2.0 PROPOSED ACTION AND ALTERNATIVES

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 of existing memoranda of understanding or agreement that may be in effect. No new environmental measures would be implemented. We use this alternative to establish baseline conditions for comparison with PacifiCorp's Proposal and other alternatives and to judge the benefits and costs of any measures that might be required under a new license. The effects of the No-action Alternative contribute to the character of existing environmental conditions, and we describe them in our discussion of the affected environment (see section 3.0). A description follows of the existing project facilities, current operations, and current environmental measures.

2.1.1 Existing Project Facilities

The Klamath Hydroelectric Project is located on the upper Klamath River in Klamath County (south-central Oregon) and Siskiyou County (north-central California). The existing project consists of eight developments, seven of which are located on the Klamath River between river mile (RM) 190.1 and 254.3. One of the seven developments, Keno, is a dam and associated reservoir with no generation facilities. The eighth development is on Fall Creek, a Klamath River tributary at RM 196.3. The eight developments are East Side, West Side, Keno, J.C. Boyle, Copco No. 1, Copco No. 2, Fall Creek, and Iron Gate (figure 2-1). Table 2-1 shows the relative river miles of key geographical landmarks that are relevant to this relicensing proceeding along the mainstem of the Klamath River. We describe each development in more detail in the following section.

2.1.1.1 East Side and West Side Developments

Link River dam marks the upstream boundary of the current Klamath Hydroelectric Project at RM 254.3, but the dam and its reservoir (Upper Klamath Lake) are not part of the project (figure 2-2). Reclamation owns the dam, located on Reclamation-managed land. Under a contract that expired in April 2006, PacifiCorp operated and maintained the dam at Reclamation's direction. That contract provided PacifiCorp with some operational flexibility with respect to releases for generation from Link River dam, in exchange for operating the dam and providing low-cost power to Reclamation's Klamath Irrigation Project irrigators. PacifiCorp, in its comments on the draft EIS, states that it continues to operate Link River dam under an annual contract with Reclamation, renewable at the parties' discretion. In recent years, however, PacifiCorp claims this operational flexibility has not been fully realized, as Reclamation has specified releases from Link River dam in an attempt to comply with Biological Opinions (BiOps) relating to two species of sucker in Upper Klamath Lake and coho salmon in the lower Klamath River, all of which are listed as either endangered or threatened under the Endangered Species Act (ESA).

Link River dam diverts water to East Side and West Side developments, which PacifiCorp owns and operates. The dam formerly had a pool-and-weir type fish ladder. Reclamation replaced this fish ladder with a vertical slot fish ladder designed to more effectively enable upstream passage of federally listed suckers (PacifiCorp, 2003a). Reclamation's new fish ladder, located between the mechanical spill gates and the headworks of the West Side canal, was completed during summer 2005 and, besides suckers, also should enable salmonids to pass from Link River into Upper Klamath Lake. In addition, a gravity bypass from fish screens recently constructed at Reclamation's A canal passes midway through the length of Link River dam and exits immediately downstream of the primary headgates. Water for the East Side and West Side powerhouses is diverted to canals and flowlines dedicated to each powerhouse. The existing project boundary includes the intake structures, canals, and powerhouses of both developments, the East Side development primary transmission line, and most of the Link River Trail (the only recreation facility associated with either development).

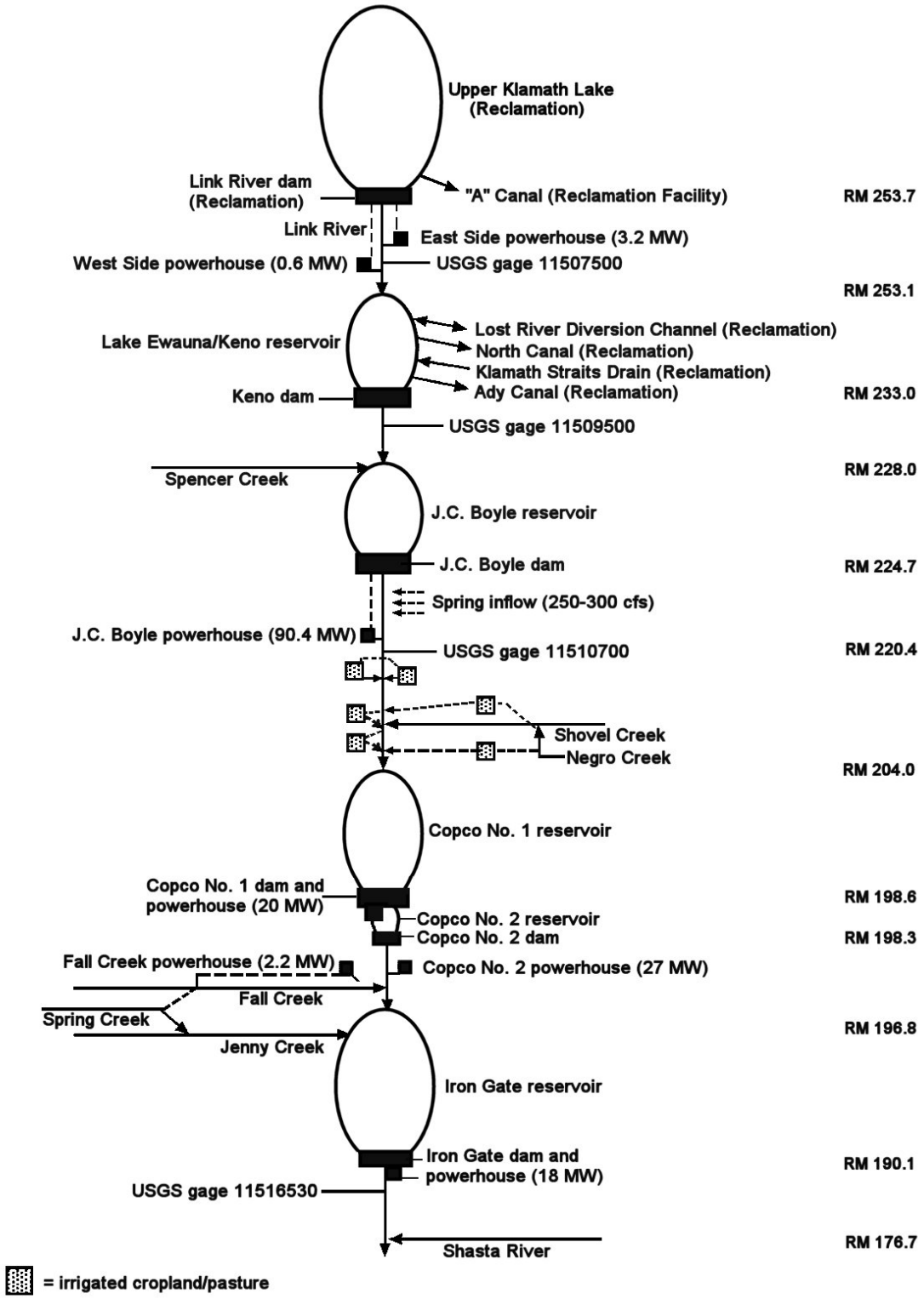

Figure 2-1. Schematic of existing PacifiCorp project facilities. (Source: PacifiCorp, 2004a, modified by staff)

Table 2-1. River reaches, reservoirs, and major tributaries proceeding downstream within the Klamath River Basin. (Source: Modified from PacifiCorp, 2004a, exhibit E; PacifiCorp response to AIR WQ-5)

River Reach (RR), Reservoir (R), or Tributary (T)	Approximate River Mile (RM)	Description or Location
Wood River (T)	RM 282.3	Tributary to Agency Lake
Williamson River (T)	RM 272.3	Tributary to Upper Klamath Lake
Upper Klamath Lake/Agency Lake (R)	RM 254.3 – 282.3	Approximately 28 miles from upper end of Agency Lake to Link River dam on Upper Klamath Lake
Link River (RR)	RM 254.3 – 253.1	1.2 miles long, connecting Upper Klamath Lake to Lake Ewauna on Klamath River
Keno Reservoir (Lake Ewauna) (R)	RM 253.1 – 233.0	20.1 miles long from headwaters of Lake Ewauna to Keno dam
Klamath River – Keno Reach (RR)	RM 233.0 – 228.3	4.7 miles long, between Keno dam and headwaters of J.C. Boyle reservoir
J.C. Boyle Reservoir (R)	RM 228.3 – 224.7	3.6 miles from headwaters to J.C. Boyle dam
Spencer Creek (T)	RM 227.6	Tributary to J.C. Boyle reservoir
Klamath River – J.C. Boyle Bypassed Reach (RR)	RM 224.7 – 220.4	4.3 miles long, between J.C. Boyle dam and J.C. Boyle powerhouse
Klamath River – J.C. Boyle Peaking Reach (RR)	RM 220.4 – 203.1	17.3 miles long, between J.C. Boyle powerhouse and Copco No. 1 reservoir
Oregon/California Border	RM 209.3	State line in J.C. Boyle peaking reach
Shovel Creek (T)	RM 206.5	Tributary to J.C. Boyle peaking reach
Long Prairie Creek (T)	RM 203.3	Tributary to J.C. Boyle peaking reach
Copco Reservoir (R)	RM 203.1 – 198.6	4.5 miles from headwaters to Copco No. 1 dam and powerhouse
Copco No. 2 Reservoir (R)	RM 198.6 – 198.3	0.3 mile from Copco No. 1 dam and powerhouse to Copco No. 2 dam
Klamath River – Copco No. 2 Bypassed Reach (RR)	RM 198.3 – 196.9	1.4 miles long, between Copco No. 2 dam and Copco No. 2 powerhouse
Iron Gate Reservoir (R)	RM 196.9 – 190.1	6.8 miles from headwaters and Copco No. 2 powerhouse to Iron Gate dam
Fall Creek (T)	RM 196.3	Tributary to Iron Gate reservoir
Jenny Creek (T)	RM 194.0	Tributary to Iron Gate reservoir
Klamath River (RR)	RM 190.1 – 0.0	190.1 miles from Iron Gate dam to Klamath River mouth
Bogus Creek (T)	RM 189.6	Tributary to Klamath River
Cottonwood Creek (T)	RM 182.1	Tributary to Klamath River
Shasta River (T)	RM 176.6	Tributary to Klamath River
Scott River (T)	RM 143.0	Tributary to Klamath River
Salmon River (T)	RM 66.0	Tributary to Klamath River
Trinity River (T)	RM 40.0	Tributary to Klamath River

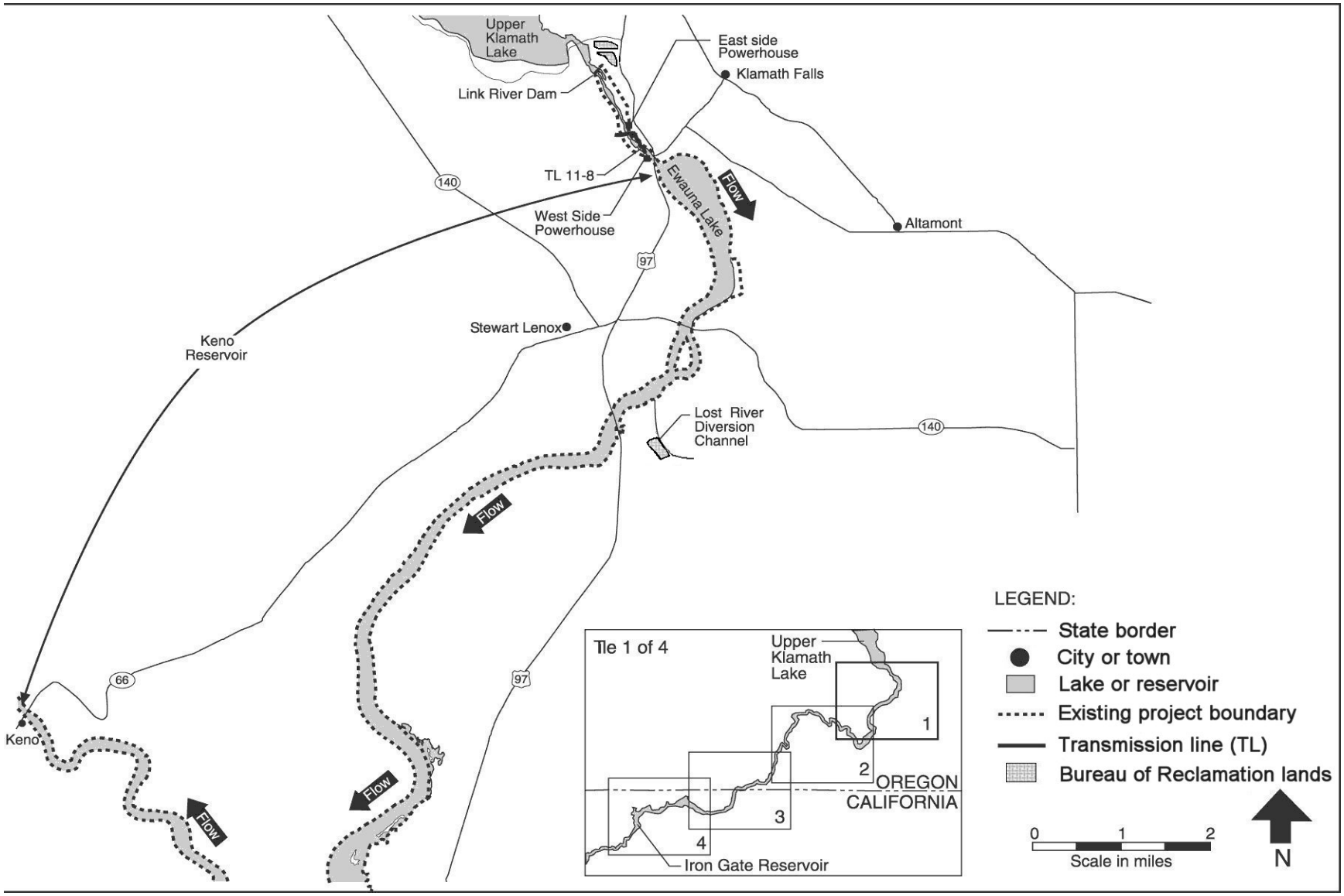

Figure 2-2. General site location of the Klamath Hydroelectric Project, Link River dam to Keno reservoir. (Source: PacifiCorp, 2000)

East Side development facilities are partially located on Reclamation-managed lands. The majority of land within the existing project boundary is owned by PacifiCorp, with smaller portions owned by the city of Klamath Falls and private parties. The facilities consist of (1) 670 feet of mortar and stone canal; (2) an intake structure; (3) 1,729 feet of 12-foot-diameter, wood-stave flowline; (4) 1,362 feet of 12-foot-diameter, steel flowline; (5) a surge tank; and (6) a powerhouse. Maximum diversion capacity for the East Side powerhouse is 1,200 cubic feet per second (cfs).

The East Side powerhouse is a reinforced-concrete structure housing a single vertical Francis turbine with rated discharge of 975 cfs and a rated capacity of 3.188 MW. The generator has a rated capacity of 3.2 MW. The authorized generating capacity for the East Side powerhouse unit is 3.188 MW.[5] There are three single-phase step-up transformers at the powerhouse. From the East Side powerhouse, a 69-kilovolt (kV) primary transmission line, approximately 0.36-mile long (PacifiCorp Line 56-8), crosses over the Klamath River and connects to PacifiCorp's Line 11.

West Side development facilities are partially located on Reclamation-managed land (the remainder are located on PacifiCorp-owned land), and consist of (1) a 5,575-foot-long concrete-lined and unlined canal; (2) a spillway and discharge structure; (3) an intake; (4) 140 feet of 7-foot-diameter steel flowline; and (5) a powerhouse. Maximum diversion capacity of the West Side powerhouse is 250 cfs.

The West Side powerhouse is a reinforced concrete and wood structure housing a single, horizontal, pit-type Francis turbine with a rated capacity of 0.78 MW. The generator has a rated capacity of 0.6 MW. The authorized generating capacity for the West Side powerhouse unit is 0.6 MW.[6] There are three single-phase step-up transformers at the powerhouse. There is no primary transmission line due to a small substation adjacent to the powerhouse that connects to the larger West Side substation.

2.1.1.2 Keno Development

Keno development is a regulating facility owned by PacifiCorp that controls the water level of the Klamath River upstream of Keno dam (figures 2-2 and 2-3). The dam is partially located on Reclamation-managed land at RM 233.0 (the remainder of the dam is on PacifiCorp-owned land, and much of the remaining land within the existing project boundary is privately owned or owned by the state of Oregon). The dam creates Keno reservoir, an impoundment that extends 22.5 miles upstream.[7] The facility does not include power-generating equipment. PacifiCorp currently operates Keno dam under an agreement with Reclamation, the execution of which was required by article 55 of the existing license. This agreement is still in effect. Maintenance of a stable water level in Keno reservoir is important because it facilitates consistent water delivery to dependent water users. Gravity flow from Keno reservoir provides water either directly or indirectly to about 41 percent of the lands irrigated by the Klamath Irrigation Project and the Lower Klamath Lake National Wildlife Refuge (figure 2-4). In addition, there are a number of privately owned diversions from Keno reservoir for irrigation of non-federal lands, and important wildlife and recreational resources exist along the shores of Keno reservoir. The existing project boundary includes the dam, reservoir shoreline, and the Keno Recreation Area (the only project-related recreation facility).

[5] 99 FERC ¶62,212 (June 19, 2002).

[6] 99 FERC ¶62,212 (June 19, 2002).

[7] Throughout the remainder of this document, we generally refer to the impounded portion of the Klamath River upstream of Keno dam, including Lake Ewauna (the wider, 2-mile-long upstream-most portion of the impoundment), as Keno reservoir.

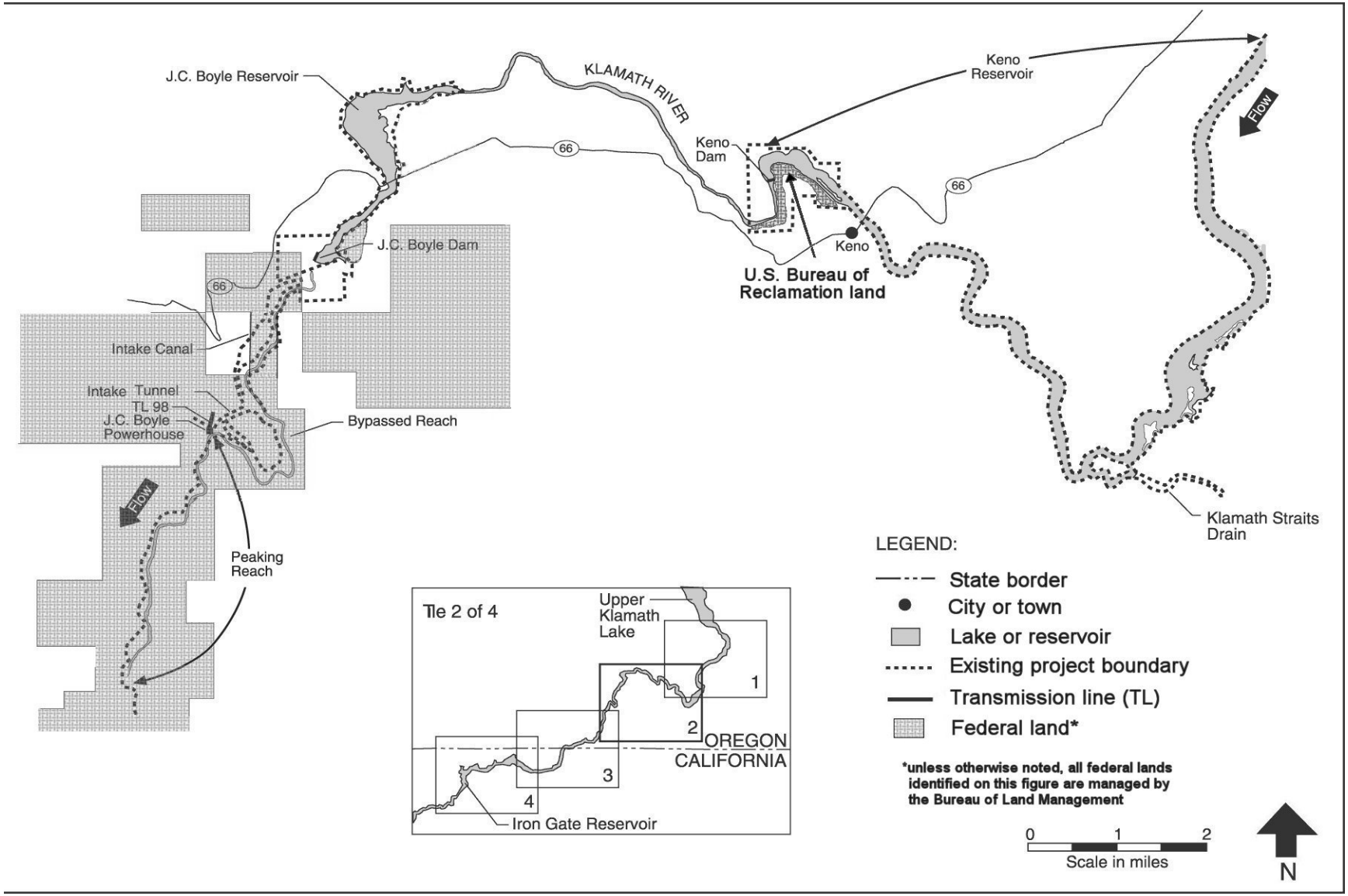

Figure 2-3. General site location of the Klamath Hydroelectric Project, Keno reservoir to downstream of J.C. Boyle powerhouse (the peaking reach). (Source: PacifiCorp, 2000)

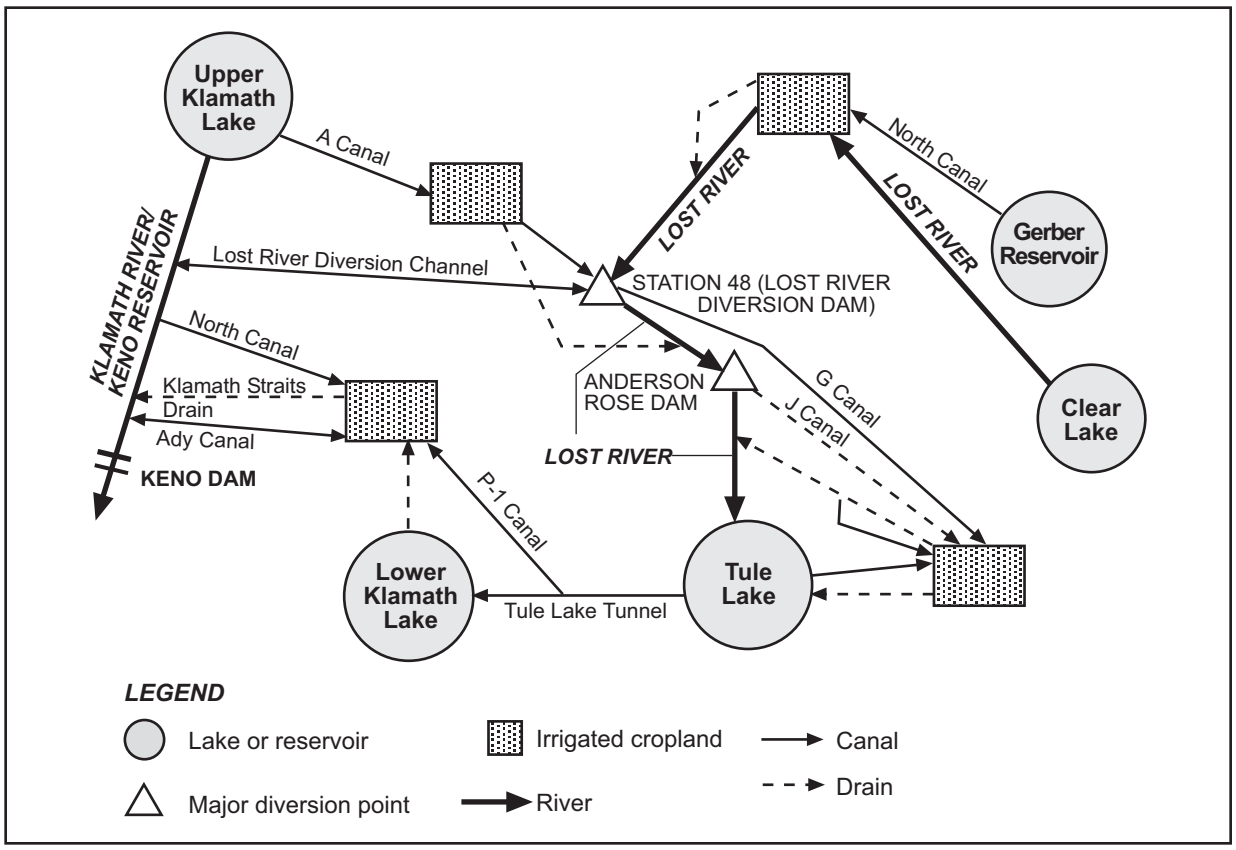

Figure 2-4. Schematic showing movement of water through the Klamath Irrigation Project area. (Source: FWS, 2002a, modified by staff)

Keno dam is a combination of earth embankment and reinforced-concrete, non-overflow, and spillway sections. The dam crest elevation is at elevation 4,070 feet (U.S. Geological Survey [USGS] datum)[8] and approximately 680 feet long and 25 feet high. The ogee-type spillway section has a crest elevation of 4,070 feet, is 265 feet wide, and has six 40-foot-wide spill gates. The normal maximum water surface is at elevation 4,086.5 feet. There is a 24-pool weir and orifice-type fish ladder. This fish ladder gains 19 feet in elevation over a length of 350 feet. Keno reservoir has a surface area of 2,475 acres at elevation 4,085 feet and a total storage capacity of 18,500 acre-feet.

2.1.1.3 J.C. Boyle Development

J.C. Boyle development consists of a reservoir, a combination embankment and concrete dam, a water conveyance system, and a powerhouse on the Klamath River, all between about RMs 228.3 and 220.4 (see figure 2-3). The powerhouse tunnel and much of the intake canal are located on Bureau of Land Management-managed land. PacifiCorp owns most of the remaining land within the existing and proposed project boundary. The existing project boundary includes the dam, most of the reservoir shoreline, the intake canal and tunnel, the powerhouse, the primary transmission line, much of the right bank of the bypassed reach, as well as Pioneer Park (East and West) and Topsy Campground (operated and maintained by the Bureau of Land Management).

J.C. Boyle dam impounds a narrow reservoir of 420 surface acres (J.C. Boyle reservoir). The normal maximum and minimum operating levels are between elevation 3,793.5 and 3,788 feet. The

[8]All subsequent elevations are in USGS vertical datum, unless otherwise indicated.

reservoir contains approximately 3,495 acre-feet of total storage capacity and 1,724 acre-feet of active storage capacity.

The embankment dam is a 68-foot-high earthfill structure with a length of 413.5 feet at elevation 3,800 feet. The concrete portion of the dam is 279 feet long and composed of a spillway section, an intake structure, and a 115-foot-long gravity section that is 23 feet high. The spillway is a concrete gravity ogee overflow section with three 36-foot-wide by 12-foot-high radial gates. The spillway crest is at elevation 3,781.5 feet, and normal pool is 0.5 foot below the top of the gates (at elevation 3,793.5 feet).

A 24-inch-diameter fish screen bypass pipe provides about 20 cfs of flow below the dam. The intake structure is a 40-foot-high reinforced concrete tower. A pool and weir fishway approximately 569 feet long provides upstream fish passage. The water conveyance between the dam and the powerhouse has a total length of 2.56 miles. From the intake structure, the water flows through a 638-foot long, 14-foot-diameter, steel flowline. The flowline is supported on steel frames where it spans the Klamath River and discharges into an open power canal. The canal is a 2-mile-long concrete flume. The power canal is provided with overflow structures at the upstream and downstream ends and terminates in a forebay. Water for power generation passes from the forebay through a 15.5-foot-diameter, concrete-lined, horseshoe-section tunnel, which is 1,660 feet long. The last section of the tunnel before the downstream portal is steel lined with the liner bifurcating into two 10.5-foot-diameter steel penstocks. Descending to the powerhouse, the penstocks reduce in two steps to 9 feet in diameter. Each penstock is 956 feet long.

The conventional outdoor-type reinforced concrete powerhouse is located approximately 4.3 river miles downstream of the dam (defined as the J.C. Boyle bypassed reach). There are two vertical-Francis turbines, each with a rated discharge of 1,425 cfs. The rated capacity of the Unit 1 turbine is 56.775 MW with a generator rating of 50.35 MW (order amending the project license, issued on July 21, 2005). The rated capacity of the Unit 2 turbine is 47.63 MW. The Unit 2 generator is rated at 48.45 MW. The authorized capacity of the units is 97.98 MW.[9] Two three-phase transformers step up the generator voltage for transmission interconnection. Flow from the powerhouse passes into the 17.3-mile-long J.C. Boyle peaking reach, before entering Copco reservoir (figure 2-5).

The power from the powerhouse is transmitted 0.24 mile to the J.C. Boyle substation. There is also a second line that pre-dates the substation. The 0.24-mile 69-kV transmission line (PacifiCorp Line 98), which connects the plant to a tap point on PacifiCorp's Line 18, is not currently energized.

2.1.1.4 Copco No. 1 Development

Copco No. 1 development consists of a reservoir, dam, spillway, intake, and outlet works and powerhouse located on the Klamath River between RMs 203.1 and 198.6 near the Oregon-California border (figure 2-6). Nearly all of the land within the existing and proposed project boundary is owned by PacifiCorp. Most of the remaining land is privately owned, and less than 1 acre of land in the proposed project boundary is managed by Reclamation. The existing project boundary includes the dam, powerhouse, reservoir shoreline, all of primary transmission line 26, a portion of primary transmission line 15, and the Copco Cove Recreation Area.

Copco reservoir[10] has a surface area of approximately 1,000 acres and contains approximately 33,724 acre-feet of total storage capacity at elevation 2,607.5 feet and approximately 6,235 acre-feet of active storage capacity. The normal maximum and minimum operating levels are at elevations 2,607.5 and 2,601.0 feet, respectively.

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[9] 112 FERC ¶62,063 (July 19, 2005) and 117 FERC ¶62,252 (December 19, 2006).

[10] Copco No. 1 reservoir is also commonly known as Copco reservoir. Subsequent references will be made to Copco reservoir. Copco No. 2 reservoir is referred to by its full name to distinguish it from Copco reservoir.

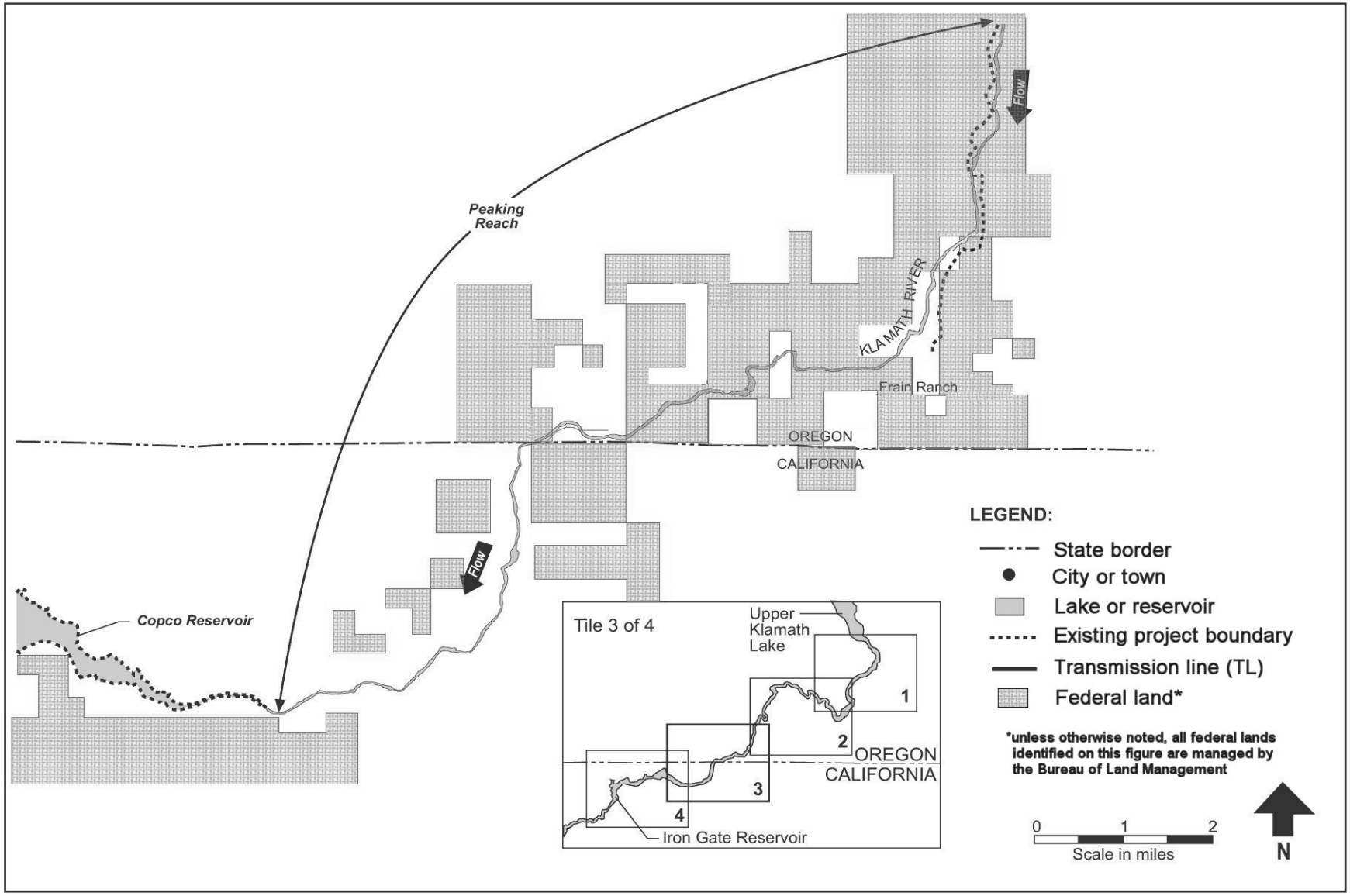

Figure 2-5. General site location of the Klamath Hydroelectric Project, from the J.C. Boyle peaking reach to Copco reservoir. (Source: PacifiCorp, 2000)

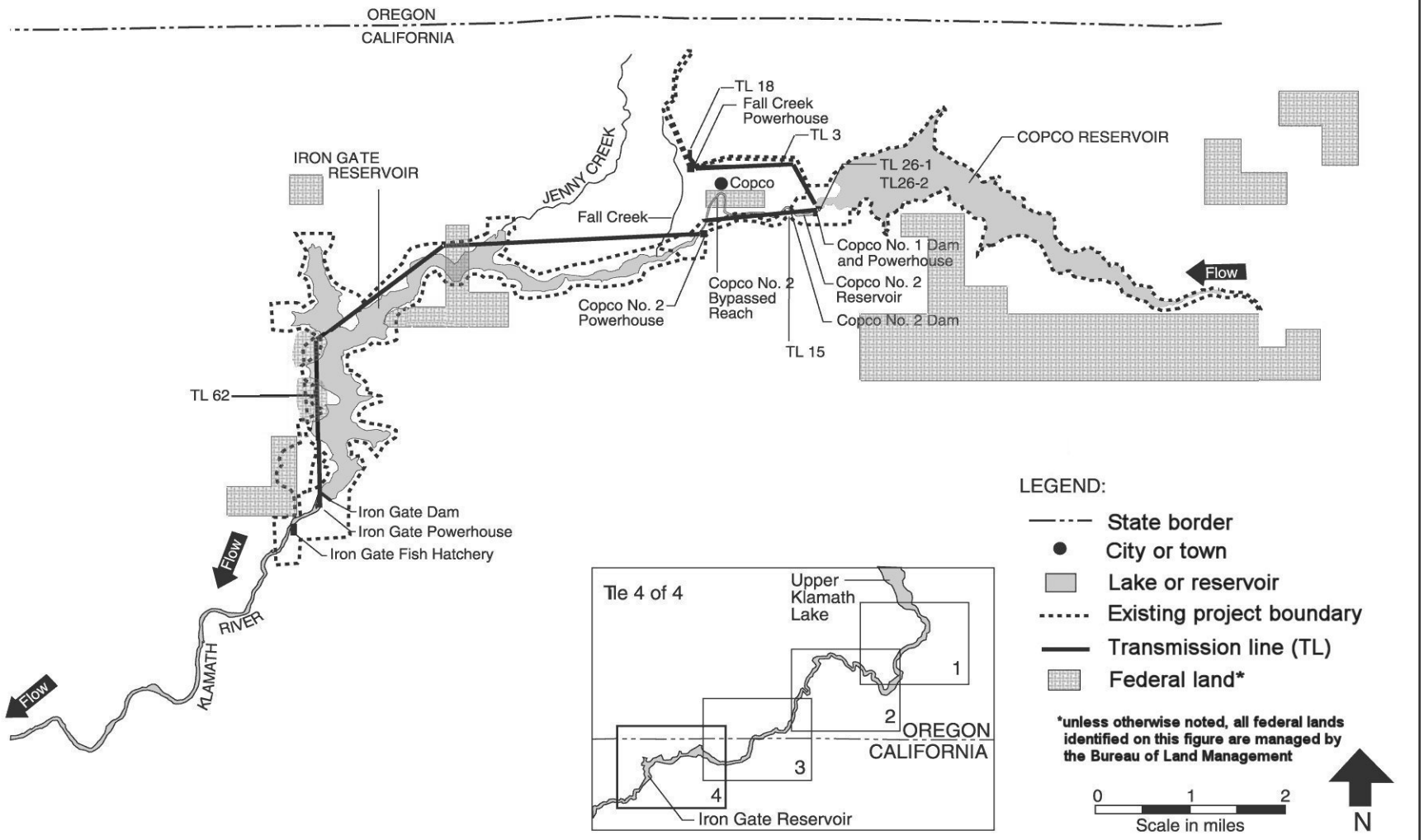

Figure 2-6. General site location of the Klamath Hydroelectric Project, from Copco reservoir to Iron Gate dam. (Source: PacifiCorp, 2000)

Copco No. 1 dam is a concrete gravity arch structure with a 462-foot radius at the crest. The total height of the dam is 126 feet, and the crest length is about 410 feet. The ogee-type spillway on the crest of the dam is divided into 13 bays controlled by 14-foot by 14-foot Taintor gates. The spillway crest is at elevation 2,593.5 feet. The normal operating reservoir water level is at elevation 2,606.0 feet. Two intake structures are located in the dam. The left intake provides water to two 10-foot-diameter (reducing to 8-foot-diameter) steel penstocks that feed Unit No. 1 in the powerhouse. The right intake provides water to a single, 14-foot-diameter (reducing to two 8-foot-diameter) steel penstock that feeds Unit No. 2.

The Copco No. 1 powerhouse is a reinforced-concrete substructure with a concrete and steel superstructure enclosed by metal siding located at the base of Copco No. 1 dam. The two turbines are double-runner, horizontal-Francis units, each with a rated discharge of 1,180 cfs. The Unit 1 turbine has a rated capacity of 16.319 MW, and the Unit 2 turbine has a rated capacity of 13.95 MW. The generators are each rated at 10 MW. The total authorized capacity of the units is 20 MW.[11] There are no turbine bypass valves. Unit 1 has three single-phase step-up transformers. Unit 2 also has three single-phase step-up transformers.

Copco No. 1 plant has two associated 69-kV primary transmission lines. PacifiCorp Line 15 connects the Copco No. 1 switchyard to Copco No. 2, approximately 1.23 miles to the west. PacifiCorp lines 26-1 and 26-2, each approximately 0.07 mile long, connect Copco No. 1 powerhouse to the Copco No. 1 switchyard.

2.1.1.5 Copco No. 2 Development

Copco No. 2 development consists of a small impoundment, a diversion dam, a water conveyance system, and a powerhouse (see figure 2-6). All land associated with this development is owned by PacifiCorp. The existing project boundary includes the dam, reservoir, flowline, powerhouse, and primary transmission line. The reservoir is about 0.25-mile long and has a storage capacity of 73 acre-feet. At the normal water surface elevation of elevation 2,483 feet, there is very minimal active storage, and thus, the reservoir is held at elevation 2,483 feet. As a result, Copco No. 2 generation follows Copco No. 1 generation.

Copco No. 2 dam is a concrete gravity structure with an intake to the flowline on the left abutment and a 145-foot-long spillway section with five Taintor gates. The dam is 33 feet high with an overall crest length of 335 feet. The crest elevation is at elevation 2,493 feet. The dam includes a 132-foot-long earthen embankment. A corrugated metal flume provides about 5 to 10 cfs of instream flow to the 1.5-mile-long bypassed reach. The concrete gravity spillway section crest elevation is 2,473 feet. The flowline to the powerhouse consists of 2,440 feet of concrete-lined tunnel, 1,313 feet of wood-stave pipeline, an additional 1,110 feet of concrete-lined tunnel, a surge tank, and two steel penstocks. The diameter of the tunnel and wood stave pipeline sections is a constant 16 feet. The two penstocks, one 405.5 feet long and one 410.6 feet long, range from 16 feet in diameter at the inlet to 8 feet in diameter at the turbine spiral cases.

The powerhouse is a reinforced concrete structure that houses two vertical-Francis turbines. Each turbine has a rated discharge of 1,338 cfs. The Unit 1 turbine has a rated capacity of 19.714 MW, and the Unit 2 turbine has a rated capacity of 15 MW. The generators are rated at 13.5 MW. The total authorized capacity of the units is 27.0 MW.[12] There are three single-phase, 6,600/72,000-volt transformers connected to three single-phase, 73,800/230,000-volt step-up transformers for interconnection to the transmission system. A 69-kV primary transmission line (PacifiCorp Line 15) connects the Copco No. 2 powerhouse to the Copco No. 1 switchyard, approximately 1.23 miles to the west.

[11] 99 FERC ¶62,212 (June 19, 2002).

[12] 99 FERC ¶62,212 (June 19, 2002).

2.1.1.6 Fall Creek Development

Fall Creek development is located on Fall Creek, a tributary to the Iron Gate reservoir, about 0.4 mile south of the Oregon-California border (figure 2-7). The facilities on Fall Creek consist of a 5-foot-high, concrete and timber flashboard spillway structure; an earth- and rock-filled diversion dam; 4,560 feet of earthen and rock-cut power canal; 2,834 feet of steel penstock; and a powerhouse. These existing facilities are on land owned by PacifiCorp. The existing project boundary includes the Fall Creek diversion dam, intake canal, penstock, powerhouse, tailrace, and primary transmission line. Additional existing diversion facilities located on Spring Creek are not currently part of the licensed project, but PacifiCorp proposes to include the Spring Creek facilities as part of the Fall Creek development. A description of the Spring Creek diversion facilities, located on Bureau of Land Management-managed land, is presented as part of the proposed project in section 2.2.1.5.

The overall dam crest length is 130 feet with a crest elevation at 3,253.4 feet. The concrete spillway section is 32 feet wide. At a normal water surface elevation of 3,251 feet, there is no active storage in the diversion pond. A small hole in one of the spillway stop logs provides 0.5 cfs of instream flow in Fall Creek below the dam. The 4,560-foot-long earth and rock power canal is 9 feet wide. The 42-inch-diameter penstock (reducing to 30-inch-diameter), approximately 2,834 feet long, drops over the hillside to the powerhouse.

Fall Creek powerhouse is a reinforced-concrete substructure with a steel superstructure enclosed by corrugated metal siding. It houses three horizontal shaft Pelton turbines. The Unit No. 1 turbine has a rated discharge capacity of 14 cfs and a rated output of 0.75 MW, and the generator is rated at 0.5 MW. The Unit No. 2 turbine has a rated discharge capacity of 21 cfs and a rated output of 1.125 MW, and the generator is rated at 0.45 MW. Unit No. 3 has a rated discharge capacity of 25 cfs and a rated output of 1.35 MW, and the Unit 3 generator is rated at 1.25 MW. The total authorized capacity of the units is 2.2 MW.[13] The combined rated hydraulic capacity of the three turbines is 60 cfs. There are three single-phase, step-up transformers at the powerhouse. A tailrace channel extends about 500 feet from the powerhouse to Fall Creek.

The Fall Creek powerhouse has two associated 69-kV transmission line segments. Line 3 connects the Fall Creek plant to Copco No. 1 switchyard, about 1.65 miles to the east. There is also a very short segment of Line 3 that connects the plant to a tap point on Line 18.

2.1.1.7 Iron Gate Development

Iron Gate development consists of a reservoir, an earth embankment dam, a non-gated side-channel spillway, intakes for the diversion tunnel and penstock, a steel penstock from the dam to the powerhouse, and the powerhouse. It is located on the Klamath River between RMs 196.9 and 190.1, approximately 20 miles northeast of Yreka, California (see figure 2-6). It is the farthest downstream hydroelectric facility of the Klamath Hydroelectric Project. Most of the land within the existing and proposed project boundary is owned by PacifiCorp, but the Bureau of Land Management is also present at several locations along the reservoir. The existing project boundary includes the dam, powerhouse, reservoir shoreline, and primary transmission line. Also included in the existing project boundary are the Fall Creek, Jenny Creek, Wanaka Springs, and Iron Gate Hatchery recreation areas; portions of the Camp Creek, Juniper Point, and Mirror Cove recreation areas; and the Long Gulch Boat Launch. The Iron Gate Hatchery is also included in the project boundary.

[13] 99 FERC ¶62,212 (June 19, 2002).

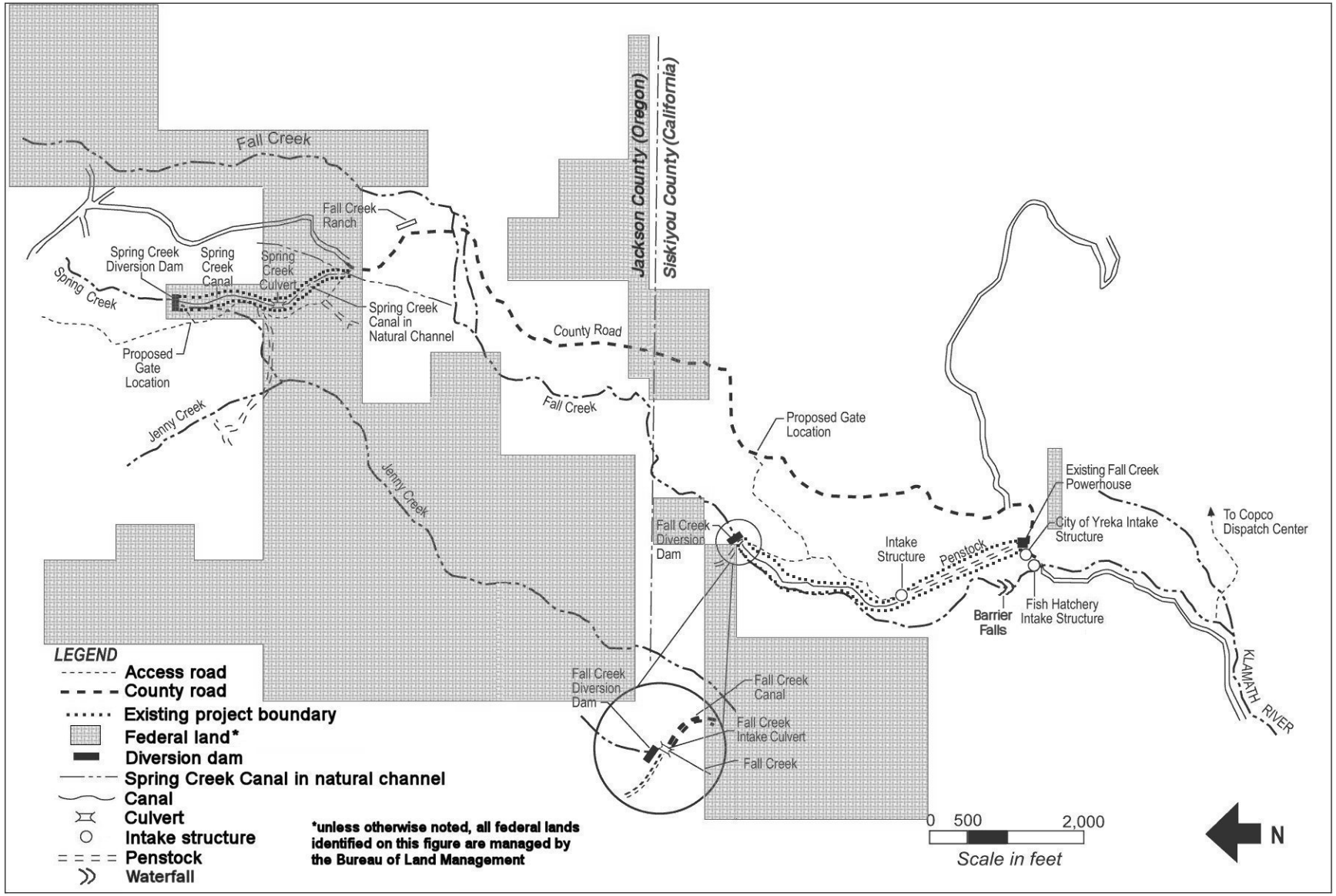

Figure 2-7. Locations of project facilities, Fall Creek development. (Source: PacifiCorp, 2000, modified by staff)

The reservoir formed upstream of Iron Gate dam is about 944 surface acres and contains about 50,941 acre-feet of total storage capacity (at elevation 2,328.0 feet) and 3,790 acre-feet of active storage capacity. The normal maximum and minimum operating levels are between elevation 2,328.0 and 2,324.0 feet, respectively.

Iron Gate dam is a zoned earthfill embankment with a steel extension wall on the crest. The dam has a height of 194 feet to the top of the wall at elevation 2.348.0 feet and is about 740 feet long. There are fish trapping and holding facilities located at the toe of the dam. High- (elevation 2,310.0 feet) and low- (elevation 2,250 feet) level intakes for the fish facility water are incorporated into the dam. The non-gated chute spillway is excavated in rock at the right dam abutment. The spillway crest, at elevation 2,328.0 feet, is 727 feet long. The diversion tunnel used during construction is limited to emergency use during high flow events. The intake structure for the powerhouse is a 45-foot-high, free-standing, reinforced-concrete tower, located in the reservoir. The intake structure provides flow to a 12-foot-diameter, welded-steel penstock.

The powerhouse is located at the base of the dam. The Iron Gate powerhouse consists of a single vertical Francis turbine. The turbine has a rated discharge capacity of 1,735 cfs, with a rated output of 18.75 MW, and the generator is rated at 18 MW. The total authorized capacity of the unit is 18 MW.[14] In the event of a turbine shutdown, a synchronized Howell-Bunger bypass valve located immediately upstream of the turbine diverts water around the turbine to maintain flows downstream of the dam. There is a single three-phase, step-up transformer at the powerhouse. The Iron Gate powerhouse has one associated 69-kV primary transmission line. Line 62 runs along the north side of Iron Gate reservoir for about 6.55 miles to the Copco No. 2 switchyard.

The Iron Gate fish hatchery is located downstream of Iron Gate dam, adjacent to the Bogus Creek tributary. The hatchery complex includes an office, incubator building, rearing ponds, fish ladder with trap, visitor information center, and employee residences. Up to 50 cfs is diverted from Iron Gate reservoir to supply the 32 raceways and fish ladder. The California Department of Fish and Game (Cal Fish & Game) operates the hatchery, and PacifiCorp provides 80 percent of the annual operating and maintenance costs.

2.1.1.8 Project Safety

Portions of the project have been operating for more than 50 years under the existing 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, J.C. Boyle, Copco No. 1, and Iron Gate developments have been inspected and evaluated every 5 years by an independent consultant, and a consultant's safety report has been submitted for Commission review. East Side, West Side, Keno, Copco No. 2, and Fall Creek developments have been exempted by the Commission from that requirement. 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 ensure 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.

2.1.2 Existing Project Operations

Link River dam controls Upper Klamath Lake elevations under the direction of Reclamation. Iron Gate minimum flow releases are stipulated by article 52 of PacifiCorp's FERC license. However,

[14] 99 FERC ¶62,212 (June 19, 2002).

PacifiCorp indicates that, since 1997, these releases have increasingly been stipulated by Reclamation, as it attempts to comply with two ESA BiOps related to the operation of its Klamath Irrigation Project. At present, PacifiCorp asserts that it has effectively little or no control over the river's flow regime downstream of Iron Gate dam. Because of limited storage capacity, the project can manage only short-term (hourly, daily) water balancing operations at certain project reservoirs. Water flow through the project is directly related to Reclamation's control of Upper Klamath Lake elevations, downstream releases out of Iron Gate dam, flows into and out of the Reclamation project area, and the relatively small active storage capacities of the project reservoirs. When river flows are less than hydraulic capacity, J.C. Boyle, Copco No. 1, and Copco No. 2 generally operate as peaking generation facilities. Water at Link River dam either flows over the dam or is diverted to East Side or West Side development after which it enters the Link River and flows to Keno reservoir.

According to a 1968 contract between PacifiCorp and Reclamation for the operation of Keno reservoir, the reservoir must be maintained between elevations 4,085.0 and 4,086.5 feet. The contract was developed in compliance with article 55 of the current license. However, at the request of irrigators with pumps and gravity-fed diversion weirs located on Keno reservoir, PacifiCorp maintains Keno reservoir at 4,085.4 +/- 0.1 foot from October 1 through May 15 and at 4,085.5 +/-0.1 foot from May 16 through September 30 such that reservoir levels are suited for their irrigation pumps and weirs. There are no terms or conditions in the current license that require PacifiCorp to accommodate the irrigators' requests. Water released from Keno dam enters the Keno reach of the Klamath River before entering J.C. Boyle reservoir.

The normal maximum and minimum elevations of J.C. Boyle reservoir are elevations 3,793.5 and 3,788 feet, a range of 5.5 feet. Under typical peaking operations, the reservoir fluctuates about 3.5 feet, while average daily fluctuations are approximately 1 to 2 feet. Water at J.C. Boyle dam either enters the flow conduit to the powerhouse or the bypassed reach. Flows from the powerhouse and bypassed reach enter the peaking reach of the Klamath River before entering Copco reservoir.

Copco reservoir can fluctuate up to 6.5 feet, from 2,601.0 to 2,607.5 feet, but the average daily fluctuation is about 0.5 foot. Water at Copco No. 1 dam passes directly into Copco No. 2 reservoir, either via the powerhouse or spillage. Because Copco No. 2 reservoir has virtually no active storage, the reservoir rarely fluctuates more than several inches. Water at Copco No. 2 dam either enters the flow conduit to the Copco No. 2 powerhouse or the Copco No. 2 bypassed reach, after which it enters Iron Gate reservoir.

The Spring Creek and Fall Creek diversions that provide flows to Fall Creek powerhouse are operated as run-of-river facilities with no storage. The diversion dams maintain water at elevation 100.2 feet (local datum) and elevation 3,250.5 feet, respectively. Water at Spring Creek diversion dam either spills over the dam or enters the diversion canal, where it eventually enters a tributary to Fall Creek. Once in Fall Creek, water passes about 2 miles downstream to the Fall Creek diversion dam. At Fall Creek diversion dam, water either flows over the dam to the bypassed reach or enters the Fall Creek flow conduit, through the powerhouse and the tailrace channel before re-joining Fall Creek. Fall Creek flows into Iron Gate reservoir.

Iron Gate reservoir is maintained between elevations 2,328 and 2,324 feet, a range of 4 feet. The reservoir is operated on a daily basis over a limited range of about 1.5 feet. Water at Iron Gate dam passes through the powerhouse or over the dam to the Klamath River, and flows unimpeded to the Pacific Ocean, 190 miles downstream.

2.1.3 Existing Environmental Measures

Currently, PacifiCorp provides and supports numerous ongoing project-related environmental resource measures within the Klamath River Basin, as required by its existing license, as amended. These measures are summarized as follows:

- Regulate the water level upstream of Keno dam in accordance with the agreement with Reclamation (article 55, 1965 amended license).
- Operate J.C. Boyle (formerly Big Bend) development such that the rise or fall of the river is increased or decreased gradually at a rate not to exceed 9 inches per hour at a point 0.5 mile below the J.C. Boyle powerhouse, subject to Commission review and adjustment from time to time, after notice and opportunity for hearing (article 36, 1957 amended license).
- Release an instantaneous minimum flow of 0.5 cfs from the Fall Creek diversion dam into Fall Creek and maintain an instantaneous 15 cfs minimum flow, or a quantity equal to the natural flow of the stream, whichever is less (article 69, 1970 amended license).
- Release the following minimum flows downstream of Iron Gate dam: September 1 through April 30, 1,300 cfs; May 1 through May 31, 1,000 cfs; June 1 through July 31, 710 cfs; and August 1 through August 31, 1,000 cfs (article 52, 1961 amended license).
- Restrict changes of release rates to not more than 250 cfs per hour or a 3-inch change in river stage per hour, whichever produces the least change in stage as measured at a gage located not less than 0.5 mile downstream of Iron Gate dam (article 52, 1961 amended license).
- Construct, maintain, and operate permanent wildlife facilities and protective devices including, but not limited to, deer protective fences, and comply with such reasonable modification in project structures and operation in the interest of wildlife as may be prescribed hereafter by the Commission upon the recommendation of the U.S. Department of the Interior (Interior) and Cal Fish & Game (article 53, 1961 amended license).
- Reimburse Cal Fish & Game for 80 percent of the combined annual cost of operation and maintenance of the Iron Gate Hatchery and of the permanent fish trapping, collecting, holding, and spawn-taking facilities and appurtenances constructed at Iron Gate dam. If the licensee and Cal Fish & Game fail to agree on the amount to be paid by the licensee for this purpose, the Commission reserves the right to determine the amount of such annual payment, after notice and opportunity for hearing (article 50, 1963 amended license).
- Construct, operate, and maintain fishways at the J.C. Boyle (formerly Big Bend) diversion dam, screens at the intake for the J.C. Boyle conduit, and deer escape facilities in and around the open portions of the J.C. Boyle conduit (article 32, 1957 amended license).
- Maintain in the natural channel of the Klamath River immediately below the J.C. Boyle diversion dam a reasonable minimum flow consistent with the primary purpose of the project to be fixed hereafter by the Commission after notice to interested parties and opportunity for rehearing (article 34, 1957 amended license). This minimum flow was later set by the Commission at 100 cfs, released at the dam according to exhibit B of the license application.

2.2 PACIFICORP'S PROPOSAL

2.2.1 Proposed Project Facilities

PacifiCorp proposes to modify the existing project by decommissioning East Side and West Side developments; removing Keno development from the licensed project; and adding or modifying facilities associated with J.C. Boyle, Copco No. 2, Fall Creek, and Iron Gate developments. PacifiCorp also proposes to include the diversion facilities on Spring Creek in the licensed project, as part of Fall Creek development. These changes would require corresponding adjustments to the existing project boundary. Details regarding the facilities that would be removed from or made part of the proposed project are discussed in more detail in the following section.

2.2.1.1 East Side and West Side Developments

All seven gates that supply water to the East Side diversion at Link River dam would be rendered inoperable by removing the individual gate lifting devices. Concrete would be added to the backside of the gates, sealing the intakes. An access ramp would be constructed from the dam site to allow access for filling the existing forebay. The woodstave-portion of the flowline would be dismantled and removed from the site. The steel penstock, surge tank, and support structures would be removed. The powerhouse would have all wooden materials removed. Any components containing chemical or hazardous materials would be removed from the site, including transformers, bushings, tanks, lead bearings, and asbestos based insulating products. All windows and doors would be sealed to prevent public access. The incoming water line and the battery bank would be removed. After removal of the penstock, the penstock outlet would be sealed at the powerhouse assuring that access is prevented. The transmission line (No. 56-8) from the East Side powerhouse to a tap-point on transmission line 11 also would be removed.

Four of the six steel slide gates that control flow at the Link River dam intake at the West Side canal would be made inoperable through removal of the lifting devices. The gates would be secured in place with concrete, with backfill being placed immediately below the dam. The site would be restored and fill areas planted to prevent erosion. The canal leading to the West Side penstock would be filled and regraded to the natural contour. Both the spillway and the intake concrete would be removed. The penstock, including the support structures, also would be removed. The powerhouse would have all wooden materials removed. Any components that contain chemical or hazardous materials would be removed from the site including transformers, bushings, tanks, lead bearings, and asbestos-based insulating products. All windows and doors would be sealed to prevent public access. The incoming water line and the battery bank would be removed. Following the removal of the penstock, the penstock outlet would be sealed at the powerhouse, assuring that access is prevented. The small powerhouse-related substation and transmission lines leading to the larger nearby substation would be removed. The larger West Side substation would remain in place, since it is not associated with the West Side hydroelectric development.

2.2.1.2 Keno Development

In the future, Keno dam would remain in operation to maintain the elevation of Keno reservoir. However, it is not included in the proposed project because the development has no generation facilities, and PacifiCorp states that its operation does not substantially benefit generation at its downstream hydroelectric developments, which would make it, according to PacifiCorp, non-jurisdictional.

2.2.1.3 J.C. Boyle Development

PacifiCorp proposes a surface collection system (gulper) for the J.C. Boyle forebay to exclude fish from the power intake and to facilitate downstream fish passage. The system would include a full-depth guide net barrier extending from the fishway exit to the left bank. A pump system mounted on a floating barge would provide about 200 cfs of attraction flow and surface collection of downstream fish migrants. Collected fish would be conveyed past the dam via a 24-inch bypass pipe with a flow of 20 cfs.

PacifiCorp also proposes modifications for the J.C. Boyle fish ladder. The existing bar spacing on the fishway exit pool trashrack would be increased to facilitate the passage of adult fish. An additional weir also would be added to the fishway entrance pool to decrease the height of the existing step.

PacifiCorp proposes two synchronous bypass valves at the J.C. Boyle powerhouse so that (1) downstream ramping rate requirements would be maintained after a unit trips off-line and (2) the use of the emergency spillway just upstream from the power tunnel and at the end of the power canal would be minimized. The modifications would include two 9.5-foot diameter stainless steel shutoff butterfly valves and two 4-foot diameter stainless steel fixed cone valves. Normally, the butterfly valves would be in the open position, but they would close automatically in the event of an operational failure of the respective

fixed cone valve. A hooded discharge structure and energy dissipation structure also would be included to prevent large amounts of spray that could negatively affect switchyard equipment downstream of the powerhouse. The turbine bypass facility may need to be modified to meet new instream flow requirements downstream of the J.C. Boyle powerhouse. In its license application, PacifiCorp proposes to provide an additional 100 cfs below the powerhouse, but stated that the release would be made (a) at the dam, (b) through a potential small hydro turbine, or (c) through modifications to the proposed turbine bypass facility. PacifiCorp provided the estimated energy loss associated with a release from the dam. Therefore, staff assumes that the release would be made from the dam.

2.2.1.4 Copco No. 2 Development

PacifiCorp proposes to automate the existing instream flow bypass sluiceway on the left side of the spillway to provide a constant release of 10 cfs below Copco No. 2 dam. An automated level sensor and gate operator would be added to control the instream flow releases.

2.2.1.5 Fall Creek Development

PacifiCorp proposes to include the existing diversion facilities on Spring Creek in the licensed project as part of Fall Creek development. The Spring Creek diversion is located on Bureau of Land Management-managed land in the Cascades-Siskiyou National Monument. Spring Creek dam is a small earthen embankment about 7 feet high and 10 feet wide that spans the entire stream width (66 feet). There is a 42-inch diameter vertical pipe that serves as a water level control for the reservoir. The vertical pipe connects to a 42-inch diameter culvert under the road that discharges spill flows to the creek channel downstream. There is a separate gated structure that passes flows of up to 16.5 cfs from the reservoir to the Spring Creek ditch, which, in turn, flows into Fall Creek.

PacifiCorp proposes canal screens and fish ladders for both the Fall Creek and Spring Creek diversions. The canal screens would be diagonal-type screens meeting U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Service Fisheries (NMFS) SW Region criteria for salmonid fry, including a maximum approach velocity of 0.4 foot per second, a sweeping velocity of 2 times the approach velocity, maximum screen openings of 0.07 inch, and a minimum open area of 27 percent. The bypass pipes would be 12 inches in diameter with 2.5 cfs of flow each. The Fall Creek fish ladder would be a pool-and-weir type ladder consisting of six pools. The pools would be constructed from rock and include a 0.5-foot vertical jump for each pool. The existing flashboards would be notched at the exit pool to permit a fishway flow of 2.5 cfs. The Spring Creek fish ladder would be a timber or concrete pool-and-weir type ladder consisting of eight pools. The pools would be 4 feet by 5 feet in plan with 0.5-foot vertical jumps. A fishway control structure consisting of a 24-inch diameter culvert and manually operated slide gate would provide 2.5 cfs of fishway flow. PacifiCorp also proposes to include a Parshall flume for the Spring Creek canal to permit measurement of diverted flows.

2.2.1.6 Iron Gate Development

Minor modifications proposed for Iron Gate development include the purchase of a mass-marking trailer for use at the hatchery. The mass-marking trailer is a portable building containing automated fish-marking equipment. Modifications to Iron Gate dam may be required to facilitate the release of low-level reservoir water, pending the outcome of ongoing water quality investigations. These modifications may include retrofit of the existing low-level outlet and bulkhead gate. PacifiCorp also proposes to install an oxygenation system at Iron Gate development, which would entail installation of a diffuser on the bottom of Iron Gate reservoir (letter from C. Scott, Licensing Project Manager, PacifiCorp, to the Commission dated October 17, 2005; response to our AIR WQ-1).

2.2.2 Proposed Project Operations

The proposed project would not include East Side and West Side developments, so it is expected that Reclamation would solely and at its own discretion operate Link River dam and would be responsible for releasing water to meet any Link River dam instream flow requirements and also the Klamath River instream flow requirements, which are specified for and measured at Iron Gate dam. The proposed project also would not include Keno development, but Keno dam would likely continue to be operated as it is currently, only under the jurisdiction of the state of Oregon unless provisions of the total maximum daily load (TMDL)[15] or directives from the state require changes.

Overall, the amount and timing of water available at J.C. Boyle, Copco No. 1, Copco No. 2, and Iron Gate developments would likely be similar to those under existing hydrologic conditions, because PacifiCorp does not propose any new storage facilities above J.C. Boyle, nor are storage facilities being removed. East Side and West Side developments have no storage capacity.

2.2.3 Proposed Environmental Measures

PacifiCorp proposes the following additional protection and enhancement measures:

Water Resources

1P. Implement instream flow and ramping rate measures in project reaches to protect and/or enhance various flow-dependent resources, including water quality.

2P. Implement a low-level release of cooler hypolimnetic water from Iron Gate reservoir during summer to provide some cooling of the Klamath River downstream of the project.[16]

3P. Install a reservoir oxygenation diffuser system at Iron Gate development as needed to prevent adverse downstream effects caused by seasonally low levels of dissolved oxygen in hypolimnetic generation flows.

4P. Implement reservoir management plans for improving water quality in J.C. Boyle, Copco, and Iron Gate reservoirs that include evaluating the effectiveness and feasibility of hypolimnetic oxygenation, epilimnetic or surface aeration or circulation, and copper algaecide treatment, for controlling water quality conditions.[17]

5P. Consult and coordinate with appropriate agencies on the annual scheduled outages for project maintenance events where flows in project reaches are required to be outside the normal operations.

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[15]Section 303(d) of the Clean Water Act requires states to identify waterbodies that are considered impaired relative to applicable water quality standards or objectives. TMDLs identify the maximum amount of a pollutant that can be added to such impaired waterbodies, and strategies to implement to address the causes of the impairment so that the water quality standards/objectives are met.

[16]On page E3-207 of its license application, PacifiCorp describes this as a "potential" measure, which would be evaluated in consultation with the Water Board during the CWA Section 401 certification process. PacifiCorp reaffirmed its commitment to continue to explore opportunities for using cool-water storage in Iron Gate reservoir to enhance downstream water temperatures in its May 12, 2006, response to terms and conditions.

[17]Not included in PacifiCorp's license application, but proposed in PacifiCorp's water quality certification application, submitted to the Water Board by letter dated March 29, 2006, and confirmed in PacifiCorp's responses to terms and conditions, filed by letter to the Commission, dated May 12, 2006.

Aquatic Resources

6P. Develop a decommissioning plan for the East Side and West Side facilities in consultation with NMFS, Interior, and Reclamation.

7P. Release a minimum flow of 100 cfs from J.C. Boyle dam at all times to enhance usable fish habitat while maintaining high water quality in the J.C. Boyle bypassed reach, and install a gage to measure the flow.

8P. Release an additional minimum flow of 100 cfs at J.C. Boyle powerhouse or dam.

9P. Limit flow downramp rates to 150 cfs per hour in the J.C. Boyle bypassed reach, except for flow conditions beyond PacifiCorp's control.

10P. Limit flow upramp rates to 9 inches (in water level) per hour in the J.C. Boyle peaking reach (the reach of the Klamath River from the J.C. Boyle powerhouse to Copco reservoir). Flow downramp rates would not exceed 9 inches per hour for flows exceeding 1,000 cfs and would not exceed 4 inches per hour for flows less than 1,000 cfs.

11P. Install a synchronized bypass valve on each of the two J.C. Boyle powerhouse units to ensure ramping rates could be met if a unit trips off-line.

12P. Install a surface collection system (gulper) for the J.C. Boyle reservoir to exclude fish from the power intake and to facilitate downstream fish passage.

13P. Make minor improvements to the J.C. Boyle fish ladder (i.e., increasing the existing bar spacing on the exit pool trashrack and adding an additional weir) to facilitate the passage of adult fish.

14P. Eliminate the gravity-fed water diversions from Shovel Creek and its tributary, Negro Creek (located adjacent to the Klamath River in the California segment of the J.C. Boyle peaking reach), to prevent trout fry from being entrained and lost in the various ditches on PacifiCorp's Copco Ranch (a non-hydro related property).

15P. Place approximately 100 to 200 cubic yards of spawning gravel in the upper end of the J.C. Boyle bypassed reach.

16P. Maintain a minimum flow of 10 cfs in the Copco No. 2 bypassed reach, and make improvements to the gate and flow conduit to the bypassed reach.

17P. Limit flow downramp rates to 125 cfs per hour (equivalent to less than 2 inches per hour in most of the expected flow ranges) in the Copco No. 2 bypassed reach, except for flow conditions beyond PacifiCorp's control.

18P. Release a minimum flow of 5 cfs into the Fall Creek bypassed reach, and release a minimum flow of 15 cfs downstream of the bypass confluence.

19P. Divert no flow from Spring Creek during July and August, and release 1 cfs, or inflow, downstream of the Spring Creek diversion dam for the remainder of the year; install a Parshall flume to measure the minimum flow.

20P. Install canal screens and fish ladders for both the Fall Creek and Spring Creek diversions.

21P. Maintain the instream flow schedule and ramp rates downstream of Iron Gate dam according to Reclamation's Klamath Project Operations Plans consistent with BiOps issued by FWS and NMFS.

22P. Place approximately 1,800 to 3,500 cubic yards of spawning gravel downstream of Iron Gate dam between the dam and the Shasta River confluence.

23P. Maintain current obligation of funding for operation and maintenance of the Iron Gate Hatchery.

24P. Purchase, construct, and operate a mass-marking facility at the Iron Gate Hatchery that provides for marking 25 percent of all Chinook salmon released.

Terrestrial Resources

25P. Implement a vegetation resource management plan to include the following environmental measures: (1) project facility (including road and powerline rights-of-way) vegetation management activities; (2) noxious weed control; (3) restoration of project-disturbed sites; (4) protection of threatened, endangered, and sensitive plant populations; and (5) riparian habitat restoration.

26P. Implement a wildlife resource management plan to include the following environmental measures: (1) installation of wildlife crossing structures on the J.C. Boyle canal; (2) deer winter range management; (3) monitoring powerlines and retrofitting poles to decrease electrocution risk; (4) development of amphibian breeding habitat along Iron Gate reservoir; (5) support of aerial bald eagle surveys and protection of bald eagle and osprey habitat; (6) selective road closures; (7) installation of turtle basking structures; (8) installation of bat roosting structures; (9) surveys for threatened, endangered, and sensitive wildlife species in areas to be affected by new recreation development; and (10) long-term monitoring of environmental measures.

Recreational Resources

27P. Work with the Bureau of Land Management and others to resolve current effects of recreational use on sensitive resources and provide increased resource protection and visitor management controls throughout the proposed project area.

28P. Increase the supply of camping and day-use facilities to help meet current and future demand, principally at Iron Gate reservoir, by adding about 85 new campsites and 30 day-use picnic sites by 2040, or when needed based on the results of monitoring.

29P. Provide increased management presence at developed and undeveloped recreation sites.

30P. Address Americans with Disabilities Act (ADA) compliance at all existing and new recreational facilities, including providing ADA-accessible fishing access sites.

31P. Provide improved maintenance and repair or replace site-specific facilities at existing developed recreation sites, including boat launches, picnic sites, and campsites.

32P. Finalize the draft Recreational Resource Management plan (dated September 2004) in consultation with the Bureau of Land Management, the Forest Service, National Park Service, Oregon Parks & Rec, Cal Fish & Game, Siskiyou County Sheriff's Office, Klamath County Sheriff's Office, Oregon Fish & Wildlife, and the tribes. The plan would include a multi-resource interpretation and education program with new signs, kiosks, brochures, and/or services.

33P. Provide new or enhanced multi-use, non-motorized trail opportunities.

34P. Provide designated wildlife viewing areas, such as watchable wildlife stations.

35P. Maintain current undeveloped open space lands on PacifiCorp-owned property for activities such as wildlife viewing, sightseeing, nature appreciation, photography, and other recreational activities that rely on adequate natural open space.

36P. Work with the Bureau of Land Management and Oregon Parks and Recreation Department to implement portions of the Upper Klamath River Management Plan, when adopted, from Stateline Take-Out on the Klamath River to Fishing Access Site 1 on Copco reservoir.

37P. Provide whitewater boating and fishing opportunities in the upper Klamath River/Hell's Corner reach by conducting daily peaking operations at J.C. Boyle powerhouse and providing boating and fishing access above the powerhouse and downstream of the Oregon-California state line.

Land Use and Aesthetic Resources

38P. Reduce visibility and contrast of powerhouse facilities through vegetative screening or painting at J.C. Boyle and Iron Gate developments.

39P. Finalize and implement the Study Area Roadway Inventory Analysis and Project Roadway Management Plan.

Cultural Resources

40P. Complete the project's historic properties management plan providing direction and guidelines for the management of historic properties within the new project boundary as proposed by PacifiCorp.

41P. Through the final HPMP, implement measures to protect historic buildings and structures, archaeological sites, and traditional cultural properties.

2.2.4 Proposed Project Boundary

The proposed project boundary includes about 3,737 acres of land, of which 156 acres are lands of the United States administered by the Bureau of Land Management. PacifiCorp's proposed project boundary excludes some lands in the existing project boundary that it no longer considers necessary for project purposes. Lands proposed for exclusion from the project boundary are lands associated with (1) East Side and West Side developments, which are proposed for retirement; (2) Keno development, because the development has no generating facilities and PacifiCorp asserts its operation does not substantially benefit generation at PacifiCorp's downstream hydroelectric facilities and is thus non-jurisdictional; (3) roadways that are not needed for project operations and maintenance; and (4) excess lands surrounding project features that PacifiCorp concludes are unnecessary for project operations and maintenance or are not needed for long-term, project-related environmental protection or enhancement. PacifiCorp's proposed project boundary would eliminate all land managed by Reclamation (about 20 acres) from the project.

PacifiCorp also proposes to include some additional land within the project boundary that it now considers necessary for project operations and maintenance or for long-term environmental protection or enhancement. Lands proposed for inclusion in the project boundary include (1) lands associated with the Spring Creek diversion structures and the canal from the diversion to Fall Creek; (2) lands needed for development, enhancement, or expansion of recreational facilities; (3) project-related transmission line rights-of-way that are not currently within the project boundary; (4) buffer zones along the Klamath River mainstem or tributary streams that are considered to be environmentally sensitive and in need of protection or enhancement; (5) roadways needed for project purposes that are not currently within the project boundary; and (6) other lands deemed necessary for project operations and maintenance or for long-term protection or enhancement.

We summarize PacifiCorp's proposed project boundary modifications for each development in the following sections.

2.2.4.1 East Side and West Side Developments

PacifiCorp proposes to remove all current project lands associated with East Side and West Side developments from the project boundary as part of its proposed retirement of those facilities. This would exclude from the project boundary the gates, canals, forebays, penstocks, and powerhouses of both developments, as well as the Link River from Link River dam to its confluence with Keno reservoir (and about 80 to 500 feet of land from the edge of the river). This also would exclude from the project boundary lands associated with much of the Link River Trail.

2.2.4.2 Keno Development

PacifiCorp proposes to remove all current project lands associated with Keno development from the project boundary because it asserts that Keno dam does not serve project purposes. This would exclude from the project boundary land that generally corresponds to Keno reservoir high water mark, including that associated with the Miller Island Wildlife Refuge (managed by Oregon Fish & Wildlife), except within about 1 mile of Keno dam, where the project boundary varies from about 50 to more than 1,300 feet from the high water mark of the reservoir and the 0.7-mile-long reach downstream of Keno dam. PacifiCorp's proposed project boundary also would exclude lands associated with the Keno Recreation Area, a campground currently managed by PacifiCorp, and Keno dam itself, including the existing fish ladder.

2.2.4.3 J.C. Boyle Development

PacifiCorp proposes to add a small area at the upstream-most limit of the reservoir to extend the project boundary about 650 feet to the area currently backwatered, including the high water line on both sides of the reservoir. Nearly all of the proposed project boundary along the reservoir, except the 0.7 mile portion immediately upstream of the dam, would remain essentially unchanged, and would provide a buffer zone of from 50 to more than 1,200 feet from the water's edge, with typical buffer zone distances of from 100 to 300 feet. The limit of the buffer zone in this area corresponds to the edge of PacifiCorp-owned property. PacifiCorp also proposes to expand the project boundary to include some land to the east of Topsy Grade Road near a cove adjacent to the Topsy Campground upstream of the dam. Downstream of J.C. Boyle dam, PacifiCorp proposes to include two small semi-circular areas along the access road to the powerhouse near Spring Island in the project boundary.

PacifiCorp also proposes to remove land from the project boundary at several locations. These include (1) a small area along Topsy Grade Road near the Rt. 66 bridge crossing; (2) excess PacifiCorp-owned lands to the north (but retaining at least a 200 foot buffer zone in the proposed project boundary along this portion of the reservoir), west, and south of the dam (but retaining in the project boundary the uppermost 0.6 mile of the bypassed reach that passes through land owned by PacifiCorp); (3) lands associated with the Bureau of Land Management-owned and -managed Topsy Campground that are included in the current project boundary (the proposed project boundary would be essentially at the high water mark of the reservoir); (4) excess lands along the upper access road from the dam to the powerhouse, leaving a 50-foot-wide road right-of-way; (5) lands along the west side, and portions of the bypassed reach extending to the limits, of the 200-foot-wide canal right-of-way (including much of the downslope area from the canal overflow spillway); (6) lands associated with the right-of-way for a retired transmission line near the powerhouse; (7) lands along the Klamath River opposite the powerhouse; and (8) the road and its right-of-way south of the turn-around near the Bureau of Land Management-managed Spring Island Boater Access site (the road from the turnaround to the powerhouse would remain in the proposed project boundary).

The proposed project boundary at J.C. Boyle development would encompass a total of about 718 acres, including the 341-acre reservoir, 82 acres of which are managed by the Bureau of Land Management (most of which are downstream of the dam). The proposed project boundary would include

the proposed upper J.C. Boyle reservoir boater access site, but not the access road to that site (which passes through Sportsman's Park, a non-project recreational area). The proposed project boundary would only include a portion of the proposed Boyle Bluff recreation area, but would include all land associated with J.C Boyle dam and powerhouse river access sites, which would provide public access to the bypassed reach.

2.2.4.4 Copco No. 1 Development

PacifiCorp proposes to extend the existing project boundary upstream of the Klamath River from its current limit about 0.3 mile upstream of Fishing Access Site 1 north to the California-Oregon border (a portion of the peaking reach). The land to be included within the project boundary ranges from 50 feet to about 300 feet from the shoreline at various locations along the reach. Also proposed for inclusion in the project boundary would be PacifiCorp-owned land and water within 50 feet of the centerline of Shovel Creek for a distance of about 2.2 miles upstream of its confluence with the Klamath River and PacifiCorp-owned land and water within 50 feet of the centerline of Negro Creek from its confluence with Shovel Creek to about 0.2 mile upstream.

Most of the project boundary around Copco reservoir would remain essentially unchanged, corresponding to the high water mark, with minor adjustments to reflect more recent surveys and the current reservoir configuration. As such, there would be no buffer zone along most of the reservoir shoreline, which is predominantly privately owned. PacifiCorp proposes to expand the project boundary in the vicinity of Copco reservoir at several locations: (1) land associated with the Mallard Cove Recreation Area, 0.7 acre of which is currently managed by the Bureau of Land Management; (2) a small, PacifiCorp-owned parcel abutting the Copco Cove Recreation Area; (3) roadway rights-of-way leading to Copco Road and the Copco No. 1 water supply, ranging in width from 30 to 50 feet, as well as the area surrounding the water supply and the 25-foot-wide water line right-of-way; (4) the 30-feet-wide road right-of-way leading to the cinder pit, as well as the 900-feet diameter volcanic cinder pit; and (5) some additional lands between the Copco No. 1 powerhouse and Copco No. 2 dam to the west of the current project boundary.

At the Copco No. 1 development, the only lands PacifiCorp proposes to remove from the project boundary are excess PacifiCorp-owned lands along the southern limits of the current project boundary near the dam (but retaining a 200-foot-wide buffer zone along the southern 0.3 mile of the reservoir immediately upstream of Copco No. 1 dam), and some excess lands outside of the 100-foot-wide transmission line right-of-way between the Copco No. 1 substation and the Fall Creek substation. The buffer zone along the 0.5 mile of the northern side of the reservoir immediately upstream of the dam on PacifiCorp-owned land would continue to range from about 150 to 900 feet, as it does with the existing project boundary.

The proposed project boundary would include the portion of the existing Stateline Boating Take-out Recreation Area that is on PacifiCorp property, but not the abutting Bureau of Land Management-managed campground, which includes the access road to the boating take-out site. Fishing Access Sites 1 to 6, which currently provide angler access to the peaking reach, would be included within the proposed project boundary, although at Access Sites 2, 3, 4, and 6, the parking area and associated facilities would be project boundary "islands" separated from the project area adjacent to the river by a public road. Only the shoreline at Fishing Access Site 1, which also serves as a whitewater boating takeout area, is within the existing project boundary. The existing Mallard Cove Recreation Area would be completely within the proposed project boundary, whereas only the high water line at this site is within the existing project boundary. The existing Copco Cove Recreation Area would continue to be within the project boundary.

2.2.4.5 Copco No. 2 Development

The only lands proposed for removal from the project boundary at Copco No. 2 development are PacifiCorp-owned land outside a 200 foot buffer zone along the southern shoreline of the Copco No. 2 reservoir. This proposed adjustment would diminish the width of the existing buffer zone, which now approaches 1,000 feet at some locations.

PacifiCorp proposes to add the following to the project boundary associated with Copco No. 2 development: (1) a 100-foot-wide transmission line right-of-way from near the dam to the Copco No. 2 powerhouse; (2) road rights-of-way, ranging in width from 25 to 30 feet, near from the vicinity of the dam to the vicinity of the powerhouse and from near the dam and powerhouse to Ager-Beswick Road (50-feet wide); (3) some additional lands south of the power canal; (4) lands adjacent to the canal spill channel; (5) lands south and east of the existing project boundary along the Klamath River downstream of the powerhouse (with adjacent lands associated with the Iron Gate development); and (6) an area of land north of the Klamath River downstream of the powerhouse (with adjacent lands associated with Iron Gate development). The only portion of the Copco No. 2 bypassed reach that is included in the existing or proposed project boundary is associated with the proposed project boundary expansion identified in item (6), which would include only the lower 800 feet of this reach.

As previously mentioned, the proposed project boundary adjustments would decrease the width of the buffer zone along the south side of the Copco No. 2 reservoir. However, the width of the buffer zone to the north of the reservoir, which currently ranges from about 50 to 800 feet, would be increased to between 300 and 1,300 feet, based on adjustments to include portions of project roads associated with Copco No. 1 powerhouse.

The proposed project boundary at the Copco No. 1 and No. 2 developments would encompass a total of about 1,514 acres, including the 1,008-acres associated with both reservoirs. PacifiCorp owns 1,498 acres of the land associated with this total area. Lands of the United States at both developments would include only 0.7 acre that is managed by the Bureau of Land Management at the Mallard Cove Recreation Area.

2.2.4.6 Fall Creek Development

PacifiCorp proposes to expand the project boundary at Fall Creek development to include Spring Creek diversion dam and a 100-foot-wide right-of-way associated with a canal that leads to a tributary of Fall Creek. The diversion dam and canal are not included in the current project boundary. PacifiCorp also proposes to expand the project boundary to include the 30-feet-wide roadway rights-of-way leading from Copco Road to the Fall Creek diversion canal and spillway, and lands from the spillway to its point of discharge to Fall Creek. The 100-feet-wide right-of-way associated with the Fall Creek canal and penstock would continue to be within the project boundary. In addition, PacifiCorp proposes to include additional lands along about 2,000 feet of the bypassed reach of Fall Creek and lands surrounding the existing Fall Creek trail, a proposed loop trail that would extend the existing trail to the north and east of the Fall Creek bypassed reach, and the Cal Fish & Game fish hatchery/holding facility. Finally, PacifiCorp proposes to expand the project boundary to the southeast of the Fall Creek powerhouse to include the access road to the powerhouse and parking area adjacent to Copco Road, and to the northeast of the powerhouse.

The proposed project boundary at Fall Creek development would encompass a total of about 102 acres. PacifiCorp owns 83 acres of the land associated with this total area. Lands of the United States at this development would include about 10 acres managed by the Bureau of Land Management at the Spring Creek diversion dam and canal. PacifiCorp does not propose to include in the project boundary the natural channel of the tributary of Fall Creek into which the Spring Creek diversion canal discharges or most of the natural channel of Fall Creek, other than near the diversion dam, the spill channel, and the lower portion of the bypassed reach where recreational enhancements are proposed.

2.2.4.7 Iron Gate Development

PacifiCorp proposes to expand the area within the project boundary at Iron Gate development at the following locations: (1) a corridor that extends 100 feet from the center line of Jenny Creek for a distance of about 1 mile upstream of Iron Gate reservoir; (2) lands to accommodate the proposed expansion of the existing Camp Creek Recreation Area; (3) lands adjacent to the existing Juniper Point Recreation Area to a distance of 50 feet to the west of the centerline of Copco Road for a distance of about 1,700 feet along the road; (4) lands that include all of the existing Mirror Cove Recreation Area (some of which were not included in the existing project boundary) and abutting land to a distance of 50 feet to the south of the centerline of Copco Road for a distance of about 800 feet along the road; (5) a 20-foot-wide right-of-way associated with the access road to Overlook Point (which was not included in the existing project boundary); (6) a corridor that extends 50 feet from the center line of Long Gulch extending approximately 3,500 feet upstream from the Iron Gate reservoir and approximately 7.5 acres at the upstream end of the reach; (7) lands to the west of Iron Gate Estates Road that would include the proposed Long Gulch Bluff recreational area (adjacent to the existing Long Gulch boat launch) and the portion of Iron Gate Estates Road, and its associated 60-foot-wide right-of-way, that provides access to these existing and proposed recreational sites; and (8) a corridor that extends 50 feet from the center line of Bogus Creek for a distance of about 1 mile upstream of its confluence with the Klamath River (about half of this reach is within the current project boundary).

PacifiCorp proposes to remove from the project a substantial amount of land from along the periphery of the impoundment that was included in the current project boundary. In many areas, the existing buffer area within the project boundary along the impoundment, which ranges from about 50 feet to about 1,000 feet from the high water line (and typically is about 100 to 200 feet from the shoreline), would be eliminated, setting the high water line as the new project boundary. A 100-foot-wide right-of-way would be retained along the transmission lines.

PacifiCorp proposes to remove some excess lands to the west of Copco Road, across the Klamath River from the fish hatchery, and some excess lands to the east of the access road on the east side of the dam and fish hatchery. Much of the right-of-way for Copco Road from the Fall Creek Recreational Area (at the confluence of Fall Creek with Iron Gate reservoir) to the Iron Gate dam and fish hatchery (which is in the existing project boundary) would be removed from the proposed project boundary, as would excess lands on both sides of the Copco Road right-of-way.

The proposed project boundary at Iron Gate development would encompass a total of about 1,402 acres, including the 935-acre reservoir, 64 acres of which are managed by the Bureau of Land Management (most of which are associated with transmission line rights-of-way). The proposed project boundary would include the existing Fall Creek Recreation Area; the existing Jenny Creek Recreation Area; the existing Wanaka Springs Recreation Area and its proposed expansion; the existing Camp Creek Recreation Area and its proposed expansion; the existing Juniper Point Recreation Area; the existing Mirror Cove Recreation Area; the existing Overlook Point Recreation Area, including its access road; the existing Long Gulch Bluff Recreation Area and its proposed expansion; and the existing Hatchery Day Use Area.

2.3 MODIFICATIONS TO THE PROPOSED ACTION

2.3.1 Mandatory Conditions

2.3.1.1 Water Quality Certification

Under section 401 of the Clean Water Act (CWA), a license applicant must obtain certification from the appropriate state pollution control agency verifying compliance with the CWA. PacifiCorp filed applications for water quality certification with the California State Water Resources Control Board

(Water Board) and Oregon Department of Environmental Quality (Oregon Environmental Quality) by letters dated March 29, 2006. Both water quality agencies documented receipt of the requests for water quality certification on the same day, March 28, 2006. PacifiCorp withdrew and refiled its applications for water quality certification with the Water Board and Oregon Environmental Quality by letters dated February 28, 2007. Oregon Environmental Quality and the Water Board received this letter on February 28, 2007, respectively. Decisions by the agencies are pending, with agency actions due by February 28 and March 2, 2008, respectively.

2.3.1.2 Section 18 Fishway Prescriptions

Section 18 of the FPA states that the Commission is to require construction, maintenance, and operation by a licensee of such fishways as the Secretaries of Commerce and Interior may prescribe. In its March 29, 2006, filing, Interior (for the U.S. Fish and Wildlife Service) provided preliminary fishway prescriptions for anadromous and resident fish passage. On March 29, 2006, NMFS also filed preliminary fishway prescriptions for anadromous fish passage. On January 29, 2007, NMFS and FWS filed modified prescriptions and alternatives analyses for fishways. Both letters state that the prescriptions were developed jointly and are consistent with the prescriptions filed by the other agency. The modified prescriptions include revisions to downstream fishway prescriptions at Copco No. 1 tailraces, spillway prescriptions at all project developments, and bypass/attraction flow changes.

The agencies provide general prescriptions, followed by specific fishway prescriptions for each project development. The general prescriptions are as follows:

- For each facility, PacifiCorp should develop detailed design, construction, evaluation and monitoring plans for review and approval by FWS and NMFS prior to construction. Facilities should be constructed according to NMFS guidelines for the design of fish screens, fishways, and other fishway structures. All designs would be reviewed by the fisheries technical subcommittee (that FWS and NMFS would establish), and agency consultation would be required during the conceptual level design. FWS and NMFS would approve conceptual designs prior to advancing to feasibility and final level design. PacifiCorp should allow at least 90 days for review and approval of comprehensive plans. PacifiCorp should implement design modifications required by FWS and NMFS necessary to provide safe, timely, and effective passage for all species considered.
- PacifiCorp should provide timely site access to agency and affected tribal personnel at all project developments and project records for the purpose of inspecting fishways to determine compliance with this fishway prescription.
- PacifiCorp should keep all fishways in proper order, clear of trash, sediment, logs, debris, and other material that would hinder passage or create a personnel safety hazard. PacifiCorp should perform maintenance well in advance of critical migratory periods. If any fishway becomes seriously damaged or inoperable, PacifiCorp should notify FWS and NMFS within 48 hours and take timely remedial action in a manner satisfactory to FWS and NMFS. Fish passage facilities should be completed and brought online in a phased schedule. Unless otherwise approved, downstream fishways at each development should be completed prior to completion of upstream development at any given development. Designs approved by FWS and NMFS should be filed with the Commission.
- PacifiCorp should, in consultation with agencies and affected tribes, develop a fishway operation, inspection, and maintenance plan describing the planned activities and contingencies for each fish passage facility. Plans should be completed and approved prior to completion and operation of fishways, and filed with the Commission.

- Prior to the completion of construction of new fishways, PacifiCorp, in consultation with agencies and affected tribes, should develop post-construction monitoring and evaluation plans to assess the effectiveness of each fishway, spillway, and tailrace barrier. Plans should include hydraulic, water quality, and biological evaluations using electronic tags or similar technology to detect and record fish passage and assess the performance of the fishway, including measures for follow-up evaluation of effectiveness of fish survival through the fishways. PacifiCorp should provide a report on the monitoring and evaluation annually for the term of the license. Plans should provide for estimating numbers of fish passed by species on a daily basis (including spring and fall-run Chinook, coho, steelhead, Pacific lamprey, Lost River and shortnose suckers, and redband/rainbow trout); sampling fish size and age class on a daily basis; records of daily observations by a qualified fisheries biologist on the physical condition of fish using the fishways; and a continuous record of DO and water temperature at locations in the fishways determined by FWS and NMFS, and in front of and adjacent to the entrances and exits of the fishways. Evaluation plans should be submitted to FWS and NMFS within 6 months of the date when final designs for fishway construction are approved. As least 60 days should be given for FWS and NMFS to review evaluation plans. PacifiCorp should fund plan implementation and any operational or physical changes necessary for effective fish passage. After approval by FWS and NMFS, these plans should be filed with the Commission.
- PacifiCorp should, in consultation with the fisheries technical subcommittee, prepare a fishway evaluation and modification plan for each fishway, spillway, and tailrace barrier. An outline for the plan should be provided to FWS and NMFS no later than 1 year from license issuance. Consultation with agencies and affected tribes should begin as soon as fishways are operational. Complete plans should be submitted to FWS and NMFS no later than 18 months from license issuance. Each plan shall include (1) a quantified program to meet FWS and NMFS fish passage goals, objectives, and strategies; (2) FWS and NMFS criteria by which to measure progress towards fisheries management goals; (3) procedures for redirecting efforts to achieve goals; (4) schedule for implementation of activities; (5) a monitoring plan to evaluate progress towards and achievement of FWS and NMFS goals and objectives; and (6) a format for an annual report and work plan. FWS and NMFS would review plans and reserve the right to modify, accept, or reject them to ensure safe, timely, and effective passage of resident and anadromous fish. Annual reports detailing work under this plan for the previous year should be submitted to FWS and NMFS for approval by February 1. By December 1 of each year, PacifiCorp should submit a proposed work plan for the upcoming year to FWS and NMFS for approval.
- PacifiCorp should design each upstream fish passage facility to pass migrants throughout a designed streamflow range, bracketed by a designated high and low fish passage design flow, in accordance with NMFS guidelines and criteria (NMFS, 2004), unless site-specific analysis demonstrates a more suitable flow that meets the objectives of safe, timely, and effective passage.
- Each upstream passage facility should be designed to produce at least 10 percent of the high fish passage design flow, determined in accordance with NMFS guidelines and criteria (NMFS, 2004) at a point upstream of the hydropower diversion, unless site-specific analysis demonstrates other flows are more suitable. After approval by FWS and NMFS, PacifiCorp should file results of any such site-specific analyses that demonstrate a more suitable flow meets objectives. During facility evaluations, PacifiCorp may alter or balance attraction flows for testing purposes between the range of 5 and 10 percent to determine whether fish passage efficiency can be maintained at a lower attraction flow.

- For Copco No. 2 and J.C. Boyle bypassed channels, PacifiCorp should consult with FWS and NMFS to design, operate, maintain, and evaluate structures, facilities, devices, and channel modifications necessary to ensure migrating fish are consistently attracted into the bypassed reach without excessive delays, unless FWS and NMFS determine that such physical facilities or channel modifications are unnecessary. PacifiCorp should conduct engineering and biological analysis in consultation with the fisheries technical committee and FWS and NMFS to determine attraction flow and hydraulic conditions at the point of confluence between the bypassed reaches and hydropower discharge. Based on these or other analyses, PacifiCorp should, in consultation with FWS and NMFS, determine any physical facilities or channel modifications necessary to ensure migrating anadromous fish are consistently attracted into the bypassed reaches without excessive delays.

Table 2-2 summarizes the specific fishway prescriptions for each development. We discuss these measures further in sections 3.3.3.2.2, *Fish Passage*, and 3.3.3.2.5, *Anadromous Fish Restoration*.

Table 2-2. Summary of modified fishway prescriptions and timetable for the Klamath Hydroelectric Project (NMFS and Interior). (Source: Letter from R. McInnis, Regional Administrator, NMFS, to the Commission dated January 26, 2007)

Development	Target Species	Fish Ladder and Passage Impediment Modification (in Chronological Order)	Tailrace Barrier[a]	Screens and Bypass	Spillway Modifica-tions[a]	Interim, Seasonal Trap and Haul
Copco No. 2 Bedrock Sill	Salmonids (includes resident trout), lamprey	2 years (Bypass Barrier/Impediment Elimination)	Not Applicable (NA)	NA	NA	NA
J.C. Boyle (Bypass)	Salmonids, lamprey	2 years (Bypass Barrier/Impediment Elimination	NA	NA	NA	NA
East Side	Salmonids, lamprey, suckers	Reclamation current facility	3 years[b]	3 years[c] (to sucker criteria)	NA	Seasonal downstream trapping and hauling for Chinook salmon
West Side	Salmonids, lamprey, suckers	Reclamation current facility	3 years[b]	3 years[c] (to sucker criteria)	NA	Seasonal downstream trapping and hauling for Chinook salmon
Fall Creek	Resident trout	3 years (0.5 foot/drop and ≤ 10% slope)	5 years[d]	3 years	NA	NA
Spring Creek	Resident trout	3 years (0.5 foot/drop and ≤ 10% slope)	NA	3 years	NA	NA
Keno	Salmonids, lamprey	3 years (0.5 foot/drop and ≤ 10% slope)	NA	NA	3 years	Seasonal upstream trapping and hauling for Chinook salmon
J.C. Boyle (Dam)	Salmonids, lamprey	4 years (0.5 foot/drop and ≤ 10% slope)	4 years	4 years	4 years	NA
Iron Gate	Salmonids, lamprey	5 years (0.5 foot/drop and ≤ 10% slope)	NA	5 years	5 years	Modify existing trapping facility

Development	Target Species	Fish Ladder and Passage Impediment Modification (in Chronological Order)	Tailrace Barrier[a]	Screens and Bypass	Spillway Modifica-tions[a]	Interim, Seasonal Trap and Haul
Copco No. 2	Salmonids, lamprey	6 years (0.5 foot/drop and ≤ 10% slope)	8 years[d]	6 years	6 years	NA
Copco No. 1	Salmonids, lamprey	6 years (0.5 foot/drop and 10% slope)	8 years[d] (if adults in Copco No.2 reservoir pool)	6 years (bypass below Copco No. 2 dam)	6 years	NA

[a] PacifiCorp would be allowed to conduct site-specific studies on the need for and design of spillway modifications and tailrace barriers. Unless NMFS and FWS determine that spillway modifications or tailrace barriers are unnecessary based on PacifiCorp's studies, they would be installed in accordance with the schedules above.

[b] Study of effects on and the potential design and construction of tailrace barrier is given priority due to the presence of federally listed suckers.

[c] Screen and bypass system given priority due to the presence of federally listed suckers.

[d] Timing of tailrace barrier design and construction deferred for study to determine optimal design.

In addition to its fishway prescriptions, FWS and NMFS jointly request that the Commission include as a license condition a reservation of authority to prescribe the construction, operation, and maintenance of additional or modified fishways, as appropriate, including measures to determine, ensure, and improve the effectiveness of such fishways during the term of a new license. The reservation of authority would include, but would not limited to, authority to prescribe fishways for spring and fall-run Chinook salmon; coho salmon; steelhead; Pacific lamprey; Lost River and shortnose suckers; resident trout; and any other fish to be managed, protected, or restored to the Klamath River Basin during the term of a new license. Authority would also be reserved to prescribe an upstream fishway for sucker criteria at Keno dam, pending evaluation of the need for such a fishway. As an alternative, if necessary, authority would be reserved to prescribe performance standards to ensure safe, timely, and effective movement.

2.3.1.3 Alternative Section 18 Fishway Prescriptions Pursuant to the Energy Policy Act of 2005

The Energy Policy Act of 2005 (EPAct) provides parties to this licensing proceeding the opportunity to request trial-type hearings regarding issues of material fact that support the prescriptions developed under FPA section 18. EPAct also provides parties the opportunity to propose alternatives to preliminary prescriptions.

PacifiCorp

In an April 28, 2006, filing in accordance with section 241 of EPAct, PacifiCorp requested hearings regarding issues of material fact pertaining to the preliminary fishway prescriptions. The primary issue raised by PacifiCorp is that it is premature to require fishways when it is not yet established that anadromous fish can be restored to identified historic spawning and rearing habitat. An administrative law judge is scheduled to release findings following the hearing at about the same time this draft EIS is due to be issued. PacifiCorp also presented an alternative fishway prescription that takes an adaptive approach to anadromous fish restoration. PacifiCorp would construct a trap and haul facility at Iron Gate dam and hatchery, including a collection, sorting, holding, and loading facility. Some of the existing facilities at the dam and hatchery would be used, with modifications. Anadromous fish collected would be hauled above J.C. Boyle dam or upstream sites, as appropriate, and would form the basis for

conducting a series of studies designed to address uncertainties pertaining to anadromous fish restoration. PacifiCorp would conduct the following six related studies.

1. An evaluation of juvenile salmonid survival through lakes and reservoirs; from March through June 15 and September and October.
2. An assessment of survival of juvenile fish collected at collection facilities during the juvenile downstream passage study, as they are transported to holding facilities at Iron Gate Hatchery by truck.
3. An assessment of survival of adult salmonids collected at Iron Gate dam as they are transported to various release sites upstream of J.C. Boyle dam, including the Williamson and Wood rivers, and an assessment of the spawning success of released fish by spawning surveys.
4. An assessment of the smolt to adult survival rate, by using uniquely marked juvenile fish transported and released in the lower Klamath River and upon their return to Iron Gate dam. PacifiCorp would also possibly search spawning areas to retrieve tags.
5. An evaluation of the survival rate of young introduced salmonids, an assessment of whether most of the young salmonids outmigrate as subyearlings or yearlings, and when juvenile outmigration begins and ends. This evaluation would entail monitoring young anadromous salmonid migration behavior in upper Klamath River Basin tributaries (e.g., Wood and Williamson rivers) with screw-traps.
6. An assessment of whether redband trout disease load and severity increases as more anadromous fish are released into the upper Klamath River Basin based on constant monitoring (samples taken during spring, summer, fall, and winter) of juveniles and adults for disease, including redband trout.

Based on the results and analysis of the six studies, fisheries' managers would decide if self-sustaining runs of anadromous fish can be established. If so, PacifiCorp would design permanent juvenile collection facilities at or above J.C. Boyle dam, and modify the adult collection facility at Iron Gate dam, as appropriate, to implement a reintroduction program (using a trap and haul approach). If fisheries' managers determine that reintroduction of anadromous fish is not feasible, PacifiCorp would conduct a limiting factors analysis to identify obstacles to establishing self-sustaining populations of anadromous fish to historical habitat. We discuss PacifiCorp's alternative fishway prescriptions further in sections 3.3.3.2.2, *Fish Passage*, 3.3.3.2.3, *Disease Management*, and 3.3.3.2.5, *Anadromous Fish Restoration*.

Hoopa Valley Tribe

The Hoopa Valley Tribe also requested a hearing on disputed issues of fact, and filed an alternative fishway prescription by letter dated April 27, 2006. By letter dated July 3, 2006, the Hoopa Valley Tribe withdrew its request for a hearing. Its alternative fishway prescription is as follows: PacifiCorp should provide a minimum flow of 730 cfs to the Copco No. 2 bypassed reach to facilitate safe, timely, and effective upstream and downstream volitional fish passage. If inflow is less than 730 cfs, PacifiCorp should direct all flow to the bypassed reach. If 40 percent inflow to Copco reservoir is greater than 730 cfs, than 40 percent inflow should be released to the bypassed reach. Inflow should be computed as a running average of flows during the prior 3 days at the J.C. Boyle powerhouse gage added to a new gage on Shovel Creek. By letter filed with NMFS, dated January 8, 2007, the Hoopa Valley Tribe withdrew its alternative fishway prescription.

Administrative Law Judge Decision

On September 27, 2006, the Administrative Law Judge assigned to the EPAct trial-type hearing, the Honorable Parlen L. McKenna, issued his decisions on issues of disputed fact pertaining to mandatory

prescriptions and conditions associated with the Klamath relicensing proceeding.[18] Of the 14 disputed issues of material fact, the following 8 pertain to the preliminary fishway prescriptions issued by NMFS and FWS: (1) whether stocks of anadromous fish suitable to conditions above Iron Gate dam are available to use the prescribed fishways; (2) the potential that reintroduction of anadromous fish could introduce pathogens to resident fish populations upstream of Iron Gate dam; (3) whether steelhead introduction could result in residualization and whether steelhead could adversely influence resident trout; (4) whether current project operations adversely affect resident trout; (5) whether entrainment at project powerhouses is affecting resident fisheries; (6) whether 58 miles of habitat for anadromous fish exists within the project area; (7) whether habitat for coho salmon exists within the project area, and would restoration of this species upstream of Iron Gate dam provide benefits for this species; and (8) whether habitat for Pacific lamprey exists within the project area, and would restoration of this species upstream of Iron Gate dam provide benefits for this species. The judge's rulings on these issues provided direction to NMFS and FWS in developing the modified fishway prescriptions filed on January 29, 2007. As pertinent, we include the judge's findings and related information in our environmental effects analysis in sections 3.3.3.2, *Aquatic Resources*, and 3.3.5.2, *Threatened and Endangered Species*.

2.3.1.4 Section 4(e) Federal Land Management Conditions

Section 4(e) of the FPA provides that any license issued by the Commission for a project within a federal reservation shall be subject to and contain such conditions as the Secretary of the responsible federal land management agency deems necessary for the adequate protection and use of the reservation. The existing Klamath Hydroelectric Project occupies approximately 219 acres of lands that are administered by the Bureau of Land Management or Reclamation, both within Interior. The proposed project would occupy 156 acres of land administered by the Bureau of Land Management.

In a March 29, 2006, filing with the Commission, Interior, on behalf of the Bureau of Land Management and of Reclamation, submitted preliminary terms and conditions pursuant to section 4(e) of the FPA. On January 29, 2007, Interior filed modified terms, conditions, and prescriptions for the project with the Commission. The conditions consist of specific environmental measures, summarized in tables 2-3 and 2-4, as well as administrative conditions that pertain to aspects of PacifiCorp's use of Bureau- or Reclamation-managed reservation lands. Because the administrative conditions are not environmental measures, we do not analyze them in this EIS.

[18]Decision. Dated September 27, 2006. Issued by: Hon. Parlen L. McKenna, Presiding. In the Matter of: Klamath Hydroelectric Project (license applicant PacifiCorp). Docket Number 2006-NMFS-0001. Filed by letter from G.P. Kaitell-Paul, Attorney-Advisor, U.S. Coast Guard, Baltimore, MD, to the Commission dated October 2, 2006.

Table 2-3. Environmental measures specified by the Bureau of Land Management pursuant to section 4(e) of the Federal Power Act and PacifiCorp's and others' corresponding alternative conditions pursuant to the Energy Policy Act of 2005. (Source: Letter from S. Thompson, Manager, California/Nevada Operations Office, Interior, to the Commission filed on January 29, 2007; letter from PacifiCorp to Interior, dated April 27, 2006; and letters from Oregon Fish & Wildlife and Cal Fish & Game to Interior, dated April 26, 2006)

Bureau of Land Management Specified 4(e) Conditions	**Alternative Conditions**
Condition 1A: For any proposed activity to be implemented by PacifiCorp on or affecting lands administered by the Bureau of Land Management to be added to the project boundary, PacifiCorp should request and obtain a Bureau use authorization prior to conducting the activity. PacifiCorp should fund any required environmental analysis related to the issuance of the use authorization, as determined by the Bureau. As part of the request for the use authorization, PacifiCorp may provide environmental analysis of the proposed action that meets Bureau requirements for implementing NEPA in existence at the time the request is made, including changes in states or regulations governing Bureau NEPA procedures. PacifiCorp may also refer to or rely on any previous NEPA analysis for the proposed measure to the extent the analysis is currently applicable, as determined by the Bureau. The use authorization may contain stipulations for fire protection, spoils disposal, hazardous materials, safety or other standard use authorization measures consistent with the requirements in effect at the time for implementation of similar actions on lands administered by the Bureau.	
Condition 1B: PacifiCorp should prepare site-specific plans for Bureau of Land Management approval for PacifiCorp activities required by the license that could affect Bureau-administered lands or resources. The site-specific plans would include, at a minimum: (1) a map showing the location of the proposed activity; (2) the land use allocation and management designation including standards and guidelines for the area of the proposed activity; (3) site-specific designs for the proposed activity; (4) proposals for project-specific mitigation measures, including, but not limited to, applicable measures addressing safety, inspections, spoils disposal, hazardous substances, and restoration needs; (5) proposals for implementation and effectiveness monitoring necessary to meet standards and guidelines; and (6) data from surveys, biological evaluations, or consultation required by regulation and as applicable to activities on Bureau-administered lands.	PacifiCorp adds a "reasonable discretion" phrase to its need to obtain written approval from the Bureau prior to changing the location of a project, and restricts the scope to Bureau reservation lands within the project boundary.

Bureau of Land Management Specified 4(e) Conditions	Alternative Conditions
Condition 1C: Upon Bureau of Land Management approval of site-specific plans, PacifiCorp should conduct any additional environmental analysis deemed necessary by the Bureau to ensure consistency with statutes, regulations, and policies, including the National Historic Preservation Act, Archaeological. Resources Protection Act, Native American Grave Protection Act, Clean Air Act, Clean Water Act, ESA, and Bureau direction in its NEPA Handbook. As part of the site-specific plan, PacifiCorp may provide environmental analysis of the proposed activity that meets Bureau requirements for implementing NEPA at the time the request is made. PacifiCorp may also refer to or rely on any previous site-specific NEPA analysis for the proposed activity to the extent the analysis is currently applicable, as determined by the Bureau. PacifiCorp should obtain written authorization of the Bureau before implementing the activity.	PacifiCorp would eliminate this condition.
Condition 1F: PacifiCorp should restore Bureau-administered lands affected by the project to a condition satisfactory to the Bureau prior to any surrender of the project license. At least one year in advance of license surrender, PacifiCorp should file with the Commission a restoration plan approved by the Bureau. The plan should identify project-related improvements to be removed, restoration measures, and time frames for implementation and estimated restoration costs.	PacifiCorp limits the scope of this condition to Bureau reservation lands within the project boundary and that the restoration of such lands would not be to a level that is greater than surrounding lands. [The rest of this alternative condition no longer applies.[a]] PacifiCorp agrees to provide information to the Bureau that PacifiCorp has the ability to fund restoration work specified in the Restoration plan, but not by an audit, if the information provided is sufficient to document PacifiCorp's financial ability to fund decommissioning. After receiving this information, PacifiCorp agrees that the Bureau could request an audit. Deletes the Bureau's provision that if the license is transferred, PacifiCorp should guarantee that the transferee or licensee would provide for the costs of surrender and restoration.

Bureau of Land Management Specified 4(e) Conditions	Alternative Conditions
Condition 1G: Prior to abandonment of any project-related facilities on or affecting Bureau of Land Management-administered lands, including impacts due to changes in the project boundary from that in the original license, PacifiCorp should restore Bureau lands to a condition satisfactory to the Bureau. At least one year in advance of the abandonment of these project-related facilities, PacifiCorp should file with the Commission a restoration and maintenance plan approved by the Bureau. The plan should identify, at a minimum, improvements that would be removed, improvements abandoned but not removed restoration, and maintenance measures, time frames, and costs. Condition 1G was combined with the previous condition in the preliminary 4(e)s.	
Condition 1H: PacifiCorp should, within one year of license issuance, develop a standard operating procedures plan that PacifiCorp should implement in the event of project-related emergencies. At a minimum, the plan should address Bureau-administered lands potentially affected by the project, and procedures, environmental permits, and subsequent mitigation measures for any project-related impacts to Bureau-administered lands including, but not limited to, the J.C. Boyle emergency spillway and canal and slope failures. This plan should be developed with consultation and approval by the Bureau. The plan should include implementation strategies for agency coordination, restoration actions, monitoring and evaluation, and potential mitigation measures.	PacifiCorp limits the scope of this condition to Bureau reservation lands within the project boundary; eliminates the required development of standard operating procedures that would specifically address emergency spillway and canal and slope failures; and adds a "reasonable discretion" phrase to PacifiCorp's need to obtain Bureau approval of the plan to address emergencies.
Condition 2A: PacifiCorp should consult with the Bureau of Land Management at least annually and prepare a report on the status of implementing conditions of the license including, at a minimum, those that could affect Bureau-administered lands and resources. The report should include, but is not limited to, monitoring results from the previous year regarding effectiveness of environmental measures, a review of non-routine maintenance, discussion of foreseeable changes in project facilities or operations, discussion of any needed revisions or modification to plans approved as part of this license, and discussion of elements of current year maintenance plans, such as road maintenance.	PacifiCorp limits the scope of the annual consultation with the Bureau to Bureau reservation lands within the project boundary.
Condition 2C: Within 60-days of issuance of the report to the Bureau of Land Management, PacifiCorp should file the record of consultation and any Bureau comments and recommendations with the Commission.	PacifiCorp eliminates the Bureau of Land Management 's reservation of rights to change its 4(e) conditions after notice, comment, and administrative review.

Bureau of Land Management Specified 4(e) Conditions	Alternative Conditions
Condition 2D: PacifiCorp should consult with the Bureau of Land Management on an as-needed basis to identify and resolve potential conflicts with Bureau policy and direction prior to initiating activities on Bureau-administered lands.	PacifiCorp restricts consultation to proposed activities on Bureau reservation lands within the project boundary, and deletes the "beyond the scope of the license" phrase. [The last part of this alternative condition no longer applies.[a]]
Condition 3A: Within 6 months of license issuance, PacifiCorp should complete, in consultation with the Bureau of Land Management, a Project Roads Inventory Analysis and file the analysis with the Commission for approval. Additional details of the analysis review process prior to submittal to the Commission are provided.	PacifiCorp modifies the Bureau's condition to conform to the content of its application and its Roadway Inventory and Analysis and Project Roadway Management Plan (2004). Limits the scope of this condition to Bureau reservation lands within the project boundary. PacifiCorp still calls for finalizing the plan in consultation with the Bureau prior to submitting the final plan to the Commission, but deletes provisions for Bureau modification of the plan after it has been filed with the Commission. [Some of this alternative condition no longer applies.[a]]
Condition 3B: Within one year of license issuance, PacifiCorp should develop, in consultation with the Bureau of Land Management, a Road Management Plan and file the plan with the Commission for approval. PacifiCorp should prepare a draft plan after consultation with the Bureau. At the time it files the plan with the Commission, PacifiCorp should serve a copy of the filed documents to the Bureau. The plan should include all roads that cross Bureau-administered lands that are identified in the Project Roads Inventory Analysis that sustain project-related uses, including project related recreation. Additional details of the plan contents are provided.	PacifiCorp modifies the Bureau's condition to conform to the content of its application and its Roadway Inventory and Analysis and Project Roadway Management Plan (2004). Limits the scope of this condition to Bureau reservation lands within the project boundary. PacifiCorp still calls for finalizing the plan in consultation with the Bureau prior to submitting the final plan to the Commission, but deletes provisions for Bureau modification of the plan after it has been filed with the Commission.

Bureau of Land Management Specified 4(e) Conditions	Alternative Conditions
Condition 4A1(a)(b): PacifiCorp should discharge from J.C. Boyle dam no less than 40 percent of the combined inflow from Keno reach (gage #11509500) and Spencer Creek (gage #11510000), as calculated by averaging the previous 3 days of the combined daily flows. When calculated inflow is less than 1,175 cfs, no less than 470 cfs should be provided to the J.C. Boyle bypassed reach, with the following exception, when the calculated inflow is less than 470 cfs, then release flow to the J.C. Boyle bypassed reach should equal the calculated inflow.	PacifiCorp's first alternative is to eliminate this measure. PacifiCorp's second alternative is its proposed minimum flow of 100 cfs from J.C. Boyle dam supplemented by an additional 100 cfs from the dam or powerhouse. Oregon Fish & Wildlife and Cal Fish & Game set the minimum base flow at 640 cfs, rather than 470 cfs.
Condition 4A1(c): When calculated inflow to J.C. Boyle reservoir exceeds 3,300 cfs during the period between February 1st and April 15th, diversion to the J.C. Boyle power canal should be suspended at least once and continued for a minimum of 7 days.	PacifiCorp's alternative is to eliminate this measure.
Condition 4A2: PacifiCorp should, within one year of license issuance, not exceed an upramp or downramp rate of 2 inches per hour as measured at a new gage downstream of J.C. Boyle dam at RM 225, when conducting controlled flow events (e.g., scheduled maintenance and changes in minimum flow requirements), except during implementation of the seasonal high flow. PacifiCorp should consult with the Bureau of Land Management to develop and implement an appropriate ramp rate to follow after the seasonal high flow to prevent stranding fish in the J.C. Boyle bypassed reach.	PacifiCorp's first alternative is to eliminate this measure. PacifiCorp's second alternative is a downramp rate of 150 cfs per hour in the J.C. Boyle bypassed reach, applicable primarily to spills and planned maintenance. To the extent possible, flow changes would occur at night. Oregon Fish & Wildlife and Cal Fish & Game set a ramping rate of 1 inch per hour and a maximum daily ramping rate of 300 cfs.
Condition 4B1: Within one year after licensure, PacifiCorp should operate the J.C. Boyle development from May 1st to October 31st to provide a minimum streamflow of 1,500 cfs a maximum of once a week, such that these flows occur at the Spring Island Boat Launch between 0900 and 1400 hours from Friday through Sunday, in the priority of Saturday, Sunday, and then Friday.	PacifiCorp's alternative is to eliminate this measure. Oregon Fish & Wildlife and Cal Fish & Game set a minimum flow of 720 cfs and would eliminate peaking operations for even once per week.

Bureau of Land Management Specified 4(e) Conditions	Alternative Conditions
Condition 4B2: PacifiCorp should., within one year of license issuance, not exceed an upramp or downramp rate of 2 inches per hour as measured at the existing USGS gage downstream of J.C. Boyle powerhouse, when conducting controlled flow events (e.g., scheduled maintenance, power generation, and changes in minimum flow requirements), except during implementation of seasonal high flow.	PacifiCorp's first alternative is to eliminate this measure. PacifiCorp's second alternative is to not exceed an upramp rate of 9 inches per hour, not exceed a downramp rate of 9 inches per hour for flows exceeding 1,000 cfs, and not exceed 4 inches per hour for flows less than 1,000 cfs. Daily peaking operation flow changes would not exceed 1,400 cfs. Oregon Fish & Wildlife and Cal Fish & Game set a ramping rate of 1 inch per hour and a maximum daily ramping rate of 300 cfs.
Condition 4B3: PacifiCorp should, within one year of license issuance, implement a flow continuation measure at the J.C. Boyle canal and powerhouse to provide a minimum of 48 hours of continuous flow under powerhouse shutdown conditions.	
Condition 4C1: PacifiCorp should, within one year of license issuance continuously measure the stage of water at a minimum of four gage sites; below Keno dam (existing), Spencer Creek (existing), peaking reach (existing), and a new gage below all outlets from J.C. Boyle dam and above the springs at RM 225, using the most current USGS protocols. PacifiCorp should operate and maintain the gages if they are no longer served by the current operators.	PacifiCorp's first alternative is to eliminate this measure. PacifiCorp's second alternative is essentially the same as the Bureau's.
Condition 4C2, 4C3: PacifiCorp should, within one year of license issuance: (1) provide instantaneous 30-minute real time streamflow data in cfs via remote access that is readily available and accessible to the public; and (2) design and maintain a database, similar to the most current version of the USGS National Water Information System, for reporting on surface water. The Bureau of Land Management should review and approve the database. Within two years of license issuance, PacifiCorp should begin submitting annual water year reports to the Bureau within 6 months of the end of each water year.	PacifiCorp's first alternative is to eliminate this measure. PacifiCorp's second alternative is essentially the same as the Bureau's condition

Bureau of Land Management Specified 4(e) Conditions	Alternative Conditions
Condition 4D: Within one year of license issuance, PacifiCorp should develop, in consultation with and approval of the Bureau, a sediment management plan and file the plan with the Commission for approval. PacifiCorp should prepare a draft plan after consultation with the Bureau and other stakeholders that are willing to participate, including, but not limited to FWS, Reclamation, NMFS, USGS, Oregon Environmental Quality, EPA, Oregon Fish & Wildlife, Cal Fish & Game, NCRWQCB, Oregon State Lands and affected tribes. The plan should be designed to increase channel complexity and spawning habitat for resident and anadromous fish. The plan, at a minimum, should adhere to the overall strategy, goals, elements, performance measures, and reporting requirements defined in the text of this condition.	PacifiCorp's first alternative is to eliminate this measure. PacifiCorp's second alternative is to place about 100 to 200 cubic yards of spawnable gravel in the upper end of the J.C. Boyle bypassed reach, monitor the initial placement, and augment as necessary to maintain the effect of the initial placement**.** [This alternative condition no longer applies.[a]]
Condition 4E: PacifiCorp should, within one year of license issuance, develop an adaptive management plan in consultation with the Bureau that is designed to monitor how implementation of the "river corridor management condition" [this is the previous 9 measures] is effective in improving fish habitat; quantity and quality for resident, migratory, and anadromous fish, with emphasis on spawning habitat; how implementation of the river corridor management condition is effective in increasing channel complexity and riparian habitat quality; how it affects flows for recreational boating; and how it is affecting fish migration, spawning, and rearing conditions for salmonids. The adaptive management plan should include provisions for annual reporting of monitoring results, data collection, and an evaluation of these results for all monitoring efforts in the river corridor.	PacifiCorp's alternative is to eliminate this measure.
Condition 5-1: PacifiCorp should, within one year of license issuance, complete a cultural resources inventory on about 77.2 acres of unsurveyed Bureau-administered land within the APE, not inventoried in PacifiCorp's 2002-2003 efforts. The inventory would be conducted using Bureau Class III protocols. Newly identified sites would be documented using Bureau and SHPO standards, and assessed for National Register eligibility in consultation with the Bureau, affected tribes, and the SHPO. Newly discovered sites should be incorporated into an amended HPMP (see below). Within 60 days of inventory completion, PacifiCorp should submit a draft report for Bureau review that follows SHPO report guidelines. The final report should be submitted to the Commission, Bureau, affected tribes, and the SHPO.	PacifiCorp deletes the Bureau's reference to 77.2 acres of unsurveyed lands within the APE to be surveyed within 1 year of license issuance and replaces it with land within the project boundary, "to the extent such an inventory has not been completed prior to the issuance of the License." PacifiCorp also limits the scope of this condition to Bureau reservation lands within the project boundary. PacifiCorp also specifies that any newly discovered sites should be incorporated into an amended HPMP, with appropriate protective measures.

Bureau of Land Management Specified 4(e) Conditions	Alternative Conditions
Condition 5-2: PacifiCorp should, within one year of license issuance, amend, in consultation with the Bureau, the HPMP to address the management of all sites within the APE and file the HPMP with the Commission for approval. The HPMP should, at a minimum, include the following: (a) measures to monitor, stabilize, protect, restore, and/or mitigate for project-related effects to known sites within the APE on Bureau-administered land; (b) monitoring of Bureau cultural sites within the APE, completed by a qualified professional archaeologist, and involve visiting at least 20 percent of the eligible sites each year to ascertain impacts, effects of mitigation, whether eligible properties are being affected by project-related activities, and whether non-eligible historic properties should be re-evaluated for consideration of eligibility; (c) protocols for conducting cultural resources surveys on Bureau-administered lands prior to future project-related activities proposed within the APE. If a project-related activity is proposed within an area where cultural resource surveys are older than 15 years, PacifiCorp should conduct a new survey; (d) procedures for handling, cataloging, interring, or repatriating cultural resources on Bureau-administered land exposed by unanticipated project related effects; (e) provisions for annual reports to be submitted to the Commission, Bureau, and affected tribes documenting mitigations, new findings, and assessment of the effectiveness of mitigations in preventing degradation of cultural properties on Bureau-administered lands; (f) a schedule for implementing the amended HPMP, incorporating a priority for those sites which are at greatest risk of continued degradation from project related activities; (g) provisions for the review and periodic revision of the HPMP to incorporate new information regarding the condition or effects to historic properties on Bureau-administered lands or changes in site eligibility as a function of policy, law, regulation, or advances in scientific technology; and (h) implementation of the HPMP upon Commission approval.	
Condition 5-3: Within one year of license issuance, PacifiCorp should consult with the Bureau to conduct site-specific studies to determine erosion impacts, if any, from flow resulting from five specific Bureau sites which are within or partially within the T1 terrace. PacifiCorp should consult with the Bureau regarding the draft study reports and submit the final report to the Commission, Bureau, affected tribes, and the SHPO.	PacifiCorp deletes the Bureau's reference to 18 specific known sites and limits the scope of this condition to Bureau reservation lands within the project boundary**.** [This alternative condition no longer applies.[a]]

Bureau of Land Management Specified 4(e) Conditions	Alternative Conditions
Condition 6A: PacifiCorp should, within one year of license issuance, develop a recreation resources management plan in consultation with the Bureau, and submit to the Commission for approval. The plan should include the following: (1) descriptions of existing and potential recreational sites and trails on Bureau-managed lands affected by the project including Topsy Campground, Spring Island Boater Access, Klamath River Campground, dispersed day-use sites, Stateline Takeout, and bypassed reach fishing access and trails; (2) a schedule for implementation, maintenance, capital improvements, and monitoring of Bureau recreational sites affected by the project; (3) estimates of costs to operate, maintain, and monitor Bureau facilities that receive project-related recreation, and identification of the entity responsible for costs of operating, maintaining, and monitoring the sites identified in (1), and the estimated costs, and identification of the appropriate instrument for shared administration of these sites; (4) maintenance and needed development measures for recreation sites, day-use areas, and non-motorized trails located on Bureau-administered lands affected by project-related recreation; at a minimum, these sites would include: Topsy Campground; J.C. Boyle bypassed reach, boating and fishing access sites and associated access trails; Spring Island Boaters Access; Klamath River Campground; dispersed day-use sites used by whitewater boaters along the Klamath River; scouting trails at major rapids; and the Stateline Takeout; (5) standards for facilities operation and maintenance; facility replacement, modification, or upgrade; and monitoring for those Bureau recreation facilities affected by project-related recreation; (6) provisions to bring facilities up to accepted standards for handicap accessibility, public health and cleanliness, safety, and security; (7) provisions for monitoring and assessment of visitor use on Bureau-administered lands affected by project-related recreation at an interval no greater than 6 years; (8) provisions for an annual visitor-use report that would be provided to the Bureau; and (9) provision for annual review and periodic modifications or revisions of the RRMP.	PacifiCorp eliminates provisions of this condition that reserves the Bureau's right to require changes to the RRMP [This alternative condition no longer applies.[a]] PacifiCorp limits the scope of this condition to Bureau reservation lands within the project boundary and deletes any reference to describing and providing for O&M and additional development at Topsy Campground, Spring Island Boater access, the Stateline Takeout, the Klamath River Campground, dispersed day use sites, J.C. Boyle bypassed reach boating and fishing and access sites and associated access trails, and scouting trails at major Boyle peaking reach rapids.
Condition 6B: PacifiCorp should include in its recreation resource management plan a visual resource management plan that includes provisions and guidelines for managing visual resources on Bureau-managed lands from the headwaters of J.C. Boyle reservoir to Iron Gate reservoir. The plan should describe how design, maintenance, and construction of project facilities (i.e., bypass canal and other concrete structures, switch yards, powerhouses, buildings, penstocks, metal structures associated with powerlines, and project recreational facilities) would maintain or preserve visual resource values. Examples of types of enhancement are given.	

Bureau of Land Management Specified 4(e) Conditions	Alternative Conditions
Condition 7: PacifiCorp should, within one year of license issuance, develop a vegetation resources management plan. The plan should include (1) provisions to re-survey lands affected by project-related activities to determine or verify distribution of rare and sensitive species, (2) provisions for establishing a weed management area, (3) provisions for surveying, documenting, managing and monitoring noxious weed and invasive plant species, including periodic review of federal, state and local noxious weed lists in the project area, (4) provisions for surveying, documenting, monitoring, and protecting rare and sensitive plants, including periodic review of Bureau sensitive species, Oregon Natural Heritage Information Center, California Natural Diversity Database, and California Native Plant Society records, (5) proposed vegetation management activities for, at a minimum, the J.C. Boyle powerhouse and canal, maintenance of transmission line and road rights-of-way, and use of project-related roads on or affecting Bureau-administered lands, (6) proposed remediation measures and subsequent monitoring program for the eroded area below the J.C. Boyle emergency spillway, (7) a geospatial map (e.g., GIS map) and digital database to store information on species occurrence; distribution; status according to the Oregon Department of Agriculture system of ranking species for control; and timing of last survey, (8) proposed treatments, mitigations, and best management practices for managing weeds on Bureau-administered lands that are impacted by project-related activities, (9), descriptions as to how the plan is consistent with Bureau guidance for integrated pest management, (10) principles of integrated pest management that include prevention and detection, application of integrated control methods, education, coordination, native plant community restoration, monitoring, and evaluation; integrated control methods may include cultural, physical, biological, and chemical control techniques, and (11) provisions for annual review and periodic modifications or revisions of the plan.	PacifiCorp limits the scope of this condition to Bureau reservation lands within the project boundary and along roads for which PacifiCorp has sole or joint responsibility (as determined by the Commission), deletes references to “invasive plants”, and modifies the plan content to include provisions for periodic follow-up noxious weed surveys, rather than the Bureau’s specified "timeline for systematic survey of land affected b the project." PacifiCorp also deletes the Bureau’s condition 7C, which reserves the Bureau's right to require changes to the vegetation management plan. [Some of this alternative condition no longer applies.[a]]

Bureau of Land Management Specified 4(e) Conditions	Alternative Conditions
Condition 8: PacifiCorp should, within two years of license issuance, prepare a wildlife habitat management plan for Bureau-managed lands affected by project operation and maintenance, in consultation with the Bureau. The plan should include provisions for: (1) measures with use monitoring for wildlife crossings and escape ramps for the J.C. Boyle canal; (2) measures with use monitoring for western pond turtle habitat improvement; (3), threatened, endangered, sensitive species, and special status species survey and monitoring including survey protocols for long-term survey and monitoring of these species and their habitat for Bureau-administered lands affected by project-related activities to assess impacts and develop necessary mitigations; this information would supplement the previous study completed by PacifiCorp (PacifiCorp 2004c - Threatened, Endangered, Sensitive and Special Status Species Assessment); (4) restoration, protection, and/or enhancement measures for wildlife and/or wildlife habitat affected by project-related activities; (5) seasonal restrictions for active nest sites on Bureau-administered lands for bald eagles, golden eagles, ospreys, peregrine falcons, and other raptors affected by project-related activities; (6) an avian protection plan for the Upper Klamath River that addresses avian interaction (electrocution, collision, nesting, perching) with all transmission facilities and follow guidelines in the Avian Protection Plan Guidelines (APLIC and USFWS, 2005), "Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996" (APLIC, 1996), and/or the most current publication for avian protection at the time; and (7) provisions for annual review and periodic modifications or revisions of the plan.	PacifiCorp limits the scope of this condition to Bureau reservation lands within the project boundary, and changes monitoring of wildlife crossings and escape ramps for the Boyle canal from "effectiveness" to "use" and adds the word "existing" to the escape ramp monitoring. Similarly, PacifiCorp modifies the western pond turtle effectiveness monitoring to "use monitoring." PacifiCorp also deletes the Bureau's condition 8C, which reserves the Bureau's right to require changes to the wildlife habitat management plan**.** [Some of this alternative condition no longer applies.[a]]

[a] PacifiCorp's alternative conditions were based on the Bureau of Land Management's preliminary land management conditions, filed on March 27, 2006, and were addressed in the draft EIS. In many cases, the Bureau of Land Management modified conditions, filed on January 29, 2007, no longer include the elements or language with which PacifiCorp took issue in its alternative condition. However, PacifiCorp has not withdrawn its alternative conditions, and we address them in this EIS, as applicable.

Table 2-4. Environmental measures specified by Reclamation pursuant to section 4(e) of the Federal Power Act and PacifiCorp's and others' corresponding alternative conditions, pursuant to the Energy Policy Act of 2005. (Source: Letter from S. Thompson, Manager, California/Nevada Operations Office, Interior, to the Commission filed on March 29, 2006, and affirmed by letter to the Commission, filed on January 29, 2007)

U.S. Bureau of Reclamation Specified Conditions	Alternative Conditions
Condition 1A: PacifiCorp should continue to operate and maintain Link River dam in a manner consistent with the Klamath Reclamation Project Annual Project Operations Plans.	PacifiCorp's alternative is to eliminate this condition.
Condition 1C: PacifiCorp should, at its own expense, maintain the approach channel to the A canal of the Klamath Reclamation Project to the satisfaction of Reclamation so far as may be necessary to carry a flow of not less than 1,200 cfs into the canal with the water of Upper Klamath Lake at elevation 4,137 feet (USBR vertical datum)	PacifiCorp's alternative is to eliminate this condition.
Condition 1E: Nothing in the contract that Reclamation would develop with PacifiCorp, should curtail or be construed as curtailing the rights of the U.S. to Klamath water or to the lands along or under the margin of Upper Klamath Lake. No Klamath water should be used by PacifiCorp when it may be needed or required by the U.S. or any irrigation or drainage district, person, or association obtaining water from the U.S. for use for domestic, municipal, and irrigation purposes on project land.	PacifiCorp's alternative is to eliminate this condition.
Condition 1F: PacifiCorp should operate Keno dam so that the upstream water level would not be below the minimum normal objective of elevation 4,085.0 feet (USBR datum), at or near the location of the present Highway 66 bridge at Keno.	PacifiCorp's alternative is to eliminate this condition.
Condition 1G: PacifiCorp should operate Keno dam to accommodate the discharge of 3,000 cfs from Lost River diversion channel and 600 cfs from Klamath Straits drain.	PacifiCorp's alternative is to eliminate this condition.
Condition 2: PacifiCorp should, in consultation with Reclamation, develop operating criteria that provide for coordination of Link River and Iron Gate dam (or the most downstream dam of the project) operations to allow Reclamation to meet its responsibilities.	PacifiCorp's alternative is to eliminate this condition.
Condition 3: PacifiCorp should, in consultation with Reclamation, develop operating criteria that provide for coordination of Keno and Iron Gate dam (or the most downstream dam of the project) operations to allow Reclamation to meet its responsibilities.	PacifiCorp's alternative is to eliminate this condition.
Condition 4: PacifiCorp should provide Reclamation with area capacity curves for all project facilities and real time access to reservoir elevations and releases for project facilities.	PacifiCorp's alternative is to eliminate this condition.

Modified conditions that we consider administrative or legal in nature filed by the Bureau of Land Management include the following: 1D, avoid disturbance of survey monuments, private property corners, and Bureau boundary markers and replace any that are disturbed; 1E, maintain project facilities to acceptable standards; 1J, indemnification of the U.S. for judgments against the U.S. arising from project operations; 1I, use of due diligence to protect land and property of the U.S.; 2B, provision of relevant documents prior to the annual meeting with the Bureau of Land Management; 2, submit project safety and non-compliance reports to the Bureau of Land Management concurrent with submittal to the Commission; 2E, consult annually with the Bureau to determine if project-related activities affect other authorized activities on Bureau-administered lands and resolve potential conflicts with representatives of the other authorized uses; 3C, consult with the Bureau prior to erecting signs on Bureau-administered lands; and 9, reservation of authority for the Commission to implement such conditions for protection and use of Bureau of Land Management reservations as may be provided by the Secretary of Interior.

Conditions that we consider administrative or legal in nature filed by Reclamation include the following: 1, requirement to enter into a new or amended contract with Reclamation for operation and maintenance of Link River and Keno dams; 1B, provide electric power for pumping Klamath River water for use on Klamath Irrigation Project land and for drainage of Klamath Irrigation Project land at rates no higher than the cost of service from the Klamath Hydroelectric Project; 1D, assume all liability for damages resulting from PacifiCorp operation of Link River dam; 5, prohibition of any operations or modifications to the project that could affect the Klamath Irrigation Project; 6, no claims against the U.S. arising from the effect of any changes in releases from Upper Klamath Lake or Keno reservoir related to Klamath Irrigation Project operations or use of water from Upper Klamath, Lower Klamath, or Tule Lake National Wildlife refuges; and 7, reservation of authority for the Commission to implement such conditions for protection and use of Reclamation reservations as may be provided by the Secretary of Interior.

2.3.1.5 Alternative Section 4(e) Conditions from Others

Oregon Fish & Wildlife and Cal Fish & Game also filed alternative 4(e) conditions pursuant to the EPAct pertaining to flows in the J.C. Boyle bypassed and peaking reaches by letters dated April 26, 2006. Tables 2-3 and 2-4 show the alternative 4(e) conditions of PacifiCorp and the agencies. In addition, by letter dated April 27, 2006, Pacific Coast Federation of Fishermen's Associations and Institute for Fisheries Resources requested a trial-type hearing regarding issues of material fact pertaining to Reclamation's preliminary 4(e) conditions.

2.3.1.6 Administrative Law Judge Decision

On September 27, 2006, the Administrative Law Judge assigned to the EPAct trial-type hearing issued his decisions on issues of disputed fact pertaining to mandatory prescriptions and conditions associated with the Klamath relicensing proceeding. Of the 14 disputed issues of material fact, 6 pertain to the Bureau of Land Management preliminary 4(e) conditions, and include the following: (1) whether seasonal high flow events in the J.C. Boyle bypassed reach would improve riparian conditions and if so, the effects on birds that would use this habitat; (2) whether project operations adversely affect riparian habitat and birds that would use this habitat in the J.C. Boyle bypassed and peaking reaches; (3) whether seasonal high flow events in the J.C. Boyle bypassed reach would have a net adverse effect on redband trout spawning; (4) whether and how current project operations affect the redband trout fishery resources; (5) whether and to what extent a 2-inch-per-hour upramp rate at the J.C. Boyle development would affect aquatic resources; and (6) how the flow regime specified in the 4(e) conditions may affect existing whitewater boating and flyfishing in the peaking reach. The judge's rulings on these issues provided direction to Bureau of Land Management in developing the modified 4(e) conditions filed with the Commission on

January 29, 2007. As pertinent, we include the judge's findings and related information in our environmental effects analysis in sections 3.3.1.2, *Geology and Soils*, 3.3.2.2, *Water Resources*, 3.3.3.2, *Aquatic Resources*, 3.3.4.2, *Terrestrial Resources*, 3.3.5.2, *Threatened and Endangered Species*, and 3.3.6.2, *Recreational Resources*.

2.3.2 Staff Alternative

After evaluating PacifiCorp's Proposal and recommendations from resource agencies, tribes, and other interested parties, we compiled a set of environmental measures that we consider appropriate for addressing the resource issues raised in this proceeding, calling this the Staff Alternative. The Staff Alternative includes some measures included in PacifiCorp's Proposal as well as some of the section 18 and alternative section 18 fishway prescriptions, section 4(e) and alternative section 4(e) conditions, section 10(j) recommendations, section 10(a) recommendations, and measures developed by the staff. We note that the Staff Alternative does not include East Side and West Side developments or Keno dam.

The Staff Alternative incorporates PacifiCorp's proposed environmental measures (see section 2.2.3), modified as follows:

Water Resources

- #2P--modified to include development of a temperature management plan that would include: (1) a feasibility study to assess modifications of existing structures at Iron Gate dam to enable release of the maximum volume of cool, hypolimnetic water during emergency circumstances to be completed within 1 year of license issuance; (2) an assessment of methods to increase the dissolved oxygen of waters that may be released on an emergency basis to be completed within 1 year of license issuance; and (3) development of protocols that would be implemented to trigger the release of hypolimnetic water by using existing, unmodified structures at Iron Gate development or, if determined to be feasible, modified structures, when conditions for downstream salmonid survival approach critical levels to be completed within 2 years of license issuance.
- #3P--modified to delay implementation of reservoir oxygen diffuser until potential adverse effects are evaluated as part of #4P, but implement turbine venting at Iron Gate development, as described in Mobley (2005), and monitor and evaluate the response of the downstream dissolved oxygen and total dissolved gas regime.
- #4P--modified to include development of a single, comprehensive water quality management plan for all project-affected waters within 1 year of license issuance, rather than three separate reservoir management plans, and expanded to include: (1) consideration of spillage of warm water at Iron Gate dam during late spring; (2) consideration of spillage at Copco No. 1, Copco No. 2, and Iron Gate dams during the summer to enhance dissolved oxygen released at Iron Gate development; (3) consideration of turbine venting at Copco No. 1 and No.2 powerhouses to increase dissolved oxygen in the epilimnion of Iron Gate reservoir and, potentially, downstream of Iron Gate development; (4) consideration of nutrient controls in project reservoirs including but not limited to using biological measures, aquatic vegetation, harvesting, and treatment wetlands to limit algae blooms; (5) specification of water quality monitoring that would be used to evaluate the effectiveness of any implemented water quality management measures; (6) specification of long-term water quality monitoring programs (e.g., temperature and dissolved oxygen) that would enable adaptive management decisions to occur; (7) provisions for periodically updating the water

quality management plan; and (8) provisions for annual consultation with the integrated fish passage and disease management work group as part of our recommended fish passage and disease management adaptive management approach (see measure 8S). Specific measures to enhance temperature and DO and reduce project-related nutrient loading, identified during development of this plan and any studies needed to assess whether specific techniques are feasible, would be implemented within 3 years of license issuance.

Aquatic Resources

- #6P--modified to include Oregon Fish & Wildlife and Oregon SHPO among the entities consulted during development of the decommissioning plan and to include provisions in the plan to ensure that PacifiCorp's actions to safely secure the developments and restore the landscape in proximity to both developments would not forestall the future installation of a smolt facility at this site.
- #8P--modified to specify that the extra 100 cfs, or 200 cfs in total, would be released from J.C. Boyle dam.
- #10P--modified to specify that, when peaking operation of the J.C. Boyle powerhouse commences in the spring, or after 7 or more days of non-peaking operation (as defined by the consistent operation of only 0, 1, or 2 units), downramping would be limited to a maximum rate of 2 inches per hour in the first 24 hours, and 9 inches per hour thereafter. During the periods when 6 or 9 inch downramping rates are in effect, downramping also would be limited to 4 inches per hour whenever flows are 1,000 cfs or less.
- #12P--not recommended, replaced by staff measure #8S.
- #15P--not recommended, replaced by staff measure #1S.
- #16P--not recommended, replaced by staff measure #7S.
- #19P--modified so that the period during which no flow would be diverted from Spring Creek would extend from June 1 to September 15 and a minimum flow of 4 cfs, or inflow, would be provided during the remainder of the year.
- #21P is modified as follows*:* If inflow to the project drops to below the specified minimum release from the Iron Gate development, PacifiCorp would operate Iron Gate development in a run-of-river mode, defined as the 3-day running average of inflow to the Klamath Hydroelectric Project. In the event that project facilities are not included in any future Klamath Project Operations Plans (e.g., if coho salmon should be delisted), PacifiCorp would develop an Iron Gate flow release plan within 6 months of issuance of such a plan. Flows specified in the Operations Plans at the time of new plan issuance would remain in effect until the Commission approves the new flow release plan. Any such flow schedule and ramp rate would be developed in coordination with Reclamation and be consistent with Klamath Irrigation Project operations. PacifiCorp would also develop the plan in consultation with Cal Fish & Game, Oregon Fish & Wildlife, NMFS, FWS, and the tribes.
- #22P--not recommended, replaced by staff measure #1S.
- #23P--modified to increase PacifiCorp's obligation from 80 to 100 percent of the cost of operation of Iron Gate Hatchery.

- #24P--modified to provide for marking 100 percent of Chinook and coho salmon released from Iron Gate Hatchery and implementation of a hatchery and genetics management plan.

Terrestrial Resources

- #25P--expanded the vegetation management plan to include consultation with affected tribes regarding opportunities for re-establishment of plants of tribal significance in project-affected areas, and include in the upland vegetation management program measures to reduce fire fuels, such as controlled fires, to reduce the risk of wildfires and enhance wildlife habitat.
- #26P--modified to address deer winter range management in the vegetation management plan, rather than the wildlife resource management plan, because it would entail primarily vegetation management measures.

Recreational Resources

- #28P--modified the schedule for construction of a potable water supply and restroom facilities at the proposed J.C. Boyle Bluffs campground and day-use area to correspond with the initial construction phase at this site (rather than 20 years after license issuance). The site design for J.C. Boyle Bluffs is modified to include a host site with full RV hookups, including a pressurized water system to be included in the initial site development phase. This proposed measure also is modified to include fencing at the city of Yreka's domestic water supply diversion at Fall Creek to protect public safety.
- #29P--modified to exclude provisions for funding law enforcement agencies to patrol the project area as a condition of a new license.
- #32P--expanded the flow-related information available to the public on PacifiCorp's website and addressed in the Whitewater Boating and River-based Fishing Program component of PacifiCorp's Recreation Resources Management Plan to include real-time and projected flow information, generation times, and scheduled outages at all telemetry-gaged project-reaches and provisions for prompt posting of any changes to scheduled flow releases on the website.
- #33P--modified to ensure acquisition of appropriate easements for the final alignment of the proposed J.C. Boyle loop trail that avoids environmentally sensitive areas and includes the final alignment in the project boundary. Exclude the proposed trail from the J.C. Boyle powerhouse to the Spring Island boater access site because it would not serve project purposes.
- #36P--expanded the proposed project boundary at the State-line Takeout Area to include the access road from Ager-Beswick Road to the existing site on PacifiCorp land and includes provisions to repair an adjacent leaking irrigation canal that adversely affects this road, as appropriate.

Land Use and Aesthetic Resources

- #38P--included vegetative screening measures for the Fall Creek and Copco No. 2 powerhouses and the Copco No. 2 substation in the visual resources management plan component of the final Recreation Resources Management Plan.

Cultural Resources

- #40P--modified to specify revision and finalization of the project's HPMP for management of historic properties within the geographic area of historic property management for the project as determined by Commission staff and reflected in a new license.

The Staff Alternative also includes the following additional measures:

Geology and Soils

1S. Develop and implement a sediment resource management plan that includes mapping and evaluating gravel and other sediment distribution in project reaches and the Klamath River from Iron Gate dam to the confluence of the Shasta River, determining specific amounts and locations for sediment augmentation based on the mapping; monitoring gravel and spawning use after placement; and supplementing sediment placement based on monitoring results.

2S. Develop and implement a plan to restore slope failures and the affected channel, including the slope below the emergency spillway and removal of sidecast material, along the J.C. Boyle bypassed reach, if shown to be needed, based on monitoring results. Retain the right bank slope that is within the existing project boundary in the project boundary of a new license to ensure Commission oversight of restoration and protection measures and to ensure continued stability of the intake canal and project access road.

3S. Develop protocols for contacting agencies that would be followed in the event of a water conveyance system failure. In addition, promptly notify resource agencies in the event of all unanticipated or emergency project-related situations that may result in harm to fish or wildlife to obtain guidance on appropriate remedial measures that should be implemented. Develop thresholds of harm that would trigger such notification, in consultation with the resource agencies, and provide the thresholds to the Commission as well as reports following each event that triggers agency notification, indicating the nature of the event, the actions taken in response to the event, and any follow-up monitoring to ensure that the response is effective.

4S. If a proposed project-related activity entails ground-disturbing activities, develop a site-specific erosion and sedimentation control plan to address erosion and dust control and measures that would be taken to restore such areas following the activity. If the activity would generate spoils, include measures to (1) characterize the spoils; (2) identify where the spoil would be disposed in an environmentally responsible manner; and (3) restore, stabilize, and monitor the spoil disposal site following its use. As appropriate, include this plan in the broader plan for the activity (e.g., the final plan for development of a specific recreational site, or in annual road maintenance plans developed pursuant to a road management plan).

Water Quantity and Quality

5S. Develop and implement a project operations management plan that includes provisions for installing gages to appropriately monitor the flow regime specified in a new license, coordinating operation of the Klamath Hydroelectric Project with the Klamath Irrigation Project, reporting project-related flows to appropriate entities, minimizing water level fluctuations at Iron Gate reservoir from March through July to protect breeding wildlife, establishing an appropriate range of water level

elevations that would enable implementation of concurrent measures to enhance aquatic habitat, and periodically updating the plan.

6S. Develop and implement a monitoring plan for *Microcystis aeruginosa* and its toxin in project reservoirs and immediately downstream of Iron Gate dam. The plan would include protocols for providing Oregon Environmental Quality, the Water Board, and other appropriate public health agencies with monitoring results for their review and appropriate action. Such protocols would include potential locations for posting any public health warnings at project-related public access sites, and procedures for cooperation in providing agency access to those sites for posting any health advisories that may be issued. The plan would also include provisions for extending the monitoring program to locations further downstream, pending completion and evaluation of the first 4 years of *Microcystis* and microcystin monitoring that would be implemented under the fish passage and disease management program (measure 8S).

Aquatic Resources

7S. Release 70 cfs or inflow, whichever is less, to the Copco No. 2 bypassed reach.

8S. Develop and implement the integrated fish passage and disease management program as described in section 3.3.3.2.5, *Anadromous Fish Restoration*. The program would include the following components:

Year 1: (1) develop a Phase I implementation plan to initiate the restoration of anadromous fish passage to habitat upstream of Copco No. 1 and J.C. Boyle dams and conduct studies to address the feasibility of volitional passage through Copco and Iron Gate reservoirs; (2) design a downstream fish passage and collection facility at J.C. Boyle dam; (3) modify adult collection facilities at Iron Gate dam to facilitate fish handling for trap and haul operations; (4) initiate monitoring of key water quality parameters to determine the extent of downstream project effects on water quality and to evaluate the relationship between water quality and fish disease; and (5) initiate field and laboratory studies to evaluate approaches for reducing the prevalence of disease pathogens downstream of Iron Gate dam.

Year 2: (1) initiate trap and haul of adult anadromous fish above Copco No. 1 and J.C. Boyle dams; (2) initiate adult telemetry studies to determine effectiveness of the J.C. Boyle ladder and trap and haul survival rates; and (3) construct the downstream fish passage and collection facility at J.C. Boyle dam using design developed in year 1.

Year 3: (1) conduct radio telemetry studies to evaluate reservoir passage and spillway survival and the effects of different spill levels on spill passage rates, using Chinook salmon and steelhead smolts collected at the J.C. Boyle downstream passage and fish collection facility and at screw traps deployed at the head of Copco reservoir; (2) monitor the effects of spill at Copco No. 1 and Iron Gate dams on water quality conditions and disease incidence downstream of Iron Gate dam; and (3) conduct radio telemetry and mark-recapture studies to determine the transport and migration survival of smolts transported to and released at one or more locations downstream of Iron Gate dam to compare survival rates associated with different transport distances and release locations to the existing FWS smolt monitoring site at Big Bar.

Year 4: (1) Monitor the effects of a pulse flow, created by drawing down Copco No. 1 and Iron Gate reservoirs as rapidly as feasible to minimum operating pool, on attached algae, pathogen density, and disease incidence downstream of Iron Gate dam; and (2) evaluate the effects of holding Iron Gate and Copco reservoirs at minimum operating pool on passage conditions and downstream water quality and disease incidence.

Year 5: Develop a Phase II implementation plan that (1) evaluates alternative approaches for providing upstream and downstream fish passage at each project dam; (2) evaluates the potential effects of each alternative approach on water quality conditions and disease incidence downstream of Iron Gate dam; and (3) describes a proposed schedule and approach for implementing fish passage and disease management measures, study efforts and monitoring to be continued into the future, and provisions for adaptive management based on study and monitoring results. Development of the Phase II implementation plan could be deferred for up to two years if additional studies are determined to be necessary.

During Phase I, PacifiCorp would be required to file for Commission approval annual Phase I implementation plans and reports that describe (1) measures implemented, monitoring, and studies conducted in the past year; and (2) measures, monitoring, and studies for implementation in the coming year.

The Phase I and Phase II implementation plans would be developed in consultation with the fisheries management agencies, tribes, and a representative to be selected by the NGOs. The consulted parties would be provided at least 30 days to comment on a draft of each plan, and the plans filed with the Commission would include copies of comments received and describe how the comments were addressed. PacifiCorp would be responsible for implementing the plans following Commission approval.

9S. Develop a fish passage resource management plan in consultation with resource agencies that includes designs for any fishways included in a new license, provisions for developing fishway operation and maintenance plans, provisions for evaluating and monitoring fish passage at the fishways, and provisions for modifying the fishways in response to evaluation and monitoring.

10S. Allow state and federal resource agency personnel access to project developments to inspect fishways and records to monitor compliance with license conditions.

11S. Rehabilitate the Fall Creek rearing ponds, and fund 100 percent of the operation and maintenance costs to resume the production of yearling fall Chinook salmon, as previously funded by Cal Fish & Game.

12S. Sponsor a fishery technical advisory committee that would provide input to guide project-related fish passage, hatchery, and anadromous fish restoration activities.

13S. Develop and implement an aquatic resources monitoring and management plan that includes specific resource goals and provisions for recommending project operations and facility modifications in response to monitoring results. Fish populations in project-affected reaches, including reservoirs, would be monitored every third year for the first 9 years, after which the frequency of monitoring in subsequent years would be re-evaluated.

Terrestrial and Threatened and Endangered Resources

14S. Within 2 years of license issuance develop a bald eagle management plan for the project in consultation with FWS, the Bureau of Land Management, Cal Fish & Game, and Oregon Fish & Wildlife that includes provisions for (1) conducting annual aerial bald eagle surveys to document new nests and productivity of territories, (2) monitoring and protecting bald eagle nest sites, roost sites, and regular foraging areas from human disturbance within the project boundary, including seasonal restrictions for active nest sites, and (3) evaluating changes in prey base relationships. The bald eagle management plan should be prepared in coordination with the wildlife habitat management plan, which includes provisions for monitoring transmission lines and retrofitting poles on lines where birds have died to improve avian protection.

Recreational Resources

15S. Include provisions for retaining the existing day-use area at Pioneer Park East (adjacent to the Highway 66 bridge across J.C. Boyle reservoir) in the final Recreation Resources Management Plan.

16S. Acquire necessary easements to include the access road to the upper J.C. Boyle reservoir boating access site in the project boundary.

17S. Retain Topsy Campground in the project boundary, develop a potable water system for this facility, address this facility in the Operations and Maintenance Program of PacifiCorp's Recreation Resources Management Plan, and develop a Memorandum of Agreement with the Bureau of Land Management that defines PacifiCorp's and the Bureau's responsibilities at this site.

18S. Develop an off-highway vehicle management plan as a component of the final Recreation Resources Management Plan.

19S. Conduct a feasibility study for enhancing communications between the J.C. Boyle powerhouse and the Stateline Take-out and, if feasible, develop a plan and cooperative agreement with appropriate entities to implement reasonable measures that may be identified in the feasibility study.

Land Use and Aesthetic Resources

20S. Consult with the Bureau of Land Management, Oregon Fish & Wildlife, and Cal Fish & Game in the finalization of the Recreation Resources Management Plan and Road Management Plan, as appropriate.

21S. Include the portion of Topsy Grade Road from Highway 66 to the intersection of the road that provides access to J.C. Boyle dam (designated 300000116 on PacifiCorp's road inventory map) in the project boundary because this road provides, or would provide, access for the public and PacifiCorp staff to Topsy Campground, the proposed Boyle Bluffs Campground and day-use area, proposed recreational areas along the J.C. Boyle bypassed reach, and all J.C. Boyle development features.

Cultural Resources

22S. Consult with state and appropriate federal land management agencies in addition to the local law enforcement agencies, Oregon SHPO, California SHPO, and tribes

specified in the revised Historic Properties Management Plan (HPMP) in the finalization of the plan and subsequent plan updates.

23S. Conduct archaeological identification surveys in Bureau of Land Management units I through P on the J.C. Boyle peaking reach within the limits of project capacity, and in Units A through H in the J.C. Boyle bypassed reach at Big Bend and treat any sites determined eligible or potentially eligible for the National Register in accordance with the provisions of the HPMP.

24S. Include the Oregon State Commission on Indian Services in notifications of discoveries of human remains in Oregon.

25S. Develop a plan for providing tribes with access to areas within the project boundary where plants of traditional cultural importance occur, and permit use of such plants for traditional practices.

2.3.3 Staff Alternative with Mandatory Conditions

NMFS and Interior have made preliminary fishway prescriptions for the project (described in section 2.3.1.2, *Section 18 Fishway Prescriptions*) which, when finalized, the Commission may need to include in a new license for this project. Similarly, the Bureau of Land Management and Reclamation have specified modified 4(e) conditions (described in section 2.3.1.4, *Section 4(e) Federal Land Management Conditions*) which, when finalized, also may need to be included in a new license for this project. Incorporation of these mandatory conditions into a new license would cause us to modify or eliminate some of the environmental measures that we include in the Staff Alternative. Because the Staff Alternative does not include East Side, West Side, and Keno developments, we do not include any mandatory conditions associated with those developments in this alternative. PacifiCorp's proposed measures that we either accepted or modified for inclusion in the Staff Alternative that would be adjusted by mandatory conditions would include the following (see section 2.2.3 for the numerical designation and description of PacifiCorp's measures that would be adjusted):

- Measures 7P and 8P would be replaced by the Bureau of Land Management's condition 4A1(a)(b), which pertains to the minimum flow in the J.C. Boyle bypassed reach.
- Measure 9P would be replaced by the Bureau of Land Management's condition 4A2, which pertains to ramping rates in the J.C. Boyle bypassed reach.
- Measure 10P would be replaced by the Bureau of Land Management's condition 4B2, which pertains to ramping rates in the J.C. Boyle peaking reach. In addition, J.C. Boyle powerhouse would only be able to operate in a peaking mode 1 day per week.
- Measures 12P and 13P would be replaced by NMFS and Interior's fishway prescription for J.C. Boyle development.
- Measure 32P would be modified to include provisions for operating, maintaining, and monitoring Spring Island Boater access, Klamath River Campground, scouting trails at major rapids, and dispersed day-use sites on Bureau of Land Management administered lands in the final RRMP, in accordance with condition 6A.
- Our modification to measure 33P, to exclude from the project the proposed trail from the old foundations day-use area to the Spring Island boater access site would be eliminated.

Additional measures identified by staff based on our analysis that would be replaced by mandatory conditions include the following (see section 2.3.2 for the numerical designation and description of staff's additional measures):

- Measure 8S would be replaced by NMFS and Interior's fishway prescriptions.

2.3.4 Retirement of Project Developments not Proposed by PacifiCorp

The Commission and resource agencies developed an Interagency Task Force Report (ITF, 2000) that identifies factors to be considered in determining whether, in certain cases, a more thorough analysis of decommissioning a project facility is warranted. Using these factors, Commission staff either examines decommissioning as a reasonable alternative or briefly discusses the reason for eliminating decommissioning from detailed study. Table 2-5 shows the 17 factors that the Task Force agreed upon and our assessment of which apply to dams in the proposed project.

Table 2-5. Dam removal alternatives: assessment of factors. (Source: ITF, 2000, and staff)

	J.C. Boyle dam	**Copco No. 1 dam**	**Copco No. 2 dam**	**Iron Gate dam**	**Fall Creek diversion dam**	**Spring Creek diversion dam**
1. Listed threatened or endangered species (positive effect if dam removed)	**X**	**X**	**X**	**X**		
2. Economic viability, including costs of resource protection measures (dam removal may be less costly than implementing measures)		**X**		**X**		
3. River targeted for fish recovery	**X**	**X**	**X**	**X**		
4. Feasibility of fish passage (achieved with difficulty at existing dams)		**X**		**X**		
5. Consistency with comprehensive plans						
6. Protected river status (e.g., scenic river, wilderness area)(dam removal could enhance ORV)		**X**		**X**		

	J.C. Boyle dam	Copco No. 1 dam	Copco No. 2 dam	Iron Gate dam	Fall Creek diversion dam	Spring Creek diversion dam
7. Effectiveness of past mitigation measures and availability of future measures (dam removal may be more effective than implementing measures)		**X**		**X**		
8. Support by applicant or other party for decommissioning	**X**	**X**	**X**	**X**		
9. Tribal lands, resources, or interests (could be enhanced with dam removal)	**X**	**X**		**X**		
10. Water quality issues, including presence of toxic sediments (dam removal would likely improve water quality in the long term)		**X**		**X**		
11. Potential opportunities for recreation (substantially enhanced with dam removal)						
12. Physical condition of project (poor condition, needed repairs may be too costly to implement)						
13. Presence of existing project-dependent development (e.g., houses abutting reservoir)(would not be negatively influenced with dam removal)			**X**		**X**	**X**
14. Other non-power project-related benefits (e.g., municipal water supply, flood control, irrigation)(would not be negatively influenced with dam removal)	**X**	**X**	**X**	**X**	**X**	**X**

	J.C. Boyle dam	Copco No. 1 dam	Copco No. 2 dam	Iron Gate dam	Fall Creek diversion dam	Spring Creek diversion dam
15. Project-dependent resource values (e.g., recreation, wetlands, wildlife, habitat)(would not be negatively influenced with dam removal)			X		X	X
16. Need for power and ancillary services (dam removal would not substantially impair)					X	X
17. Historic properties (dam removal would likely not substantially impair)				X		

Our analysis indicates that the Iron Gate development has 11 of the 17 attributes and Copco No. 1 development had 10 of the attributes that we consider indicative of a more thorough decommissioning and removal evaluation. There is a clear break between these two developments and the remaining five project dams, which have from four to six of the attributes for potential dam removal consideration. Therefore, we consider grouping the decommissioning and removal of Copco No. 1 and Iron Gate developments together as a project action alternative to be appropriate. The four attributes attributed to the Fall Creek and Spring Creek diversion dams relate primarily to the lack of substantial negative effects if the dams were to be removed, rather than noteworthy environmental enhancements that could not be achieved with the dams in place. We therefore do not consider it appropriate to conduct a more thorough assessment of decommissioning and removal of these two project dams. We consider three of the five attributes of potential dam removal benefits at the Copco No. 2 development (attributes 13, 14, and 15) and only one of the four attributes of potential dam removal at the J.C. Boyle development (attribute 14) to be primarily related to lack of substantial negative effects from potential dam removal. Three attributes at J.C. Boyle (attributes 1, 3, and 9) and two at Copco No. 2 (attributes 1 and 3) could be enhanced with dam removal, although a case could be made that such enhancements could possibly be achieved with properly implemented measures with dams in place. However, given the goal of many entities to restore anadromous fish to historical habitat upstream of Iron Gate dam, and the support for a four dam removal action alternative by numerous entities, we conclude that grouping the four project mainstem dams into a separate action alternative is appropriate.

2.3.4.1 Retirement of Copco No. 1 and Iron Gate Developments

We have identified for analysis a dam removal and development retirement alternative, consisting of the removal of Copco No. 1 and Iron Gate dams from the project. This alternative is intended to address water quality issues that originate in the reservoirs associated with both developments, facilitate restoration of anadromous fish to habitat upstream of Iron Gate dam, and retain a substantial portion of the generation capability of the project. In this alternative, we modify or eliminate some of the environmental measures that we include in the Staff Alternative. We also note that this alternative does not include East Side, West Side, and Keno developments.

PacifiCorp's proposed measures that we either accepted or modified for inclusion in the Staff Alternative that would be adjusted under this two dam removal scenario would include the following (see section 2.2.3 for the numerical designation and description of PacifiCorp's measures that would be adjusted):

- Measure 2P would be eliminated.
- Measure 3P would be eliminated.
- Measure 4P would be modified to reflect primarily a water quality monitoring plan that would serve as a basis to verify the environmental response to the altered conditions and serve as a basis for potential remedial actions.
- Measure 10P would be eliminated, as operations at J.C. Boyle development would be determined by operational measures at Copco No. 2 development, as specified in Measure 21P (peaking at J.C. Boyle would no longer be possible).
- Measure 15P would be replaced with aspects of 1S that pertain to sediment augmentation at the J.C. Boyle bypassed reach.
- Measure 21P would be modified to provide for flows released from Copco No. 2 development that are consistent with Reclamation's Klamath Operations Plans and the BiOps issued by FWS and NMFS for the Klamath Irrigation Project. In the event that project facilities are not included in any future Klamath Project Operations Plans (e.g., if coho salmon should be delisted), PacifiCorp would develop a Copco No. 2 flow release plan within 6 months of issuance of such a plan. Flows specified in the Operations Plans at the time of new plan issuance would remain in effect until the Commission approves the new flow release plan. Any such flow schedule and ramp rate would be developed in coordination with Reclamation and be consistent with Klamath Irrigation Project operations. PacifiCorp also would develop the plan in consultation with Cal Fish & Game, Oregon Fish & Wildlife, NMFS, FWS, and the tribes.
- Measure 22P would be eliminated.
- Measure 23P would be modified to provide 100 percent of the cost of operation of the Iron Gate Hatchery until Iron Gate dam is removed; after which the disposition of the hatchery (i.e., decommissioning or operation by another entity) would be determined.
- Measure 24P would be eliminated.
- Measure 26P would be modified to eliminate proposed wildlife enhancement measures at Copco reservoir.
- Measure 28P would be modified to eliminate proposed recreational facility enhancements at Copco and Iron Gate developments.
- Measure 31P would be modified to eliminate proposed improved maintenance provisions at recreational facilities at Copco and Iron Gate developments.
- Measure 32P would be modified to eliminate aspects of the interpretation and education program that pertain to Copco and Iron Gate developments.
- Measure 36P would be modified to eliminate PacifiCorp's responsibility for river access points from Stateline Take-out to Fishing Access Site No. 1 under a new license for this project, to be replaced by a Copco No. 2 day-use area near Copco

No. 2 dam that would also serve as a take-out point for boaters putting in near J.C. Boyle powerhouse. The site would include picnicking facilities, car-top boat access, rest room, potable water, and parking. Enhanced security measures (fencing) would be needed to protect the dam from unauthorized public access.

- Measure 37P would be eliminated, as peaking would no longer provide whitewater or angling opportunities that would not exist without the project.
- Measure 38P would be modified to eliminate aspects of proposed vegetative screening or painting at Iron Gate development.
- Measure 41P would be modified to replace proposed measures to protect historic buildings and structures, archaeological sites, and traditional cultural properties associated with Copco and Iron Gate developments, with measures that would be established during consultation with California SHPO and tribes in a decommissioning plan for both developments.

Additional measures identified by staff based on our analysis that would be replaced or modified under the two dam removal scenario would include the following (see section 2.3.2 for the numerical designation and description of staff's additional measures):

- Measure 1S would be modified to include only aspects of sediment augmentation that pertain to the J.C. Boyle bypassed reach.
- Measure 6S would be eliminated.
- Measure 8S would be replaced with the fishway described in NMFS and Interior's prescription for the Copco No. 2 dam fish ladder, intake screening with fish bypass system, and spillway modifications at Copco No. 2 dam and the natural bedrock sill removal at the Copco No. 2 bypassed reach. Construction of a facility to provide downstream passage of anadromous fish at J.C. Boyle dam, in accordance with the fishway described in NMFS and Interior's prescription for intake screening and fish bypass system, also would be implemented. Anadromous fish collected at the existing fish ladders at Iron Gate Hatchery and the base of Iron Gate dam that are not needed for hatchery brood stock would be transported via truck to the upper end of Copco reservoir beginning during the first year from license issuance to begin establishing naturally reproducing salmonid populations. Once Copco No. 1 dam is removed and upstream and downstream fishways are constructed at Copco No. 2 dam, all fish collected in excess of brood stock would be transported by truck to Iron Gate reservoir, instead of the upper portion of Copco reservoir, until the beginning of deconstruction of Iron Gate dam.
- Measure 11S would be eliminated.
- Measure 12S would be modified to have the fishery technical advisory committee address the disposition of the Iron Gate Hatchery once it is removed from the project.
- Measure 13S would be eliminated.
- Measure 19S would be eliminated, because peaking would no longer serve as a project-related enhancement of riverine whitewater boating.

2.3.4.2 Four-Dam Removal Alternative

We analyzed a dam removal and development retirement alternative consisting of removal of J.C. Boyle, Copco No. 1, Copco No. 2, and Iron Gate dams from the project. This alternative is intended to address water quality issues that originate in the reservoirs associated with Copco and Iron Gate developments, facilitate restoration of anadromous fish to habitat upstream of Iron Gate dam, and enhance habitat connectivity for resident fish. J.C. Boyle, Copco No. 1, and Copco No. 2 dams would be removed within about 3 years of license issuance, following a year of studies to fine tune engineering approaches to dam removal beyond those which have already been completed (GEC, 2006); a year for development and Commission approval of J.C. Boyle, Copco No. 1 and Copco No. 2 development decommissioning plans; and about a year of actual deconstruction. During the year following removal of J.C. Boyle, Copco No. 1, and Copco No. 2 dams, supplemental sediment characterization in Iron Gate reservoir would occur along with development and Commission approval of an Iron Gate development decommissioning plan, which would be followed by deconstruction of Iron Gate dam. We expect Iron Gate deconstruction to begin about 5 years from license issuance, which would enable anadromous fish reintroduced upstream of Iron Gate dam to become established to the point where eliminating salmonid production at Iron Gate Hatchery would have less adverse effect on the number of anadromous fish available for harvest. The Fall Creek development would be the only generation facility remaining in the project.

If removal of these four dams should be incorporated into a new license for this project, it would cause us to modify or eliminate most of the environmental measures that we include in the Staff Alternative. PacifiCorp's proposed measures that we either accept or modify for inclusion in the Staff Alternative that would be adjusted under a four-dam removal scenario would include the following (see section 5.1.1.2 for the numerical designation and description of PacifiCorp's measures that would be adjusted):

- Measures 1P through 5P would be eliminated.
- Measures 7P through 17P would be eliminated.
- Measures 21P and 22P would be eliminated.
- Measure 23P would be modified to provide 100 percent of the cost of operation of the Iron Gate Hatchery until Iron Gate dam is removed; after which the disposition of the hatchery (i.e., decommissioning or operation by another entity) would be determined.
- Measure 24P would be eliminated.
- Measure 26P would be modified to eliminate proposed wildlife enhancement measures at the J.C. Boyle canal and Copco and Iron Gate reservoirs.
- Measures 27P and 28P would be eliminated.
- Measure 32P would be modified to only address recreation resources at the Fall Creek development at a scale commensurate with the size of the development (2.2 MW).
- Measure 33P would be modified to pertain only to the proposed Fall Creek Trail.
- Measures 34P through 37P would be eliminated.
- Measure 38P would be modified to only address measures to reduce visibility and contrast of project features at the Fall Creek development by use of vegetative screening.
- Measure 39P would be modified to only include roads necessary for the operation and maintenance of the Fall Creek development in the roadway management plan.

Additional measures identified by staff based on our analysis that would be eliminated, replaced, or modified under the four-dam removal scenario would include the following (see section 5.1.1.2 for the numerical designation and description of staff's additional measures):

- Measure 1S would be eliminated.
- Measure 2S would be incorporated into the decommissioning plan for J.C. Boyle development, rather than a stand-alone slope and channel restoration plan.
- Measure 5S would be modified to only include provisions for installing gages to appropriately monitor flows at Fall and Spring creeks specified in a new license. Coordination with the Klamath Irrigation Project would no longer be necessary, thus Reclamation would not need to be consulted during the development of the project operation management plan.
- Measures 6S and 7S would be eliminated.
- Measure 8S would be replaced with provisions to trap and haul anadromous fish from downstream of Iron Gate dam to appropriate locations upstream of this dam up to the time when Iron Gate dam is removed. Anadromous fish collected at the existing fish ladders at Iron Gate Hatchery and the base of Iron Gate dam that are not needed for hatchery brood stock would be transported via truck to the upper end of Copco reservoir beginning during the first year from license issuance to begin establishing naturally reproducing salmonid populations. Once Copco No. 1 and Copco No. 2 dams are removed, all fish collected in excess of brood stock would be transported by truck to Iron Gate reservoir, instead of the upper portion of Copco reservoir, until the beginning of deconstruction of Iron Gate dam.
- Measures 10S through 13S would be eliminated.
- Measures 15S through 20S would be eliminated.
- Measure 21S would be eliminated.
- Measure 23S would be eliminated.

2.4 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

2.4.1 Federal Government Takeover

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

2.4.2 Nonpower License

A nonpower license is a temporary license the Commission would terminate whenever it determines that another governmental agency is authorized and willing to assume regulatory authority and supervision over the lands and facilities covered by the nonpower license. At this time, no government agency has suggested a willingness or ability to take over the project. No party has sought a nonpower license, and, at this time, we have no basis for concluding that the

Klamath Hydroelectric Project should no longer be used to produce power. Thus, we do not consider a nonpower license a reasonable alternative.

2.4.3 Decommissioning of Project with Dams Remaining in Place

In its May 12, 2006, reply comments to agency preliminary terms and conditions, PacifiCorp stated that, in its view, the nature and extent of the Departments' preliminary conditions warrant an examination in the EIS of the alternative of project decommissioning without dam removal. PacifiCorp expressed concern that there is the potential that the costs associated with all the final terms, conditions, and prescriptions for the license may put in serious question its ability to accept a new license.

Decommissioning of the project would result in the loss of an annual average of 716,800 MWh of energy, which would need to be replaced by an alternate source. Some or all of the various disabled project works could remain in place for historic or other purposes, but this would require the Commission to identify one or more government agencies with authority to assume regulatory control and supervision of the remaining facilities. No such agency has stepped forward. In addition, PacifiCorp would no longer require the project lands for project purposes, thus ownership of the lands could change. Depending on the subsequent landowner, public access to some parts of the project area and recreational opportunities may be eliminated. In addition, leaving the dams in place would not address the environmental issues that result from their presence, including their adverse effects on water quality and anadromous fish passage. We discuss these and other effects in detail in section 3, *Environmental Consequences*. For all these reasons, we do not consider this a reasonable alternative in this relicensing proceeding.