Water Quality Protection Plan.
Terrestrial Resources		
501	Terrestrial Resource Management	• Prepare and file Terrestrial Resource Management Plan. • Report annually on all terrestrial measures and expenditures.
502	Deciduous Forest Habitat	• Acquire and manage deciduous forest habitat (having 40 percent or more deciduous composition) for birds using that habitat.
503	Elk Habitat	• Acquire and manage elk foraging habitat in three phases. • Annual planning, habitat enhancement and management of those lands that are acquired.
504	Wetland Habitat	• Acquire and manage wetland habitat based on Terrestrial Resources Implementation Group (TRIG) selection criteria.
505	Aquatic Riparian Habitat Protection, Restoration and Enhancement	• Prepare and submit Aquatic Riparian Habitat Protection, Restoration, and Enhancement Plan.
506	Osprey Nest Structures	• Provide and maintain 10 artificial osprey nest structures. • Modify 10 trees near Lake Shannon to create new sites. • Monitor usage and expand as necessary with goal of supporting 7 breeding pairs.
507	Floating Loon Nest Platforms	• Install and maintain three to six floating platforms for common loon nesting. • Monitor and report on use.

Article	Measure	Elements
508	Noxious Weeds	• Manage project lands for the control of noxious weeds, complying with state and federal regulations. • Address seven high-quality wetlands with a priority on control of reed canarygrass.
509	Special Status Plants	• Manage plants of special status on existing project lands and specified non-project lands.
510	*Carax Flava* (yellow sedge)	• Manage for protection of *Carax flava* (yellow sedge). • Inventory and map known populations. • Develop control strategies for invasive plant species near populations of *Carax flava*.
511	Decaying and Legacy Wood	• Manage snags, logs, and residual live trees on project lands as habitat for decaying and legacy wood-dependent species.
512	Bald Eagle Night Roosts	• Conduct two surveys for communal night roost for bald eagle near the project.
513	Bald Eagle Management	• Develop management plan for each bald eagle nest and night roost site known on project lands. • Develop management plan for each bald eagle nest and night roost site known on acquired lands.
514	Habitat Evaluation Procedures (HEP)	• Develop plan to monitor effectiveness of implementation of proposed articles 502–504, 506, 507, and 513, using the FWS' HEP.
515	Late Seral Forest	• Fund Forest Service for actual costs of thinning trees on approximately 321 acres of second-growth forest.
516	Mountain Goats	• Fund Forest Service for actual costs for habitat improvements in mountain hemlock occupied by mountain goats. • Fund licensee's contribution of the cost of planning and implementing improvements for up to 194 acres of forest.
517	Grizzly Bears	• Fund Forest Service for actual cost of planning, reviewing, and implementing road closure to benefit grizzly bear recovery.

Article	Measure	Elements
General		
601	Baker River Coordinating Committee	• Create topical subgroups TRIG, Recreation Resources Group (RRG), ARG, and Cultural Resources Advisory Group (CRAG). • Implement decision-making. • Track settlement implementation. • Resolve disputes.
602	Contingency Funds	• Create the Habitat Enhancement, Restoration, and Conservation Fund (HERC Fund); Terrestrial Enhancement and Research Fund (TERF); Recreation Adaptive Management Fund (RAM Fund); and Cultural Resources Enhancement Fund (CREF). • Fund adaptive management needs in all topic areas. • Address some identified, but as yet unquantified, needs such as connectivity. • Encourage partnering with similar interests. • Create funding tracking account, interest rate accrual, and unspent fund carryover from year to year.
603	Adaptive Management	• Consider alternative strategies.

2.3 MODIFICATIONS TO THE PROPOSED ACTION

2.3.1 Staff's Modifications to the Proposed Action

After evaluating the Proposed Action and comments, terms and conditions, and recommendations from the resource agencies and other interested parties, we considered what, if any, additional protection, mitigation or enhancement measures would be necessary or appropriate with continued operation of the project. The Staff Alternative consists of the Proposed Action (section 2.2) with the following additional measures:

- Conduct a study to determine the need for flow continuation valves, other equipment, and operating procedures at the Lower Baker dam to maintain minimum flows during project outages and file a plan to install such facilities if warranted.

- With respect to fish protection measures, provide the agencies and tribes copies of operational records, allow agencies and tribes reasonable access in the performance of their official duties, and notify agencies and tribes of all unusual operational occurrences.

We do not, however, recommend that all measures in the Settlement Agreement be included as conditions in any license issued for the project. Some proposed measures do not have a clear nexus to the project (are not tied to either project effects or purposes), are not needed to fulfill any project-demonstrated need, are general measures that should not be Puget's responsibility, or do not provide benefits to the resource that are worth the costs. While we recognize that Puget may elect to provide these measures as terms of the Settlement Agreement, we do not recommend them as license conditions. These measures include:

- Providing a Baker Lake Water Safety Plan (Proposed Article 304) because Puget has an existing public safety plan that is maintained in accordance with the Commission's regulations.
- Providing an Aquatic Riparian Habitat Protection, Restoration, and Enhancement Plan (Proposed Article 505) because this measure does not appear to be worth its high cost and because we recommend other aquatic measures that are adequate for the project.
- Providing aquatic, recreation, terrestrial, and cultural resource contingency funds (Proposed Article 602) to mitigate unforeseen effects not otherwise addressed in other proposed license articles because we are not certain these funds would be needed or how these funds would be used, and we are recommending a comprehensive set of measures designed to protect, mitigate, and enhance environmental resources at the project.
- Complying with certain adaptive management provisions (Proposed Article 603) because the stated provisions are too vague to be enforceable and are not specific with regards to individual measures.

2.3.2 Water Quality Certification

On March 8, 2005, Puget submitted an application for a water quality certificate (WQC) to Ecology as required by section 401 of the Clean Water Act. Puget then withdrew and refilled its WQC application with Ecology by letter dated March 7, 2006. Ecology has one year to issue either a WQC, a wavier, or deny Puget's WQC application.

2.3.3 Section 18 Fishway Prescriptions

Section 18 of the FPA provides the Secretaries of Interior and Commerce the authority to prescribe fishways.[15] By letters dated March 16 and March 21, 2005, respectively, the NMFS (as delegated by the Secretary of Commerce) and Interior filed preliminary section 18 prescriptions for the construction, operation, and maintenance of upstream and downstream fishways.

NMFS and Interior both signed the Settlement Agreement and helped develop the fish passage measures contained in proposed articles 103, 104, and 105. Both entities say their prescriptions are intended to be consistent with the Settlement Agreement.

In general, NMFS and Interior are requiring Puget to continue the existing trap and haul method of transporting fish around the Upper and Lower Baker Developments, but with substantial improvements. Both entities' upstream and downstream fishway prescriptions require interim trap and haul operations using existing facilities, new and/or redesigned facilities, and post-construction effectiveness evaluations. Upstream fishway prescriptions specifically address: the barrier dam, fishway, gravity water supply, entrance pool diffusers, ladder type, fishway pool volume, trap holding pools, fish lock crowder, fish lock brail, fish lock water supply, transport flume and raceways, transport hopper and trucks, recovery tanks, and auxiliary power. Downstream fishway prescriptions specifically address: debris and trash management, guide nets, net transition structures, FSCs, dewatering and detection, raceways, transport hoppers, transport trucks and trailers, stress relief ponds, and auxiliary power.

In addition to the above, Interior is also prescribing a fishway between the Upper and Lower Baker Developments which it says should also be consistent with Proposed Article 104. NMFS says it "has provided no details [for a fishway prescription] for Proposed Article 104 because its development is still contingent on the investigations described in the proposed article." Interior includes the prescription to improve connectivity for native char and other native fish species that are isolated between the two dams. Specifically, Interior requires Puget to investigate and study the feasibility of a fishway and prepare a Fish Connectivity Implementation Plan that includes details on: construction and design, operation and maintenance, quality assurance and control, emergency response, annual reporting, and documentation of consultation.

[15] Section 18 of the FPA provides: "The Commission shall require the construction, maintenance, and operation by a licensee at its own expense of . . . such fishways as may be prescribed by the Secretary of Commerce or the Secretary of the Interior, as appropriate."

In their March 2005 letters, the Secretaries of Commerce and Interior both stated that they would file modified prescriptions within 60 days of the comment due date of the draft EIS.

2.3.4 Section 4(e) Federal Land Management Conditions

Most lands within the project boundary at the Upper Baker development are owned by the Forest Service and are located within the Mt. Baker-Snoqualmie National Forest. Conversely, most lands within the project boundary at the Lower Baker development are owned by Puget and are not within the above National Forest.

As authorized under section 4(e) of the FPA, the Forest Service filed preliminary conditions on March 21, 2005. The Forest Service is a signatory to the Settlement Agreement and says its section 4(e) conditions are intended to be consistent with the Settlement Agreement.

The Forest Service included 38 preliminary conditions which require compliance with the entire Settlement Agreement and compliance with specific portions of the Settlement Agreement. Each condition is shown in table 2-2, below.

On June 16, 2006, the Forest Service filed modified 4(e) conditions which are substantially the same as its preliminary 4(e) conditions. The Forest Service stated that they are reserving their right to revise their modified 4(e) conditions if significant new information becomes available or if this final EIS differs significantly from the draft EIS.

We do not recommend some of the measures included in the Forest Service's modified 4(e) conditions as discussed in this final EIS because some measures are not directly related to project purposes or effects.

Table 2-2. Forest Service preliminary section 4(e) conditions. (Source: Staff)

No.	Summary of Condition	No.	Summary of Condition
1	Compliance with the Settlement Agreement	20	Developed Recreation Monitoring and Funding
2	Acceptance and Implementation of the Settlement Agreement	21	Upper Baker Developed Recreation Maintenance Funding
3	Reservation for Change in the Event of a Party Withdrawal	22	Forest Service Forest Road Maintenance Funding
4	Implementation of Activities on Forest Service Lands	23	Access to Baker Lake
5	Self Insurance	24	Law Enforcement
6	Surveys, Land Corners	25	Terrestrial Resource Management Plan
7	Fire Prevention	26	Forest Habitat
8	Heritage Resource Protection	27	Elk Habitat
9	Shoreline Erosion	28	Wetland Habitat
10	Recreation Management Report	29	Aquatic Riparian Habitat Protection, Restoration, and Enhancement Plan
11	Aesthetics Management	30	Loon Floating Nest Platforms
12	Baker Lake Resort Development Plan	31	Noxious Weeds
13	Reservoir Recreation Water Safety Plan	32	Plants of Special Status and *Carex flava*
14	Upper Baker Visitor Information Services Funding	33	Late Seral Forest Growth
15	Upper Baker Visitors Interpretive Services Funding	34	Mountain Goats
16	Dispersed Recreation Management	35	Grizzly Bear Road Management
17	Upper Baker Trail and Trailhead Construction Funding	36	Flow Implementation
18	Upper Baker Trail and Trailhead Maintenance Funding	37	Baker River Coordinating Committee
19	Bayview Campground Rehabilitation Funding	38	Required Funding

2.3.5 Section 10(j) Recommendations

Under the provisions of section 10(j) of the FPA, each hydroelectric license issued by the Commission shall include conditions based on recommendations provided by federal and state fish and wildlife agencies for the protection, mitigation, and enhancement of fish and wildlife resources affected by the project.

Section 10(j) also states that, whenever the Commission believes that any fish and wildlife agency recommendation is inconsistent with the purposes and the requirements of the FPA or other applicable law, the Commission and the agency shall attempt to resolve any such inconsistency, giving due weight to the recommendations, expertise, and statutory responsibilities of the agency.

On March 16, 2005, NMFS filed section 10(j) recommendations for the project. FWS[16] and WDFW filed section 10(j) recommendations on March 21, 2005. We have determined that one of these recommendations, within the scope of section 10(j), is inconsistent with the purposes and requirements of the FPA (see section 5.2, Fish and Wildlife Agency Recommendations).

2.4 ALTERNATIVIES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

We also considered other alternatives to the Proposed Action, but eliminated them from detailed study because they are not considered reasonable in the circumstances of this case.

2.4.1 Federal Takeover

We do not consider federal takeover to be a reasonable alternative. Federal takeover and operation of the project would require Congressional approval. While that fact alone would not preclude further consideration of this alternative, there is no evidence to indicate that federal takeover should be recommended to Congress. No party has suggested that a federal takeover would be appropriate, and no federal agency has expressed an interest in operating the project.

[16] Interior filed these recommendations on behalf of FWS.

2.4.2 Nonpower License

The FPA permits governmental bodies to obtain a temporary nonpower license. A nonpower license is temporary in that the Commission would terminate the nonpower license whenever it determines that another government agency would assume regulatory authority and supervision over the lands and facilities covered by the nonpower license. Such a nonpower license could preserve the reservoir and the flood storage, but would not allow the generation of power. In the case of the Baker River Project, no agency has suggested its willingness or ability to accept a nonpower license. No party has sought a nonpower license, and there is no basis for concluding that the project should no longer be used to produce power. As such, a nonpower license is not viewed as a reasonable alternative requiring further analysis.

2.4.3 Project Retirement

A project retirement alternative was included in Puget's PDEA filed with the license application. Since that time, Puget has filed a Settlement Agreement to continue operating the project and no entity has recommended project retirement. Continued operation of the project would have many benefits as discussed in this final EIS. As such, we have no basis for recommending project retirement and we do not consider this option a reasonable alternative requiring further analysis.