COVER SHEET

FEDERAL ENERGY REGULATORY COMMISSION

DRAFT ENVIRONMENTAL IMPACT STATEMENT
FOR THE LEWIS RIVER PROJECTS
Docket Nos. P-2071-000, et al.

Section 2
Proposed Action and Alternatives
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DEIS

2.0 PROPOSED ACTION AND ALTERNATIVES

This section describes each of the alternatives analyzed in detail in this draft EIS, and summarizes the alternatives considered but eliminated from detailed study. The two alternatives analyzed in detail include the proposed action (which includes the SA measures), and no action, which is the baseline against which the other alternatives are compared. PacifiCorp and Cowlitz PUD propose to relicense the Lewis River Projects including the measures agreed upon by the parties to the Lewis River SA (PacifiCorp and Cowlitz PUD et al., 2004).

Protection, mitigation, and enhancement measures included in the proposed action are described below and summarized in tables 2.1-2 and 2.1-4. The effects of implementing each of these measures are analyzed in section 3; cost estimates and effects of these measures on project economics are presented in section 4; and staff conclusions are presented in section 5.

2.1 APPLICANTS' PROPOSALS

2.1.1 General Project Descriptions and Operations

The Lewis River is a tributary of the Columbia River in southwest Washington. It originates in the Cascade Range of the Gifford Pinchot National Forest and flows westward, joining the Columbia River near Woodland, Washington. The four hydroelectric projects that are the subject of this draft EIS are located on the North Fork Lewis River and include the 136,000-kW Merwin Project (constructed in 1932); the 134,000-kW Yale Project (constructed in 1953); the 70,000-kW Swift No. 2 Project (constructed in 1958); and the 240,000-kW Swift No. 1 Project (constructed in 1958). The Merwin Project is located at RM 19, and the other projects continue in succession upstream, with the Swift No. 1 Project located farthest upstream (figure 2.1.1-1). Three fish hatcheries were constructed as mitigation for the projects and include the Merwin Hatchery (located immediately below the Merwin Project), the Lewis River Hatchery (located about 3 miles below the Merwin Project), and Speelyai Hatchery (located on Speelyai Creek, a tributary to Lake Merwin). The three hatcheries are operated by WDFW with funding support by PacifiCorp and Cowlitz PUD (see section 2.1.1.5). The Lewis River Hatchery is located outside of project boundaries, but the Merwin and Speelyai hatcheries are located within the project boundary for the Merwin Project.

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2.1.1.1 Swift No. 1

Swift No. 1 is the largest project in the Lewis River system. Swift dam is a 412-foot-high, 2,100-foot-long embankment structure that forms an 11.5-mile-long reservoir (figure 2.1.1-2). At full pool, Swift Creek reservoir has a 4,600-acre surface area at an elevation of 1,000 feet above mean sea level (msl), as measured at the dam. A deep-water intake directs flow to a surge tank, through three penstocks with a total capacity of 9,120 cubic feet per second (cfs), to three turbines within a concrete powerhouse at the base of the dam. The generating capacity is 240,000 kW, which is transmitted by 230-kilovolt (kV) line to a substation about 1,000 feet to the north of the Swift No. 1 powerhouse. All flow from the Swift No. 1 powerhouse enters Swift No. 2 canal, which terminates approximately 3 miles downstream at the Swift No. 2 powerhouse. The approximately 3-mile reach of the North Fork Lewis River bypassed by the Swift No. 2 canal is known as the Lewis River bypassed reach.

The project boundary (figure 2.1.1-2) would include all shoreline recreational sites (Swift Forest Camp, Eagle Cliff Park, and Drift Creek Cove dispersed sites); a narrow shoreline buffer around the reservoir; all project works (dam, powerhouse, and switchyard); and conservation easement lands totaling 36 acres in Swift Creek Cove.

Swift No. 1 typically operates in a peaking mode, generating from 6:00 a.m. to 10:00 p.m., and not generating the remainder of the night. There is no minimum flow into the Swift No. 2 power canal or the Lewis River bypassed reach. Leakage or local inflow to the Lewis River bypassed reach is low most of the time (about 5 to 10 cfs measured upstream from the canal spillway, and an estimated total of 21 cfs of accumulated groundwater and seepage at the downstream end of the reach). Swift Creek reservoir has a total storage capacity of 755,500 acre-feet and a useable storage capacity of 447,000 acre-feet at an elevation of 1,000 feet msl. Useable storage is regulated for power generation, recreation, and flood management. As the uppermost impoundment in the Lewis River Basin, Swift Creek reservoir is affected significantly by natural inflow. Winter and spring elevations reflect this variability, with median levels ranging from about 970 to 991 feet msl. Summer elevations are more constant, with a median monthly level of about 997 feet. Daily fluctuations are typically less than 1 foot. Flows released into the Swift No. 2 canal vary from 0 to 9,000 cfs. Average monthly flows in the canal from October through May are close to 4,000 cfs, while average monthly flows in the canal from June through September are less than 2,000 cfs. When inflow to the reservoir exceeds the capacity of Swift No. 1, water flows over the Swift dam spillway directly into the Lewis River bypassed reach, an event that occurs for short periods (typically about three days). Spill events occur sporadically, but generally spill events of several thousand cfs or more occur every few years, usually occurring in the period of December through February during winter storm events. In addition, on an infrequent basis, outflow from the Swift No. 1 powerhouse exceeds Swift No. 2 capacity and flows over the Swift No. 2 canal spillway and into the Lewis River bypassed reach. The Swift No. 2 canal spillway is located about 1 mile downstream of the Swift No. 1 powerhouse.

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2.1.1.2 Swift No. 2

Swift No. 2 is located between Swift No. 1 and Yale Lake. It consists of a canal, powerhouse, substation, and tailrace and operates with flows released from the Swift No. 1 powerhouse into the 3-mile-long Swift No. 2 canal (figure 2.1.1-3). A section of the Swift No. 2 power canal failed on April 21, 2002, and currently is being reconstructed. When reconstructed, the upstream canal section will remain earthen, and the downstream 1-mile section will be concrete lined. As of the end of May 2005, the overall reconstruction work is 58.45 percent complete, based on work performed, although some of the components have been completed. In the event of a load rejection, a surge arresting structure is also being constructed to reduce the impacts from power flow surges. This would consist of an intake structure, just to the east of the existing powerhouse intake, approximately 245 feet of 16-foot-diameter steel pipe, a bifurcation section, two parallel 136-inch-diameter steel pipes approximately 90 and 122 feet long, two fixed cone valves and a stilling basin. Any flow surges would pass through this structure and back into the river, preventing any damage to project facilities. Flows in excess of the canal capacity pass over an ungated spillway, located about 2 miles upstream of the Swift No. 2 powerhouse, and into a spillway channel to the Lewis River bypassed reach less than 2 miles upstream of Yale Lake. A concrete intake with two penstocks delivers water to the metal-sheathed powerhouse containing two turbine generators with a total generating capacity of 70,000 kW and maximum hydraulic capacity of 9,000 cfs. Cowlitz PUD owns 0.9 mile of a 230-kV transmission line between the Swift No. 1 and Swift No. 2 projects (the section between the Skamania-Cowlitz County line and Swift No. 2 station), and is the primary transmission line for the project.

The Swift No. 2 project boundary would include the Swift No. 2 power canal, spillway, applicant-owned lands around the canal and powerhouse, and approximately 3.79 acres of Forest Service lands associated with Forest Road (FR) 90. The bypassed reach would not be included in the project boundary.

Operation of Swift No. 2 is dependant upon water releases from Swift No. 1 to the Swift No. 2 canal; therefore, the two facilities operate in tandem. Canal operating levels range from a maximum of 604 feet msl to a minimum of 601 feet msl, at the normal range of operating flows of about 9,000 cfs to less than 2,000 cfs. Releases from the Swift No. 2 powerhouse enter Yale Lake, while flows in excess of the powerhouse capacity are released through the canal overflow spillway into the Lewis River bypassed reach about 1 mile downstream of the Swift No. 1 powerhouse (see figure 2.1.1-3). Between elevation 490 feet msl (full pool) and about elevation 478 feet msl, Yale Lake encroaches on (backwaters into) the Swift No. 2 tailrace, creating a pool that overtops the tailrace channel. Below about elevation 478 feet, the tailrace channel is exposed and all flows are carried within the limits of the channel. The Swift No. 2 Project provides peaking capacity and has no flood management capability, function, or responsibility.

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2.1.1.3 Yale

Yale, the middle project in the Lewis River system, includes two zoned embankment dams, a 10.5-mile-long reservoir with a surface area of 3,800 acres at full pool elevation (490 feet msl), a two-unit powerhouse, and 10.5-mile-long, 115-kV primary transmission line (figure 2.1.1-4). The largest of the two project dams is Yale dam at 323 feet high and 1,500 feet long. It includes five Taintor gates that control releases to a chute-type spillway. Located 0.25 mile north of Yale dam is the adjacent zoned embankment dam, Saddle dam, which is 40 feet high and 1,600 feet long. Two tunnels/penstocks with a total capacity of 9,640 cfs direct flow to a concrete powerhouse at the base of Yale dam. It contains two turbine generators with a nameplate capacity of 134,000 kW. Power is transmitted 10.5 miles to a substation adjacent to the Merwin Project. A secondary project feature is the Speelyai Canal, a 3,200-foot-long earthen-banked canal that was excavated to direct flow from upper Speelyai Creek into Yale Lake. An earthen diversion structure at RM 4.3, constructed in 1953, directed all flow into the canal, although the diversion also included an intake to provide releases to lower Speelyai Creek to help supply the Speelyai Hatchery located near the mouth of Speelyai Creek. The diversion and intake, however, has been non-functional since 1996 when floods altered the Speelyai Creek channel adjacent to and upstream of the diversion. Although the new channel bypasses the diversion, all flows from upper Speelyai Creek still enter the canal and flow into Yale Lake. Inflow from the lower Speelyai Creek drainage discharges into Lake Merwin and provides sufficient flow to serve as the water supply for the Speelyai Hatchery.

The Yale Project boundary would include all shoreline recreational sites (Yale Park, Cougar Campground and Park, Beaver Bay Campground); a narrow shoreline buffer around the reservoir; all project development facilities (dams and powerhouse); the Speelyai diversion and canal; Saddle Dam Campground; and the proposed visitor center in Cougar. The 115-kV Merwin-Yale transmission line would also be included within the project boundary. This line extends 10.5 miles from the Yale powerhouse to a substation near the Merwin Project.

The Yale Project typically operates as a peaking resource, generating from 6:00 a.m. to 10 p.m., and is off-line (not generating) the remainder of the night. Although the full powerhouse capacity is 9,640 cfs, median monthly releases range from a peak of 6,500 cfs in December to low of 1,300 cfs in August, with releases dropping to zero when off-line. Water levels are maintained between 480 and 490 feet msl in summer for recreation uses, averaging 487 feet msl, although daily fluctuations are generally less than a foot. Winter/spring elevations are relatively stable, with median monthly values averaging 475 feet msl. Primary inflow to the reservoir is from the Swift No. 2 powerhouse and Swift No. 2 ungated spillway, with additional flow contributions from Swift No. 1 spillway releases, Upper Speelyai Creek, Cougar Creek, Rain and Ole Creeks, Siouxon Creek, and Speelyai Canal.

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2.1.1.4 Merwin

The oldest and most downstream project in the basin is the Merwin facility. Its 313-foot-high concrete arch dam extends 1,300 feet across the Lewis River. Deepwater inlets lead to three short penstocks with a total capacity of 11,470 cfs, discharging to the powerhouse immediately downstream of the dam (figure 2.1.1-5). The plant has a nameplate capacity of 136,000 kW. Power from the project is carried by two 115-kV primary transmission lines 900 feet to the Merwin substation. Flows in excess of powerhouse capacity are controlled by five Taintor gates situated above the 206-foot-long spillway. The project impounds the 14.5-mile-long Lake Merwin, with a surface area of about 4,000 acres at full pool. Merwin's 263,700 acre-feet of useable storage is managed for the purposes of power generation, flood management, recreation, and downstream fish habitat enhancement.

The Merwin Project boundary would include all shoreline recreational sites (Merwin Park, Speelyai Bay Park, Cresap Bay Campground); a narrow shoreline buffer around the reservoir; the Lower Speelyai Creek diversion and Speelyai Fish Hatchery; all project development facilities (dam, powerhouse, switchyard); the Merwin Fish Hatchery; the Hydro North Control Center; and lands downstream of the dam along the Lewis River that include the Merwin fishing access on the north shore of the river and the PacifiCorp fishing easement on the south shore.

As the downstream-most facility, Merwin operates as a regulation facility for the other Lewis River Projects, providing minimum instream flows and meeting ramping rate restrictions for the lower river. Current minimum flows range from 1,000 to 5,400 cfs, depending on season, while downramping rates are limited to 2 inches per hour. The reservoir is maintained at a fairly constant level throughout the year, fluctuating between elevations 235 feet (normal minimum summer pool) and 239.6 feet (full pool). Due to its large size, Lake Merwin experiences only minimal hourly fluctuations in response to peaking operations at the Yale Project. The pattern of releases from the Merwin Project varies seasonally, with median monthly values ranging from 1,300 cfs in August to 8,000 cfs in December. During periods of high runoff, the Merwin facility spills water in volumes ranging from a few thousand cfs in moderate high runoff events to as much as 80,000 cfs or more during severe floods. Flood management operations are described in section 2.1.1.6.

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2.1.1.5 Lewis River Hatchery Complex

Three fish hatcheries are associated with the Lewis River Projects (see figure 2.1.1-5). Operational since 1932, the Lewis River Hatchery is the oldest, built in conjunction with the Merwin Project and located about 3 miles below the project, outside of the project boundary. Its construction and all operation costs are funded by PacifiCorp, although the facility is owned and operated by WDFW. The Lewis River Hatchery currently has 12 concrete raceways, three 0.5-acre ponds, and one 0.5-acre juvenile rearing/adult holding pond located off-station (NPPC, 1990; WDFW, 2000a). There are 410,000 cubic feet of rearing space with a total water flow of approximately 65 cfs. The facility has an eyeing capacity of 13 million eggs and a hatching capacity of 7.7 million fry. Nine pumps deliver water from the Lewis River to supply all the water needs. Currently, the Lewis River Hatchery is used for adult collection, incubation, and rearing of spring Chinook, early run coho (Type S), and late-run coho (Type N) salmon.

The Speelyai Hatchery began operation in 1954 near the confluence of Speelyai Creek and Lake Merwin, inside the Merwin Project boundary. PacifiCorp owns the property upon which the hatchery was constructed; Cowlitz PUD and PacifiCorp jointly funded its construction and jointly own the facility; and PacifiCorp has fully funded subsequent capital improvements. Hatchery operations are a joint responsibility, with Cowlitz PUD providing approximately 20 percent of the annual funding and PacifiCorp providing 80 percent. WDFW operates the facility to produce spring Chinook and coho salmon and kokanee. Today, the primary rearing structures at Speelyai Hatchery include a hatchery building that houses vertical incubators and deep troughs for bulk eyeing. The eyeing capacity is 6 million eggs. Outside rearing space consists of raceways and two 0.25-acre rearing ponds. Approximately 20.5 cfs can be delivered to the hatchery system by gravity flow from Speelyai Creek. The Speelyai Hatchery water diversion, located at the mouth of Speelyai Creek, is a total barrier to upstream fish migration from Lake Merwin. Currently, Speelyai Hatchery is used for adult holding, spawning, incubation, and rearing of spring Chinook, coho, and kokanee (TetraTech/KCM, Inc., 2002).

Operational since 1993, the Merwin Trout and Steelhead Hatchery, owned by PacifiCorp just downstream of Merwin dam and inside the project boundary, is operated by WDFW. Operations are fully funded by PacifiCorp for the production of rainbow trout, steelhead, and cutthroat trout. The facility includes four adult holding ponds, 10 concrete fingerling raceways, six intermediate raceways, four rearing ponds, and incubation facilities. Approximate rearing space is 216,470 cubic feet. Water is supplied to the hatchery from Lake Merwin using an 11 cfs pump station on the face of the dam. Two intakes are used at depths of 15 and 110 feet (Montgomery Watson, 1997). Ozone water sterilization is used to meet fish health needs. In addition to treating incoming water, all water exiting the adult holding ponds and incubation building is disinfected prior to discharge into the pollution abatement ponds. The original goal of the Merwin Trout Hatchery program was to provide winter and summer steelhead, sea-run cutthroat

trout, and rainbow trout for harvest by sport anglers (Montgomery Watson, 1997). Because of a low return to the creel in 1997 and 1998, as well as concerns over potential interactions (predation and competition) between the cutthroat and fall Chinook salmon, the sea-run cutthroat trout program at the Merwin Trout Hatchery was discontinued in 1999 (Hillson and Tipping, 2000). The hatchery is used for adult collection, incubation, and rearing of winter steelhead and summer steelhead.

The overall goal of PacifiCorp's anadromous fish program at the Lewis River Hatchery Complex is to produce 3,125,000 smolts to target pre-harvest returns of 12,800 adult spring Chinook, 71,000 adult coho, 1,250 adult winter steelhead, and 8,000 adult summer steelhead.

2.1.1.6 Flood Management Operations

The three-reservoir, four project system is currently operated to optimize power production. Merwin, Yale, and Swift No. 1 are also operated to meet Commission and Federal Emergency Management Agency (FEMA) requirements for flood management and minimum instream flows downstream of Merwin dam. In addition, PacifiCorp voluntarily maintains reservoir water levels during the recreation season.

Prior to a major flood in 1962, the projects provided incidental flood management (secondary to power generation operations), but significant damage downstream prompted revisions to the operating procedures. Currently, flood management operations are carried out in accordance with procedures formalized under a 1983 contract between PacifiCorp and FEMA, the terms of which are conditions of the existing Merwin, Yale and Swift No. 1 licenses. Under Article 43 of the Merwin license, flood control storage is increased from zero on September 20 to a minimum of 70,000 acre-feet by November 1 of each year allocated among all three reservoirs. This minimum level must be maintained from November 1 through April 1. The reservoirs are then gradually refilled to their normal full pool levels by April 30 for the start of the recreation season. These procedures, documented in PacifiCorp's Standard Operating Procedure (1994), are referred to as the "High Runoff Procedures." Available flood management storage, described in terms of "hole," is the feet of depth between the current reservoir level and normal maximum full pool elevations of 1,000 feet msl at Swift, 490 feet msl at Yale, and 239.6 feet msl at Merwin. Total project hole is the sum of the flood storage space in Swift, Yale, and Merwin reservoirs. The surface areas at full pool of Swift, Yale, and Merwin are 4,600 acres, 3,800 acres, and 4,000 acres, respectively. Thus, one foot of hole represents on average about 4,000 acre-feet of storage in each reservoir. As a point of reference, under normal operating conditions during the flood management season, the total project hole is usually substantially higher than the required minimum of 17 feet (or 70,000 acre-feet), and can be in excess of 50 to 60 feet, depending on snowpack and climatological conditions.

Under the existing High Runoff Procedures, releases from Merwin dam are made during a flood as a function of the magnitude of the estimated natural inflow and the amount of flood control storage remaining at any particular point in time. Project releases are increased in a stepped fashion as available flood storage space (project hole) is filled during high runoff, as is shown in table 2.1-1. For example, during high runoff, the total release from Merwin dam would be held at 40,000 cfs, as high inflows cause the available flood storage to drop from 70,000 to 60,000 acre-feet. Once the available flood storage is reduced to 60,000 acre-feet, the release from Merwin would be increased to 50,000 cfs, and held at that level until the available flood storage drops to 50,000 acre-feet, and so forth.

Table 2.1-1. Existing flood management storage and releases for the three-reservoir system. (Source: PacifiCorp and Cowlitz PUD, 2004)

Available Flood Storage (acre-feet)	**Project Hole[a] (feet)**	**Release from Merwin (cfs)**
100,000	24	Increase to 40,000 at 17 feet of hole
70,000	17	40,000
60,000	14.5	50,000
50,000	12	60,000
24,000	6	75,000
20,000	5	85,000
4,000	1	90,000
–14,000[b]	–3.5	
	Less than –3.5	Greater than 90,000 and natural inflow

[a] Total project hole is the sum of the flood storage space in Swift, Yale, and Merwin reservoirs.

[b] Negative values indicate surcharge storage (i.e., storage above maximum normal full pool elevations).

After the runoff peak has passed, a similar set of requirements applies to operations on the receding or falling limb of the runoff hydrograph, with the intent of restoring the mandatory minimum flood control storage as rapidly as is reasonable in anticipation of the occurrence of another high runoff event.

The 70,000 acre-feet of mandated flood management storage requires a total cumulative reservoir drawdown of about 17 feet (17 feet of hole). Distribution of the required storage space between the three reservoirs varies somewhat from year to year, based on PacifiCorp operating parameters. Generally speaking, Lake Merwin is drawn

down for flood management purposes from 1 to 5 feet below normal full pool, Yale from 5 to 10 feet, and Swift from 5 to 10 feet. Actual reservoir drawdown during the flood management season is usually significantly greater than the required minimum as a result of normal operations for power generation or to capture runoff from snowpack.

Coordinated flood management operation of the Lewis River Projects significantly reduces the magnitude and frequency of floods below Merwin dam, with most being controlled to a release of 60,000 cfs or less. Significant flood damages start to occur in the Lewis River Valley when releases are greater than 60,000 cfs. The largest major flood in recent years, 85,000 cfs recorded below Merwin dam at the Ariel gage in February 1996, had a return period of approximately 50 years and caused considerable damage in the Lewis River valley below Merwin dam.

During flood events, considerable coordination takes place among PacifiCorp, the National Weather Service, Clark and Cowlitz county emergency services, the city of Woodland, and, in very severe events, the U.S. Army Corps of Engineers. The National Weather Service and the relevant county and local government agencies are responsible for issuing notifications and flood warnings to the public. Warnings are broadcast over radio and television. If the situation warrants, the county emergency services and local government agencies may initiate evacuations.

2.1.2 Existing Environmental Measures to Be Continued

Under the proposed action, the applicants would continue to support the numerous ongoing environmental resource measures and programs within the Lewis River Basin. These measures are listed in table 2.1-2, and described in greater detail below.

Table 2.1-2. Measures to be continued by PacifiCorp and Cowlitz PUD under the proposed action. (Source: PacifiCorp and Cowlitz PUD et al., 2004)

Resource Area	Resource Component	Continuing Measure	S1[a]	S2[a]	Y[a]	M[a]
Water Quality/ Quantity	Water Quality	Periodically monitor total dissolved gases in project tailraces.	X		X	
	Water Quantity	Downramping rates at Merwin of 2 inches/hour.				X
		Maintain minimum flow releases below Merwin in accordance with Article 49.				X

Resource Area	Resource Component	Continuing Measure	S1[a]	S2[a]	Y[a]	M[a]
Flood Management		Flood management storage of 70,000 acre-feet.	X		X	X
		Maintain the current high runoff procedure from Nov. 1 to April 1.	X		X	X
Aquatics	Upstream Fish Passage	Net bull trout in Yale tailrace and transport to Cougar Creek.			X	
		Net bull trout from Swift No. 2 tailrace and haul to a location defined by FWS.	X	X		
		Follow NOAA Fisheries and FWS facility and handling guidelines for anadromous fish and bull trout.	X	X	X	X
	Hatcheries: Anadromous Fish	Operate upstream collection trap at Merwin dam.				X
		Partially fund operation of Speelyai Hatchery.		X		
		Maintain current smolt production levels (3,125,000) to achieve a goal of 92,000 ocean recruits.	X		X	X
	Hatcheries: Resident Fish	Maintain current production levels for kokanee and rainbow trout.	X		X	X
	Fish Monitoring	Support WDFW annual evaluation of fall Chinook in lower Lewis River.				X
		PacifiCorp evaluates bull trout and kokanee populations annually.	X		X	X

Resource Area	Resource Component	Continuing Measure	S1[a]	S2[a]	Y[a]	M[a]
	Habitat Management	PacifiCorp manages its designated conservation lands on Cougar Creek for the protection of bull trout.			X	
Terrestrial	Habitat Management	Continue implementation of Merwin Wildlife Habitat Management Plan in the Merwin Wildlife Habitat Management Area.				X
		Buffer sensitive habitat from ground-disturbing activities (timber harvest, construction, etc.).	X		X	X
		PacifiCorp manages its designated conservation lands on Cougar Creek for the protection of bull trout.			X	
		Maintain road closures through sensitive habitat areas by installing and maintaining gates and identify additional areas for access control on PacifiCorp lands.	X		X	X
		Cowlitz PUD manages its lands on Devil's Backbone to allow natural succession.		X		
	Timber Management	Manage PacifiCorp lands outside the MWHMA to benefit wildlife habitat.	X		X	X
		Continue to manage project roads to maintain existing aquatic connectivity and control runoff and erosion.	X	X	X	X
	Monitoring	Conduct annual raptor nest surveys on PacifiCorp lands.	X		X	X

Resource Area	Resource Component	Continuing Measure	S1[a]	S2[a]	Y[a]	M[a]
Recreation	Visitor Management	Allow recreational access to project lands except where conditions are unsafe.	X	X	X	X
		PacifiCorp continues to operate its voluntarily constructed recreation and river access sites.	X		X	X
	Camp-grounds	Re-gravel group campsites and roads at Beaver Bay Campground and Cougar Park (Yale interim measure[b])			X	
	Day-Use Facilities	Install playground equipment and repair tables at Beaver Bay Campground (Yale interim measure).			X	
		Improve the boat launches at Speelyai Bay Park, Yale Park, and Beaver Bay Campground (Yale interim measure).			X	X
	Trails	Provide trails and an interpretive sign at the Beaver Bay wetland (Yale interim measure).			X	
	Access	Upgrade ADA-accessible facilities when developed recreation sites are improved.	X		X	X
Cultural	Resource Management	Protect integrity of properties listed in the National Register of Historic Places (National Register).	X		X	X
		Preserve tribal access for traditional uses.	X	X	X	X
		Conduct archaeological surveys of areas proposed for soil disturbance that have not been previously surveyed or disturbed.	X	X	X	X

Resource Area	Resource Component	Continuing Measure	S1[a]	S2[a]	Y[a]	M[a]
Socioeconomics		Fund law enforcement (marine and land-based) at existing levels.	X		X	X

[a] S1 = Swift No. 1; S2 = Swift No. 2; Y = Yale; M = Merwin

[b] Yale interim measures are recreation measures PacifiCorp has agreed to implement prior to issuance of a new license for the Yale Project.

2.1.2.1 Water Quantity

Minimum releases from Merwin dam for the protection of downstream fisheries are stipulated in Article 49 of the existing Merwin license and range from 1,000 to 5,400 cfs. These flows vary according to season, to maintain and enhance native fall Chinook in the mainstem Lewis River downstream of Merwin, and may be adjusted by natural inflows and the runoff volume forecast on May 1. Table 3.3.3-3(see section 3.3.3, *Aquatic Resources*) describes the Article 49 minimum flow requirements. Downramping rates for these releases would continue to be maintained at 2 inches per hour, except under high flow conditions. Flows from upper Speelyai Creek would continue to be routed into Yale Lake for the protection of the Speelyai Hatchery water supply in lower Speelyai Creek and to enhance power generation.

2.1.2.2 Water Quality

Total dissolved gases (TDG) are monitored in the Yale and Swift tailraces using permanent monitoring stations. Additionally, as stipulated by Article 19 of the Merwin license, measures would continue to be taken by PacifiCorp to prevent erosion, sedimentation and other water quality degradation from operation and maintenance (O&M) of the Merwin Project. Even though this is only explicitly required at Merwin, Cowlitz PUD and PacifiCorp routinely provide erosion control for ground-disturbing projects that they undertake.

2.1.2.3 Aquatic Resources

PacifiCorp operates a net-and-haul program for bull trout at the Yale tailrace, while both applicants operate a similar bull trout program at the Swift No. 2 tailrace. PacifiCorp reduces flows below Merwin dam in support of fall Chinook salmon monitoring efforts as requested by WDFW and approved by NOAA Fisheries and the FWS. Hatchery production levels stipulated in Articles 50 and 51 of the Merwin license and in the Merwin Hatchery Agreement between PacifiCorp and WDFW would be sustained. Funding for the Lewis River, Merwin, and Speelyai hatcheries would continue to be provided as required by PacifiCorp. Cowlitz PUD would continue to provide partial funding for operation of the Speelyai Hatchery as required in the Swift No. 2 license and in existing agreements with PacifiCorp and WDFW.

2.1.2.4 Terrestrial Resources

PacifiCorp continues to implement the Merwin Wildlife Habitat Management Plan (MWHMP), as stipulated in Article 40 of the Merwin license. This plan, developed in cooperation with WDFW, mitigates the effects of habitat loss from the original construction and operation of the Merwin Project. The plan includes a variety of measures and practices to enhance wildlife habitat on approximately 5,600 acres of PacifiCorp lands known as the Merwin Wildlife Habitat Management Area (MWHMA). The MWHMA is located on lands outside of the current project boundary. Management focuses on key habitats, including forest and old-growth habitat, oak groves, shrublands, farmland, orchard areas, meadows, transmission line rights-of-way (ROW) and wetlands.

In addition, PacifiCorp voluntarily manages most land within the boundary of Swift No. 1 and Yale for the benefit of wildlife. Timber harvest activities on these lands are focused on improving wildlife habitat and are governed by the Washington Department of Natural Resources (WDNR) forest practice rules. These rules describe the minimum acceptable level of resource protection, guide how silviculture treatments are applied to the landscape, and provide recommendations for maintaining aquatic connectivity and controlling erosion along forest roads. Annual raptor surveys are conducted in conjunction with WDFW.

Cowlitz PUD manages 284 acres on the Devil's Backbone land parcel adjacent to Swift reservoir in a manner that allows natural succession to occur. Forest stands on these lands would not be harvested, nor would they be actively managed for wildlife. Roads would be managed to maintain existing aquatic connectivity and control erosion. These lands are located outside the Swift No. 1 and Swift No. 2 project boundaries.

2.1.2.5 Cultural Resources

The applicants would continue to comply with Section 106 of the National Historic Preservation Act (NHPA) prior to conducting any ground disturbing activities or making changes that could adversely affect buildings and structures that are eligible for listing in the National Register of Historic Places (National Register).

2.1.2.6 Recreation

PacifiCorp provides public recreation opportunities by operating and maintaining 4 campgrounds and 14 day-use areas throughout the project area (table 2.1-3). Most facilities were developed and are operated by PacifiCorp. All of the facilities listed in table 2.1-3 are inside the project boundaries for either the Swift No. 1, Yale, or Merwin projects, except for three river access sites downstream of Merwin dam. Two of the five river access sites downstream of Merwin dam are owned by WDFW and are managed and maintained by PacifiCorp. In addition, the Vancouver-Clark Parks and Recreation Department (VCPRD) developed and operates the Haapa River access site on land donated by PacifiCorp. Upgrades to the PacifiCorp facilities would continue as part of

ongoing operations and maintenance activities. There are no developed recreation facilities associated with Cowlitz PUD's Swift No. 2 Project, but bank fishing at the canal is allowed, and the canal has been used for an annual children's fishing day.

Table 2.1-3. Summary of PacifiCorp's Swift No. 1, Yale, and Merwin developed recreation facilities. (Source: EDAW, 2000)

Facility / Location	Individual Camp Units	Group Camp Sites	Restrooms / Showers	Day-Use Area	Marine Facilities
Swift Camp/Day-Use Area – Swift Creek Reservoir	93	None	Restrooms / showers	Parking for undetermined number of vehicles	1-lane boat ramp, beach swim area
Eagle Cliff Park – Swift Creek Reservoir	None	None	Vault toilet	9 picnic sites; parking for undetermined number of vehicles	None
Cougar Camp / Park – Yale Lake	45	1	Restrooms / showers	Parking for 180 vehicles; 15 picnic tables	1-lane boat ramp
Yale Park – Yale Lake	None	None	Restrooms	44 picnic sites; parking for 280 vehicles	4-lane boat ramp, swim area
Beaver Bay Campground/Day-Use Area – Yale Lake	63	1	Restrooms / showers	Parking for 40 vehicles; 6 picnic tables	1-lane boat ramp
Saddle Dam Park – Yale Lake	None	None	Restrooms / showers	Parking for 200 vehicles; 10 picnic tables	1-lane boat ramp (new)
Cresap Bay Campground/Day-Use Area – Lake Merwin	58	1	Restrooms / showers	20 picnic tables	2-lane boat ramp, beach swim area
Speelyai Bay Park – Lake Merwin	None	None	Restrooms	25 picnic tables; parking for 250 vehicles	2-lane boat ramp, beach swim area

Facility / Location	Individual Camp Units	Group Camp Sites	Restrooms / Showers	Day-Use Area	Marine Facilities
Merwin Park – Lake Merwin	None	None	Restrooms	135 picnic tables; parking for 500 vehicles	Beach swim area
Merwin Trout Hatchery River Access – below Merwin dam	None	None	None	Parking for 25 vehicles	1-lane boat ramp
Lewis River Hatchery River Access – below Merwin dam	None	None	None	Parking for 15 vehicles	River access; hand launch
Island River Access – below Merwin dam[a]	None	None	None	Parking for 25 vehicles with trailers	2-lane boat ramp
Cedar Creek River Access – below Merwin dam[a]	None	None	Vault toilets	Parking for 25 vehicles	2-lane boat ramp
Johnson Creek River Access – below Merwin dam[a]	None	None	None	Parking for 10 vehicles, trail to river	River access; fishing

[a] These facilities are outside of the project boundary.

2.1.3 Measures Proposed Under the Lewis River Settlement Agreement

PacifiCorp and Cowlitz PUD propose a comprehensive set of measures covering the full range of resources in the Lewis River Basin. Table 2.1-4 summarizes those measures proposed under the SA, as well as some of the existing measures that would be continued. Many of the proposed measures are closely tied to the existing measures. The new measures proposed by the SA appear in *italics* in table 2.1-4, while existing measures appear in normal font. Additional details of these proposed measures are provided in the following sections.

Table 2.1-4. Measures proposed under the Lewis River SA (in italics), with some of the existing measures shown in normal font. (Source: PacifiCorp and Cowlitz PUD et al., 2004)

Resource Area	Resource Component	Proposed Measure	S1[a]	S2[a]	Y[a]	M[a]	Timing
Water Quality/ Quantity	Water Quality	*Develop a Water Quality Management Plans to monitor compliance with state criteria.*	X	X	X	X	As required by the WQCs.
	Water Quantity	*Continuously release flow to the upper Lewis River bypassed reach through the existing flow release device in Swift No. 2 canal.*	X	X			Upon completion of Swift No. 2 reconstruction.
		Design & construct a new flow release structure from Swift No. 2 canal to upper Lewis River bypassed reach. Interim release schedule, when combined with the 47 cfs from the above measure: *7/1 – 10/31: 60 cfs* *11/1 – 1/31: 100 cfs* *2/1 – 6/30: 75 cfs* *Negotiate combined release schedule.*	X	X			By first anniversary of Swift No. 1 or 2 license issuance.
		Maintain downramping rates at Merwin of 2 inches/hour except as follows: *no downramping 2/16 – 6/15 one hr. before and after sunrise & one hr. before and after sunset. Limit upramping to 1.5 ft/hr.*				X	Upon issuance of Merwin license.
		Follow plateau operation procedures between 2/16 and 8/15. Changes in flow to be consistent with ramping restrictions at or below flows of 8,000 cfs, and flow changes limited to no more than one change in any 24-hour period, 4 times in any 7-day period, or 6 times per month.				X	Upon issuance of Merwin license.

Resource Area	Resource Component	Proposed Measure	S1[a]	S2[a]	Y[a]	M[a]	Timing
		Flows below Merwin: minimum range from 4,200 cfs (Nov 1 to Dec 15) to 1,200 cfs (July 31 to Oct 12).				X	Upon issuance of Merwin license.
Flood Management		Maintain 17 feet of flood management storage.	X		X	X	Upon issuance of new licenses.
		Develop and implement a forecast-based high runoff procedure.	X		X	X	By first anniversary of Merwin license
		Reduce flood management season by 2 weeks.	X		X	X	By first anniversary of Merwin license
		Provide funding to authorities responsible for flood notification, including an emergency phone system and weather radio transmitter.	X		X	X	Annually to counties and NOAA. Upon request to USGS.
Aquatics	Upstream Fish Passage	*Improve efficiency and safety of existing Merwin trap and add a new sorting and truck loading facility.*				X	By 2nd anniversary of Merwin license.
		Transport spring Chinook, coho & steelhead from the Merwin sorting facility to Swift Creek reservoir. Transport bull trout to a location in Yale Lake or as directed by the FWS.				X	By 6 months after 4th anniversary of Merwin license.
		Net bull trout in Yale tailrace and transport to Cougar Creek 2X/week when migratory. *Investigate alternative trapping methods for bull trout.*			X		Ongoing measure.
		Develop trap, transport, and sorting facility at Yale.			X		By 17th anniversary of Yale license.
		Net bull trout from Swift No. 2 tailrace and transport to a location defined by FWS.	X	X			Ongoing measure.

Resource Area	Resource Component	Proposed Measure	S1[a]	S2[a]	Y[a]	M[a]	Timing
		Develop trap and transport facility above Yale Lake (for analysis, assumed to be at Swift No. 2 tailrace).	X	X			By 17th anniversary of Swift licenses.
	Down-stream Fish Passage	*Install a modular surface collector system with guide walls and nets at Swift dam. Collect fish, sort, mark a subsample, and truck to a release pond near Pekins Ferry below Merwin dam. Release bull trout (if they reach a defined smolt-like development phase) to Yale or lower river.*	X	X			6 months after 4th anniversary of licenses.
		If directed by NOAA Fisheries, seasonally install spring Chinook satellite collection facility (modular screw trap) upstream of Swift Creek reservoir.	X				If required.
		Construct modular surface collector & transport facilities at Yale dam.			X		By 13th anniversary of Yale license.
		Modify Yale spillway to improve downstream resident fish survival (including bull trout) during spill events.			X		6 months after 4th anniversary of Yale license.
		Install barrier nets in Yale and Merwin forebays to reduce bull trout entrainment up to and until the modular surface collector is installed.			X	X	1 year after issuance of Yale license, and when directed by FWS at Merwin.
		Construct modular surface collector & transport facilities at Merwin dam.				X	By 17th anniversary of Merwin license.

Resource Area	Resource Component	Proposed Measure	S1[a]	S2[a]	Y[a]	M[a]	Timing
		Construct a release pond downstream of Merwin dam near Pekins Ferry.	X		X	X	6 months after 4th anniversary of Swift 1 or 2 license orders.
		Construct bull trout collection facilities at Yale and Merwin if anadromous facilities are not constructed.			X	X	By 13th anniversary of Yale license, and 17th anniversary of Merwin license, if required.
	Hatcheries: Anadro-mous Fish	*Develop and implement a hatchery supplementation plan for spring Chinook, steelhead and coho. Target production to return 12,800 spring Chinook, 13,200 steelhead, and 60,000 coho pre-harvest ocean recruits. Reduce production on a 1:1 basis when natural production exceeds settlement threshold levels.*	X	X	X	X	Develop plan within 4 months after first anniversary of licenses.
		Production of anadromous juveniles will be as identified in Section 8.3.1 of the Settlement Agreement.	X	X	X	X	Develop plan by first anniversary of licenses.
		Transport supplementation spring Chinook and steelhead juveniles above Swift.	X	X			Supplement for 10 years after completion of the Swift downstream collection facility (beginning 6 months after 4th anniversary of Swift license).

Resource Area	Resource Component	Proposed Measure	S1[a]	S2[a]	Y[a]	M[a]	Timing
		Transport supplementation coho juveniles above Swift for 6 years after completion of the Swift downstream collection facility.	X	X			Supplement for 6 years after completing Swift downstream facility.
		Transport supplementation spring Chinook and steelhead juveniles to Yale Lake and Lake Merwin.			X	X	Supplement for 10 years after completion of the Yale anadromous downstream collection facility and for 10 years after completion of the Merwin downstream collection facility.
		Transport supplementation coho juveniles to Yale Lake and to Lake Merwin.			X	X	Supplement for 6 years after completion of the Yale anadromous downstream collection facility and for 10 years after completion of the Merwin downstream collection facility.
		Transport supplementation adult spring Chinook, coho and steelhead above Swift through term of the new license and as directed to Yale Lake and Lake Merwin.			X	X	3rd year after license issuance.

Resource Area	Resource Component	Proposed Measure	S1[a]	S2[a]	Y[a]	M[a]	Timing
		Fund upgrades and maintenance to all three hatcheries.	X	X	X	X	Per plan to be complete 4 months after first anniversary of licenses.
		Place juvenile acclimation sites above Swift Cr. reservoir if there are suitable and accessible sites.	X	X			4th anniversary of license issuance.
		Place temporary juvenile acclimation sites in tributaries to Yale Lake and Lake Merwin.			X	X	After completion of Yale and Merwin downstream facilities.
	Hatcheries: Resident Fish	*Update Hatchery and Supplementation Plan.*	X	X	X	X	Revise 5 years following introduction into each reservoir and every 10 years thereafter.
		Fund production of no more than 20,000 lbs. of rainbow trout annually for placement in Swift Creek reservoir.	X	X	X	X	Annually.
		Fund production of no more than 12,500 lbs. of kokanee annually for placement in Lake Merwin.				X	Annually.
	Habitat Measures	Manage conservation covenants for bull trout.	X	X	X	X	Ongoing.
		Implement Habitat Preparation Plan, releasing hatchery salmonids into each reservoir to prepare habitat for 4 years prior to construction of anadromous collection facilities.	X		X	X	6 months after license issuance.

Resource Area	Resource Component	Proposed Measure	S1[a]	S2[a]	Y[a]	M[a]	Timing
		Construct channel in Lewis River bypassed reach to maximize benefits of releases from the existing release device in Swift No. 2 canal.	X	X			Upon completion of upper bypassed reach release structure.
		PacifiCorp to store large woody debris for habitat improvement projects and contribute funds annually for such projects.	X				After license issuance.
		Conduct a LWD study downstream of Merwin dam.				X	Initiate study within 9 months of license issuance.
		Assess spawning gravel and develop a trigger for implementing an augmentation program below Merwin dam.				X	Initiate within 6 months of license issuance.
		Establish Aquatic Enhancement Fund by April 2005. Total combined contribution $5.72 million by the applicants.	X	X	X	X	PacifiCorp contributions start 4/30/05. Cowlitz contributions start after first anniversary of Swift No. 2 license.
		PacifiCorp establishes "In Lieu" fund in Years 11 – 17 if fish passage facilities not constructed. Potential commitment of up to $30 million.			X	X	Contributions on anniversary dates of license issuance as follows: Yale in years 11-13 and 14-17; Merwin in years 14-17; Swift No. 1 in years 14-17.

Resource Area	Resource Component	Proposed Measure	S1[a]	S2[a]	Y[a]	M[a]	Timing
	Fish Monitoring	Support WDFW annual evaluation of fall Chinook and chum in lower Lewis River.				X	Ongoing.
		Develop monitoring and evaluation plans for aquatic measures.	X	X	X	X	By 2nd anniversary of first license issued.
		Monitor performance of upstream and downstream passage facilities.	X	X	X	X	To be defined in monitoring plans.
		Monitor bull trout collection.	X	X	X		Annually.
		Monitor adult salmonid migration and spawning below Merwin.				X	Annually.
		Subsample and tag outmigrants from each downstream transport facility.	X	X	X	X	After Year 4.5 at Swift; after Year 13 at Yale; and after Year 17 at Merwin.
		Monitor anadromous hatchery returns.	X	X	X	X	Monitor daily; report periodically.
		Complete limiting factors analysis for bull trout in Lake Merwin and Swift Creek reservoir.	X			X	By 2nd anniversary of licenses.
		Conduct stranding study below Merwin dam.				X	By 3rd anniversary of license.
		Monitor kokanee populations in Yale Lake each fall.			X		Annually.
		Evaluate status of ESA-listed anadromous species and bull trout.	X	X	X	X	Annually.
		Conduct study of effects of predation on introduced salmonids in Lake Merwin.				X	By 10th anniversary of license issuance.

Resource Area	Resource Component	Proposed Measure	S1[a]	S2[a]	Y[a]	M[a]	Timing
Terrestrial	Habitat Manage-ment	*Develop and implement Wildlife Habitat Management Plans on Project lands using HEP as baseline.*	X	X	X	X	Prior to issuance of new licenses.
		PacifiCorp commits $2.5 million to fund habitat acquisition in the Yale Project area.			X		Within first and 2nd year of date of Settlement Agreement.
		PacifiCorp establishes a $7.5 million habitat acquisition, protection, and enhancement fund for the Swift Projects.	X				Within 9 months of license issuance and per settlement schedule thereafter.
		PacifiCorp establishes a $2.2 million habitat acquisition and enhancement fund for the Lewis River Basin area.	X		X	X	Establish 6 months after 4th anniversary of Yale license issuance.
		Buffer sensitive habitat from ground-disturbing activities (timber harvest, construction, etc.).	X	X	X	X	Post license issuance.
		Reduce dispersed campsites in shoreline and riparian areas and post visitor use rules.	X	X	X	X	As defined in WHMPs.
		Monitor the effectiveness of the WHMP in improving wildlife habitat using the HEP.	X	X	X	X	17 years after issuance of all licenses.
		Maintain existing road closures through sensitive habitat areas by installing and maintaining gates and *identify additional areas for access control on PacifiCorp lands.*	X		X	X	Ongoing, and as defined in WHMPs.
	Timber Manage-ment	Implement a timber management program on PacifiCorp lands, if applicable under the WHMP.	X		X		To be defined in PacifiCorp's WHMP.

Resource Area	Resource Component	Proposed Measure	S1[a]	S2[a]	Y[a]	M[a]	Timing
		Continue to manage roads on project lands to control runoff and erosion. *Develop a culvert replacement plan and schedule to reduce barriers to wildlife and improve aquatic and riparian habitat connectivity at select streams through PacifiCorp lands.*	X		X	X	Ongoing, and as defined in WHMPs.
		Develop and implement measures to maintain existing aquatic connectivity and control runoff and erosion from roads through Cowlitz PUD lands on Devil's Backbone.		X			To be defined in WHMP.
	Monitoring	Continue annual raptor surveys on PacifiCorp lands.	X		X	X	Ongoing.
		Monitor dispersed camping and day use on PacifiCorp lands.	X		X	X	To be defined in WHMP.
		Implement BMPs to protect sensitive species and habitats during construction activities.	X	X	X	X	Coordinate with construction schedules.
Recreation	Visitor Manage-ment	*Finalize the RRMP as directed by FERC and implement the recreation measures described therein.*	X		X	X	After issuance of new licenses.
		Increase visitor management controls, such as additional signs, barriers and enforcement.	X		X	X	Upon issuance of new licenses.
		Allow managed recreational access to project lands except where conditions are unsafe.	X	X	X	X	Ongoing.
		Develop and implement an Interpretation and Education (I&E) program, including information about protecting bull trout.	X	X	X	X	By first anniversary of new licenses.

Resource Area	Resource Component	Proposed Measure	S1[a]	S2[a]	Y[a]	M[a]	Timing
		Install interpretive signs at the Beaver Bay wetland.			X		By 13th anniversary of Yale license.
		Seasonally install portable restrooms at Swift No. 2 canal.		X			By 9/30/05.
		Provide earlier public notice that project recreation sites are full.	X		X	X	Upon issuance of new licenses.
		Dispersed upland camping and motorized use would be discouraged on project lands.	X		X	X	After issuance of licenses.
		Manage parking at Swift No. 2 canal fishing facility		X			After 9/30/05 installation.
		PacifiCorp provides $5,220/yr and Cowlitz provides $780/yr to the US Forest Service to manage dispersed camping on its land in the project vicinity but outside the project boundary.	X	X			Upon issuance of new licenses.
	Camp-grounds	*Shoreline camping would be prohibited at Lake Merwin.*				X	By 4th anniversary of Merwin license.
		Some shoreline campsites at Yale and along Swift Creek reservoir would be hardened, some eliminated, others managed.	X		X		Per schedules in the RRMP: within first 3 years after issuance of licenses.
		Expand Swift Camp and Cougar Camp when monitoring establishes a sustained need. At Cougar, accomplish this by closing the boat ramp and converting parking areas to campsites.	X	X	X		When needed, based on demand.
		Renovate Cougar Camp.			X		By 14th anniversary of Yale license.

Resource Area	Resource Component	Proposed Measure	S1[a]	S2[a]	Y[a]	M[a]	Timing
		Redesign Beaver Bay Campground and replace older restrooms.			X		By 13th anniversary of Yale license.
		Allow public use of RV holding tank dump sites in PacifiCorp campgrounds for a fee.	X		X	X	Post license issuance.
	Day-Use Facilities	*Provide more day-use opportunities and sanitation facilities at five river access sites below Merwin dam. Negotiating maintenance agreements with WDFW and WDNR.*				X	At 4 sites by first anniversary. At Island River Access by 4/30/07. Picnic tables by 11th anniversary.
		Provide two new picnic shelters at Merwin Park, one at Swift Camp and four additional sites on Yale Lake.	X	X	X	X	By 5th and 11th anniversary of Swift No. 1 license, and by 7th anniversary of Yale license.
		Renovate Eagle Cliff Park.	X	X			By 11th anniversary of Swift No. 1 license.
		Upgrade restrooms and parking at Speelyai Bay Park (made ADA-compliant). Keep Cresap Bay Park open through September.				X	By 6th anniversary of Merwin license. Add parking by 12th anniversary.
		Provide volleyball courts, horseshoe pits and children's play structure at Merwin Park.				X	By 4th anniversary of Merwin license.
		Increase separation between wetland and day-use parking area at the Beaver Bay day-use area.			X		By 4th anniversary of Yale license issuance.

Resource Area	Resource Component	Proposed Measure	S1[a]	S2[a]	Y[a]	M[a]	Timing
		Construct ADA-accessible concrete fishing pier at Swift No. 2 Canal.		X			By 9/30/05.
	Trails	*Bring Marble Creek trail up to ADA-accessibility standards.*				X	By 4th anniversary of Merwin license.
		Evaluate feasibility of trail easement to Lake Merwin for Clark County.				X	After license issuance.
		Formalize Saddle Dam Trailhead parking for horse trailers.			X		By 5th anniversary of license issuance.
		Develop non-motorized trail from Eagle Cliff to Forest Service boundary.	X	X			By 4th anniversary of Swift No. 1 license issuance.
		Develop non-motorized trail link from Saddle Dam Park to existing Saddle Dam area trails.			X		By 5th anniversary of license issuance.
		Develop a shoreline trail from Cougar Camp to Beaver Bay Campground.			X		By 5th anniversary of license issuance.
		If feasible, improve the Yale-IP Road as a non-motorized recreation trail.			X		Beginning after license issuance.
	Access	*Boat launch facilities improved at Speelyai Bay, Yale Park, and Beaver Bay.*			X	X	By 4th anniversary of license issuance. Speelyai by 11/30/04.
		Develop a primitive take-out site at Yale Bridge for non-motorized watercraft.				X	By 6th anniversary of Merwin license.

Resource Area	Resource Component	Proposed Measure	S1[a]	S2[a]	Y[a]	M[a]	Timing
		Develop river access at the "Switchback" property when use levels reach capacity below Merwin dam.				X	When capacity is reached.
		Improve ADA-accessibility at upgraded facilities.	X		X	X	Assess after license issuance and implement per Settlement schedule.
Cultural	Resource Manage-ment	*Implement Historic Properties Management Plan for Merwin, Yale and Swift No. 1.*	X		X	X	Upon license issuance.
		Protect integrity of properties listed in the National Register.	X		X	X	Upon license issuance.
		Preserve tribal access for traditional uses.	X	X	X	X	Ongoing.
	Interpreta-tion & Education	*Contribute information to an I&E program.*	X		X	X	By first anniversary of new licenses.
		Curate artifacts at a secure location in the basin.	X		X	X	By first anniversary of new licenses.
Socioeconom-ics		*Fund 3 FTE law enforcement (marine and land-based) positions.*	X		X	X	Within 6 months of license issuance.
		Contribute to County-developed installation and maintenance of emergency phone system for flood notification.	X		X	X	Annual contribution.
		Provide funds to reimburse NOAA for its installation of a weather radio transmitter and for certain costs associated with the operation and maintenance of the facility.	X		X	X	Annual contribution.

Resource Area	Resource Component	Proposed Measure	S1[a]	S2[a]	Y[a]	M[a]	Timing
		Partially fund development of the Visitor Information Center (either $75,000 or enter into maintenance agreement).	X	X	X	X	When development is initiated by non-licensees.
		Contribute funds to maintain FR 90 as follows: one-time payment of $10,100 for bridge repair, and annual payment of $ 27,000.	X	X			One-time payments within 6 months of Settlement. Annual payments begin in April 2005.
		Continue to support Pine Creek Work Center communication link.	X				Ongoing.
		PacifiCorp contributes $20,000 to Cowlitz-Skamania Fire Protection District No. 7.	X		X	X	Annual contribution.

[a] S1 = Swift No. 1; S2 = Swift No. 2; Y = Yale; M = Merwin

2.1.3.1 Swift No. 1 and Swift No. 2

Swift No. 1 Facilities

PacifiCorp and Cowlitz PUD would install a modular surface collector at Swift dam to enable migratory fish to be collected for transportation downstream. These facilities would be just upstream of the existing intake and spillway channel at Swift dam. The collector would lead fish to a sorting and truck loading facility, where a subset of the fish would be tagged for monitoring purposes. Tanker trucks then would transport the outmigrants to a release site below Merwin dam. No downstream fish passage facilities would be placed at Yale or Merwin dams. This approach is intended to minimize potential losses, delay, or injury resulting from migration through the Yale and Merwin reservoirs and downstream passage past the three dams. The juvenile collection system would be operational from March 15 through October 15, the period when out-migrating anadromous fish are present. If directed by NOAA Fisheries, a second collection device would be positioned upstream of Swift Creek reservoir seasonally to collect downstream migrants.

Swift No. 2 Facilities

An upstream fish collection facility would be constructed by the 17th anniversary of the Swift licenses at a presently undefined location between Yale Lake and Swift dam.

For analysis purposes, a location adjacent to the Swift No. 2 tailrace is assumed. This facility would enable adult migratory fish to be collected, sorted and transported from upper Yale Lake to Swift Creek reservoir. A new water release device would be constructed at the Swift No. 2 Canal approximately 2,000 feet downstream of Swift dam, a location selected to prevent damage from Swift No. 1 spillway discharges. This new device, in combination with releases from the existing canal drain, would continuously release a total of between 60 and 100 cfs to the Lewis River bypassed reach. The flow from the existing canal drain would enter an improved side channel in the bypassed reach, helping to maintain the hydraulic connection between the side channel, the bypassed reach, and Yale Lake.

Swift No. 1 and Swift No. 2 Operations

The applicants would implement operational modifications to continuously release flow from Swift No. 2 canal to the Lewis River bypassed reach. These modifications could occur in two ways: (1) by reducing flows from power generation in order to meet the bypassed reach objectives and retain the Swift Creek reservoir water surface level; or (2) by maintaining flows for power generation and meeting bypassed reach objectives by drafting Swift Creek reservoir. While the second option is attractive from a power generation perspective, it would not meet various environmental resource objectives. Under option 2, if Swift No. 1 and Swift No. 2 operated according to current practices (with no reduction in generation) and continuous flow was provided to the bypassed reach, water surface levels in Swift Creek reservoir would drop approximately 3.5 feet during the summer low flow season. In this circumstance, bypassed reach releases combined with power generation requirements could exceed reservoir inflow, affecting reservoir management and access, aquatic habitat, archaeological resources, and recreation. The applicants determined that this was unacceptable and therefore propose option 1, described above. Analysis of reservoir operations by the applicants shows relatively little change in the seasonal reservoir levels using this mode of operation. While this meets the bypassed reach release objectives, this occurs at the expense of generation at Swift No. 1 and Swift No. 2 (see section 4, *Developmental Analysis*). Although average water levels in summer would essentially remain unchanged, Swift Creek reservoir levels in winter and spring would average about 4 feet lower than under no action.

Other than the modifications described above, the Swift No. 2 Project would operate in the same manner as under current operations. Generating capacity, however, would be reduced as a result of releases to the bypassed reach.

Releases from Swift Creek reservoir would be modified under high runoff procedures adopted by PacifiCorp as part of the new flood management protocol. These modifications would be coordinated with operation of the two downstream reservoirs.

2.1.3.2 Yale

PacifiCorp would modify the Yale spillway to improve conditions for resident fish passing downstream during spill events. A trap-and-haul facility would be constructed at Yale dam to collect, sort, and relocate upstream migrating fish. Downstream migrants would be trapped at Yale dam in a modular surface collector and transported downstream. Until this structure is installed, barrier nets would be positioned in the forebay to reduce bull trout entrainment. Minor modifications to seasonal reservoir operations would occur as new high-runoff procedures are adopted as part of the flood management protocol. Seasonal levels of Yale Lake are expected to remain unchanged.

2.1.3.3 Merwin

PacifiCorp would modify the upstream fish collection facility, as described below. Downstream migrants would be trapped at Merwin dam in a modular surface collector and transported downstream. Until this structure is installed, barrier nets would be positioned in the forebay to reduce bull trout entrainment. In addition, PacifiCorp would modify seasonal reservoir operations under the flood management protocol. No changes in the seasonal levels of Lake Merwin are expected. Changes in hourly releases from Lake Merwin from mid-February until mid-August would be more limited than under current conditions, with adoption of a longer-term plateau operations procedure.

2.1.3.4 Flow Releases

PacifiCorp and Cowlitz PUD would provide a continuous flow of between 60 and 100 cfs to the Lewis River bypassed reach downstream of Swift dam. Releases would occur from two locations in the Swift No. 2 canal.

PacifiCorp's flow releases from Merwin dam would range from 1,200 to 4,200 cfs, with a 2-inch/hour downramping rate and no ramping permitted during the period from one hour before and after sunrise and one hour before and after sunset. Below the critical flow level of 8,000 cfs, plateau changes would be limited to not more than one change in 24 hours, four changes in a 7-day period, or six changes per month, in order to protect salmonid redds during spawning and fry emergence. Downramping rates would be limited to 2 inches per hour, except when flows are greater than 8,000 cfs.

During dry years, PacifiCorp would convene a Flow Coordination Committee (FCC), composed of state and federal agencies, the Yakama Nation, and local government representatives, in order to develop adaptive management measures for the particular circumstance. The FCC would consider fish needs (priority on Endangered Species Act [ESA]-listed species), flood management needs, and reservoir recreational pool levels when developing adaptive management measures, which may include temporary modifications to instream flows.

2.1.3.5 Flood Management

PacifiCorp would retain the amount of dependable flood control storage during the flood management season at the current 70,000 acre-foot level (17 feet of storage, or "hole"). Various operational changes would be implemented to make the most effective use of that storage, and improvements would be made in flood notification systems and procedures.

Flood management changes would involve improved forecasting for both weather and project inflows. Forecasts of high-flow events would trigger pre-releases from the projects (i.e., releases in excess of those required for power generation in order to maintain or increase storage capacity). Pre-releases from Merwin dam normally would be at rates of up to 25,000 cfs. In certain circumstances where severe floods are forecast, pre-releases from Merwin dam would be increased to a maximum of 40,000 cfs. Should forecasts be found to be sufficiently reliable, they would also be used to improve project operations near the peak of flood events by allowing storage of additional flood flows and reduction in peak project discharges. Other aspects of the existing high runoff procedures would remain unchanged.

Analysis of flow records shows that flood risk on the Lewis River drops significantly after March 1. The length of the flood management season would be reduced by two weeks in years with below-average March runoff forecasts. Project refill under these conditions would start on March 15 instead of April 1. This action would reduce the risk of failing to achieve project refill in dry years.

PacifiCorp would contribute to a package of measures to improve flood notification systems and procedures, as follows:

- Provide financial support to Clark County Regional Emergency Services Agency and Cowlitz County Department of Emergency Management for the acquisition and maintenance of a new emergency telephone notification service for areas affected by high runoff from the projects.
- Contribute funding annually to the National Oceanic and Atmospheric Administration (NOAA) for certain specified costs associated with the operation of a weather radio transmitter that would improve NOAA's ability to transmit to residents of the Lewis River Valley.
- Contribute funding to the U.S. Geological Survey (USGS) to provide public dial-in access to real-time flow information on the Lewis River below Merwin dam.
- Improve coordination between PacifiCorp and emergency management officials and personnel.

Coupled with improved flood forecasting and high flow pre-releases, these measures would increase public access to information on project storage, flows, and weather conditions, and would improve notification procedures in the event of severe floods.

2.1.3.6 Water Quality

Water quality standards are being met at each project. Continued compliance with WDOE 2003 draft standards would be assured by development of a water quality management plan for each facility. The objective of these plans would be to provide WDOE with a clear understanding of the proposed monitoring program, QA/QC measures, and protocols for reporting data. The applicants applied for Section 401 Water Quality Certification for their projects on February 3, 2005, after the Commission's notice that the projects were ready for environmental analysis (REA notice), which was issued on December 9, 2004.

PacifiCorp and Cowlitz PUD would implement erosion control measures to reduce erosion during construction of the canal water outlet structure, fish passage and recreation facilities. These measures would protect soil and geologic resources from erosion as well as protecting water quality and aquatic habitat from degradation.

2.1.3.7 Aquatic Resources

One of the primary objectives of the SA is to establish anadromous fish production in the upper Lewis River Basin. This would be accomplished using adult trap-and-haul facilities at the Merwin, Yale and Swift projects and juvenile (downstream) collection facilities at Swift, Yale and Merwin dams. PacifiCorp and Cowlitz PUD would gradually reduce production (on a 1:1 basis) of anadromous species at the existing hatcheries as natural runs are established. Specific fish passage and habitat enhancement measures proposed for the fishery resources of the Lewis River Basin are described below. Measures to mitigate the effects of construction activities on aquatic resources, such as construction timing restrictions and other best management practices (BMPs), would be developed in consultation with the appropriate resource agencies. These BMPs may include but would not be limited to:

- implementing measures to reduce construction-related adverse effects (i.e., turbidity and the introduction of potentially hazardous materials) on aquatic resources during construction activities;
- limiting in-channel work to periods that are not critical to the spawning and incubation of resident and anadromous salmonids; and
- minimizing the removal of existing vegetative cover in the riparian zone.

Fish Passage

Merwin Trap Upgrades

PacifiCorp would modify the existing fish trap located at the base of Merwin dam to improve worker safety and increase fish handling efficiency. Until construction of the Merwin Upstream Collection and Transport Facility is complete, the upgraded Merwin Trap would be operated to collect hatchery fish returning from the ocean and to transport any bull trout to Yale Lake. Any other species collected (wild salmon, steelhead, or cutthroat, and any non-target resident species) would be returned to the river below Merwin dam.

Introduction above Swift Dam

By the third anniversary of the issuance of new licenses, the applicants would begin a supplementation program to introduce adult salmon and steelhead into the basin upstream of Swift dam. This early supplementation effort would provide natural progeny to initiate the introduction effort, which is aimed at reestablishing natural runs. Collection and transport of natural juvenile outmigrants would coincide with completion of downstream collection facilities at Swift dam. An additional objective of these measures is to introduce marine-derived nutrients (MDN) into the system and preparation of habitat for future spawning. The source of the MDN would be the carcasses of spawned out salmon and steelhead (although some steelhead may survive spawning). Because the upstream river reaches have not been accessible to salmon and steelhead since the construction of Merwin dam in 1932, these reaches have not received the benefits of MDN for more than 70 years. Early re-introduction of adult salmon and steelhead into these reaches would restore some nutrient levels that have been reduced for decades.

Concurrent with implementing the supplementation program, PacifiCorp would begin a design, permitting and construction phase for upstream passage at Merwin dam and downstream passage at Swift dam. Within 6 months after the fourth anniversary of the issuance of new licenses, PacifiCorp would construct and begin operating an upstream trapping, sorting and transport facility at Merwin dam, and PacifiCorp and Cowlitz PUD would construct and begin operating a downstream modular surface fish collector at Swift dam with sorting and transport capabilities. PacifiCorp would also construct a release pond below Merwin dam, and all downstream migrating anadromous salmonids would be transported to that release pond. These facilities would result in upstream and downstream passage of spring Chinook, winter steelhead, late-run coho, bull trout and sea-run cutthroat to and from natural spawning and rearing habitat above the Lewis River Projects. Also beginning on the fourth anniversary of the issuance of new licenses, the adult supplementation program described above would be expanded to include juvenile salmon and steelhead and would continue for a minimum of 10 years for spring Chinook and winter steelhead and 6 years for late-run coho.

Introduction above Yale Dam

By the eighth anniversary of the issuance of new licenses, in addition to transporting adult salmon and steelhead collected below Merwin dam to above Swift dam, PacifiCorp would also begin transporting a portion of collected fish to Yale Lake to prepare the habitat for future fish releases and to seed the tributaries to Yale Lake. On the thirteenth anniversary of the issuance of new licenses, PacifiCorp would begin operating a Yale downstream collection facility that would include sorting and transport capabilities. All downstream migrating anadromous salmonids would be transported to the release pond. Also upon the thirteenth anniversary of the issuance of new licenses, the adult supplementation program would be expanded to include juvenile salmon and steelhead and would continue for a minimum of 10 years for spring Chinook and winter steelhead and 6 years for late-run coho.

Full Introduction and Connectivity Throughout the Lewis River Projects

By the twelfth anniversary of the issuance of new licenses, PacifiCorp would begin transporting adult salmon and steelhead to Lake Merwin to prepare the habitat for future fish releases and to seed the tributaries. On the seventeenth anniversary of the issuance of new licenses, PacifiCorp would begin operating a Merwin downstream collection facility (which would include sorting and transport capabilities) and the Yale upstream passage facility. PacifiCorp and Cowlitz PUD would construct and begin operating the Swift upstream passage facility. All downstream migrating anadromous salmonids would be transported to the release pond. Adding these facilities to the existing upstream facility at Merwin dam and downstream facilities at the Swift Projects and Yale dam would result in upstream and downstream passage of spring Chinook, winter steelhead, late-run coho, bull trout and sea-run cutthroat to and from natural spawning and rearing habitat throughout and above the Lewis River Projects. Also beginning upon the seventeenth anniversary of the issuance of new licenses, the supplementation program would be expanded to Lake Merwin to include juvenile salmon and steelhead and would continue for a minimum of 10 years for spring Chinook and winter steelhead and 6 years for late-run coho.

Continuation of Existing Bull Trout Trap-and-Haul Programs

Until the Yale upstream facility and the Swift upstream facility become operational or until alternative measures are implemented, and unless otherwise directed by FWS, the bull trout collect-and-transport programs would continue at the Yale tailrace and below Swift No. 2.

Yale and Merwin Bull Trout Entrainment Reduction

Immediately following the issuance of new licenses, PacifiCorp would develop an entrainment reduction study designed to evaluate bull trout entrainment reduction methods at Yale and Merwin dams.

Yale and Merwin Downstream Bull Trout Facility

If PacifiCorp does not build the Yale downstream facility, then PacifiCorp would, on or before the thirteenth year of the issuance of new licenses, construct and begin operating a downstream bull trout collection and transport facility in the Yale forebay. If PacifiCorp does not build the Merwin Downstream Facility, when bull trout populations have increased sufficiently in Lake Merwin, but not sooner than the seventeenth year from the issuance of the new licenses, it would construct a fish passage facility similar to the Yale downstream bull trout facility, at Merwin dam.

Yale and Swift Upstream Bull Trout Facilities

If PacifiCorp does not build the Yale upstream facility, and PacifiCorp and Cowlitz PUD do not build the Swift upstream facility, then on or before the seventeenth year of the issuance of new licenses, PacifiCorp and Cowlitz PUD would either (1) continue existing upstream transport measures described above for the remaining term of the new licenses, or (2) complete construction of and begin operating alternate passage facilities.

Juvenile Salmonids above Swift dam, in Lake Merwin and in Yale Lake

The licensees would, for the purposes of supplementation, transport juvenile salmonids to release sites above Swift dam and in Lake Merwin and Yale Lake for the times specified in the SA (PacifiCorp and Cowlitz PUD et al., 2004).

Adult Anadromous Salmonids above Merwin Dam

PacifiCorp and Cowlitz PUD would commence the supplementation of adult fish during the third year after issuance of the new licenses, would transport and release supplementation stocks of adult spring Chinook, coho, and steelhead above Swift No. 1, and into Yale Lake and Lake Merwin as directed by the Aquatics Coordination Committee (ACC). The ACC shall determine the timing for initiating supplementation into Yale Lake and Lake Merwin. The ACC, subject to the approval of NOAA Fisheries, may recommend discontinuing or recommencing the transportation of such supplementation stocks provided that any such recommendations are biologically based, and not contrary to the goals of the ESA.

In Lieu Fund

The applicants would construct and operate the Yale and Merwin downstream facilities and the Yale and Swift upstream facilities unless the FWS and NOAA Fisheries determine at least four and a half years prior to the operation date for a passage facility that the facility should not be constructed. In lieu of construction of a passage facility, PacifiCorp would contribute to an In Lieu Fund as follows: $10 million in lieu of a juvenile surface collector at Yale dam; $10 million in lieu of a juvenile surface collector at Merwin dam; and $5 million in lieu of an upstream adult fish passage facility at Yale dam; and $5 million in lieu of an upstream adult fish passage facility in the vicinity of the

Swift Projects. The In Lieu Fund would be used for mitigation measures that collectively contribute to meeting the objective of achieving equivalent or greater benefits to anadromous fish populations as would have occurred if passage through Yale Lake and/or Lake Merwin had been provided. Such measures could involve improving fish passage in tributary streams by constructing fishways, dam removal, or culvert repair/improvements, and habitat enhancement measures such as streambank protection and stabilization, minimizing sediment input, and maintaining/enhancing LWD structures.

Aquatic Habitat Enhancement Measures

Stranding Study and Habitat Evaluation

By the end of year three after the issuance of new licenses, PacifiCorp would complete a stranding study and a habitat evaluation study below Merwin dam to Eagle Island, to assess the potential effects of project operations on steelhead, coho, Chinook, and chum salmon, and their habitats. The ACC may recommend measures to minimize stranding or enhance habitat based on study results.

Constructed Channel

An existing, protected channel that runs parallel to the Swift No. 2 canal and receives water from an existing canal drain would be enhanced with instream structures and channel changes to create quality habitat that is matched to the available flows.

Large Woody Debris

PacifiCorp would stockpile large woody debris (LWD) collected from Swift Creek reservoir for use by other entities for LWD projects.

LWD Funding

PacifiCorp would provide $2,000 annually, which may be disbursed to qualified entities for costs of LWD transportation and placement. PacifiCorp would also contribute $10,000 per year to the Aquatic Enhancement Fund earmarked for LWD projects in the main stem of the Lewis River below Merwin dam, to benefit anadromous fish.

LWD Study

PacifiCorp would hire a qualified consultant to conduct a LWD study to identify and assess the potential benefits of LWD projects below Merwin dam.

Spawning Gravel Program

PacifiCorp would hire a qualified consultant to conduct a spawning gravel study and, based on the study results, develop a gravel monitoring and augmentation plan.

Predator Study

Within 10 years of the issuance of new licenses, PacifiCorp would conduct a one-time study of whether predation in Lake Merwin is likely to be a limiting factor to the success of the anadromous salmonid introduction.

Habitat Preparation Plan

Within 6 months after the issuance of new licenses, PacifiCorp would develop the "Habitat Preparation Plan," which would guide the efforts to release live adult hatchery anadromous salmonids to "fertilize" the stream habitat in preparation for the introduction of anadromous salmonids, as described above. Fish would be released for 5 years in each reservoir commencing 5 years prior to expected completion of the downstream fish passage facility from that reservoir.

Aquatic Enhancement Fund

PacifiCorp and Cowlitz PUD would establish the Lewis River Aquatic Enhancement Fund to support resource protection measures and habitat projects at the four Lewis River Projects. PacifiCorp would provide $5.2 million and Cowlitz PUD would provide $520,000. PacifiCorp's contribution would be spread over 14 years starting in 2005, and Cowlitz PUD's contribution would be spread over 21 years starting after the first year of the new license.

Monitoring and Evaluation Plans

PacifiCorp and Cowlitz PUD would monitor and evaluate the effectiveness of various aquatic measures including fish passage; adult anadromous salmonid migration, spawning, distribution, and abundance; water quality; hatchery supplementation programs; bull trout populations; cutthroat trout (if the anadromous form is present); and resident fish species.

2.1.3.8 Hatchery Facilities and Operations

The Lewis River, Merwin and Speelyai hatchery facilities would be upgraded, although not expanded beyond their current physical capacity, to meet defined production targets (see sections 8.3 and 8.4 of the SA). The anadromous fish program would include spring Chinook, steelhead and coho. Juvenile production goals would range from 3,425,000 to 3,625,000 smolts, including 1,350,000 spring Chinook, from 1,800,000 to 2,000,000 coho and 275,000 steelhead. This production level is expected to result in 86,000 pre-harvest ocean recruits (12,800 adult spring Chinook; 60,000 adult coho; and 13,200 adult winter steelhead), representing an approximately 7 percent reduction from the current adult anadromous fish production goals. Under the proposed action, production of anadromous salmonids would decrease on a one-to-one basis coinciding with increases in pre-harvest ocean recruit numbers.

Resident fish production would include rainbow trout and kokanee to support the recreational fishery in the river and reservoirs.

2.1.3.9 Terrestrial Resources

Under the SA, PacifiCorp's and Cowlitz PUD's existing terrestrial resource measures would continue to be implemented. Cowlitz PUD would manage its wildlife land to allow natural succession to continue. In addition, sensitive riparian and shoreline areas on PacifiCorp lands would be targeted for additional protection, particularly from the effects of recreational use. Recreation-related disturbance to vegetation and wildlife in shoreline and riparian areas would be reduced by evaluating and monitoring existing dispersed camping and day-use sites on PacifiCorp lands. Undesirable sites would be eliminated and allowable sites would be posted. Rules or guidelines concerning dispersed camping use would be developed and enforced to prevent site pioneering and expansion in non-designated areas. Some sites might be targeted for temporary restoration closure or seasonal closure to prevent disturbance during wildlife breeding seasons.

Improvements to riparian and aquatic habitat connectivity would also be made on PacifiCorp lands. Relicensing studies documented at least 176 stream culverts on PacifiCorp lands (PacifiCorp and Cowlitz PUD, 2003f). Of those, about 46 percent of the culverts show some level of damage and 32 percent have rust on at least one end. In addition, many have a drop from the outlet to the ground, which presents a migration barrier to fish and can restrict the movement of some aquatic and riparian dependent wildlife species, especially when moving upstream. About 80 percent of the culverts on PacifiCorp lands become full of water during high flow conditions and may not be useable by small mammals or amphibians moving along stream edges (PacifiCorp and Cowlitz PUD, 2003f).

PacifiCorp would develop a plan and schedule to prioritize and guide culvert replacements using WDNR's forest practice road standards as a reference. Over time, undersized and damaged culverts on streams through PacifiCorp lands would be replaced, with the smallest and/or most damaged culverts having the highest priority. New culverts would be larger and configured to carry high flows and provide passage for fish and wildlife. In some locations, pipe arch culverts may be most appropriate. These flat-bottomed culverts can retain some bed material and may be less of a barrier to fish and wildlife movement. In addition to improving conditions for wildlife and fish, installing larger, new culverts would reduce the risk of culvert failure and/or blockage, and consequent flooding and erosion. Erosion problems at the inlets and outlets of existing culverts would also be remedied.

A number of BMPs would be implemented to reduce disturbance to wildlife and prevent the establishment of exotic/invasive plant species during construction associated with other measures. These may include, but would not be limited to, the following:

- Coordinate construction activities to avoid take of migrating birds or their eggs and to minimize disturbance to nesting birds during the breeding season (approximately April 15 to August 1). Measures could include avoiding construction during the primary breeding season (approximately May 1 to August 1); surveying to determine the presence of nesting birds prior to initiating construction; clearing vegetation within the construction footprint outside of the breeding season to prevent nesting in the construction area; and limiting extreme construction noise and equipment access during the breeding season.
- Treat nearby infestations of exotic/invasive plant species prior to construction.
- Revegetate disturbed areas immediately following construction.
- Wash construction equipment prior to use in the project area.

Other terrestrial measures added under the SA would include an integrated wildlife habitat management program that would replace the MWHMP and would cover all PacifiCorp lands over the next license period. This program would use the data collected during the Habitat Evaluation Procedure (HEP) as the baseline for developing an Integrated Wildlife Habitat Management Plan (IWHMP) and monitoring the results. The IWHMP would include, but not be limited to, the following measures: (1) managing forests to improve habitat for big game and other native species; (2) planting native hydrophytic species to enhance wetlands; (3) installing water control structures, if needed, to improve or protect wetland hydrology; (4) planting shrubs along roads, ROWs, and open areas to provide wildlife cover; (5) managing existing grasslands and pastures, as appropriate, to meet specific objectives to enhance wildlife habitat; (6) creating/protecting habitat for species that use cavities and snags for reproduction and foraging; (7) developing and managing additional big game forage areas; (8) maintaining and/or increasing areas of late-successional forest (large trees); (9) controlling bullfrog populations in created wetlands, if feasible; and (10) developing a noxious weed control program. The IWHMP may preclude or limit timber harvest on some PacifiCorp project lands. These measures would be implemented on lands both inside and outside of the project boundaries.

In addition, the applicants would establish three separate habitat acquisition funds: (1) a $7.5-million fund to acquire habitat on lands within 5 miles of the Swift No. 1 and Swift No. 2 project boundaries (laterally and upstream, but not downstream) or on lands managed by the applicants associated with Swift No. 1 and Swift No. 2 (laterally and upstream, but not downstream); (2) a $2.5-million fund to acquire and protect habitat in the vicinity of the Yale Project; and (3) a $2.2-million fund to acquire and enhance habitat anywhere in the Lewis River Basin in the vicinity of the four projects.

2.1.3.10 Cultural Resources

PacifiCorp would implement a Historic Properties Management Plan (HPMP) for the Merwin, Yale, and Swift No. 1 projects. This plan would guide the treatment of known cultural resources, outline inventory procedures should additional development actions occur during the new license periods, and guide the evaluation and treatment of additional resources that might be identified. Archaeological artifacts recovered from the project area and associated documentation would be curated in a newly designed facility. If funded and constructed, this Visitor Information Center, proposed in the town of Cougar, would provide centralized curation space for cultural artifacts. Special facilities could be included to safely store artifacts and documentation. Public interpretation and education functions that include cultural resource topics could occur at this new facility. If the Visitor Information Center is not constructed, then PacifiCorp would retrofit an existing project building to safely store the artifacts.

Changes contemplated to National Register-eligible facilities within the Swift No. 1 Historic District or the Ariel (Merwin) Historic District would be limited in order to protect their historic value.

Tribal access to project lands for traditional cultural practices would be provided by both PacifiCorp and Cowlitz PUD except where unsafe conditions exist. Such activities could include berry picking and fishing.

2.1.3.11 Recreation Facilities

PacifiCorp's existing voluntarily operated recreation facilities in the project area would be formally included in the new FERC licenses, upgraded, modernized, and expanded over the term of the new licenses. In general, recreation facility changes would improve accessibility, provide additional and improved day use and trail facilities (parking areas, group day-use shelters, picnic tables, sanitation facilities), provide limited campground expansion (Cougar Camp and Swift Camp), create two new recreation sites (partial funding for a Visitor Information Center in Cougar; and if needed in the future, a river access site below Merwin dam at the Switchback property), and an Americans with Disabilities Act (ADA)-accessible bank fishing site (table 2.1-4). Each of these measures is described in greater detail below.

Visitor Management

Non-motorized recreational use of project lands would be allowed except where conditions are determined to be unsafe. Vehicular access to sensitive areas, such as Cresap Bay, would continue to be restricted during sensitive periods. Controls would be implemented to discourage dispersed camping in upland areas that might conflict with agency wildlife and vegetation management objectives. Management goals would be communicated to the public through an I&E program that also would share resource

information with the public. This program would include interpretive signs or kiosks at locations such as the Beaver Bay wetland.

PacifiCorp would post signs when recreation sites are at capacity. The applicant also would partially fund Forest Service efforts to reduce dispersed camping on lands it manages in the project areas.

Campgrounds and Day-Use Facilities

PacifiCorp would continue to operate its existing day use and overnight recreation facilities in the Lewis River Basin and include these measures in the new licenses. Measures outlined in PacifiCorp's draft Recreation Resources Management Plan (Appendix B to the Swift No. 1 and Merwin license applications) would be implemented in accordance with the schedule presented therein. These measures would include enlarging two campgrounds at Yale Lake and Swift Creek reservoir when monitoring demonstrates that there is a sustained need. At Yale Lake, Cougar Camp would be expanded to provide 78 to 90 new RV and/or tent campsites, as well as RV accessible group campsites. Swift Camp also would be expanded and would provide approximately 27 to 50 new RV and/or tent campsites, and 1 or 2 new group sites. In addition to future expansion, Cougar Camp and Park, Beaver Bay Campground and Eagle Cliff Park would be renovated. Measures at Beaver Bay would include replacing restrooms and increasing separation between the adjacent wetland and parking areas. RV holding tank dump sites at existing PacifiCorp campgrounds (Beaver Bay, Swift, Cougar, and Cresap Bay) would be made available for public use, reducing illegal dumping in the basin. A nominal fee would be charged for this use. At Swift Camp, a group picnic shelter would be constructed. Restrooms and parking areas would be renovated at Speelyai Bay Park. Restrooms would be provided or upgraded at PacifiCorp's five lower Lewis River access sites. In addition, modifications at Merwin Park would provide more activities for visitors, including volleyball courts, horseshoe pits, children's play area, and an additional group picnic shelter.

PacifiCorp would provide partial funding for a visitor information center in the town of Cougar (outside of the current project boundary) to provide recreation information and house cultural artifacts. The center would provide about 1,000 to 1,200 square feet of space for interpretive and educational materials and secure storage for historic and archeological artifacts and documents. The Forest Service has expressed an interest in taking the lead in developing this property with support from PacifiCorp.

Steps would be taken to reduce the impact of dispersed camping along sensitive shoreline areas. Dispersed shoreline camping would be prohibited around Lake Merwin. At Yale Lake and Swift Creek reservoir, some shoreline campsites would be hardened to more clearly delineate each site, reduce disturbance to adjacent vegetation, and minimize soil erosion. Several sanitation facilities also would be provided. Dispersed camping would be prohibited at some shoreline sites on the upper two reservoirs.

Trails

In the Lake Merwin area, the Marble Creek Trail would be improved to provide a 1/4-mile ADA-accessible path to a scenic overlook. In addition, PacifiCorp would evaluate granting a trail easement across project lands to Lake Merwin for a potential development being considered by the Vancouver-Clark Parks and Recreation Department.

If appropriate easements can be obtained, recreational use of the Yale-IP Road would be secured and a non-motorized trail developed along the existing paved roadway and shoulder. Barricades would be erected to prohibit vehicular access to the trail. Trailheads with signs, single-vault toilet buildings, and gravel parking areas would be provided at each end of the trail. In addition, a mid-point rest stop would be provided.

In the Yale vicinity, two trail segments would be developed. A new trail would link Saddle Dam Park with the existing Saddle Dam area trail. Parking for equestrian trail riders would also be formalized at a Saddle Dam Trailhead, providing space for horse trailers. The second trail would link Beaver Bay Campground and Cougar Camp, a two-mile multiple use segment that would be sited along the shoreline but away from SR 503.

If an easement can be obtained from WDNR, a non-motorized trail at Eagle Cliff Park on Swift Creek reservoir would link the park with the Forest Service boundary. This proposed trail would cross the FR 90 bridge and then proceed above Eagle Cliff, and then extend along the southern bank of the Lewis River.

Access

Boat launches would be improved at Speelyai Park, Yale Park, and Beaver Bay. One lane of these existing ramps would be extended from approximately 10 to 45 horizontal feet to enable boat launching during lower reservoir levels. A new non-motorized boat take-out site would be developed at the Yale Bridge. This site currently is a roadside pullout. Development would include a stairway with railing from the pullout to the shoreline. Users primarily would be Cedar Creek kayakers and other non-motorized boaters seeking an alternative take-out to the Cresap Bay boat launch.

During the term of the new licenses, should other lower river access sites exceed capacity, PacifiCorp would develop a new site below Merwin dam known as the "Switchback" property. Monitoring would determine when this point has been reached. The site would include an existing switchback road, small gravel parking area, and an access trail to the river.

Cowlitz PUD would maintain its bank fishing facility at the Swift No. 2 canal bridge, provide portable toilets at the fish facility on a seasonal basis and manage

recreational parking for anglers at the fishing facility. Implementation timing, identified in table 2.1-4, reflects terms of the SA (PacifiCorp and Cowlitz PUD et al., 2004).

2.1.3.12 Socioeconomics

Law Enforcement

PacifiCorp would provide funding for three full-time-equivalent law enforcement officers to augment land and marine-based traditional law enforcement activities and patrols in the North Fork Lewis River Basin, provided by state and local government, as part of the agencies' responsibility to protect public health, safety and welfare in the North Fork Lewis River Basin.

Forest Road 90

PacifiCorp would pay $7,474 and Cowlitz PUD would pay $2,626 to the Forest Service to assist in the repair of the Canal Bridge on FR 90. PacifiCorp would pay $19,980 and Cowlitz PUD would pay $7,020 per year beginning in April 2005 to the Forest Service for the maintenance of FR 90. Each applicant would pay appropriate use fees to the Forest Service for hauling heavy loads on FR 90 on a case-by-case basis.

Visitor Information Facility

PacifiCorp would allow construction of a 1,000 to 1,200-square-foot Visitor Information Facility on its property in Cougar, and would provide matching funds, or the applicants would perform periodic maintenance of the facility for the term of the licenses. PacifiCorp's portion of matching contribution would be $65,250 and Cowlitz PUD's portion would be $9,750.

Pine Creek Communication Works Center Link

Continued support would be provided for the Forest Service radio-telephone link between Swift dam and the Pine Creek Work Center.

2.2 MODIFICATIONS TO APPLICANTS' PROPOSALS

2.2.1 Water Quality Certification

The applicants applied for Section 401 Water Quality Certification for their projects on February 3, 2005, after the Commission's REA notice, which was issued on December 9, 2004. State action on the Water Quality Certification will be required by February 3, 2006.

2.2.2 Section 18 Fishway Prescriptions

Section 18 of the FPA states that the Commission shall require the construction, maintenance, and operation by a licensee of such fishways as the Secretaries of the U.S. Departments of Commerce (through NOAA Fisheries) and Interior (through FWS) may

prescribe. NOAA Fisheries, by letter dated February 3, 2005, and Interior, by letter dated February 4, 2005, state that their preliminary terms and conditions under Section 18 of the FPA are consistent with the relevant provisions of the SA. We agree that the preliminary Section 18 terms and conditions are consistent with the SA.

2.2.3 Section 4(e) Federal Land Management Conditions

Section 4(e) of the FPA states that the Commission may issue a license for a project on a federal reservation only if it finds that the license will not interfere or be inconsistent with the purpose for which the reservation was created or acquired. Such a reservation includes, without limitation, Forest Service- and BLM-administered land. Section 4(e) of the FPA requires that a Commission license for a project located on a reservation include the conditions that the Secretary of the department under whose supervision the reservation falls deems necessary for the adequate protection and utilization of such reservation. By letter dated February 4, 2005, the Forest Service filed, under Section 4(e) of the FPA, preliminary terms and conditions that are consistent with the relevant provisions of the SA. The Forest Service states that it reserves its authority to modify its terms and conditions after review of the Commission's draft NEPA document, or as new information becomes available. The BLM is a signatory to the SA, but did not provide separate Section 4(e) conditions. We do not recommend some of the measures included in the SA and in Forest Service Section 4(e) conditions, because these measures are not directly associated with project purposes or their effects (see section 2.2.5 below). However, we recognize that the Commission may include valid final Section 4(e) conditions in any licenses issued for the Lewis River Projects.

2.2.4 Section 10(j) Recommendations

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

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

In response to the Commission's REA notice dated December 9, 2004, NOAA Fisheries, Interior, and WDFW filed letters of comment that included Section 10(j) recommendations.[11] These agencies are also parties to the SA.[12] In their letters

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[11] These letters were dated February 3, 2005; February 4, 2005; and February 7, 2005, respectively.

[12] The SA was filed with the Commission on December 3, 2004.

containing their Section 10(j) recommendations, NOAA Fisheries, Interior, and WDFW recommend that the Commission approve the SA and all the provisions thereof. Because Commission staff is also recommending that essentially all the provisions of the SA within the scope of Section 10(j) be included as terms of any new licenses, we conclude that both staff and fish and wildlife agency recommendations pursuant to Section 10(j) of the FPA are generally consistent. We found that one measure within the scope of Section 10(j) is not warranted and therefore inconsistent with the substantial evidence standard of Section 313(b) of the FPA, and that six measures contained in the SA are outside the scope of Section 10(j) (see section 5.3, *Fish and Wildlife Agency Recommendations*).

2.2.5 Staff's Modification to the Proposed Action

After evaluating the proposed action, including mandatory conditions filed pursuant to sections 4(e) and 18 of the FPA, and other recommendations from resource agencies and interested entities under sections 10(a) and 10(j) of the FPA, we considered what, if any, additional measures would be necessary or appropriate for continued operation of the projects. Because of the comprehensive nature of the SA, which is signed by the major stakeholders to this relicensing action, and the myriad mitigation and enhancement measures for all resource areas proposed as part of the SA, we recommend that the proposed action be approved, along with staff's modification to the proposed action. The measures proposed under the SA are described above in section 2.1.3.

We also recommend that many of the plans and specific measures for implementation be filed with the Commission for approval to allow staff to monitor compliance with license conditions and review the results of many of the studies and measures to be implemented by PacifiCorp and Cowlitz PUD. In addition to the applicant-proposed project-related environmental measures, we recommend including the following staff-recommended measures in any license issued for the projects:

- Include any lands acquired with the habitat acquisition and protection/enhancement funds, and all other lands to be managed under the WHMPs, within the project boundaries.
- Include the proposed Visitor Information Center, to be located in Cougar, in the project boundary for one of the projects (the Yale Project would be in closest proximity).
- Develop a new barrier-free shoreline fishing site within the project boundary of the project where it is to be located.
- Include that portion of Forest Service road FR 90 in the project boundaries for Swift No. 1 and Swift No. 2 that is used for project purposes (public access to project recreation sites and access for operation and maintenance of project facilities).

We, however, do not recommend that all measures in the SA be included as conditions of any licenses issued for the Lewis River Projects. The reasons for this are that these measures do not appear to have a clear nexus to the projects (are not tied to either project impacts or purposes), are located outside of the project boundaries, or appear to be general measures that should be the responsibility of other government agencies. PacifiCorp and Cowlitz PUD may still elect to provide these measures as terms of the SA, but we do not recommend them as license conditions. These measures include:

- The In Lieu Fund, because it is a contingency fund that may or may not occur, will depend on the decisions made by other agencies, and it is not known what measures would be implemented under the fund.

- Funding of some measures under the Aquatics Fund that are located outside of the project boundary or are not directly associated with project effects.

- The gravel augmentation study downstream of Merwin dam, because adverse effects of project operations on the availability of downstream gravels have not been demonstrated.

- Funding law enforcement and emergency services at existing levels and providing additional funds to the appropriate agency to support fire services and three additional marine and land based FTE law enforcement officers; law enforcement and fire services in the project area are the responsibility of county and federal agencies.

- Improvements to five river access sites outside of the Merwin Project boundary along the lower Lewis River, because there is no physical nexus between the lower-river sites and the Merwin Project, located 5 miles upstream.

- Providing funding to the Forest Service for managing dispersed camping sites outside of the project boundaries, because other proposed measures in the SA would be sufficient to address camping use during peak-use periods.

2.3 NO-ACTION ALTERNATIVE

Under no action, the projects would continue to operate as currently licensed, and no new measures associated with the SA would be implemented. We use this alternative to establish baseline environmental conditions for comparison with other alternatives.

2.4 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

As part of our independent analysis, we considered other alternatives to the proposed action, but eliminated them from detailed analysis because they are not reasonable in the circumstances of this case. These included project decommissioning,

federal government takeover of the projects, and issuing nonpower licenses. A brief description of these potential alternatives is presented in this section, along with an explanation of why they were not considered further.

2.4.1 Project Decommissioning

Under a project decommissioning or retirement alternative, one or more of the relicense applications would be denied, and the existing licenses would be surrendered or terminated with appropriate conditions. The Swift No. 1, Swift No. 2, Yale, or Merwin projects would be decommissioned by either removing the dams and/or removing or disabling but securing powerhouses, switchyards, substations, and other associated project features. The various disabled project works could remain in place for historic or other purposes, but this would require the Commission to identify another government agency with authority to assume regulatory control and supervision of the remaining facilities. No such agency has stepped forward, and no participant has advocated this alternative. The fish hatcheries located within the project boundary (Merwin and Speelyai) would likely be either removed or sold. Funding for the Lewis River Hatchery would be discontinued, and if it were to be abandoned by WDFW, the property would revert to PacifiCorp ownership.

No participant has suggested that dam removal or project retirement would be appropriate in this case, and we have no basis for recommending it. Because the power supplied by the projects is needed, a source of replacement power would have to be identified. The project reservoirs also provide important functions, including flood management capabilities, recreation, and sport fisheries. The flow-regulating capabilities and existing hatchery programs, supported by the projects, are helping to maintain the existing anadromous fish resources of the lower Lewis River. In these circumstances, we do not consider dam removal or project retirement to be a reasonable alternative to relicensing the projects with appropriate protection, mitigation, and enhancement measures.

2.4.2 Federal Government Takeover of the Projects

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

2.4.3 Issuing Nonpower Licenses

Issuing a nonpower license would not provide a long-term resolution of the issues presented. A nonpower license is a temporary license that the Commission would terminate whenever it determines that another governmental agency will assume

regulatory authority and supervision over the lands and facilities covered by the nonpower license. In this case, no agency has suggested its willingness or ability to do so. No party has sought a nonpower license and we have no basis for concluding that the projects should no longer be used to produce power. Thus, a nonpower license is not a realistic alternative to relicensing in this circumstance.