Pelton Round Butte Project
Settlement Agreement

E X H I B I T A

PROPOSED LICENSE ARTICLES

Pelton Round Butte Project – FERC No. 2030

July 2004

EXHIBIT A

Proposed License Articles

Table of Contents

EXHIBIT A

Proposed License Articles

Ordering Paragraphs

(A) The Settlement Agreement Concerning the Relicensing of the Pelton Round Butte Hydroelectric Project, filed with the Commission on August 2, 2004 (the "Settlement Agreement"), including the exhibits attached thereto, is hereby approved and adopted and this license is subject to the Settlement Agreement conditions.

(B) The following License Implementation Plans are approved and made a part of this license:

(1) Project Operating Plan, Exhibit C to the Settlement Agreement, filed August 2, 2004;
(2) Fish Passage Plan, Exhibit D to the Settlement Agreement, filed August 2, 2004;
(3) Pelton Round Butte Fund Implementation Plan, Exhibit H to the Settlement Agreement, filed August 2, 2004;
(4) Cultural Resources Management Plan, Exhibit J to the Settlement Agreement, filed August 2, 2004;

(C) This license is subject to the conditions submitted by the State of Oregon Department of Environmental Quality under Section 401 of the Clean Water Act, as those conditions are set forth in Appendix A-1 to this order.

(D) This license is subject to the conditions submitted by the Water Control Board of the Confederated Tribes of the Warm Springs Reservation of Oregon under Section 401 of the Clean Water Act, as those conditions are set forth in Appendix A-2 to this order.

General Provisions

Article 1. Implementation Committees

(a) The Licensees shall establish a Fish Committee as provided in the Settlement Agreement. The Fish Committee shall consist of the Licensees; National Marine Fisheries Service (NOAA Fisheries); U.S. Fish and Wildlife Service (USFWS); U.S. Forest Service (USFS); Bureau of Indian Affairs (BIA); Bureau of Land Management (BLM); Confederated Tribes of the Warm Springs Reservation Branch of Natural Resources (CTWS BNR); Confederated Tribes of the Warm Springs Reservation Water Control Board (CTWS WCB); Oregon Department of Fish and Wildlife (ODFW); Oregon Department of Environmental Quality (ODEQ), and a representative of the following non-governmental organizations: Trout Unlimited, American Rivers, Oregon Trout, and the Native Fish Society. The Licensees' development and implementation of study plans, reports, facility designs, and operating and implementation plans submitted to the Fish Committee pursuant to the terms of this license shall comply with the requirements of the Settlement Agreement and the applicable License Implementation Plan. The Licensees'

implementation of measures pursuant to this license shall be reported to the Fish Committee as provided in the Settlement Agreement and the applicable License Implementation Plan. Copies of all filings with the Commission following consultation with the Fish Committee shall be provided to each member of the Fish Committee.

(i) Unless a different time period is specifically established pursuant to another provision of this License, the Licensees shall, where consultation with the Fish Committee is required, allow a minimum of 30 days for the Fish Committee members to comment, work to achieve consensus, and to make recommendations before filing any study, operating or implementation plan, report, or facility design with the Commission. If after consideration by the Fish Committee of all comments or recommendations, consensus is not achieved regarding the study, operating or implementation plan, report, or facility design, and any member of the Fish Committee invokes dispute resolution pursuant to Section 7.5 of the Settlement Agreement, the Licensees shall not file any study, operating or implementation plan, report, or facility design with the Commission until the dispute resolution process has been completed. The Licensees shall include with the study, operating or implementation plan, report, or facility design: documentation of consultation with the Fish Committee, copies of committee member comments and recommendations on the study, operating or implementation plan, report, or facility design after it has been prepared and provided to the Fish Committee, and specific descriptions of how the comments are accommodated by the study, operating or implementation plan, report, or facility design.

(ii) NOAA Fisheries, USFWS, ODFW, and CTWS BNR are collectively referred to as the Fish Agencies. Each Fish Agency has separate and distinct statutory authorities and no agency is deemed, by virtue of concurrent approvals, to be sharing its statutory authority with any other agency or to be conceding that the approval of any other agency is required for exercise of that agency's authority. Where consultation with the Fish Committee and approval by the appropriate Fish Agencies pursuant to their respective statutory authorities is required, the Licensees shall allow the Fish Agencies a minimum of 30 days to provide such approval prior to submitting the final study, operating or implementation plan, report, or facility design with the Commission. If a Fish Agency disapproves a study, operating or implementation plan, report, or facility design, the Licensees shall not file the disapproved study, operating or implementation plan, report, or design with the Commission until the dispute resolution process specified in Section 7.5 of the Settlement Agreement has been completed, unless the matter in dispute was addressed pursuant to Section 4.3.2 of the Settlement Agreement, in which case no further dispute resolution shall be required before such study, operating or implementation plan, report, or design is filed with the Commission.

(b) The Licensees shall establish a Terrestrial Resources Working Group as provided in the Settlement Agreement. The Terrestrial Resources Working Group shall consist of the Licensees; USFWS; USFS; BIA; BLM; CTWS BNR; and ODFW. The Licensees' development and implementation of study plans, reports, facility designs, and operating and implementation plans submitted to the Terrestrial Resources Working Group pursuant to the terms of this license shall comply with the requirements of the Settlement Agreement and the applicable License

Implementation Plan. Unless a different time period is specifically established pursuant to another provision of this License, the Licensees shall, where consultation with the Terrestrial Resources Working Group is required, allow a minimum of 30 days for the Terrestrial Resources Working Group members to comment, work to achieve consensus, and to make recommendations before filing any study, operating or implementation plan, report, or facility design with the Commission. If after consideration by the Terrestrial Resources Working Group of all comments or recommendations, consensus is not achieved regarding the study, operating or implementation plan, report, or facility design, and any member of the Terrestrial Resources Working Group invokes dispute resolution pursuant to Section 7.5 of the Settlement Agreement, the Licensees shall not file any study, operating or implementation plan, report, or facility design with the Commission until the dispute resolution process has been completed. The Licensees shall include with the study, operating or implementation plan, report, or facility design: documentation of consultation with the working group, copies of comments and recommendations by working group members, and specific descriptions of how the comments and recommendations are accommodated by the study, operating or implementation plan, report, or facility design.

(c) The Licensees shall establish a Recreation Resources Working Group as provided in the Settlement Agreement. The Recreation Resources Working Group shall consist of the Licensees; USFS; BIA; BLM; CTWS BNR; ODFW; and Oregon Parks and Recreation Department (OPRD). The Licensees' development and implementation of study plans, reports, facility designs, and operating and implementation plans submitted to the Recreation Resources Working Group pursuant to the terms of this license shall comply with the requirements of the Settlement Agreement and the applicable License Implementation Plan. Unless a different time period is specifically established pursuant to another provision of this License, the Licensees shall, where consultation with the Recreation Resources Working Group is required, allow a minimum of 30 days for the Recreation Resources Working Group members to comment, work to achieve consensus, and to make recommendations before filing any study, operating or implementation plan, report, or facility design with the Commission. If after consideration by the Recreation Resources Working Group of all comments or recommendations, consensus is not achieved regarding the study, operating or implementation plan, report, or facility design, and any member of the Recreation Resources Working Group invokes dispute resolution pursuant to Section 7.5 of the Settlement Agreement, the Licensees shall not file any study, operating or implementation plan, report, or facility design with the Commission until the dispute resolution process has been completed. The Licensees shall include with the study, operating or implementation plan, report, or facility design: documentation of consultation with the working group, copies of comments and recommendations by working group members, and specific descriptions of how the comments and recommendations are accommodated by the study, operating or implementation plan, report, or facility design.

(d) The Licensees shall establish a Shoreline Management Working Group as provided in the Settlement Agreement. The Shoreline Management Working Group shall consist of the Licensees, USFS; BIA; BLM; CTWS BNR; ODFW; OPRD; and Jefferson County. Licensees' development and implementation of study plans, reports, facility designs, and operating and implementation plans submitted to the Shoreline Management Working Group pursuant to the terms of this license shall comply with the requirements of the Settlement Agreement and the applicable License Implementation Plan. Unless a different time period is specifically established pursuant to another provision of this license, the Licensees shall, where consultation

with the Shoreline Management Working Group is required, allow a minimum of 30 days for the Shoreline Management Working Group members to comment, work to achieve consensus, and to make recommendations before filing any study, operating or implementation plan, report, or facility design with the Commission. If after consideration by the Shoreline Management Working Group of all comments or recommendations, consensus is not achieved regarding the study, operating or implementation plan, report, or facility design, and any member of the Shoreline Management Working Group invokes dispute resolution pursuant to Section 7.5 of the Settlement Agreement, the Licensees shall not file any study, operating or implementation plan, report, or facility design with the Commission until the dispute resolution process has been completed. The Licensees shall include with the study, operating or implementation plan, report, or facility design: documentation of consultation with the working group, copies of comments and recommendations of working group members on the completed study, operating or implementation plan, report, or facility design after it has been prepared and provided to the working group, and specific descriptions of how the comments of the Shoreline Management Working Group members are accommodated by the study, operating or implementation plan, report, or facility design.

(e) The Licensees shall establish the Pelton Round Butte Fund Governing Board as provided in the Pelton Round Butte Fund Implementation Plan, Exhibit H to the Settlement Agreement. The Pelton Round Butte Fund Governing Board shall be comprised of eleven signatories of the Settlement Agreement, including one representative or designee from the following agencies or organizations: Licensees (one representative collectively); CTWS BNR; CTWS WCB; USFWS; NOAA Fisheries; BIA; USFWS/BLM (one representative collectively); ODFW; ODEQ; OWRD; and non-governmental organizations (American Rivers, Oregon Trout, Trout Unlimited, Native Fish Society, WaterWatch of Oregon (one representative collectively)).

Article 2. Inspection of Project

The Licensees shall allow parties to the Settlement Agreement access to, through, and across Pelton Round Butte Hydroelectric Project lands and works for the purpose of inspecting facilities and records, including monitoring data, to ensure compliance with the Project license, and with the Settlement Agreement. The Licensees shall allow such inspections only after the entity requesting the inspection provides the Licensees reasonable notice of such inspections and agrees to follow the Licensees' standard safety and security procedures when engaged in such inspections.

Article 3. Law Enforcement

Within one year of license issuance, the Licensees shall enter into an agreement with Jefferson County pursuant to which the Licensees shall fund one additional land-based law enforcement officer and two additional part-time marine or law enforcement personnel for law enforcement on Project lands and waterways. The Licensees shall provide adequate funding to underwrite the salaries, benefits, training, watercraft and vehicles and associated law enforcement equipment and supplies to support the needed enforcement personnel. The agreement shall provide that the responsibilities of the land-based permanent full-time enforcement officer shall include compliance with the relevant provisions of the Terrestrial Resources Management Plan, including, but not limited to, seasonal and permanent road closures, all-terrain vehicle use, eagle

nest sites and winter range area protection, dispersed camping, shooting ordinances, wildlife harassment, and coordination with Oregon State Police and Coordinated Enforcement Programs.

Article 4. Emergency or Special Conditions

(a) If at any time, unanticipated circumstances or emergency situations arise in which Endangered Species Act (ESA) listed fish or wildlife are being killed, harmed or endangered by any of the Project facilities or as a result of Project operation, the Licensees shall immediately take appropriate action to prevent further loss. The Licensees shall, within 6 hours, notify the nearest office of the Oregon Department of Fish and Wildlife (ODFW), National Marine Fisheries Service (NOAA Fisheries), U.S. Fish and Wildlife Service (USFWS), Confederated Tribes of the Warm Springs Reservation Branch of Natural Resources (CTWS BNR), Confederated Tribes of the Warm Springs Reservation Water Control Board (CTWS WCB), Oregon Department of Environmental Quality (ODEQ), and Oregon Water Resources Department (OWRD), as appropriate, and comply with any restorative measures required by the resource agencies.

(b) If at any time, unanticipated circumstances or emergency situations arise in which non-ESA listed fish or wildlife are being killed, harmed or endangered by any of the Project facilities or as a result of Project operation, the Licensees shall immediately take appropriate action to prevent further loss. The Licensees shall, within 48 hours, notify the nearest office of the ODFW, NOAA Fisheries, USFWS, CTWS BNR, CTWS WCB, ODEQ, and OWRD, as appropriate, and comply with any restorative measures required by the resource agencies.

Article 5. Activities on Forest Service or Bureau of Land Management Lands

(a) Additional lands of the US Forest Service (USFS) or Bureau of Land Management (BLM) that are authorized for use by the Licensees in a license amendment shall be subject to laws, rules, and regulations applicable to the USFS or BLM, as appropriate. Within six months of such an amendment, the Licensees shall obtain a special use authorization from the USFS or BLM, as applicable, for occupancy and use of any lands added to the Project boundary and file it with the Commission. The special use authorization also shall be subject to applicable enforcement procedures of the Commission at the request of the USFS or BLM.

(b) The Licensees shall not make changes in the location of any constructed Project features or facilities located on National Forest System (NFS) or BLM lands, or make any departure from the requirements of any approved exhibits authorizing use or occupancy of NFS or BLM lands filed with the Commission and authorized by the new license as issued and amended before receiving written approval from the USFS or BLM. Following receipt of such approval from the agency, and at least 60 days prior to initiating any such changes or departure, the Licensees shall file a report with the Commission and with USFS or BLM as appropriate, describing the changes, the reasons for the changes, and showing the approval of the agency for such changes. .

(c) After consultation with the USFS or BLM and before starting any activity on NFS or BLM land that USFS or BLM, as appropriate, determines may affect another federally authorized activity on those lands, the Licensees shall participate with USFS or BLM in resolving any potential conflicts with representatives of those permitted uses.

(d) The Licensees shall prepare site-specific plans for approval by USFS or BLM for habitat and ground disturbing activities on NFS or BLM lands required by the license, including activities contained within resource management plans required by the license that shall be prepared subsequent to license issuance. The Licensees shall prepare such site-specific plans as defined in this license or on a schedule as agreed to by the Licensees and USFS or BLM as appropriate. The Licensees shall include in such site-specific plans the following:

(i) A map depicting the location of the proposed activity.

(ii) A description of the land management area designation for the location of the proposed activity and applicable standards and guidelines.

(iii) A description of alternative locations, designs, mitigation measures considered, and implementation and effectiveness monitoring designed to meet applicable standards and guidelines

(iv) Data collected from surveys, biological evaluations or consultation as required by regulations applicable to ground or habitat disturbing activities on National Forest System or BLM lands in existence at the time the plan is prepared.

(1) When surveys indicate the activity may affect a species proposed for listing or listed under the federal Endangered Species Act, or that may affect that species' critical habitat, the Licensees shall prepare a Biological Assessment evaluating the potential impact of the action on the species or its critical habitat and submit it to the USFS or BLM, as appropriate, for review prior to submission to the Commission and the United States Fish and Wildlife Service or National Marine Fisheries Service, as appropriate, for consultation or conference pursuant to the Endangered Species Act.

(2) When surveys indicate the activity may affect a USFS Regional Forester sensitive species, or a BLM Special Status species, or their habitat, the Licensees shall prepare a Biological Evaluation evaluating the potential impact of the action on the species or its habitat and submit it to the USFS or BLM, as appropriate, for approval. In consultation with the Commission, the USFS or BL:M may require mitigation measures for the protection of the sensitive species

(e) The Licensees shall conduct or fund any environmental analysis deemed necessary by the USFS or BLM, as appropriate, for site-specific activities or plans. This shall include, but not be limited to, funding for agency review and agency specialists involved in scoping, site-specific resource analysis, and cumulative effects analysis sufficient to meet the requirements of agency regulations under NEPA or other environmental laws in existence at the time the process is initiated.

Article 6. Escalation of Costs

Unless otherwise indicated, all costs or payment amounts specified in dollars shall be deemed to be stated as of the year 2004, and the Licensees shall escalate such sums as of January 1 of each following year (starting in January 2005) according to the following formula:

$$AD = D \times \frac{NGDP}{IGDP}$$

WHERE:

AD = Adjusted dollar amount as of January 1 of the year in which the adjustment is made.

D = Dollar amount prior to adjustment.

IGDP = GDP-IPD for the third quarter of the year before the previous adjustment date (or, in the case of the first adjustment, the third quarter of the year before the Effective Date).

NGDP = GDP-IPD for the third quarter of the year before the adjustment date.

"GDP-IPD" is the value published for the Gross Domestic Product Implicit Price Deflator by the U.S. Department of Commerce, Bureau of Economic Analysis in the publication *Survey of Current Business*, Table 7.1 (being on the basis of 2000 = 100), in the third month following the end of the applicable quarter. If that index ceases to be published, any reasonably equivalent index published by the Bureau of Economic Analysis may be substituted by the agreement of the agency and the Licensees. If the base year for GDP-IPD is changed or if publication of the index is discontinued, the Licensees shall promptly make adjustments or, if necessary, select an appropriate alternative index acceptable to the agency to achieve the same economic effect.

Article 7. Tribal Integrated Resources Management Plan

The Licensees shall not commence implementation of habitat or ground-disturbing activities on the Reservation of the Confederated Tribes of the Warm Springs Reservation of Oregon (CTWS) before complying with the requirements of the Integrated Resources Management Plan promulgated by CTWS.

Operating Conditions

Article 8. Project Operating Plan

The Licensees shall implement the Project Operating Plan, Exhibit C to the Settlement Agreement, approved in Ordering Paragraph [B(1)], including but not limited to the measures described in Articles [9] to [14] of this License.

Article 9. Stage Change Limits

(a) The Licensees shall operate the Project with the following limits for stage changes below the Reregulating Development: 0.1 foot/hour and 0.4 foot/day from October 16 to May 14, and 0.05 foot/hour and 0.2 foot/day from May 15 to October 15, except during certain extraordinary conditions, including: (1) flood events; (2) any event that triggers the Project Emergency Action Plan; (3) rapid changes in Project inflows, when the rate of inflow change exceeds the proposed stage change limits; and (4) equipment failures or emergencies at the Project facilities. During such extraordinary conditions, the Licensees may deviate from these stage change limits.

(b) To monitor compliance with this requirement, the Licensees shall record the time and control signal value for all stage change instructions at the Reregulating Development and shall report any stage change control signals that are greater than the stage change limitations identified above. In addition, the Licensees shall provide written documentation of all measured stage changes at the U.S. Geological Survey Madras gage that deviate more than 0.15 ft from the control setpoint value.

Article 10. Measurement of Flows at the U.S. Geological Survey Madras Gage

For determining compliance with the minimum flow requirements in the license, the Licensees shall implement a protocol for measuring flows at the U.S. Geological Survey (USGS) gage at Madras, OR (gage no. 14092500), that includes the following elements:

(a) *Measured Madras Flow:* The real-time flow release at the USGS Madras gage shall be the most recent 15-minute interval USGS gage reading, converted to flow using the USGS level vs. flow rating table. The real time flow setpoint for the USGS Madras gage shall be the most recent 15-minute interval water level setpoint in the Reregulating Development control system, converted to flow using the USGS level vs. flow rating table. The daily outflow of the Project is defined as the average flow measured at the USGS Madras gage each calendar day. This daily outflow will be calculated from the average of the day's 96 quarter-hour (15 minute interval) flow release readings.

(b) *Determination of Allowed Minimum Flow:* The daily allowed minimum flow shall be determined each day by the Licensees, based on provisions of the Project Operating Plan, including monthly minimum flows, refill allowances, the ±10% rule, measured inflows and other constraints. The allowed minimum flow shall be the calculated flow in cubic feet per second (cfs) adjusted up or down to match the nearest 0.01 ft measurement increment of the USGS level vs. flow rating table. The allowed minimum flow shall be calculated by the Licensees before 6 a.m. of each day. Adjustment of the flow setpoint for each day shall be completed by 9 a.m. of each day.

(c) *License Compliance for Minimum Flows:* The Project shall be in compliance with the minimum flow requirements whenever the flow setpoint equals or exceeds the allowed minimum flow. In order to accommodate flow measurement inaccuracies, control-system variations, and the inability of the turbine and spillway gates to exactly produce the flow setpoint, non-compliance with this minimum flow requirement is defined as any event where the 15-minute measured flow release falls more than 0.10 ft (approximately 260 cfs) below the allowed minimum flow for more than 30 minutes.

Article 11. Measurement of Project Inflows

The Licensees shall improve the accuracy of Project inflow monitoring through a combination of upstream U.S. Geological Survey (USGS) gage improvements and the installation of additional lake level monitoring stations in Lake Billy Chinook. Estimates of inflow shall be made using a combination of the "Storage Change" and "Average Ungaged" estimating methods as defined in the Project Operating Plan, Exhibit C to the Settlement Agreement.

(a) *System Modifications and Improvements:* The Licensees shall fund work by the USGS as needed at the three upstream tributary gages (Crooked River – gage no. 14087400, Deschutes

River – gage no. 14076500, and Metolius River – gage no. 14091500) to allow real-time telemetry of hourly inflow data from these gages to the Licensees' Project control facility. The Licensees shall install two or more new lake level monitoring stations in Lake Billy Chinook at locations selected to reduce level measurement errors. The Licensees shall install data acquisition equipment, recording hardware and software as needed to calculate inflows on a timely basis and to document the inflow record.

(b) *Inflow Estimating Method*: The Licensees shall estimate total Project inflow every 6 hours using the "Storage Change" method. This method shall calculate inflow from measured water levels in the three Project reservoirs, reservoir storage vs. elevation tables, and the USGS Madras gage hourly flow record. The Lake Billy Chinook water level used in this calculation shall be the average of the level monitors in Lake Billy Chinook. The Lake Simtustus and Reregulating Reservoir water levels shall be the level recorded by the existing lake level monitors in these two impoundments.

The inflow from the three upstream USGS gages on the Crooked, Deschutes, and Metolius Rivers will be summed every 6 hours, and this sum shall then be subtracted from the 6-hour total inflow estimate to provide an estimate of the ungaged inflow to Lake Billy Chinook. This single 6-hour estimate of ungaged inflow will be combined with prior 6-hour estimates of the ungaged inflow (using a rolling average) to estimate the "Average Ungaged" Project inflow. The net estimated hourly inflow to the Project shall then be calculated by the sum of the average ungaged inflow and the hourly flows measured at the three upstream USGS gages. In the event the upstream USGS gages or communication systems fail, the Licensees shall use the 6-hour total Project inflow calculation to substitute for the hourly inflow estimate, until the real-time gage monitoring can be restored. The estimated daily inflow shall be the average of the day's 24 estimated hourly inflow values.

(c) *Schedule*: The inflow monitoring system, including all system modifications and improvements shall be installed and operational within two years of license issuance.

(d) *Modifications of Inflow Estimating Method*: At any time, the Licensees may propose modifications regarding the inflow estimating method to improve the accuracy of the system, or to simplify the system if such simplification will not result in less accuracy. The Licensees shall develop a plan for such modifications in consultation with the Fish Committee. Upon Commission approval, the Licensees shall implement the final plan.

Article 12. Required Minimum Flows below the Reregulating Development

(a) The Licensees shall operate the Project to provide flow releases below the Reregulating Development that equal or exceed the following minimum flows:

(i) *Target Flows:* The following table shows the target flows below the Reregulating Development for each calendar month. The allowed minimum flow shall equal the target flow when Project inflows exceed the target flows and the "Refill Allowance" provision is not in effect. When the "Or Inflow" or "Refill Allowance" provisions are in effect, the allowed minimum flow will be determined pursuant to subsections (ii) and (iii) below.

Target flow in cfs, measured at the USGS Madras Gage No. 14092500.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Target Flow	4,500	4,500	4,571	4,170	4,000	4,000	4,000	3,500	3,800	3,800	4,049	4,500

(ii) *"Or Inflow" Provision:* In order to prevent drawdown of Lake Billy Chinook, the allowed minimum flow shall be reduced below the target flow when Project inflows are less than the target flow. The allowed minimum flow shall be reduced in this case, according to the following protocol.

When the lowest daily inflow during the previous 7 days is below the target flow, the allowed minimum flow shall be equal to the lowest daily inflow recorded over the past 7 days. The allowed minimum flow shall be calculated each day when the "Or Inflow" provision is in effect and the allowed minimum flow shall be changed daily, as defined by the inflow estimate.

(iii) *"Refill Allowance" Provision:* The Project shall be allowed a "refill allowance" between November 15 and June 15 (the reservoir refill season) to store water in Lake Billy Chinook to ensure that Lake Billy Chinook is filled to its summer operating level (minimum elevation 1944.0) by May 15. The "refill allowance" shall be 150 cfs less than the lowest daily inflow recorded over the past 7 days, except under the following conditions: 1) from November through February, if daily inflows are less than 3,150 cfs and greater than 3,000 cfs, the refill allowance shall be the difference between the daily inflow and 3,000 cfs; however, in instances where the daily inflows are 3,000 cfs or less, the refill allowance shall be 0; and 2) from March through June, if daily inflows are less than 3,650 cfs and greater than 3,500 cfs, the refill allowance shall be the difference between the daily inflow and 3,500 cfs; however, in instances where the daily inflows are 3,500 cfs or less, the refill allowance shall be 0.

(iv) *Extension of Refill Allowance Provision:* If the refill allowance is less than 150 cfs during the reservoir refill season, the Refill Allowance Provision shall be extended from May 15 to June 15. During this additional month the refill allowance shall be determined based on the provisions in (a)(iii) above.

(b) *Fall Flow Augmentation in Lower River for Fall Chinook:* If Project inflows fall below 3,000 cfs between September 16 and November 15, the Licensees shall release up to 200 cfs from storage in Lake Billy Chinook to maintain a daily release of 3,000 cfs. This augmentation flow is limited to a drawdown of 4 ft measured from the average Lake Billy Chinook water surface elevation recorded on September 15. The Licensees shall consult with the Fish Committee regarding the amount of available water, rate of water release, and timing and duration of augmentation flows.

(c) *Run of River Operation for Lower River Flows (+/- 10% Rule):* The Licensees shall hold river flows below the Reregulating Development to within ± 10 percent of the measured Project inflow, except under the following conditions: (1) days with measured inflow in excess of 6,000 cfs; (2) any event that triggers the Project Emergency Action Plan; (3) power emergencies, as defined in the Western States Coordinating Council Minimum Operating Reliability Criteria

(March 8, 1999), as such criteria may be amended during the license term; (4) equipment failures or emergencies at one of the Project dams or power plants; or (5) reservoir drawdowns are needed for safe passage of anticipated flood flows to minimize damage to life and property.

(d) *Fish Emergency Clause:* In years in which Project inflow is expected to be below 3,000 cfs or flow may result in in-river conditions judged by the Fish Committee to be unacceptably poor, the Licensees shall consult with the Fish Committee to determine if a deviation from the "Or Inflow" provisions above or a deviation from the flow blending scheme required by the water quality certificates issued by the Oregon Department of Environmental Quality (ODEQ) and the Confederated Tribes of the Warm Springs Reservation Water Control Board (CTWS WCB) is likely to help avoid serious harm to native species. If the Fish Committee members agree, after consultation with ODEQ and the CTWS WCB, that a deviation is likely to help avoid such harm, and to be consistent with upstream and downstream beneficial uses, the Licensees shall file with the Commission a plan, prepared after consultation with the Fish Committee, to implement the deviation deemed necessary by the Fish Committee. Upon Commission approval, the Licensees shall implement the plan.

Article 13. Long-Term Low Flow Conditions

Within one year of license issuance, the Licensees shall file with the Commission a plan to track indicators of predicted long-term low flow (LTLF) conditions in the lower Deschutes River throughout the license. The plan will provide that (i) an LTLF trigger or multiple LTLF triggers will be established, using the indicators, that signal predicted onset or realized onset of LTLF conditions in the river that are lower than historically observed at the U.S. Geological Service Madras gage; (ii) certain remedial actions will be initiated if an LTLF trigger is reached; (iii) these LTLF triggers will not be developed or implemented to address low flows of a non-long-term nature that may otherwise be addressed by the Fish Emergency Clause in Article 12 subsection (d) above; and (iv) the LTLF trigger(s) will be reviewed and, if necessary, modified, at least every ten years considering new information and changes in predictive capabilities. The Licensees shall develop the plan after consultation with the Fish Committee. Upon Commission approval, the Licensees shall implement the plan.

(a) If the LTLF trigger is reached, the Licensees shall consult with the Fish Committee, Oregon Department of Environmental Quality, and the Confederated Tribes of the Warm Springs Reservation Water Control Board to identify any negative effects to aquatic resources and Federal Wild & Scenic River outstandingly remarkable values (ORVs) resulting from the lower river flows, to identify potential mitigation measures in the lower Deschutes River basin, and to determine if changes in Project operations should be implemented to ameliorate such effects. The Licensees shall also consult with the Oregon Parks and Recreation Department and, as appropriate, the Terrestrial Resources Working Group, the Recreation Resources Working Group, and the Shoreline Management Working Group regarding potential impacts to ORVs, scenic waterway values, lake recreation, cultural/archaeological resources, shoreline erosion and riparian habitat that may result from potential changes in Project operations.

(b) If changes in Project operations are identified to mitigate any negative effects to aquatic resources and ORVs, the Licensees shall, in consultation with the entities identified in paragraph (a), prepare and file with the Commission a plan to implement such changes. Upon Commission approval, the Licensees shall implement the plan.

Article 14. Seasonal Drawdowns

(a) *Drawdown and Fluctuation Limits*: The Licensees shall begin the seasonal drawdown of Lake Billy Chinook in the fall of each year followed by refill during the late fall, winter and spring. The reservoir will be refilled as follows:

(i) by May 1 when inflows exceed the target flows;

(ii) by May 15 when inflows are below the target flows; and

(iii) by June 15 in years when the refill allowance is less than 150 cfs as provided in Article 12, subsection (a)(iii).

Drawdown and fluctuation limits for Lake Billy Chinook, Lake Simtustus and the Reregulating Reservoir shall be as shown in the following table.

Seasonal drawdown and fluctuation limits for Project reservoirs.		
	Operating Water Surface Elevation (feet)	
Reservoir	**Minimum Summer**	**Winter**
Lake Billy Chinook	1,944 (May 15* to Sept 15)	1,925 (Sept 16 to May 14)
Lake Simtustus	1,576 (June 1 to Aug 31)	1,573 (Sept 1 to May 31)
Reregulating Reservoir	1,414 (year round)	1,414 (year round)

*As provided in Article 12, in years when the refill allowance is less than 150 cfs, the refill date is June 15.

(b) During certain extraordinary situations, the Licensees may exceed the normal seasonal drawdown limits for the Project reservoirs. Such extraordinary situations include: (1) drawdown needed for safe passage of anticipated flood flows to minimize damage to life and property; (2) drawdown required to complete repairs on Project facilities (including spillway gates, the intake structures, or other dam structures); and (3) power emergencies, as defined in the Western States Coordinating Council Minimum Operating Reliability Criteria (March 8, 1999), as such criteria may be amended during the license term.

Article 15. Operations Compliance Plan

(a) Within six months of license issuance, the Licensees shall file with the Commission, for approval, an Operations Compliance Plan that describes how the Licensees will comply with the operational requirements of this license. The plan shall include, but not be limited to:

(i) a provision to monitor compliance with the stage change limit requirements specified in Article 9, the minimum flow requirements specified in Article 12, the refill requirements specified in Article 12, and lake level requirements specified in Article 14;

(ii) a description of the exact location of all gages and/or measuring devices that would be used to monitor compliance, the method of calibration for each gage and/or measuring device, the frequency of recording for each gage and/or measuring device, and a monitoring schedule;

(iii) provisions to notify the National Marine Fisheries Service (NOAA Fisheries), U.S. Fish and Wildlife Service (USFWS), Bureau of Indian Affairs (BIA), Bureau of Land Management (BLM), Oregon Department of Fish and Wildlife (ODFW), Oregon Department of Environmental Quality (ODEQ), Confederated Tribes of the Warm Springs Reservation Water Control Board (CTWS WCB), Confederated Tribes of the Warm Springs Reservation Branch of Natural Resources (CTWS BNR) and the Commission no later than 48 hours after the Licensees become aware of any deviation from the stage change limit requirements specified in Article 9, the minimum flow requirements specified in Article 12, the refill requirements specified in Article 12, or lake level requirements specified in Article 14;

(iv) a provision to maintain a log of Project operation;

(v) provisions for issuance of an Annual Project Operations Report and incident reports documenting any events where the operation of the Project is not in compliance with the operational requirements of this license. The Annual Project Operations Report shall include hourly and daily inflow records for the reporting period. Incident reports shall include hourly and daily inflow records as appropriate to document compliance with the relevant Project operating constraints. Copies of all reports shall be filed with the Commission and submitted to the Coordinating Committee established pursuant to the Settlement Agreement.

(vi) a provision for an annual project review meeting with the Coordinating Committee established pursuant to the Settlement Agreement; and

(vii) identification of a staff member of the Licensees to serve as an operations compliance monitor with the responsibility for coordinating and ensuring the implementation of the Compliance Monitoring Plan and serving as a point of contact for compliance inquiry purposes, including provision for notifying the Commission and the consulted agencies if and when the compliance monitor designee changes.

(b) The Licensees shall prepare the plan after consultation with the Fish Committee and the U.S. Geological Survey (USGS). The Licensees shall include with the plan documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the Fish Committee and USGS, and specific descriptions of how the comments of Fish Committee members and USGS are accommodated by the plan. The Licensees shall allow a minimum of 30 days for the Fish Committee members and the USGS to comment and to make recommendations before filing the plan with the Commission. If after consideration by the Fish Committee and USGS of all comments or recommendations, consensus is not achieved regarding the plan, and any member of the Fish Committee invokes dispute resolution pursuant to Section 7.5 of the Settlement Agreement, the Licensees shall not file the plan with the Commission until the dispute resolution process has been completed. The Licensees shall include with the plan documentation of consultation with the Fish Committee and USGS, copies of committee member comments and recommendations on the plan after it has been prepared and provided to the Fish Committee and USGS, and specific descriptions of how the comments are accommodated by the plan. Upon Commission approval, the Licensees shall implement the plan.

Article 16. Water Quality Monitoring

The Licensees shall conduct water quality monitoring pursuant to the Water Quality Management and Monitoring Plan (WQMMP) approved by the Oregon Department of Environmental Quality (ODEQ) and the Confederated Tribes of the Warm Springs Reservation Water Control Board (CTWS WCB) as part of the water quality certifications issued by those agencies and attached to this license as Appendices A-1 and A-2, respectively, and any subsequent amendments to the WQMMP approved by ODEQ and CTWS WCB. Copies of the annual reports submitted to ODEQ and CTWS WCB shall be filed with the Fish Committee and the Commission within 30 days of their filing with ODEQ and CTWS WCB.

Aquatic Resources

Article 17. Fish Passage Plan

The Licensees shall implement the Fish Passage Plan, Exhibit D to the Settlement Agreement, approved in Ordering Paragraph [B(2)], including but not limited to the measures described in paragraphs (a) through (d) of this article.

(a) The Licensees shall implement the Fish Passage Plan to establish self-sustaining harvestable anadromous fish runs of Chinook, steelhead and sockeye above the Project. The anadromous fish that are reintroduced shall pose acceptable minimal risks of fish disease agent introduction. The target population sizes to be used for self-sustaining harvestable runs of each species will be those developed by the Oregon Department of Fish and Wildlife (ODFW) and Confederated Tribes of the Warm Springs Reservation Branch of Natural Resources (CTWS BNR), in conjunction with the Licensees and the Fish Committee, based on historic information, modeling, habitat production capacity estimates, and research results.

(b) The Licensees shall provide for safe, timely and effective upstream and downstream fish passage of adult and juvenile life stages of spring and fall Chinook, summer steelhead, sockeye salmon, bull trout, rainbow trout, and mountain whitefish.

(c) The Licensees shall implement a three-phase fish passage program, including sequential step-by-step implementation with clearly stated targets, accomplishments, consultation, and prerequisite requirements for each phase. The three phases are Experimental, Interim, and Final.

(i) The Experimental Passage Phase is the current stage of fish passage at the Project and includes but is not limited to modeling of currents in and water withdrawal from Lake Billy Chinook, conceptual designs for downstream passage facilities at Round Butte Dam, Pelton Fish Trap improvements, juvenile migration studies in Lake Billy Chinook, fish health monitoring, approval of the Fish Health Management program and stock selection of species.

(ii) The Interim Passage Phase shall include investigations of fish passage methods and construction of selective water withdrawal (SWW) facilities and temporary and permanent downstream passage facilities at Round Butte Dam. Actions and adaptive management studies for this phase shall include but are not limited to:

(1) Evaluation of the Round Butte Dam SWW system;

(2) Hydraulic and biological evaluation of the Round Butte Dam temporary and permanent downstream collection and fish handling facilities;

(3) Biological evaluation of the adult fish release facility;

(4) Modification and reactivation of the Pelton Dam historical downstream migrant facility;

(5) Conducting predation studies in Lake Billy Chinook; and

(6) Conducting fish health monitoring and evaluation.

(iii) The Final Passage Phase shall include actions and adaptive management studies for feasibility determination, development and construction of permanent upstream fish passage facilities, contingent on the achievement of successful downstream passage at the Project. These actions and studies shall include:

(1) Reactivation and evaluation of the Pelton Fish Ladder for volitional upstream fish passage;

(2) Construction of new ponds or facilities to rear juvenile spring Chinook or construction of a new ladder to retain or replace existing spring Chinook rearing capacity;

(3) Construction of a new fish ladder, or other volitional upstream fish passage facility, at Round Butte Dam; and

(4) Continued monitoring of the success, and improvement if necessary, of fish passage for all species.

(d) The Licensees shall conduct effectiveness monitoring, annual work plans, and a phased approach that includes:

(i) A specific schedule of timelines, including Testing and Verification studies, study results, and decisions;

(ii) Analysis of self-sustaining harvestable anadromous fish runs with the use of life cycle models and evaluation of passage efficiencies and survival estimates for the different life history stages of each species;

(iii) Establishment of performance measures and monitoring success towards achieving performance measures;

(iv) Evaluation of spawning and rearing and movement of re-introduced fish species;

(v) Evaluation of movement of native resident fish species upstream and downstream through Project facilities and reservoirs;

(vi) Trap and haul of adult fish subject to the long-term goal of volitional upstream fish passage, which will eventually require construction, evaluation, and monitoring of upstream collection facilities, if determined to be feasible;

(vii) During initial implementation, capturing and marking out migrating smolts from above the Project so that they may be differentiated from other returning adults in subsequent years;

(viii) Continued reservoir and drogue studies to refine operations and implementation of structural changes that will assist juvenile migration through Lake Billy Chinook;

(ix) Annual evaluation of stock performance success via outmigrant escapement and adult returns, including periodic evaluation and validation of the model results to determine the efficacy of the passage program;

(x) Preparation of design specifications for fish passage facilities in consultation with the Fish Committee and with approval by the appropriate Fish Agencies pursuant to their respective statutory authorities; and

(xi) Fish passage standards and monitoring, evaluation and reporting requirements.

Article 18. Fish Passage Criteria and Goals

(a) The Licensees shall provide that upstream and downstream passage facilities will be functional during all months of the year to provide safe, timely and effective passage for resident and anadromous fish.

(b) The following table summarizes the criteria and goals for safe, timely and effective downstream and upstream passage for fish.

Criteria And Goals For Safe, Timely And Effective Downstream And Upstream Passage	
Item	**Criteria and Goals**
1. Screen Hydraulic Criteria	NOAA Fisheries smolt criteria (as provided in Article 22)
2. Downstream Passage Facility Survival (from Round Butte collection to lower Deschutes River release point)	93 percent smolt survival for temporary facility during first five years of operations. 96 percent smolt survival for permanent facility.
3. Upstream Passage Facility Survival (from lower Deschutes River collection point through Adult Release Facility)	95 percent during first five years of operations. 98 percent after five years.
4. Round Butte Reservoir Downstream Passage Associated with Temporary Passage Facilities	>50 percent of a statistically significant sample of tagged steelhead or spring Chinook outmigrants from any Project tributary averaged over four years of study.
5. Round Butte Reservoir Downstream Passage Associated with Permanent Collection Facilities	>75 percent survival of PIT-tagged smolts calculated as a rolling 4-year average during the first 12 years.

Article 19. Fish Passage Schedule

The Licensees shall implement the comprehensive schedule for design, construction, operations and monitoring of upstream and downstream passage facilities included in the Fish Passage Plan, Exhibit D to the Settlement Agreement, approved in Ordering Paragraph [B(2)].

Article 20. Phased Construction of Selective Water Withdrawal and Downstream Fish Passage Facilities

(a) The Licensees shall prepare, in consultation with the Fish Committee and with approval by the appropriate Fish Agencies pursuant to their respective statutory authorities, and file with the Commission a design and schedule to construct the selective water withdrawal and downstream passage facilities in the following two phases in accordance with the approved schedule: (1) construction of the selective water withdrawal structure, which shall include a temporary downstream passage facility and (2) construction of the permanent downstream passage facility. The temporary and permanent facilities shall both include a sampling area to support biological evaluation of the fish screens and fish bypass facilities, and a mechanical screen cleaner or some other suitable device to prevent the accumulation of sediment and debris that might otherwise impair screen function and cause the delay, injury, or mortality of downstream migrating fish at Round Butte Dam. Upon Commission approval, the Licensees shall construct the selective water withdrawal ("SWW") and downstream passage facilities.

(b) The Licensees shall install and operate a permanent downstream fishway that meets National Marine Fisheries Service smolt criteria within the forebay at the Round Butte Dam, including fish screens, guidance devices, and fish bypass facilities as described in the Fish Passage Plan. The Licensees shall construct permanent downstream passage facilities after determining, in consultation with the Fish Committee, Oregon Department of Environmental Quality, and CTWS Water Control Board, that the blend of surface/deep water withdrawal through the selective water withdrawal facility will: (a) satisfy the criteria for safe, timely and effective downstream passage associated with temporary passage facilities set forth in Article 18; and (b) currently meet water quality criteria set forth in the 401 certificates, or likely meet the water quality criteria within a reasonable time through continued iterative adjustments of the SWW system as constructed with permanent downstream passage facilities and/or through implementation of other water quality management strategies. The Licensees shall evaluate downstream movement as described in the Fish Passage Plan.

(c) The Licensees shall notify the Fish Committee in writing when the downstream fishways are fully operational. Operation, maintenance, and monitoring of downstream fishways shall be conducted in accordance with the Downstream Fishway Operation and Maintenance Plan and Downstream Fishway Monitoring Plan, which the Licensees shall file with the Commission after consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities. Upon Commission approval and coincident with the initiation of downstream fishway operations, the Licensees shall begin implementation of the plans.

Article 21. Downstream Passage Facilities At Round Butte Dam

The Licensees shall submit for the review by the Fish Committee, and for approval by the appropriate Fish Agencies pursuant to their respective statutory authorities, the results of all

downstream fishway design investigations, preliminary design plans and specifications, and final design plans and specifications for the construction and operation of temporary and permanent downstream fishways at Round Butte Dam to meet National Marine Fisheries Service smolt criteria. To the extent not otherwise completed as Interim Measures as described in Exhibit B to the Settlement Agreement and reported to the Commission pursuant to Article 41, the Licensees shall complete the following modeling and design steps prior to the construction of the selective water withdrawal (SWW) facilities and the downstream fish passage facilities:

(a) *Constructability and Feasibility:* Constructability/feasibility design is the first step needed to select a design option and facility location.

(b) *Design Consultation:* After the constructability/feasibility design is complete and a preferred option is selected, the Licensees shall consult with the Fish Committee, Oregon Department of Environmental Quality, and the Confederated Tribes of the Warm Springs Water Control Board prior to starting detailed design.

(c) *Modeling:* If the constructability/feasibility studies do not result in a clear cut recommended design selection, then computational fluid dynamics (CFD) modeling may be used to provide additional input into the selection.

(d) *Design selection:* If the CFD modeling is not required to make the design selection, CFD modeling and the progression to the 25% design stage will be conducted concurrently. The CFD modeling results will be used to optimize facility geometry and to review design features to provide the best attraction currents in the forebay and around the facility.

(e) *Physical Model:* After the 25% design stage and the CFD modeling have been completed, the results will be used to construct a physical model of the structure. The primary purpose of the physical modeling is to investigate the internal hydraulics of the structure and to evaluate entrance hydraulic conditions. Concurrently, the design will progress to the 50% stage.

(f) *Design Consultation and Review:* After the physical modeling is complete and the design has progressed to 50%, consultation with the Fish Committee (and with the Commission for dam safety purposes) will be undertaken prior to proceeding with further design.

(g) *Final Consultation:* After consultation is complete, the design will progress to 90%, and then to final status. The Licensees shall file the final design with the Commission after consultation with the Fish Committee and with approval by the appropriate Fish Agencies pursuant to their respective statutory authorities. Upon Commission approval, the Licensees shall construct the SWW and temporary downstream passage facilities.

Article 22. Criteria for Downstream Passage Screen Design

(a) The downstream passage facilities at Round Butte Dam shall meet the National Marine Fisheries Service (NOAA Fisheries) smolt criteria; however, the facilities' exclusion plates do not have to meet the NOAA Fisheries criteria for sweeping velocity and contact time.

(b) The smolt criteria include, but are not limited to, a maximum approach velocity perpendicular to the screens and exclusion plate of 0.80 feet per second (fps), screen openings no larger than 0.25 inches, a screen sweeping velocity component no less than 0.80 fps, and a screen contact time no greater than 60 seconds. Due to the size of the structure and the experimental nature of safely attracting and capturing juvenile migrants from Lake Billy Chinook, some

components of the fish screen and bypass system may require flexibility to design and construct to NOAA Fisheries smolt criteria, and the Licensees shall design the fish screening and collection facilities in consultation with the Fish Committee based on the best available scientific information.

(c) The Licensees shall design screening facilities to screen less than 14,000 cfs only if water quality modeling verifies that flows above 9,000 cfs can be routed through the deep intake without impact to the Project's ability to meet water quality standards and without detrimental impact to the flow pattern and fish attraction in Lake Billy Chinook.

Article 23. Round Butte Deep Exclusion Screen

(a) The Licensees shall design the Round Butte deep exclusion screen to meet National Marine Fisheries Service (NOAA Fisheries) smolt criteria except for the criteria for sweeping velocity and contact time. In addition, outmigrant collection facilities will not be required at the deep exclusion screen. The Licensees shall evaluate hydraulic performance as soon as possible after the deep exclusion screen has been installed. If the screen does not meet applicable NOAA Fisheries smolt criteria at full hydraulic capacity, the Licensees shall take any necessary measures to meet applicable NOAA Fisheries smolt criteria. The Licensees shall continuously monitor differential pressure though the deep exclusion screen while the lower withdrawal system is in operation.

(b) The Licensees shall conduct studies of fish impingement at the Round Butte deep exclusion screen. Monitoring will be conducted during the first year after installation of the deep exclusion screen when deepwater withdrawal has been initiated, and when deepwater withdrawal is maximized. The duration of monitoring will depend on the monitoring method selected, but must be for a period sufficient for evaluating the possibility of impingement.

(c) The Licensees shall monitor the hydrodynamic and biological effects of Project operations during the first season after installation of permanent screens for the Round Butte downstream fish passage facility, and at least once every five years thereafter. The Licensees shall, in consultation with the Fish Committee, evaluate the need for additional monitoring based on the previous monitoring data.

(d) If the monitoring indicates that there is impingement of fish at the Round Butte deep exclusion screen, the Licensees shall consult with the Fish Committee to determine if impingement is significant because it impedes the Licensees' ability to achieve the objectives for Interim and Permanent Downstream Passage. If the Fish Committee determines that the effects are significant, the Licensees shall, in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective authorities, take any feasible measures or implement modifications within their control that are necessary to reduce impingement below the level of significance. These measures include but are not limited to operations modifications, cleaning system modifications, louver adjustments, and deterrent systems such as strobe lights or sound to keep fish away from the exclusion screening. The Licensees shall re-evaluate the facility the next time deepwater withdrawal has been initiated or maximized. If there are no feasible structural or operational measures within the Licensees' control that will reduce impingement below significant levels, the Licensees shall, in consultation with the Fish Committee, investigate and implement alternative mitigation measures.

Article 24. Downstream Passage Facility Pumped Attraction

The Licensees shall design the permanent downstream collection facility at Round Butte Dam to include the ability to add pumps with a total capacity of 3,000 cfs and all appurtenant devices. The Licensees shall, before construction of the permanent downstream collection facility, prepare and provide the Fish Committee a report on the need to add pumped attraction flow. The report shall be based on information gathered during the Testing and Verification studies pursuant to Article 29 and prepared in consultation with the Fish Committee. If the Fish Agencies conclude that it is necessary to add pumped attraction flow, the Licensees shall, in consultation with the Fish Committee and with approval by the appropriate Fish Agencies pursuant to their respective statutory authorities, develop a plan to design, construct, and operate pumps to provide appropriate attraction flow to the permanent downstream collection facilities. Upon approval by the appropriate Fish Agencies pursuant to their respective statutory authorities, the Licensees shall submit the plan to the Commission for approval. Upon Commission approval, the Licensees shall implement the plan.

Article 25. Trap and Haul Facilities

(a) The Licensees shall provide upstream passage using trap and haul until volitional upstream passage is implemented pursuant to provisions of the Fish Passage Plan.

(b) The Licensees shall, in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, file with the Commission a final monitoring plan for the operation and maintenance of trap-and-haul fishways at the Pelton Round Butte Project. The plan shall provide for the submission of an annual monitoring report to the Fish Committee for the duration of the operation of the interim trap-and-haul fishways. Upon Commission approval, the Licensees shall implement the plan.

(c) The Licensees shall, in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, file with the Commission a plan for conducting tests of upstream passage facility survival using standard methodology for evaluation of direct injury and mortality, and other factors. The plan shall provide that, in consultation with the Fish Committee the Licensees shall take any feasible measures or implement modifications within their control that are necessary to meet the 95 percent survival standard during the first five years of operations, and the 98 percent survival standard after five years. This survival standard applies to collection at the Pelton Trap, transportation to the adult release facility, and release through the adult release facility. After correcting any deficiencies, the Licensees shall re-test the facilities to ensure compliance with the applicable upstream passage facility survival standard. After compliance with the upstream passage facility survival standard is verified, additional re-testing will only be required if deficiencies are observed. The plan will identify the methods of observation used to detect deficiencies through long-term monitoring. Upon Commission approval, the Licensees shall implement the plan.

Article 26. Adult Release Facility

(a) *Design and Construction of Adult Release Facility.* The Licensees shall, in consultation with the Fish Committee and with approval of the appropriate Fish Agencies pursuant to their respective statutory authorities**,** develop and file with the Commission preliminary design, final

design, and construction plans for an Adult Release Facility at the Round Butte forebay. Upon Commission approval, the Licensees shall implement the plans.

(b) *Operation of Adult Release Facility.* The Licensees shall, in consultation with the Fish Committee and with approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, develop and file with the Commission an operation and maintenance plan for the Adult Release Facility for the safe, timely and effective upstream passage of anadromous fish when Lake Billy Chinook is thermally stratified. Upon Commission approval, the Licensees shall implement the plan.

(c) *Monitoring and Evaluation of Adult Release Facility.* The Licensees shall, in consultation with the Fish Committee and with approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, develop and file with the Commission a monitoring and evaluation plan for the Adult Release Facility. Upon Commission approval, the Licensees shall implement the plan.

(d) *Modifications to Adult Release Facility.* The Licensees shall prepare and provide the Fish Committee reports in accordance with the monitoring and evaluation plan for the Adult Release Facility. The reports shall be based on monitoring of the Adult Release Facility, shall describe any possible need to modify the Adult Release Facility, and shall be prepared in consultation with the Fish Committee. If the Fish Agencies conclude that the Adult Release Facility must be modified to ensure safe, timely, and effective upstream passage, the Licensees shall, in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, develop a plan to modify the Adult Release Facility to ensure safe, timely, and effective upstream passage, which plan may include, but need not be limited to, measures or modifications required to meet the survival standard applicable to collection at the Pelton Fish Trap, transportation to the Adult Release Facility, and release through this facility into Lake Billy Chinook. Upon approval by the appropriate Fish Agencies pursuant to their respective statutory authorities, the Licensees shall submit the plan to the Commission for approval. Upon Commission approval, the Licensees shall implement the plan.

Article 27. Volitional Upstream Passage

(a) Following the installation of the permanent downstream passage facilities at Round Butte Dam and within 24 months of when the downstream survival targets in the Fish Passage Plan for Lake Billy Chinook have been achieved, the Licensees shall conduct a study and provide the Fish Committee a report on the feasibility of volitional upstream passage. The scope of the feasibility study shall be determined in consultation with the Fish Committee. Factors to be addressed in the study, shall include, but not be limited to:

(i) Engineering feasibility;

(ii) Biological effectiveness, including but not limited to risk of disease transfer and stray rate for out-of-basin fish;

(iii) Cost;

(iv) Performance, including efficiency, of the existing trap-and-haul operation.

(b) Following submission of this report to the Fish Committee, the Licensees shall prepare a plan to implement volitional upstream passage at the Project, which plan shall include

appropriate testing and verification studies, unless the appropriate Fish Agencies determine pursuant to their respective statutory authorities that volitional upstream passage facilities should not be installed because:

(i) Oregon Department of Fish and Wildlife (ODFW) and Confederated Tribes of the Warm Springs Reservation Branch of Natural Resources (CTWS BNR) have determined that the risk of disease transfer is too great,

(ii) The stray rate for out of basin fish is not acceptable,

(iii) Volitional upstream passage is infeasible, as determined utilizing the results of the feasibility study, or

(iv) It is preferable, due to concerns with the state of the art for volitional upstream passage facilities combined with high efficacy of trap and haul operations, to continue the trap-and-haul operation for some additional specified period of time.

The plan shall be completed within 24 months of the Fish Agencies' determination that volitional upstream passage should proceed, and shall be prepared in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities. Upon approval by the Fish Agencies, the Licensees shall file the plan with the Commission. Upon Commission approval, the Licensees shall implement the plan.

(c) Upon any determination pursuant to paragraph (b) that volitional upstream passage should not be installed for the reasons specified in paragraph (b), the Licensees shall, within six months of such determination, and in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, file with the Commission a plan to continue trap-and-haul operations for a specified number of years and to conduct a future feasibility investigation as provided in paragraph (a). During any such continued trap-and-haul operation, the Licensees shall continue to monitor survival as required by Article 25 and shall take any feasible measures or implement modifications within their control to the trap-and-haul facilities that are necessary to comply with the survival standard in Article 25. Upon Commission approval, the Licensees shall implement the plan.

Article 28. Passage at Pelton Dam

(a) The Licensees shall transport all juvenile salmonids captured at the Round Butte downstream passage facility during the primary emigration period (February 1 through July 31) to the lower Deschutes River, bypassing Lake Simtustus and the Reregulating Reservoir. During the remainder of the year (August 1 through January 31), the Licensees shall, at the request of the Fish Committee, transport downstream-migrating salmonids into Lake Simtustus to utilize the lentic habitat it provides.

(b) If downstream-migrating salmonids are transported into Lake Simtustus, the Licensees shall, in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, file with the Commission a plan to upgrade the Round Butte Dam east side upstream fish trap at the head of Lake Simtustus, and operate it annually for part or all of the period May 1 through September 30 to capture and transport maturing adult resident salmonids upstream for release into Lake Billy Chinook. Upon Commission approval, the Licensees shall implement the plan.

(c) If downstream-migrating salmonids are transported into Lake Simtustus, the Licensees shall, in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, file with the Commission a plan to install a guidance net system at the Pelton Dam and shall operate the Pelton downstream passage facility (Pelton Skimmer) during part or all of the primary migration season (February 1 through July 31) to transport downstream migrants to the lower Deschutes River. Upon Commission approval, the Licensees shall implement the plan.

Article 29. Testing and Verification Studies

(a) The Licensees shall, within one year of license issuance, file with the Commission a schedule for the development of plans for Testing and Verification studies as described in this Article and in Appendix III of the Fish Passage Plan, Exhibit D to the Settlement Agreement, approved in Ordering Paragraph [B(2)]. The Licensees shall develop the schedule in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities.

(b) Upon Commission approval of the schedule, the Licensees shall develop the Testing and Verification study plans in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities. The study plans shall provide that the Licensees shall conduct these studies with continued involvement of the Fish Committee through the annual work planning and reporting process. Each study plan will include objectives, tasks and evaluation/decision criteria. Where appropriate, study plans will be designed to evaluate the effectiveness of individual fish passage facilities in achieving the criteria and goals set forth in Articles 18 and 22. Such effectiveness evaluations shall include, at a minimum, the number of fish, by species and life stage, captured and released by the facility and a record of observations on the physical condition of the fish using the facility fishways. The Licensees shall develop Test and Verification study plans for the following study areas:

(i) Facility Evaluation;

(ii) Physical Reservoir Changes with Selective Water Withdrawal;

(iii) Juvenile Salmonid Studies – Reintroduction of Anadromous Stocks Upstream of the Project;

(iv) Juvenile Salmonid Studies – Rearing, Juvenile Densities, Habitat;

(v) Juvenile Salmonid Studies – Juvenile Migration;

(vi) Juvenile Salmonid Studies – Reservoir Survival/Predation, Fishery, Disease;

(vii) Juvenile Salmonid Studies – Round Butte Dam Juvenile Collection, Downstream Transportation and Release;

(viii) Adult Salmonid Studies – Adult Upstream Trap-and-Haul and Adult Release Facility; and

(ix) Adult Salmonid Studies – Adult Migration/Survival/Spawning.

Study plans for multi-year studies shall provide that the Licensees may implement minor modifications to the study methodology in consultation with the Fish Committee. The need for any such minor modifications to the study methodology will be described in the annual progress

report and will be based on the results of the study to date. Following approval by the appropriate Fish Agencies pursuant to their respective statutory authorities, the Licensees shall file the study plans with the Commission. Upon Commission approval, the Licensees shall implement the plans.

(c) Based on results of the individual Testing and Verification studies, the Licensees shall, after consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, file plans with the Commission for making any modifications to the facilities needed to ensure safe, timely and effective fish passage. Upon Commission approval, the Licensees shall implement the plans.

Article 30. Modification of Downstream Facilities

The Licensees shall, in consultation with the Fish Committee and with approval by the appropriate Fish Agencies pursuant to their respective statutory authorities, develop plans for measures or modifications to the existing facilities needed to achieve the criteria and goals for safe, timely and effective fish passage set forth in Articles 18 and 22. The Licensees shall file such plans with the Commission and upon approval implement the measures or modifications.

Article 31. Long-Term Monitoring of Downstream Collection Facilities

Within one year after activating the permanent downstream collection facilities at Round Butte Dam, the Licensees shall file with the Commission, after consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, a plan for a long-term program to monitor downstream fish passage performance, as described in Appendix IV of the approved Fish Passage Plan, Exhibit D to the Settlement Agreement, approved in Ordering Paragraph [B(2)]. The plan shall provide that the Licensees shall begin the long-term monitoring of the downstream passage facilities as soon as practicable after the Testing and Verification studies have demonstrated that the permanent downstream collection facilities are meeting the survival criteria and goals set forth in Article 18. Upon Commission approval, the Licensees shall implement the plan.

Article 32. Annual Work Plans and Reports

(a) The Licensees shall utilize annual work plans to document actions to be implemented, develop monitoring and evaluation studies, and propose management, monitoring and evaluation strategies for the coming year consistent with the Fish Passage Plan. The annual work plans shall include separate study plans for each Testing and Verification study being conducted. The Licensees shall issue a draft annual work plan to the Fish Committee for review by no later than January 1, and based on consultation with the Fish Committee shall issue to the Fish Committee a final annual work plan by April 1.

(b) The Licensees shall also file an annual report with the Commission before June 1 of each year, documenting the activities of the previous year. The annual report will follow the format of the previously approved annual work plan. The annual report will include, but not be limited to:

(i) Numbers of fish by species moved upstream and downstream.

(ii) Upstream and downstream passage survival rates.

(iii) Estimates of fish mortality by species associated with the fish passage facilities.

(iv) A description and evaluation of any supplementation programs.

(v) Any changes in the work plan from adaptive management recommendations to the fish passage program that might resolve problems that have been identified.

Article 33. Fishway Maintenance

The Licensees shall keep all fishways in proper order and shall keep all fishway areas clear of trash, sediment, logs, debris, and other material that would hinder passage. The Licensees shall perform maintenance in sufficient time before a migratory period such that fishways can be tested and inspected and will operate effectively prior to and during the migratory periods.

Article 34. Infeasibility of Temporary Downstream Facilities

In the event that all steps identified in the Fish Passage Plan to improve collection efficiency of the temporary downstream facilities and reservoir passage or survival have been implemented, and the criteria and goals for downstream passage stated in Article 18 have not been achieved, the Licensees shall implement the following process:

(a) *Notification*. The Licensees shall notify the Commission and the Fish Committee that the temporary downstream passage facilities have not achieved the standards set out in the criteria and goals for downstream passage stated in Article 18 and that all steps identified in the Fish Passage Plan designed to improve collection efficacy and reservoir passage or survival have been taken as prescribed in the Fish Passage Plan.

(b) *Meeting*. The Licensees shall notice a meeting of the Fish Committee within 60 days of the notice to the Commission.

(c) *Information and Analyses from Testing and Verification Studies*. Not less than 45 days before the meeting, the Licensees shall provide the Fish Committee a report, including analysis of the information gathered during the operation of the temporary downstream passage facilities pursuant to the Testing and Verification provisions of the Fish Passage Plan, to inform a determination by the Fish Committee whether (i) testing and/or modification of the temporary downstream passage facilities should continue, (ii) an alternative fish passage methodology should be implemented, or (iii) fish passage is currently scientifically and technologically infeasible.

(d) *Plan with Passage Options*. Based on the information provided pursuant to paragraph (c), the Fish Committee shall determine whether the Licensees should develop a plan to continue operation and testing of the temporary downstream passage facilities, begin implementing an alternative fish passage plan, or pursue non-passage mitigation. The Licensees shall develop a plan to implement the passage option selected under this paragraph according to the following procedures:

(i) *Temporary Collection Facilities*: If the Fish Committee determines that the information provided pursuant to paragraph (c) shows demonstrable progress related to reservoir passage and survival, the Licensees shall, within 60 days following the meeting, develop a plan for the continued operation, any needed modification, and testing of the temporary downstream passage facilities. The

Licensees shall prepare the plan in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities. After approval by the appropriate Fish Agencies, the Licensees shall file the plan with the Commission. Upon Commission approval, the Licensees shall implement the plan.

(ii) *Alternative Fish Passage Plan*: If the Fish Committee determines that the information provided pursuant to paragraph (c) supports selection of an alternative fish passage plan, including but not limited to tributary trapping, substantially new proposals based on the selective water withdrawal system, or any other scientifically supported fish passage methodology, the Licensees shall, within 12 months of the meeting, develop an alternative fish passage plan. Any alternative fish passage plan shall be consistent with maintaining relevant water quality standards, including, but not limited to, continued operation of the selective water withdrawal facility, if the selective water withdrawal facility is necessary to achieve water quality standards. The Licensees shall prepare the plan in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities. After approval by the appropriate Fish Agencies, the Licensees shall file this plan with the Commission. Upon Commission approval, the Licensees shall implement the plan.

(iii) *Non-passage Mitigation*: If the Fish Committee determines that the information provided pursuant to paragraph (c) demonstrates that it is currently scientifically and technically infeasible for fish to be collected and passed around the Project, the Licensees shall, within 120 days of the meeting, develop a non-passage mitigation plan. Any non-passage mitigation plan must be consistent with the fish passage objective of providing ecosystem integrity and self-sustaining harvestable populations of fish and must provide alternative mitigation valued at an amount equivalent to the net present value of the cost that would otherwise have been incurred in the construction of permanent downstream fish passage facilities at Round Butte Dam and the net present value of the operations and maintenance of fish passage facilities that would have otherwise been incurred over the remaining term of the License. The Licensees shall prepare the plan in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities. After approval of the appropriate Fish Agencies, the Licensees shall file the plan with the Commission. Upon Commission approval, the Licensees shall implement the plan.

(e) *Feasibility*. The Licensees shall implement any plans developed under paragraph (d) of this Article according to the schedule and procedures set out in those plans. If a plan to continue operation and testing of the temporary downstream passage facilities or an alternative fish passage plan is determined to be infeasible according to the schedule and procedures set out in any plan developed under paragraph (d) of this Article, then the Licensees shall utilize the procedures beginning with paragraph (a) of this Article to initiate further proposals.

(f) *New Information Regarding Fish Passage*. If, after the Licensees have begun implementing non-passage mitigation, new information demonstrates that downstream fish passage may be feasible, the Licensees shall, within 60 days of receiving such information, notice a meeting of the Fish Committee to determine whether downstream fish passage should be

reinitiated. If the Fish Committee determines that downstream fish passage should be reinitiated, the Licensees shall develop a fish passage plan based on the new information then available. Such plan shall be developed in consultation with the Fish Committee and be consistent with least-cost alternatives that meet the goals and objectives of the Fish Passage Plan, and, upon approval by the appropriate Fish Agencies pursuant to their respective statutory authorities, the Licensees shall file the plan with the Commission. Upon Commission approval, the Licensees shall implement the plan.

Article 35. Infeasibility of Permanent Downstream Facilities

In the event that all steps identified in the Fish Passage Plan to improve collection efficiency of the permanent downstream facilities and reservoir passage or survival have been implemented, and the criteria and goals for downstream passage stated in Article 18 have not been achieved, the Licensees shall implement the following process:

(a) *Notification*. The Licensees shall notify the Commission and the Fish Committee that the permanent downstream passage facilities have not achieved the standards set out in the criteria and goals for downstream passage stated in Article 18 and that all steps identified in the Fish Passage Plan designed to improve collection efficacy and reservoir passage or survival have been taken as prescribed in the Fish Passage Plan.

(b) *Meeting*. The Licensees shall notice a meeting of the Fish Committee within 60 days of the notice to the Commission.

(c) *Information and Analyses from Testing and Verification Studies*. Not less than 45 days before the meeting, the Licensees shall provide the Fish Committee a report, including analysis of the information gathered during the operation of the permanent downstream passage facilities pursuant to the Testing and Verification provisions of the Fish Passage Plan, to inform a determination by the Fish Committee whether (i) testing and/or modification of the permanent downstream passage facilities should continue, or (ii) fish passage is currently scientifically and technologically infeasible for some or all species.

(d) *Plan with Passage Options*. Based on the information provided pursuant to paragraph (c), the Fish Committee shall determine whether the Licensees should develop a plan to continue operation and testing of the permanent downstream passage facilities, or pursue non-passage mitigation. The Licensees shall develop a plan to implement the passage option selected under this paragraph according to the following procedures:

(i) *Permanent Collection Facilities*: If the Fish Committee determines that the information provided pursuant to paragraph (c) shows demonstrable progress related to reservoir passage and survival, the Licensees shall, within 60 days following the meeting, develop a plan for the continued operation, any needed modification, and testing of the permanent downstream passage facilities. The Licensees shall prepare the plan in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities. After approval by the appropriate Fish Agencies, the Licensees shall file the plan with the Commission. Upon Commission approval, the Licensees shall implement the plan.

(ii) *Non-passage Mitigation*: If the Fish Committee determines that the information provided pursuant to paragraph (c) demonstrates that it is currently scientifically and technically infeasible for fish to be collected and passed around the Project, the Licensees shall, within 120 days of the meeting, develop a non-passage mitigation plan. Any non-passage mitigation plan must be consistent with the fish passage objective of providing ecosystem integrity and self-sustaining harvestable populations of fish and must provide alternative mitigation as provided in paragraphs (e) or (f), as appropriate. The Licensees shall prepare the plan in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities. After approval by the appropriate Fish Agencies, the Licensees shall file the plan with the Commission. Upon Commission approval, the Licensees shall implement the plan.

(e) *Fish Passage Infeasible after Permanent Facility Construction*: If fish passage is determined pursuant to paragraph (d) to be totally infeasible after permanent downstream fish passage facilities have been constructed at Round Butte, the Licensees shall provide alternative mitigation in an amount equivalent to the net present value of the cost of the operations and maintenance of fish passage facilities that would have otherwise been incurred over the remaining term of the License.

(f) *Partial Passage Success after Permanent Facility Construction*: If fish passage is determined pursuant to paragraph (d) to be infeasible for some but not all species, the Licensees shall provide alternative mitigation related to those species for which passage is infeasible in an amount equivalent to the net present value of the reduction in the cost of operations and maintenance of the fish passage facilities as a result of this determination.

(g) *Feasibility*. The Licensees shall implement any plan developed under paragraph (d)(i) of this Article according to the schedule and procedures set out in that plan. If continued operation and testing of the permanent downstream passage facilities is determined to be infeasible according to the schedule and procedures set out in any plan developed under paragraph (d) of this Article, then the Licensees shall utilize the procedures beginning with paragraph (a) of this Article to initiate further proposals.

(h) *New Information Regarding Fish Passage*. If, after the Licensees have begun implementing non-passage mitigation, new information demonstrates that downstream fish passage may be feasible, the Licensees shall, within 60 days of receiving such information, notice a meeting of the Fish Committee to determine whether downstream fish passage should be reinitiated. If the Fish Committee determines that downstream fish passage should be reinitiated, the Licensees shall develop a fish passage plan based on the new information then available. Such plan shall be developed in consultation with the Fish Committee and be consistent with least cost alternatives that meet the goals and objectives of the Fish Passage Plan, and, upon approval by the appropriate Fish Agencies pursuant to their respective statutory authorities, the Licensees shall file the plan with the Commission. Upon Commission approval, the Licensees shall implement the plan.

Article 36. Fish Health Management Program

(a) The Licensees shall enter into an agreement with the Oregon Department of Fish and Wildlife (ODFW) to develop a plan for a fish health management program at the Project to

support the fish passage effort, and to monitor disease incidence in Deschutes River fish populations and potential changes in the distribution of fish disease agents. This program shall include funding for fish health services and supplies associated with production of salmon and steelhead eggs and fry at Round Butte Hatchery as part of the Reintroduction Plan, diagnosis of disease in mortalities at fish facilities, and monitoring of disease agents in wild fish populations. The Licensees shall continue this program throughout the Interim Passage Phase and the first five years of the Final Passage Phase (or for the first 15 years of the Interim Passage Phase if transition to the Final Passage Phase does not occur). The Licensees shall file the plan with the Commission within 18 months of license issuance. Upon Commission approval, the Licensees shall implement the plan.

(b) Within six months of license issuance, the Licensees shall enter into an agreement with ODFW pursuant to which the Licensees shall fund one full-time ODFW fish health specialist (at the NRS 3 level) and one seasonal ODFW Experimental Biological Aide for the Interim Passage Phase and the first five years of the Final Passage Phase (or for the first 15 years of the Interim Passage Phase if transition to the Final Passage Phase does not occur). Such funding will include salaries, benefits, training, vehicle, travel, supplies, equipment, and overhead to support these ODFW personnel. The agreement will provide that the purpose of the funding is to support the evaluation of disease as a mortality factor in downstream and upstream migrating anadromous salmonids, to reduce the risk of transmitting new serious disease pathogens upstream, and other fish health management activities associated with the fish passage program.

(c) The Licensees shall follow fish pathogen procedures developed by ODFW Fish Health Services staff for trap-and-haul and volitional passage programs. Licensees shall be responsible for fish health as passage is implemented with oversight provided by ODFW Fish Health Services staff.

Article 37. Round Butte Hatchery

(a) *Hatchery Agreement***:** Within six months of license issuance, the Licensees shall enter into with Oregon Department of Fish and Wildlife (ODFW) and file with the Commission the "Agreement Related To The Operation Of The Round Butte Hatchery And Related Facilities" (the "Hatchery Agreement"), substantially consistent with the draft agreement included in Appendix B to the Settlement Agreement.

(b) *Hatchery Operations*: The Licensees shall fund hatchery operations at Round Butte Hatchery at no more than current production levels of spring Chinook and summer steelhead during the term of the license, which hatchery operations shall be consistent with: (i) the annual work plan developed under Article 32; (ii) then-in-existence fish management policies and directives of ODFW and the Confederated Tribes of the Warm Springs Reservation Branch of Natural Resources (CTWS BNR); (iii) any Hatchery Genetics Management Plan or other directive developed between ODFW and the National Marine Fisheries Service (NOAA Fisheries) pursuant to the Endangered Species Act (ESA); and (iv) the priority objective of restoring and recovering wild stocks in the Deschutes River basin. To ensure consistency with the Fish Passage Plan, the Licensees shall consult with the Fish Committee regarding hatchery operations.

(c) *Hatchery Improvements:* Within six months of entering into the Hatchery Agreement, the Licensees shall, after consultation with the Fish Committee, file with the Commission a

hatchery improvement plan to implement the hatchery improvements identified in the Hatchery Agreement. Upon Commission approval, the Licensees shall implement the plan.

(d) *Sockeye*: If the Fish Committee determines that hatchery supplementation is necessary in order to reestablish an anadromous population of sockeye above Round Butte Dam, the Licensees shall file a plan with the Commission to undertake the necessary changes in equipment to support hatchery capacity at the Round Butte Hatchery for the production of sockeye. Upon Commission approval of the plan, the Licensees shall either undertake such changes or provide funding to ODFW to enable it to undertake such changes.

(e) *Periodic Review:* Every five years after issuance of the license, the Licensees, in cooperation with ODFW and CTWS BNR, shall conduct a periodic review, to be funded by the Licensees, of the hatchery program to determine whether it is meeting its goals. The review shall consider federal, ODFW and CTWS BNR fish management policies and directives, any Hatchery Genetics Management Plan or other directive developed between ODFW and NOAA Fisheries pursuant to the ESA, relevant best practices, and existing information regarding recent scientific advances, and shall include recommendations for ongoing management of the hatchery program for the next five years. The Licensees shall make the draft hatchery review available to the Fish Committee for review and comment. The Licensees also shall make the draft hatchery review available for public review and comment through an annual workshop or other appropriate forum. The Licensees shall provide notice of the annual workshop to all Parties to the Settlement Agreement. The Licensees shall allow a minimum of 30 days for the consulted parties to comment prior to finalizing the hatchery review and filing it with the Commission. The Licensees shall specify in the final review how any comments and recommendations were addressed.

If the Licensees, ODFW, and CTWS BNR determine in the final review that the hatchery program is not supporting the goals of the Fish Passage Plan or supporting the goals of self-sustaining harvestable fisheries in the lower Deschutes River, the Licensees shall consult with ODFW and CTWS BNR regarding changes that may be made to hatchery operations and shall, if necessary, negotiate with ODFW to achieve changes to hatchery operations pursuant to the Hatchery Agreement.

Article 38. Pacific Lamprey

The Licensees shall, within one year of license issuance, file with the Commission, after consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, a Pacific lamprey passage evaluation and mitigation plan as described in the approved Fish Passage Plan, Exhibit D to the Settlement Agreement, approved in Ordering Paragraph [B(2)]. Upon Commission approval, the Licensees shall implement the plan.

Article 39. Native Fish Monitoring Program

The Licensees shall, within one year of license issuance, file with the Commission, after consultation with the Fish Committee, a native fish monitoring plan to evaluate effects of reintroducing anadromous fish on resident fish populations. Upon Commission approval, the Licensees shall conduct the monitoring program according to the plan, which shall include the following biological and habitat components:

(a) Biological Components:

(i) Sockeye, steelhead, and spring chinook spawning surveys, at locations and times determined by the Fish Committee, to assess spawning escapement, distribution, and timing for fish passed above the dams; redd counts in tributaries to Lake Billy Chinook, including the Metolius River system and Squaw Creek; and annual salmon and steelhead spawning surveys and redd counts beginning the first year that returning adult anadromous fish are passed upstream of the Project and continuing after initiation of downstream passage for the length of time (approximately 12 years) required for three generations of adults to return. This salmon/steelhead spawning monitoring will continue on an annual basis until the ratio of recruits to spawners (R/S ratio) is $\geq$1. Thereafter, as long as the R/S ratio remains $\geq$1, the spawning monitoring will be discontinued (unless otherwise determined by the Fish Committee). In the event that the R/S ratio decreases to <1, annual spawning monitoring will be resumed until the R/S ratio is $\geq$1

(ii) Monitoring of competition among anadromous and resident fish species in the Metolius and middle Deschutes River systems and McKay Creek following reintroduction of steelhead and salmon upstream of the Project, using a combination of population monitoring and redd counts, including the following:

(1) Annual population surveys of the resident redband trout population in Squaw Creek and McKay Creek beginning in the first year of the license; following reintroduction of anadromous fish above the Project, redband trout monitoring surveys in five of the first ten years after reintroduction.

(2) Counts of redband trout redds annually in Squaw Creek and the Metolius River basin, at locations and times determined by the Fish Committee, beginning in the first year of the license and continuing until initiation of upstream passage of returning anadromous adults; following the initiation of upstream passage, redband trout redd counts in five of the first ten years after the initiation of upstream passage.

(3) Determination of the proportion of redband trout and steelhead in Squaw Creek and McKay Creek at years 5 and 10 after reintroduction of steelhead.

(4) Annual (unless bull trout are delisted under the Endangered Species Act) evaluation of the bull trout population using ODFW's annual bull trout redd counts on Metolius River tributaries, annual reservoir angler surveys during the targeted March–April bull trout fishery at Lake Billy Chinook, and monitoring of bull trout at Project fish passage facilities.

(5) Monitoring of sockeye and bull trout spawning interactions through redd counts and observations for spawning site overlap during five of the first ten years after the initiation of upstream passage of returning anadromous adults; if interactions are found, more intensive redd surveys and spawning observations assessing the effects of sockeye redd superimposition on bull trout redds.

(b) Habitat Components:

(i) Monitoring of the quantity of habitat available upstream of the Project by surveying approximately 20 miles of accessible stream above the Project each year. Milestones for habitat availability monitoring will be (a) before upstream passage (as baseline), (b) immediately after initiation of upstream passage, and (c) whenever changes in the quantity of accessible habitat occur (e.g., in the event passage is initiated at upstream non-Project facilities), or as otherwise determined by the Fish Committee.

(ii) Monitoring of habitat effectiveness and riparian conditions above the Project, using commonly-accepted protocols and by surveying approximately 20 miles of accessible stream above the Project each year at locations and times determined by the Fish Committee. Habitat effectiveness will be monitored during the term of the new license through fish habitat surveys and production capacity estimates. Use of a geographic information system (GIS) database to incorporate the information and to develop, prioritize, and implement fish habitat mitigation projects and evaluate success for passage efforts.

(iii) Production capacity estimates for spring chinook, summer steelhead, and sockeye habitat within two years of license issuance. Annual reevaluation for the first ten years of the new license, and every five years thereafter, incorporation of the estimates of production capacity into life cycle modeling, and evaluation of passage success for the reintroduction of anadromous fish species above the Project.

(iv) Monitoring of the condition of habitat for any riparian habitat restoration project undertaken by the Licensees. Monitoring programs will be consistent with the strategies detailed in the Terrestrial Resources Management Plan, and may include the following parameters: vegetation species composition; bank stability; herbaceous cover; tree/juniper/shrub cover; height and diameter of trees; canopy cover; growth and physical condition of vegetation; and distribution of vegetation.

Article 40. Funding for ODFW Coordinator and Facilities Engineer

(a) Within six months of license issuance, the Licensees shall enter into an agreement with Oregon Department of Fish and Wildlife (ODFW) pursuant to which the Licensees shall fund one full-time ODFW fisheries biologist at the NRS 3 level for the Interim Passage Phase and the first five years of the Final Passage Phase (or for the first 15 years of the Interim Passage Phase, if transition to the Final Passage Phase does not occur). Such funding will include salaries, benefits, training, vehicle, travel, supplies, equipment, and overhead to support this ODFW employee. The agreement will provide that the purpose of the funding is to assist in coordinating ODFW's involvement in fisheries and terrestrial projects conducted pursuant to the terms of this license.

(b) Within six months of license issuance, the Licensees shall enter into an agreement with ODFW to fund 10% of the cost of an ODFW Facilities Engineer 3 from license issuance through the time of construction of the permanent downstream fish facility at Round Butte Dam. Such funding will include a pro rata share of salaries, benefits, training, vehicle, travel, supplies, equipment and overhead to support this ODFW employee. The agreement with ODFW shall provide that this funding will be reinstated if it is determined that the fish passage program will

progress to the Final Passage Phase, and new volitional upstream fish passage facilities will be designed and constructed. Such reinstated funding will continue until construction of Final Upstream Fish Facilities is completed.

Article 41. Implementation of Interim Measures

Within six months of license issuance, the Licensees shall file with the Commission a report, prepared in consultation with the Fish Committee, documenting the status of the Interim Measures described in Exhibit B of the Settlement Agreement.

Terrestrial Resources

Article 42. Terrestrial Resources Management Plan

(a) Within one year of license issuance, the Licensees shall file with the Commission a Terrestrial Resources Management Plan (TRMP) to implement terrestrial resource protection, mitigation, and enhancement (PME) measures as specifically set out and described in the TRMP Outline, Exhibit E to the Settlement Agreement. The TRMP shall be coordinated with the Recreation Resources Implementation Plan, the Shoreline Management Plan, and with existing laws and plans to ensure consistency among the plans' objectives. The TRMP shall be prepared after consultation with and with the approval of the Terrestrial Resources Working Group. Upon Commission approval, the Licensees shall implement the plan.

(b) The TRMP shall be the principal instrument for management of, implementation, monitoring and adaptation of PME measures for terrestrial resources affected by or related to the Project. The TRMP shall include specific goals for terrestrial resources, as well as clearly defined objectives for achieving the goals. The Licensees shall include in the TRMP the following resource management strategies for implementing specific PMEs:

(i) Riparian and wetland restoration and protection strategy;

(ii) Vegetation management strategy;

(iii) Exotic and invasive vegetation management strategy;

(iv) Comprehensive bald eagle management strategy;

(v) Raptor protection strategy;

(vi) Threatened, endangered, and sensitive (TES) species and habitats of special concern protection strategy;

(vii) Wildlife control strategy;

(viii) Travel and access management strategy;

(ix) Public access strategy;

(x) Pelton Fish Ladder wildlife protection strategy;

(xi) Wildlife monitoring strategy.

(c) The Licensees shall, after consultation with the Terrestrial Resources Working Group, file with the Commission by June 1 of each year after approval of the TRMP, an annual report documenting the implementation of the TRMP. The annual TRMP report shall:

(i) Document the implementation of PME measures as scheduled in the TRMP.

(ii) Describe the coming year's proposals for implementing scheduled management actions pursuant to the TRMP.

(iii) Document consultation activities related to the TRMP.

(iv) Document the results of monitoring of completed actions (to the extent monitoring is necessary for any particular action) to ensure proper implementation and effectiveness.

(d) The Licensees shall develop and implement an adaptive management process to monitor implementation and effectiveness of terrestrial resource PME measures, and adapt implementation measures as needed to meet resource specific goals and objectives. The Licensees, in consultation with the Terrestrial Resources Working Group, shall develop adaptive management proposals, including protocols and schedules, in consultation and coordination with the Terrestrial Resources Working Group. The TRMP shall be updated every 5 years during the license term in consultation with the Terrestrial Resources Working Group as part of the adaptive management process. As appropriate, the Licensees shall incorporate peer review into the adaptive management process to evaluate adaptive management actions and assess technical evaluations. Upon Commission approval, the Licensees shall implement the updated plan.

(e) The Licensees shall continue to fund and employ wildlife staff at the Project upon license issuance.

Article 43. Terrestrial Resource Interim Measures

The Licensees shall implement the following measures within one year of license issuance while the Terrestrial Resources Management Plan (TRMP) is being developed as provided in Article 42:

(a) *Upland Vegetation Management.* The Licensees shall implement upland vegetation management measures to improve, protect, and maintain terrestrial plant and wildlife habitat diversity on lands within the Project boundary. The measures shall anticipate, and to the extent possible be consistent with, the TRMP Vegetation Management Strategy.

(b) *Exotic and Invasive Vegetation Management.* The Licensees shall inventory and map noxious weed presence, distribution and density, and control, suppress, or eradicate existing infestations at sites identified in the TRMP Outline. The weed management measures shall anticipate, and to the extent possible be consistent with, the TRMP Exotic and Invasive Vegetation Management Strategy.

(c) *Bald Eagle Nesting Productivity Surveys.* The Licensees shall conduct bald eagle nesting surveys to monitor trends in nesting productivity and success, and the status of bald eagle nesting pairs that use the Project reservoirs. The nesting surveys shall be conducted using the protocol described in the TRMP Outline.

(d) *Bald Eagle Communal Roost Surveys.* The Licensees shall conduct fall and winter communal roost surveys at known bald eagle communal roosts associated with the Project reservoirs. The surveys shall be conducted using the protocols described in the TRMP Outline.

(e) *Bald Eagle Winter Use Surveys.* The Licensees shall conduct winter use surveys to monitor bald eagle winter use of the Project reservoirs. The surveys shall be conducted using the protocol described in the TRMP Outline.

(f) *Golden Eagle Nesting Productivity Surveys.* The Licensees shall conduct golden eagle nesting surveys to monitor trends in nesting productivity and success, and the status of golden eagle nesting pairs associated with the Project reservoirs. The surveys shall be conducted using the protocols described in the TRMP Outline.

(g) *Osprey Nesting Productivity Surveys.* The Licensees shall conduct osprey nesting surveys to monitor trends in the nesting productivity of ospreys that nest in association with the Project reservoirs. The Licensees shall conduct the surveys using the protocol described in the TRMP Outline.

(h) *Avian Power Line Electrocution and Collision.* The Licensees shall survey Project-related distribution lines to identify the potential for avian electrocution. These lines include the following: (1) 12.5-kV line to Round Butte Powerhouse (station service feeder); (2) 12.5-kV line to Round Butte Dam, Spillway, and Auxiliary Station Feeder; and (3) 12.5-kV line to the Reregulating Dam. To the extent practicable and following guidelines in the publication "Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996" (APLIC 1996) (or the most current Avian Power Line Interaction Committee [APLIC] publication for avian protection), the Licensees shall rebuild or retrofit any line or power pole involved in a bird fatality or injury or identified as a high risk for avian electrocution to render the facility raptor-safe.

(i) *Waterfowl Surveys.* The Licensees shall conduct waterfowl nesting productivity and winter use surveys to monitor trends in waterfowl production and use associated with the Project reservoirs. The surveys shall be conducted using the protocols described in the TRMP.

(j) *Pelton Fish Ladder Wildlife Protection.* The Licensees shall install five small animal crossings over the Pelton Fish Ladder, remove the shotgun style outlets from six culverts that pass under the fish ladder, and install a wildlife diversion device in the dirt canal section of the fish ladder to improve crossing opportunities for small mammals, reptiles, and amphibians, and reduce the potential for animal entrapment. The design and construction locations for the small animal crossings and the canal diversion device shall be determined in consultation with and with approval by the Terrestrial Resources Working Group.

Article 44. Funding For USFS Coordinator

Within six months after license issuance, the Licensees shall enter into a collection agreement with the U.S. Forest Service (USFS) providing that the Licensees shall make an annual contribution of an amount not to exceed $15,000 to the USFS for the purpose of supporting USFS and Bureau of Land Management participation in the development of the Terrestrial Resources Management Plan.

Recreation, Aesthetic, and Cultural Resources

Article 45. Recreation Resources Implementation Plan

(a) Within one year of license issuance, the Licensees shall file with the Commission a Recreation Resources Implementation Plan (RRIP) to implement recreation measures described in the List of Measures to be Included in the Recreation Resources Implementation Plan, Exhibit G to the Settlement Agreement according to the schedule identified for each measure. The RRIP shall be developed after consultation with the Recreation Resources Working Group. Upon Commission approval, the Licensees shall implement the RRIP.

(b) The RRIP will be consistent with existing laws and plans, and will be consistent with the following objectives:

(i) Effective management of recreation resources in the Project area in a manner consistent with agency and tribal objectives;

(ii) Adequate and safe public access to the reservoirs;

(iii) Avoidance or minimization of recreation related impacts on other sensitive resources;

(iv) Providing a range of feasible and desirable recreation opportunities consistent with the Pelton-Round Butte Comprehensive Management Plan, or any subsequent recreation management plan that replaces, amends, or supplements the Comprehensive Management Plan.

(c) In addition to the measures specifically identified in the List of Measures to be Included in the Recreation Resources Implementation Plan, Exhibit G to the Settlement Agreement, the Licensees shall implement measures designed to mitigate for Project-related recreation authorized or implemented by entities other than the Licensees, provided however, that the actions taken by those entities are consistent with the Comprehensive Management Plan, or any subsequent recreation management plan that replaces, amends, or supplements the Comprehensive Management Plan. Such additional measures shall be developed as needed in consultation with the Recreation Resources Working Group.

(d) Every 10 years beginning in the tenth year following license issuance, the Licensees shall convene a meeting of the signatories to the Pelton-Round Butte Comprehensive Management Plan to discuss unforeseen impacts of recreation patterns in the Project area (if any) and to agree upon appropriate management actions or mitigation measures.

(e) The Licensees shall implement the projects identified in the List of Measures to be Included in the Recreation Resources Implementation Plan, Exhibit G to the Settlement Agreement, at the Cove Palisades State Park, in accordance with the schedule specified in the Recreation Resources Implementation Plan, through a combination of in-kind services, sub-contracts, or other consideration, including cash payments or reimbursement as determined in cooperation with Oregon Parks and Recreation Department (OPRD) for each project or combination of projects. The Licensees shall consult with Oregon Department of Fish and Wildlife (ODFW) prior to new trail construction. If OPRD completes any project currently identified in the List of Measures to be Included in the Recreation Resources Implementation Plan, Exhibit G to the Settlement Agreement, prior to license issuance or the Licensees and

OPRD determine that greater efficiency could be gained by cost sharing some or all of the projects, OPRD may request that other project(s) of equivalent value be substituted. The Licensees shall undertake the substituted project(s); provided, the substituted project(s) shall be consistent with the Pelton-Round Butte Comprehensive Plan and the 1999 Cove Palisades State Park Master Plan; and provided further, the Licensees' commitment for substituted project(s) shall be limited to $1.6 million (2004 dollars) for the term of the license.

(f) The Licensees shall file with the Commission, after consultation with the Recreation Resources Working Group, an annual report documenting the implementation of the RRIP. The annual RRIP report shall:

(i) Document the implementation of measures as scheduled in the RRIP.

(ii) Describe the coming year's proposals for implementing scheduled recreation management actions.

(iii) Reconcile and document differences between each year's proposals and any replacement or additional measures agreed upon by the Licensees and the affected agencies.

(iv) Document consultation activities related to the RRIP.

(v) Document the results of monitoring of completed actions (to the extent monitoring is necessary for any particular action) to ensure proper implementation and effectiveness.

Article 46. Recreation Funding Measures

Within one year of license issuance, the Licensees shall:

(a) Enter into an agreement with the Confederated Tribes of the Warm Springs to provide annual funding for maintenance and operation of Indian Park Campground and Chinook Island Day-Use Area.

(b) Continue to provide annual funding for operation and maintenance (O&M) of Pelton and Round Butte Overlook parks, and Pelton Wildlife Overlook.

(c) Fund a Project staff position to coordinate implementation of the RRIP and to provide for necessary resource coordination.

(d) Fund seasonal O&M costs for one new self-contained floating restroom for use by boaters on the Metolius River Arm near the BLM beach east of Three Rivers Recreation Area.

(e) Close and rehabilitate the road leading into the Balancing Rocks area, develop a trail, and provide a small roadside parking area.

Article 47. Emergency Communications

(a) Within six months of license issuance, the Licensees shall file with the Commission a report detailing the results of a communications coverage study designed to address the following objectives:

(i) Emergency/Safety (ability for emergency response personnel to contact each other and to contact external emergency services);

(ii) Day-to-day management;

(iii) General public communication outside of the immediate reservoir areas.

The report shall be prepared in consultation with the Recreation Resources Working Group. Upon Commission approval, the Licensees shall implement the report, as provided in paragraph (b) of this Article.

(b) Within one year of license issuance, the Licensees shall fund measures identified in the coverage study as necessary for emergency/safety communications, including measures to provide coverage of existing "dead areas" on Project reservoirs using two-toned radio frequencies.

Article 48. Programs for Interpretation and Education

(a) Within five years of license issuance, the Licensees shall develop an Integrated Interpretation and Education Plan (I & E Plan) to inform the public about resource and Project features in the Project area, at a total expense to the Licensees of no more than $75,000 in then-current dollars. The I & E Plan will be developed in consultation with the Recreation Resources Working Group. The I & E Plan shall address important resources in the Project area, including but not limited to fish and aquatic resources, terrestrial and wildlife resources, cultural resources and tribal culture and history, and energy production and Project history. Themes related to terrestrial and wildlife resources may include resource stewardship, Threatened, Endangered and Sensitive species biology and protection, protection of sensitive plant communities, riparian habitat restoration, winter range protection, mule deer biology and habitat requirements, and causes and effects of human disturbance. Implementation elements may include signs and signboards at Rainbow and Mecca campgrounds on the Deschutes River below the Project, as well as at recreation facilities within the Project. The plan shall be prepared in consultation with the Recreation Resources Working Group. Upon Commission approval, the Licensees shall implement the plan.

(b) Annually, for the term of the license, the Licensees shall implement agreed-upon elements of the I & E plan at an annual cost of not more than $20,000, which amount shall be escalated as provided in Article 6.

(c) Annual work plans and reports regarding the Licensees' implementation of I & E plan measures will be included in the annual work plans and reports required in the Recreation Resources Implementation Plan.

Article 49. Shoreline Management Plan

Within one year of license issuance, the Licensees shall, in consultation with the Shoreline Management Working Group, file with the Commission a Shoreline Management Plan which shall include standards and guidelines for new shoreline development, installation of new docks, and modification of existing docks. Upon Commission approval, the Licensees shall implement the plan.

Article 50. Shoreline Erosion Plan

(a) Within one year of license issuance**,** the Licensees shall, in consultation with the Shoreline Management Working Group, file with the Commission a Shoreline Erosion Plan, which may be part of a larger Shoreline Management Plan, to monitor and control stream and impoundment shoreline erosion at the Project. The Shoreline Erosion Plan will address all Project-related shoreline erosion, and will:

(i) Discuss the conditions and probable causes of, as well as potential remedies for shoreline erosion;

(ii) Describe agreed upon actions, including, but not limited to the measures described in paragraphs (b)–(f), below; and

(iii) Provide that all actions conducted under the plan shall be developed and implemented in consultation with the Shoreline Management Working Group.

(iv) Provide that all actions conducted under the plan must be approved by the landowner or agency with management authority and be consistent with and permitted under existing laws and plans.

The Licensees shall develop the plan using the annotated outline in Section E-V11 – Land Management and Use of the Final Joint Application Amendment, and any other applicable information, in consultation with the Shoreline Management Working Group. Upon Commission approval, the Licensees shall implement the plan.

(b) Within three years of license issuance, the Licensees shall initiate actions following the process described in paragraph (g) at the following sites:

(i) Chinook Island

(ii) Indian Park Campground

(iii) Juniper Canyon

(iv) Big Canyon

(v) Dispersed sites on the east bank just south of Round Butte Dam

(vi) Dispersed sites on the east side of the Island Research Natural Area

(vii) Shoreline of the cove at Perry South Campground and along Spring Creek

(viii) Shoreline upstream of the Upper Deschutes Day-Use Area

(ix) Bureau of Land Management Beach east of the Three Rivers Marina

(x) Shoreline and access road at Monty Campground

(xi) Pelton Park

(c) The Licensees shall provide a third party expert, in consultation with the Shoreline Management Working Group, to perform a baseline survey of the Project area to identify, map, and assess all existing erosion sites that are Project related and are significantly affecting terrestrial habitats, fish habitats or water quality; or that, if the site is located on Reservation of the Confederated Tribes of the Warm Springs Reservation, is causing or is likely to cause significant loss of shoreline. For each erosion site identified, the Licensees shall include a re-

locatable topographic survey transect, notes on sediment types, vegetative condition or fish or wildlife habitat existing on the site, photographic documentation, and an analysis of the probable causes of the erosion.

(d) Beginning in the first year following license issuance, and in consultation with the Shoreline Management Working Group, the Licensees shall conduct annual condition monitoring of the Project area to monitor all existing erosion sites and identify and map any new Project-related erosion sites. This annual condition monitoring shall follow the pattern and standards established by the baseline survey performed above and shall include the opportunity for the Shoreline Management Working Group to accompany the Licensees' survey crew in the field. Information that is unchanged from any prior year's survey should be so noted, but need not be repeated. Annual monitoring of sites will occur until there has been documentation of stable or improved conditions, after which the period of additional monitoring can be changed based on agreement by the Shoreline Management Working Group. Annual monitoring shall also include effectiveness monitoring of ongoing mitigation activities.

(e) Not later than March 31 of each year after approval of the Shoreline Erosion Plan, the Licensees shall file an annual report, prepared in consultation with the Shoreline Management Working Group, which details mitigation activities, describes annual maintenance of erosion control sites, details any other erosion mitigation activities including those undertaken during emergency situations, describes coordination with other resource management plans including the Cultural Resources Management Plan, and documents consultation activities.

(f) In addition to the sites included in the annual monitoring above, the Licensees shall monitor all identified erosion sites following (i) any event at the Round Butte Development where the outflow exceeds inflow by more than the maximum turbine flow, (ii) any drawdown of Lake Simtustus resulting in seven or more feet of reservoir elevation change in a 24-hour period, or (iii) other events that could rapidly change the shoreline condition.

(g) The Licensees shall develop site-specific rehabilitation plans for all erosion sites listed above, and for any Project-related erosion sites identified during the baseline survey or subsequent annual monitoring,. The Licensees shall give preference to "soft" erosion control techniques including, bioengineering, planting and seeding of appropriate native riparian species, sediment replenishment, or anchored woody debris, but may, when necessary, utilize "hard" erosion control, including use of geotextiles, rock armoring, or other hard surfaces. The Licensees shall develop the site-specific rehabilitation plans in consultation with the Shoreline Management Working Group and any landowner affected by the proposed plan. After consultation, the Licensees shall file the plan with the Commission. Upon Commission approval, the Licensees shall implement the plan.

Article 51. Aesthetic Resources Protection Plan

(a) Within one year of license issuance**,** the Licensees shall, in consultation with the Recreation Resources Working Group, file with the Commission an Aesthetic Resources Protection Plan (ARPP) consistent with the requirements of this Article. Upon Commission approval, the Licensees shall implement the plan.

(b) The ARPP shall provide for the Licensees to implement the following specific measures:

(i) Fish Ladder

(1) Coat the outside surface that is visible from the wildlife viewing platform (approximately ¼ mile) with permeon.

(ii) Pelton Dam Road

(1) Investigate, in the 10th year following license issuance, whether feasible and economic solutions exist to reduce the color contrast associated with the road cuts.

(2) Within 10 years of license issuance, replace existing guardrail material with "rusted rail" guardrail material.

(iii) Round Butte Switchyard

(1) When transformers are being replaced for regular maintenance and replacement, replace them with grey transformers whenever available.

(iv) Pelton Park and Round Butte Overlook Park

(1) Apply compatible paint color on Pelton Park store and apartment building.

(2) Treat interior of Overlook building with compatible colors.

(3) When replacement is otherwise required, phase out existing fencing to non-galvanized, vinyl-coated fencing when adjacent to PGE recreation sites or Project-maintained public access roads to those parks.

(v) Round Butte Dam and the Round Butte Powerhouse Area

(1) Paint the Jefferson County Sheriff's boat house with a color agreed upon with the Forest Service.

(2) Consult with the Recreation Resources Working Group regarding (i) appropriate colors for any fish facilities constructed pursuant to the Fish Passage Plan, and (ii) appropriate treatments for any existing fish facilities on the top of Round Butte Dam or in the forebay that remain as long-term components of the fish passage program.

Article 52. Financial Support of U.S. Forest Service Recreational Facilities

(a) Within two years of license issuance, the Licensees shall either:

(i) Negotiate appropriate agreements with the U.S. Forest Service (USFS) that require that the Licensees shall collect and retain the revenue from and operate and maintain Perry South and Monty campgrounds and the facilities at Street Creek; or

(ii) Develop a mechanism that requires the Licensees to contribute to the USFS the following percentages of that portion of the operations and maintenance (O&M) costs that are in excess of the revenue collected related to the site:

(1) Perry South Campground percentage: 100%

(2) Monty Campground percentage: 30%

(3) Street Creek percentage: 100%

The formula is: (O&M costs – campground revenue) x site-specific percentage = contribution from the Licensees.

(b) The Licensees shall begin operations of the recreation sites or contributions to O & M beginning in the 2009 recreation season, after expiration of the current concessionaire agreement.

(c) The Licensees shall implement capital improvements at Perry South Campground, Monty Campground, and Street Creek recreation sites as described in the List of Measures to be Included in the Recreation Resources Implementation Plan, Exhibit G to the Settlement Agreement, as implemented in the Recreation Resources Implementation Plan pursuant to Article 45.

Article 53. Maintenance of U.S. Forest Service Roads

Within one year of license issuance, the Licensees shall enter into an agreement with the U.S. Forest Service (USFS) governing upgrades to and maintenance of USFS Roads FS 11 and FS 1170. The agreement shall provide for:

(a) A one-time contribution, within five years of license issuance, toward specified capital improvements for USFS Roads FS 11 and FS 1170. For USFS Road FS 11, the Licensees' contribution shall be 10% of total capital costs (up to $81,200); for USFS Road FS 1170, the Licensees' contribution shall be 81% of total capital costs (up to $361,000). The agreement may also provide that such contribution may be made in cash or in kind.

(b) Annual contributions, in cash or in kind, of 10% of the annual maintenance costs of USFS Road FS 11 and 81% of the annual maintenance costs of USFS Road FS 1170.

Article 54. Haystack Reservoir Infrastructure

Within one year of license issuance, the Licensees shall enter into an agreement with the U.S. Forest Service (USFS) that requires contribution of three payments to the USFS for infrastructure maintenance or improvements at Haystack Reservoir. These payments shall be distributed as follows: $10,000 in the fifth year after license issuance, $15,000 in twentieth year after license issuance, and $15,000 in the fortieth year after license issuance. These payments are not subject to escalation as provided in Article 6.

Article 55. BLM Lower River Recreation Sites

Within one year of license issuance, the Licensees shall enter into an agreement with Bureau of Land Management (BLM) to implement the following measures at the BLM-managed lower river recreation sites specified below.

(a) Beginning in fifth year after license issuance, the Licensees shall:

(i) Assist with campsite development at Mecca for 15 sites (for up to $15,000) and improve the Mecca campground road (for up to $28,000).

(ii) Improve road access to Mecca (1.5 miles) by re-grading and re-surfacing (up to $28,500).

(iii) Contribute $10,000 toward either a portion of the power line or a solar panel system at Trout Creek.

(iv) Contribute $5,000 for materials to plant Ponderosa pines along the river.

(b) Beginning in the seventh year after license issuance, the Licensees shall:

(i) Improve road access to Trout Creek campground (for up to $24,500).

(ii) Provide water at either Trout Creek or Mecca campground (for up to $25,000).

These payments are not subject to escalation as provided in Article 6.

Article 56. Jefferson County Road Maintenance Agreement

Within one year of license issuance, the Licensees shall enter into an agreement with Jefferson County pursuant to which the Licensees shall fund road maintenance activities on Jefferson County roads affected by traffic generated by the Project. The agreement shall be consistent with the term sheet attached as Appendix E to the Settlement Agreement.

Article 57. Historic Properties

The Licensees shall implement the "Programmatic Agreement (PA) among the Federal Energy Regulatory Commission, the Advisory Council on Historic Preservation, the State of Oregon, State Historic Preservation Officer, and the Confederated Tribes of the Warm Springs Reservation, Tribal Historic Preservation Officer for Managing Historic Properties That May be Affected By A License Issuing to Portland General Electric Company and the Confederated Tribes of the Warm Springs Reservation of Oregon for the Continued Operation of the Pelton Round Butte Hydropower Project in Jefferson County Oregon", executed on _____, 2004, including but not limited to the final Cultural Resources Management Plan (CRMP) for the Project (July 2003). In the event that the Programmatic Agreement is terminated, the Licensees shall implement the provisions of the final CRMP. The Commission reserves the authority to require changes to the CRMP at any time during the term of the license. If the Programmatic Agreement is terminated prior to Commission approval of the CRMP, the Licensees shall obtain approval before engaging in any ground-disturbing activities or taking any other action that may affect any historic properties within the Project's area of potential effect.

Lower River Resources

Article 58. Lower River Gravel Study

(a) Within twelve months of license issuance, the Licensees shall file with the Commission a detailed Lower River Gravel Study Plan, as described in the Lower River Gravel Study Design, Exhibit I to the Settlement Agreement. The plan shall evaluate gravel mobility, supply, and use by spawning salmonids in the lower Deschutes River from the Reregulating Dam (RM 100) to the Trout Creek confluence (RM 87.3) and shall be developed in consultation with the Fish Committee. Upon Commission approval, the Licensees shall implement the plan.

(b) As provided in the Lower River Gravel Study Design, Exhibit I to the Settlement Agreement, the study plan shall include a geomorphic component and a biological monitoring component.

(i) The geomorphic component of the study shall assess the impacts of the Project on downstream gravel availability and channel morphology and to test the dynamics and quality of augmented gravels and shall include the following elements:

(1) Sediment transport monitoring.

(a) Placement of radio-tagged and colored tracer rocks (or rocks with exotic lithologies) at six to seven cross sections between the Reregulating Dam and Trout Creek.

(b) Establishment of survey cross sections at the tracer gravel sites to monitor whether tracer particles had been displaced by that year's flow, or by flows greater than 6,500 cfs.

(c) Measurement of bedload transport at the Warm Springs Bridge (U.S. Highway 26) on rising and falling limbs of flows exceeding 5,500 cfs.

(d) Placement of columns of painted rocks or scour chains at each cross section to determine depth of scour and any subsequent filling.

(e) If annual monitoring described in paragraphs (a) – (d) show that sediment transport is occurring, the Licensees shall develop a plan in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities to resample bed material size at the sample sites of previously studied by the Licensees.

(2) Experimental Gravel Augmentation Program.

(a) The experimental gravel augmentation program shall provide for the addition, starting one year prior to the initiation of selective water withdrawal, of a total of 300 cubic yards of gravel distributed amongst at least three sites between the Reregulating Dam and Shitike Creek. Sites shall be chosen in consultation with the Fish Committee to minimize potential adverse effects of the augmented gravel, including disturbance to existing spawning habitat.

(b) The Licensees shall obtain all necessary tribal, federal and state permits or approvals, including but not limited to Wild and Scenic River Act Section 7 consistency determinations and Clean Water Act Section 404 (dredge/fill) permits, prior to any test gravel placement.

(ii) The biological monitoring component shall monitor the quality of the augmented gravels to determine if the addition of new gravel between the Reregulating Dam (RM 100) and the mouth of Shitike Creek (RM 97) would be necessary and beneficial to salmonid populations and shall include the following elements:

(1) Determination of relative use of spawning sites above and below Shitike Creek to determine if relative spawner use is shifting downstream as spawning habitat quality and quantity changes upstream.

(2) Measurement of steelhead and rainbow spawning habitat area above and below Shitike Creek.

(3) Measurement of spawner use of experimental gravel augmentation sites compared to use of other spawning areas upstream of Shitike Creek.

(4) Measurement of spawning gravel quality parameters including permeability, and inter gravel dissolved oxygen (IGDO).

(5) Comparison of the survival of rainbow trout embryos within redds at the three study sites above Shitike Creek and the three study sites below Shitike Creek.

(6) Comparison of invertebrate populations at the gravel augmentation sites and non-augmented control sites.

(c) After five years of study, the Licensees shall submit annual monitoring results of the gravel study to a three-member expert review panel consisting of experts in geomorphology and fisheries selected by the Licensees, subject to approval by the Fish Committee.

(d) The expert review panel shall determine if the gravel study should be continued, the Licensees should implement a long-term gravel augmentation program, or no further study or augmentation is needed. If the expert panel determines that 1) the Project is causing impacts that could be mitigated by gravel augmentation, including examination of whether the Project may be having deleterious effects on channel bedforms and spawning gravel quantity and quality, 2) that the augmentation test did not adversely affect downstream bank stability or cause downstream pool filling, and 3) that augmentation would be beneficial to fish habitat and fish populations, the expert review panel will notify the Fish Committee of its conclusion that a long-term gravel augmentation action plan should be implemented or that the current study program should be extended. If, after consideration of the report of the expert panel, the Fish Committee determines that a long-term gravel augmentation program is required or that an extended study program is required, the Licensees shall, after consultation with the Fish Committee develop a plan to implement such program. Upon Commission approval, the Licensees shall implement the plan.

Article 59. Lower River Large Wood Management

Within one year of license issuance, the Licensees shall file with the Commission a Large Wood Management Plan (LWMP), developed in consultation with the Fish Committee. The purpose of the LWMP is to provide for (i) the management of floating wood greater than 8 inches in diameter (at the small end) by 10 feet long that enters Lake Billy Chinook and (ii) the placement of large wood along the Project reservoir shorelines for the protection of riparian plantings. The LWMP shall include a monitoring plan to be conducted through the term of the license, for the evaluation of the effectiveness of placed wood, including river transport (for wood moved below the Project), use by wildlife and fish, and as appropriate, erosion control for the establishment of shoreline riparian vegetation. The LWMP shall provide that the management of large wood will be adapted to reflect improvements identified through monitoring to improve the erosion control function of shoreline wood and the habitat value of all wood placements for riparian vegetation, fish and wildlife. At a minimum, the plan shall include:

(a) Description of methods to be used for collection, transport and placement of large wood entering Lake Billy Chinook (minimum size of 8 inches in diameter (at the small end) by 10 feet long);

(b) Guidelines for placement of large wood in the Lower Deschutes River or Lake Billy Chinook;

(c) Notification and reporting requirements, for when wood is collected, transferred and placed;

(d) Guidelines to transfer large wood entering Lake Billy Chinook. At a minimum these guidelines shall include:

(i) Transfer of floating wood collected east of Rattlesnake Point in the Metolius Arm, and the Deschutes and Crooked River Arms of Lake Billy Chinook to the Lower Deschutes River for fish habitat improvement;

(ii) Anchoring wood found floating west of Rattlesnake Point in the Metolius Arm of Lake Billy Chinook for shoreline wildlife loafing sites, riparian vegetation plantings, erosion control, or shallow water juvenile salmonid cover;

(iii) Replacement of an equal volume, type and sizes of wood that is retained in the Metolius Arm of Lake Billy Chinook; and

(iv) Logs found in Lake Billy Chinook that were found to have been illegally cut from the Metolius River will be replaced in the Metolius River, if feasible.

(e) Integration with the Terrestrial Resources Work Group assessment of available sites for riparian vegetation establishment; and

(f) Monitoring plan for the evaluation of the effectiveness of placed wood, including river transport (for wood moved below the Project), use by wildlife and fish, and as appropriate, erosion control for the establishment of shoreline riparian vegetation. If improvements are identified through monitoring, then the management of wood shall be adapted to improve the erosion control function of shoreline wood and habitat value of all wood placements for riparian vegetation, fish and wildlife.

The plan shall be developed in consultation with the Fish Committee. Upon Commission approval, the Licensees shall implement the plan.

Article 60. Lower River Fish Habitat Enhancement

Within one year of license issuance, the Licensees shall file with the Commission a plan to implement the Trout Creek habitat enhancement project described in the Exhibit F to the Settlement Agreement. The plan shall be consistent with the requirements of Article 5 for those portions of the project on U.S. Forest Service or Bureau of Land Management lands. The plan shall be developed in consultation with the Fish Committee and with approval by the appropriate Fish Agencies pursuant to their respective statutory authorities. Upon Commission approval, the Licensees shall implement the plan.

Pelton Round Butte Fund

Article 61. Pelton Round Butte Fund

(a) Within 6 months of license issuance, the Licensees shall establish the Pelton Round Butte Fund (the "Fund") in the initial amount of a $3.5 million credit (2003 dollars) to fund mitigation and enhancement projects for fish and wildlife resources and habitats affected by the Pelton Round Butte Project. The Fund shall be a tracking account held by Licensees with all accrued interest being credited to the Fund. The Fund shall be dedicated to the funding of mitigation and enhancement projects in accordance with this license article. Following this initial credit, the Licensees shall make periodic credits as specified in the Pelton Round Butte Fund Implementation Plan, Exhibit H to the Settlement Agreement. Amounts credited to the Fund shall be escalated as provided in the Pelton Round Butte Fund Implementation Plan.

(b) Amounts credited to the Fund shall not be used to defray the cost of administrative, legal, and overhead costs associated with the management of the Fund, which shall be borne by the Licensees. Any funds remaining unexpended at the end of the license term, including any annual licenses, shall be returned to the Licensees.

(c) The Licensees shall utilize the Fund in accordance with the provisions of the Pelton Round Butte Fund Implementation Plan, Exhibit H to the Settlement Agreement.

(d) By March 31 of each year during the license term, Licensees shall provide the Commission and the parties to the Settlement Agreement with an annual written report setting forth and describing all Fund activity during the previous calendar year. In addition to any other Fund activity, this report shall list withdrawals from the Fund for mitigation and enhancement projects and itemize costs associated with each project. The Licensees shall prepare the report in accordance with the Pelton Round Butte Fund Implementation Plan, Exhibit H to the Settlement Agreement, after consultation with the Governing Board provided for in Exhibit H of the Settlement Agreement, or, if the Settlement Agreement has become void, in consultation with Bureau of Indian Affairs, U.S. Fish and Wildlife Service, National Marine Fisheries Service, Oregon Department of Fish and Wildlife, Oregon Water Resources Department, Oregon Department of Environmental Quality, U.S. Forest Service, and Branch of Natural Resources and Water Control Board of the Confederated Tribes of the Warm Springs Reservation of Oregon, and any non-governmental organizations previously represented on the Governing Board (the Successor Agencies). When a draft report has been prepared, it shall be provided to the Governing Board or the Successor Agencies, as applicable, for 30-day review and comment. The Licensees shall include with the final report documentation of consultation and copies of comments and recommendations, and specific descriptions of how the final report accommodates all comments and recommendations. If the Licensees do not adopt a recommendation, the filing shall include the Licensees' reasons, based on project-specific information.

Pelton Round Butte Project
Settlement Agreement

E X H I B I T B

INTERIM MEASURES

Pelton Round Butte Project – FERC No. 2030

July 2004

EXHIBIT B

Interim Measures

FISH PASSAGE RELATED MEASURES

(i) Complete constructability/feasibility design for the Selective Water Withdrawal and select a preferred option. Seek approval of the Fish Agencies regarding the preferred option.

(ii) Assist Oregon Department of Fish and Wildlife in the annual bull trout spawning redd survey in tributaries to the Metolius River in September and October.

(iii) Determine the timing and relative numbers of juvenile kokanee migrating downstream into Lake Billy Chinook from the Metolius River during the Spring.

(iv) Estimate the spawning escapement of maturing adult kokanee in the Metolius River and tributaries during the Fall.

(v) Study the migration of radio-tagged steelhead smolts from the Crooked River System during the Spring.

WATER ACQUISITION PROJECT

Acquire priority water rights on Squaw Creek, a tributary to the Deschutes River. The cost of this transaction is estimated to be approximately $1 million. If this project cannot be completed in 2004, the Joint Licensees will complete an equivalent project in 2005 or as soon thereafter as practicable. If such a project cannot be substantially completed by the date of the first deposit to the Water Rights Fund, the Licensees may, instead of completing such project, increase the first payment to the Water Rights Fund by $1,000,000. Following the acquisition of the priority water rights, the Licensees shall transfer the water rights to the state of Oregon to be held as instream water rights.

Pelton Round Butte Project
Settlement Agreement

E X H I B I T C

PROJECT OPERATING PLAN
for the
PELTON ROUND BUTTE PROJECT

Pelton Round Butte Project – FERC No. 2030

July 2004

EXHIBIT C

Project Operating Plan
for the
Pelton Round Butte Project

1. Background and Introduction

This Operating Plan describes in detail the operating rules and constraints for the Pelton Round Butte Project (Project) which are being proposed by the Project Licensees. This plan was developed as part of the Pelton Round Butte Settlement Negotiations in 2003 and 2004. It has been formulated to be both part of the final Settlement Agreement and to form the basis for Articles in the New License that will govern Project operations.

This Operating Plan includes the following major operating elements:

- Improvements in Flow Monitoring at the U.S. Geological Survey (USGS) Madras gage
- Measurement of flows at the USGS Madras Gage
- Measurement and calculation of Project inflows
- Minimum Flows below the Reregulating Development, Including Reservoir Refill Provisions
- Run-of-River Operation for Lower River Flows (±10% Rule)
- Control of River Stage Changes below the Reregulating Development
- Seasonal Drawdown, Refill and Fluctuation Limits for Project Reservoirs
- Fall Flow Augmentation in Lower River for Fall Chinook

Specific elements of the Licensees' operating proposal are described below.

2. Improvements in Flow Monitoring at the USGS Madras Gage

Currently, the USGS and the Project use a common stilling well and primary float device below the Reregulating Development to measure flow in the lower Deschutes River. The Project and the USGS have separate sensing tapes and electrical transmitters connected to the float. The Project transmitter provides flow information to the Project operator for control of

the Reregulating Development and for the Project's flow records. The USGS transmitter provides data for the USGS reporting of the Madras gage flows.

There are often small differences in reported flow from the USGS and Project systems due to variations in the electronics and in the time when flow is measured. In addition, the stilling well connection to the river at the gaging structure has a history of plugging with silt, leading to erroneous readings. Improvement in this system's accuracy is needed to eliminate flow monitoring discrepancies between the USGS and Project gage data.

To enhance the accuracy of river flow readings and to maintain agreement between the Project and USGS data, the Licensees in conjunction with USGS, will install modern flow monitoring equipment at the Madras gage. This equipment will be used for both the Project's control of downstream flows and for USGS flow monitoring. The Licensees will also improve or replace the stilling well to reduce silting problems, will coordinate the equipment selection and installation with the USGS, and will obtain USGS approval of the final equipment installation. Improvements to the flow monitoring equipment will be completed within 18 months of license issuance.

3. Project Operations Reports

The Licensees shall provide the following reports to document the Project is being operated in compliance with the New License. Copies of all reports shall be filed with the Commission and submitted to the Coordinating Committee established pursuant to the Settlement Agreement.

Preliminary Incident Reports. Upon determining or suspecting an incident of non-compliance with an operating constraint required by the New License, such as minimum flows, ramp rates, reservoir elevations, etc., the Licensees shall issue a Preliminary Incident Report. The Preliminary Incident Report shall be issued within 15 days of the Licensees first becoming aware of the incident or problem. The incident report shall briefly describe the operating conditions and operator actions surrounding the incident, including relevant flows, levels, stage changes, control settings, weather, etc for 7 days prior to and 24 hours after the apparent incident. A preliminary description of the nature of the incident, its possible causes and current actions being taken by the Licensees to prevent re-occurrence of the problem shall be included in this report.

Final Incident Reports. Within 45 days following an apparent incident the Licensees shall publish a Final Incident Report, describing in detail the subject incident. This report shall include the relevant flow, water level, control signal and other operating data surrounding the event in such a way that a comprehensive understanding of the sequence of events leading up to and following the incident is presented. Descriptions of corrective actions taken (if needed) by the Licensees to prevent re-occurance of similar incidents shall be included in the report. Incident reports shall include hourly and daily inflow records as appropriate to document compliance with the relevant Project operating constraints.

Annual Project Operations Report. Before April 1 of each year the Licensees shall publish an Annual Project Operations Report that describes the operating history of the Project over the previous calendar year. This report shall include a general summary of the hydrologic conditions, overall project operation, and unusual events or conditions that occurred during the year. Charts shall be included which graphically show the Project's operating parameters over the prior year, such as: calculated inflows; Madras outflow; days of operation at "or inflow"; days of operation with the Refill Allowance provision; and lake levels. Operating incidents that occurred during the year shall be listed and briefly described, and the Final Incident Reports for these events shall be included as an appendix to the annual report. Monthly average data for the following parameters shall be included: 1) flows recorded by the upstream USGS Metolius, Crooked, and Deschutes River gages; 2) estimated Project inflow; 3) USGS Madras gage flow; 4) water level in each Project reservoir, and 5) generation by development. Hourly data for all of these parameters and the flow control setpoint for the Reregulating Development shall be published on electronic media as an attachment to the report. Measurement of Flows at the USGS Madras Gage

For determining compliance with the minimum flow requirements in the New License, the Licensees shall implement a protocol for measuring flows at the USGS gage at Madras, OR, that includes the following elements:

Measured Madras Flow. The real-time *flow release* at the Madras gage shall be the most recent 15-minute interval USGS gage reading, converted to flow using the USGS level vs. flow rating table. The real-time *flow setpoint* for the Madras gage shall be the most recent 15-minute interval water level setpoint in the Reregulating Development control system, converted to flow using the USGS level vs. flow rating table. The *daily outflow* of the Project

is defined as the average flow measured at the USGS Madras gage each calendar day. This *daily outflow* will be calculated from the average of the day's 96 quarter-hour (15 minute interval) *flow release* readings.

Determination of Allowed Minimum Flow. The daily *allowed minimum flow* shall be determined each day by the Licensees, based on provisions of this Operating Plan, including monthly minimum flows, refill allowances, the ±10% rule, measured inflows and other constraints. The *allowed minimum flow* shall be the flow in cubic feet per second (cfs) calculated from the rules of this Operating Plan and then adjusted up or down to match the nearest 0.01 ft measurement increment of the USGS flow vs. level rating table[1].

The *allowed minimum flow* shall be calculated by the Licensees before 6 a.m. of each day. Adjustment of the *flow setpoint* for each day shall be completed by 9 a.m. of each day.

License Compliance for Minimum Flows. The Project shall be in compliance with the minimum flow requirements whenever the *flow setpoint* equals or exceeds the *allowed minimum flow*. In order to accommodate flow measurement inaccuracies, control-system variations, and the inability of the turbine and spillway gates to exactly produce the *flow setpoint*, non-compliance with this minimum flow requirement is defined as any event where the 15-minute measured flow release falls more than 0.10 ft (approximately 260 cfs) below the *allowed minimum flow* for more than 30 minutes. The Licensees shall issue incident reports for any events where the *flow setpoint* is less than the *allowed minimum flow*. The Project operator shall also issue incident reports for any events where the 15-minute measured *flow release* falls more than 0.10 ft (approximately 260 cfs) below the *allowed minimum flow* for more than 30 minutes. This allowance for variations in the actual measured flow is proposed to accommodate flow measurement inaccuracies, control-system variations, and the inability of the turbine and spillway gates to exactly produce the flow setpoint.

[1] The USGS gage and the project control systems both operate based on the water level at the Madras gage (not the measured flow). The USGS gage is rated in 0.05 ft increments of level. The rating is then further interpolated to 0.01 ft increments to define measured flows. Matching the *allowed minimum flow* to a specific water level will allow the *flow setpoint* and the *allowed minimum flow* to be the same value during times when the Project is required to release inflow. Note that each increment of 0.01 ft at Madras represents a flow increment of about 26 cfs.

4. Measurement of Project Inflows

General - The Licensees shall improve the accuracy of Project inflow monitoring through a combination of upstream USGS gage improvements and the installation of additional lake level monitoring stations in Lake Billy Chinook. Estimates of inflow shall be made using a combination of the "Storage Change" and "Average Ungaged" estimating methods. Inflow estimates shall be included in the Annual Project Operations Report for the Project. To enhance measurement and recording of inflows, the Licensees propose to improve flow monitoring systems upstream of the Project and to prepare hourly estimates of inflows to the Project. The hourly inflow estimates will be the sum of USGS-gaged flows at three upstream locations and an estimate of ungaged flows to the Project (groundwater inflows and side-stream surface flows to the three Project impoundments).

System Modifications and Improvements – The Licensees shall fund work by the USGS as needed at the three upstream tributary gages (Crooked River – gage no. 14087400, Deschutes River – gage no. 14076500, and Metolius River – gage no. 14091500) to allow real-time telemetry of hourly inflow data from these gages to the Licensees' Project control facility[2]. The Licensees shall install two or more new lake level monitoring stations in Lake Billy Chinook at locations selected to reduce level measurement errors caused by wind and other effects. The Licensees shall install data acquisition equipment, recording hardware and software as needed to calculate inflows on a timely basis and to document the inflow record.

Inflow Estimating Method – The Licensees shall estimate total Project inflow every 6 hours using the "Storage Change" method. This method shall calculate inflow from measured water levels in the three Project reservoirs, reservoir storage vs. elevation tables, and the Madras USGS gage hourly flow record. The Lake Billy Chinook water level used in this calculation shall be the average of the level monitors in Lake Billy Chinook. The Lake Simtustus and Reregulating reservoir water levels shall be the level recorded by the existing lake level monitors in these two impoundments.

The inflow from the three upstream USGS gages on the Crooked, Deschutes, and Metolius Rivers will be summed every 6 hours, and this sum shall then subtracted from the 6-hour

[2] Note that real-time telemetry equipment was installed on the Metolius River gage in 2002. This real-time hourly flow data is currently being used by Project operators to assist in Project operations.

total inflow estimate to provide an estimate of the ungaged inflow to Lake Billy Chinook. This single 6-hour estimate of ungaged inflow will be combined with prior 6-hour estimates of the ungaged inflow (using a rolling average) to estimate the "Average Ungaged" Project inflow. The net estimated *hourly inflow* to the Project shall then be calculated by the sum of the average ungaged inflow and the hourly flows measured at the three upstream USGS gages. In the event the upstream USGS gages or communication systems fail, the Licensees shall use the 6-hour total Project inflow calculation to substitute for the *hourly inflow* estimate, until the real-time gage monitoring can be restored.

The estimated *daily inflow* shall be the average of the day's 24 estimated *hourly inflow* values.

Reporting Requirements – The Licensees shall publish the hourly and daily inflow estimates in the Annual Project Operations Report. The hourly and daily Project inflow estimates shall also be published when appropriate for incident reports, to help document compliance (or non-compliance) with minimum flow, ramping and other Project constraints.

Schedule – The inflow monitoring system, including all system modifications and improvements shall, be installed and operational within two years of issuance of the New License.

Modifications of Inflow Estimating Method – At any time, the Licensees may propose modifications regarding the inflow estimating method to improve the accuracy of the system, or to simplify the system if such simplification will not result in less accuracy. The Licensees shall develop a plan for such modifications in consultation with the Fish Committee.[3] Upon FERC approval, the Licensees shall implement the plan.

[3] As provided in the Settlement Agreement, the Fish Committee shall consist of the Licensees; National Marine Fisheries Service (NOAA Fisheries); U.S. Fish and Wildlife Service (FWS); U.S. Forest Service (USFS); Bureau of Indian Affairs (BIA); Bureau of Land Management (BLM); Confederated Tribes of the Warm Springs Reservation Branch of Natural Resources (CTWS BNR); Confederated Tribes of the Warm Springs Reservation Water Control Board (CTWS WCB); Oregon Department of Fish and Wildlife (ODFW); Oregon Department of Environmental Quality (ODEQ), and a representative of the following non-governmental organizations: Trout Unlimited, American Rivers, Oregon Trout, and the Native Fish Society.

5. Minimum Flows below the Reregulating Development, Including Reservoir Refill Provisions

The Licensees shall increase minimum flows below the Project to protect downstream river values. The *allowed minimum flow* will be calculated each day based on monthly target flows, Project inflow estimates, reservoir refill allowances and other provisions of this Operating Plan. The Licensees shall operate the Project to provide flow releases below the Reregulating Development that equal or exceed the *allowed minimum flow* as described in the following.

Target Flows. Table 1 shows the target flows below the Reregulating Development for each calendar month. The *allowed minimum flow* shall equal the target flow when Project inflows exceed the target flows and the "Refill Allowance" provision is not in effect. When the "Or Inflow" or "Refill Allowance" provisions are in effect, the *allowed minimum flow* will be determined by those provisions.

Table 1. Target flow in cfs, measured at the USGS Madras Gage No. 14092500.

	Jan	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Target Flow	4,500	4,500	4,571	4,170	4,000	4,000	4,000	3,500	3,800	3,800	4,049	4,500

"Or Inflow" Provision. In order to prevent drawdown of Lake Billy Chinook, the *allowed minimum flow* shall be reduced below the target flow when Project inflows are less than the target flow. The *allowed minimum flow* shall be reduced in this case, according to the following protocol.

When the lowest *daily inflow* during the previous 7 days is below the target flow, the *allowed minimum flow* shall be equal to the lowest *daily inflow* recorded over the past 7 days[4]. The *allowed minimum flow* shall be calculated each day when the "Or Inflow" provision is in effect and the *allowed minimum flow* shall be changed daily, as defined by the inflow estimate.

[4] This use of the lowest day's inflow over the prior week is required to prevent drawdown of Lake Billy Chinook in the summer of dry years when inflows are gradually decreasing. If an average of the past week's inflow were used in such a summer season, this average flow would exceed the day's inflow resulting in drawdown of the lake if the setpoint were based on the 7-day average.

Refill Allowance Provision. The Project shall be allowed a "*refill allowance*" between November 15 and June 15 (the reservoir refill season) to store water in Lake Billy Chinook to ensure that Lake Billy Chinook is filled to its summer operating level (minimum elevation 1,944.0) by May 15. The "refill allowance" shall be 150 cfs less than the lowest daily inflow recorded over the past 7 days, except under the following conditions: 1) from November through February, if *daily inflows* are less than 3,150 cfs and greater than 3,000 cfs, the *refill allowance* shall be the difference between the *daily inflow* and 3,000 cfs; however, in instances where the daily inflows are 3,000 cfs or less, the *refill allowance* shall be 0; and 2) from March through June, if *daily inflows* are less than 3,650 cfs and greater than 3,500 cfs, the *refill allowance* shall be the difference between the daily inflow and 3,500 cfs; however, in instances where the daily inflows are 3,500 cfs or less, the *refill allowance* shall be 0.

Extension of Refill Allowance Provision. If the refill allowance is less than 150 cfs during the reservoir refill season, the Refill Allowance Provision shall be extended from May 15 to June 15. During this additional month the refill allowance shall be determined based on the provisions in the above paragraph.

Reservoir Refill Curve. A chart showing the reservoir refill curve under most operating conditions as described above is shown in Figure 1. Note that in years when inflows are above the monthly target flows, the Licensees will operate the Project to fill Lake Billy Chinook by a target date of May 1. If the *refill allowance* is 150 cfs or greater, the Licensees shall fill Lake Billy Chinook by May 15. As shown in this Figure, the refill date would be delayed until after May 15 to June 15 in those years when the *refill allowance* is less than 150 cfs.

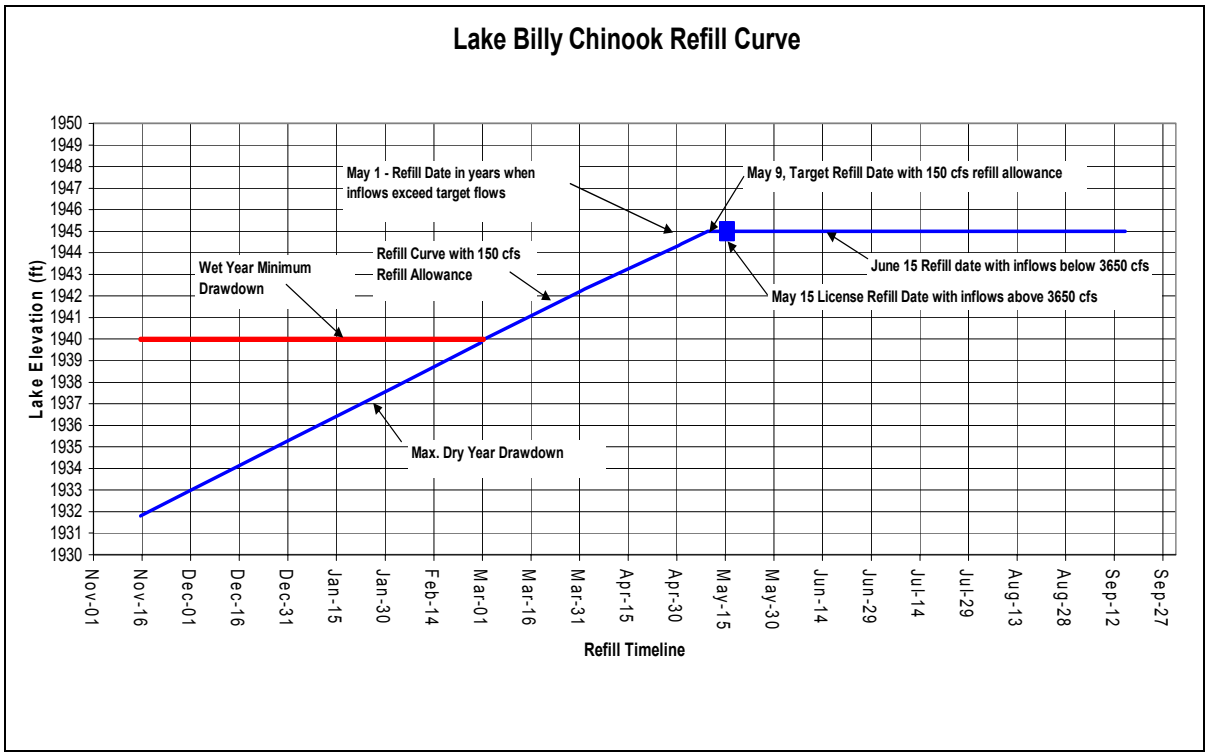


Figure 1. Refill Curve for Lake Billy Chinook.

Refill Guidance. The Licensees shall design Lake Billy Chinook reservoir refill curves which, to the extent consistent with other limitations and restrictions on Project operations set forth in the Settlement Agreement, the CWA 401 certifications, and FERC dam safety regulations, minimize the use of the refill allowance and fill the reservoir as soon as feasible. Periodic reports developed by the Licensees regarding Project operations shall include information on use of the refill allowance.

Long-Term Low Flow (LTLF) Trigger Provision. Within one year of license issuance, the Licensees shall file with the Commission a plan to track indicators of predicted long-term low flow (LTLF) conditions in the lower Deschutes River throughout the New License. The plan will provide that (i) an LTLF trigger or multiple LTLF triggers will be established, using the indicators, that signal predicted onset or realized onset of LTLF conditions in the river that are lower than historically observed at the U.S. Geological Service Madras gage; (ii) certain remedial actions will be initiated if an LTLF trigger is reached; (iii) these LTLF triggers will not be developed or implemented to address low flows of a non-long-term nature that may otherwise be addressed by the Fish Emergency Clause as set forth in the New

License; and (iv) the LTLF trigger(s) will be reviewed and, if necessary, modified, at least every ten years considering new information and changes in predictive capabilities. The Licensees shall develop the plan after consultation with the Fish Committee. Upon Commission approval, the Licensees shall implement the plan.

If the LTLF trigger is reached, the Licensees shall consult with the Fish Committee, Oregon Department of Environmental Quality, and the Confederated Tribes of the Warm Springs Reservation Water Control Board to identify any negative effects to aquatic resources and Federal Wild & Scenic River recreational outstandingly remarkable values (ORVs) resulting from the lower river flows, to identify potential mitigation measures in the lower Deschutes River basin, and to determine if changes in project operations should be implemented to ameliorate such effects. The Licensees shall also consult with the Oregon Parks and Recreation Department and, as appropriate, the Terrestrial Resources Working Group, the Recreation Resources Working Group, and the Shoreline Management Working Group regarding potential impacts to ORVs, scenic waterway values, lake recreation, cultural/archaeological resources, shoreline erosion and riparian habitat that may result from potential changes in Project operations.

If changes in Project operations are identified to mitigate any negative effects to aquatic resources and ORVs, the Licensees shall, in consultation with the entities identified in the above paragraph, prepare and file with FERC a plan to implement such changes. Upon FERC approval, the Licensees shall implement the plan.

6. Run-of-River Operation for Lower River Flows (±10% Rule)

The Licensees shall hold river flows below the Reregulating Development to within ±10 percent of the measured Project inflow[5] except under the following conditions: (1) days with measured inflow in excess of 6,000 cfs; (2) any event that triggers the Project Emergency Action Plan; (3) power emergencies, as defined in the Western States Coordinating Council (WSCC) Minimum Operating Reliability Criteria (March 8, 1999),[6] as such criteria may be

[5] This flow release restriction is in addition to other minimum flow requirements. Under many conditions, the "Or Inflow" provision will be more restrictive and will govern the flow release.

[6] Page X-60: "Power Emergency: An abnormal system condition which requires immediate manual or automatic action to prevent loss of firm load, equipment damage, or tripping of system elements that could adversely affect the reliability of the electric system."

amended during the term of the New License; (4) equipment failures or emergencies at one of the Project dams or powerplants, and (5) reservoir drawdowns needed for safe passage of anticipated flood flows to minimize damage to life and property.

A flow of 6,000 cfs has been historically exceeded about 12 percent of the time over the period of record. Inflows of this magnitude occur during storm events or the spring runoff season. The Licensees shall be allowed to not follow the run-of-river provision when inflows are above this level because the Project must be operated to ensure the structural safety of the Project facilities and to protect downstream life and property during flood events.

7. Control of River Stage Changes below the Reregulating Development

The Licensees shall limit level fluctuations in the lower river according to the stage change limits shown in Table 2.

Table 2. River stage change limits for the Project system control in Deschutes River below the Reregulating Development.

Period	Hourly Stage Change Control Limit	Daily Stage Change Control Limit
May 15 to October 15	0.05 ft	0.2 ft
October 16 to May 14	0.1 ft	0.4 ft

During extraordinary situations, the Licensees may deviate from these stage change limits. Such extraordinary situations include: (1) flood events; (2) any event that triggers the Project Emergency Action Plan; (3) rapid changes in Project inflows, when the rate of inflow change exceeds the proposed stage change limits; and (4) equipment failures or emergencies at the Project facilities.

To monitor compliance with this requirement, the Licensees shall record the time and control signal value for all stage change instructions at the Reregulating Development and shall report in an Incident Report any stage change control signals that are greater than the values specified in Table 2 above. In addition, the Licensees shall provide written documentation in

the Annual Project Operations Report, of all measured stage changes at the USGS Madras gage that deviate more than 0.15 ft from the control setpoint value[7].

8. Seasonal Drawdown and Fluctuation Limits for Project Reservoirs

Drawdown and Fluctuation Limits. The Licensees shall begin the seasonal drawdown of Lake Billy Chinook in the fall of each year followed by refill during the late fall, winter and spring. The reservoir will be refilled

1) by May 1 when inflows exceed the target flows,

2) by May 15 when inflows are below the target flows, and

3) by June 15 in years when the refill allowance is less than 150 cfs as described in Section 5, above.

After filling in the spring of each year the Licensees shall keep Lake Billy Chinook as full as practical through September 15 as shown in Table 3. Drawdown and fluctuation limits for Lake Simtustus and the Reregulating Reservoir shall be as shown in Table 3.

Table 3. Proposed seasonal drawdown and fluctuation limits for Project reservoirs.

	Operating Water Surface Elevation (feet)	
Reservoir	**Minimum Summer**	**Winter**
Lake Billy Chinook	1,944 (May 15[A] to Sept 15)	1,925 (Sept 16 to May 14)
Lake Simtustus	1,576 (June 1 to Aug 31)	1,573 (Sept 1 to May 31)
Reregulating Reservoir	1,414 (year round)	1,414 (year round)

[A] Note that in years when the refill allowance is less than 150, the refill date is June 15.

[7] The ability to achieve these proposed limitations was evaluated by Project operating staff during 1998 and 1999. This evaluation showed that natural oscillations in the river and limitations of the Project equipment can result in river level fluctuations up to 0.15 ft greater than the control setpoint employed by Project operating staff. This historical fluctuation is the basis for the proposed variation range that triggers reporting of specific measured stage changes.

During certain extraordinary situations, the Licensees may exceed the normal seasonal drawdown limits for the three Project reservoirs. Such extraordinary situations include (1) drawdown needed for safe passage of anticipated flood flows to minimize damage to life and property; (2) drawdown required to complete repairs on Project facilities (including spillway gates, the intake structures, or other dam structures); and (3) power emergencies, as defined in the WSCC Minimum Operating Reliability Criteria (March 8, 1999), as such criteria may be amended during the term of the New License.

Refill of Lake Billy Chinook in the spring may be delayed if *daily inflows* are below 3,650 cfs. Under these conditions, the Licensees will refill Lake Billy Chinook according to the Refill Allowance Provision when Inflows are Less than 3,650 cfs, which is described earlier in this Operating Plan.

9. Fall Flow Augmentation in Lower River for Fall Chinook

If Project inflows fall below 3,000 cfs between September 16 and November 15, the Licensees shall release up to 200 cfs from storage in Lake Billy Chinook to maintain a daily release of 3,000 cfs. This augmentation flow is limited to a drawdown of 4 ft, measured from the average Lake Billy Chinook water surface elevation recorded on September 15. The Licensees shall consult with the Fish Committee regarding the amount of available water, rate of water release, and timing and duration of augmentation flows.

Pelton Round Butte Project
Settlement Agreement

E X H I B I T D

PELTON ROUND BUTTE PROJECT

FISH PASSAGE PLAN

Pelton Round Butte Project – FERC No. 2030

July 2004

EXHIBIT D

PELTON ROUND BUTTE PROJECT

FISH PASSAGE PLAN

PORTLAND GENERAL ELECTRIC COMPANY
and
THE CONFEDERATED TRIBES OF THE
WARM SPRINGS RESERVATION OF OREGON

in conjunction with the
Pelton Round Butte Settlement Working Group

July 2004

TABLE OF CONTENTS

Appendices

LIST OF TABLES

LIST OF FIGURES

PELTON ROUND BUTTE PROJECT
FISH PASSAGE PLAN

I. INTRODUCTION

This document contains the plan by Portland General Electric Company ("PGE") and the Confederated Tribes of the Warm Springs Reservation of Oregon ("Tribes")[1] for evaluating the feasibility of, and implementing, a program to reestablish passage for anadromous and resident fish species through the Pelton Round Butte Project ("Project"). PGE and the Tribes are joint licensees ("Licensees") of the Project. The fish passage program has been developed in conjunction with relicensing of the Project with the Federal Energy Regulatory Commission ("FERC"). This program is intended to accomplish specific goals and objectives consistent with those initially developed by the Interagency Fisheries Technical Subcommittee ("Technical Subcommittee"[2]) and in furtherance of policy statements included in fisheries and habitat management plans relevant to the Project.[3] This Fish Passage Plan was further developed in settlement negotiations for the licensing of the Project, and implements fish passage requirements issued under Sections 4(e), 10(j), and 18 of the Federal Power Act ("FPA") and state law, and is consistent with the federal government's tribal trust responsibilities.

A. Overview of the Fish Passage Program

This document sets forth a detailed and rigorous implementation plan for pursuing fish passage for anadromous and resident species at the Project. The basic framework for the fish passage program reflected in this Fish Passage Plan was initially developed in concert with the Technical Subcommittee utilizing a structured decision-making process to identify important uncertainties related to achieving successful fish passage. The fish passage program is designed as a four-phase effort based on an appropriate timing and sequencing of continuing research and evaluation efforts aimed at addressing these important uncertainties, reducing risks associated with fish passage to an acceptable level, and implementing components of the program in a logical sequence. Critical uncertainties addressed through this program include risk of disease,

[1] The Tribes as a Licensee are acting through Warm Springs Power Enterprises ("WSPE"). The Tribes in their governmental capacity, the Branch of Natural Resources ("BNR"), and the Water Control Board ("WCB"), but excluding WSPE, are referred to in this document as the "CTWS."

[2] The Technical Subcommittee was established in 1997 to identify and address questions regarding the feasibility of potential fish passage at the Project. The Technical Subcommittee was composed of fisheries biologists and others with experience in aquatic ecosystems representing the following entities: PGE, CTWS, U.S. Fish and Wildlife Service, National Marine Fisheries Service, U.S. Forest Service, U.S. Bureau of Land Management, Oregon Department of Fish and Wildlife, Oregon Department of Environmental Quality, and a coalition of non-governmental organizations.

[3] Technical Subcommittee meeting summaries (Aug. 7–8, 1997, Sept. 24–25, 1997, Jan. 20–21, 1998) and Final Charge Statement and Ground Rules (Feb. 15, 1998).

implications for reservoir and downstream water quality, and efficacy of downstream passage through Lake Billy Chinook. Key components of the fish passage program include design and construction of downstream passage facilities, testing and verification of the performance of those facilities, and evaluation and implementation of volitional upstream passage at the Project (if volitional passage is determined to be feasible and appropriate). Throughout implementation of the Fish Passage Plan, the Licensees will consult with (and where specified, seek approval from) an interagency fisheries committee, the Pelton Round Butte Fisheries Committee ("Fish Committee").[4]

Implementation of the Fish Passage Plan will be conducted according to the precepts of adaptive management as incorporated into license terms. The essence of adaptive management is to view management actions as having an experimental component designed to both protect the resource as well as produce critical information about the resource being managed, and to make changes in future management actions that reflect the knowledge gained through these measures. Thus, adaptive management includes three main components: 1) the implementation of specific protection, mitigation and enhancement measures designed to avoid or minimize the impact of a project on specific resources; 2) monitoring and evaluation of the measures to evaluate their performance towards the agreed-upon criteria, resource goals, objectives and expectations; and 3) implementing alterations and management changes that improve future performance if criteria, resource goals, objectives and expectations are not met. This approach helps to reduce uncertainty and, more importantly, provides a broader base of knowledge and experience that helps managers to manage more effectively in the face of continued uncertainty and ever-changing conditions.

In addition to fish passage, the existing Round Butte Hatchery supplementation program will continue through the term of the New License, subject to future periodic review of the hatchery program in light of the progress on the reintroduction program. The hatchery program will serve to support the objective of self-sustaining and harvestable fisheries below the Project and the goals of the Fish Passage Plan.

B. Progress to Date

Over the past several years, the analysis of the feasibility of fish passage at the Project has included:

- Review of relevant fisheries and habitat management plans
- Consideration of the guidance provided in the "Conceptual Foundation for the Management of Native Salmonids in the Deschutes River" (Lichatowich 1998)

[4] See section V.A. for a list of entities that will be members of the Fish Committee.

- Establishment of the advisory Fisheries Technical Subcommittee
- Utilization of a formal structured decision-making process (Oosterhout 1998)
- Risk assessment simulation modeling to evaluate the impacts of uncertainties on the feasibility of fish passage (Oosterhout 1999)
- Conducting studies relevant to the major identified uncertainties associated with the reintroduction of anadromous fish above the Project
- Evaluating the feasibility of potential components of the Fish Passage Plan

During this same timeframe, an Ecosystem Diagnosis and Treatment ("EDT") assessment was completed (Mobrand Biometrics, Inc. 1999). This assessment concluded that "the greatest overall benefit to chinook salmon within the basin would be achieved by providing restoration of passage at the Pelton-Round Butte Project and other dam structures in the basin" (Mobrand Biometrics, Inc. 1999).

A description of the activities related to evaluating fish passage feasibility from the filing of PGE's and the Tribes' final license applications at the end of 1999 through the filing of the Joint Application Amendment ("Joint Amendment") in 2001 is included as Attachment III-3 to the Fish Resources section of Exhibit E of the Joint Amendment. In addition, technical reports and a record of supplemental consultation are included on CDs accompanying the Joint Amendment. Activities since the filing of the Joint Amendment have included continued consultation and technical work related to the fish passage program through the Technical Subcommittee; filing by PGE and the Tribes of responses to FERC Additional Information Requests (July 2002); issuance of water quality certificates (pursuant to § 401 of the Clean Water Act) for the Project by the Oregon Department of Water Quality ("ODEQ") and the CTWS Water Control Board ("WCB") (June 2002); preparation by PGE and the Tribes of a Water Quality Management and Monitoring Plan (September 2002); filing of Preliminary Conditions, Prescriptions, and Recommendations by parties to the licensing proceeding (November 2002); and development by PGE and the Tribes of a refined engineering schedule for implementation of fish passage in conjunction with responding to agency preliminary terms and conditions (January 2003).

A comprehensive list of documents that have been developed to support the fish passage feasibility analysis and design of the fish passage program is provided as Appendix I. These documents are provided on the CD included in Appendix I.

II. PROGRAM GOALS AND OBJECTIVES

The Technical Subcommittee developed a formal decision-making structure to evaluate the feasibility of reestablishing fish passage at the Project. The overarching goal of fish passage as defined in that decision-making structure is to maximize ecosystem integrity. Ecosystem integrity was further defined by the Technical Subcommittee to include three primary components: connectivity, biodiversity, and natural production.

The objectives of the Fish Passage Plan are:

- To contribute to recovery efforts for Middle Columbia steelhead;
- Establish self-sustaining, harvestable populations of summer steelhead trout ("steelhead"), spring-run chinook salmon ("spring chinook"), and sockeye salmon ("sockeye") in the Deschutes River Basin to fully utilize the available habitat and production capability;
- Provide access to and through Project waters for Pacific lamprey, summer-run / fall-run chinook salmon, rainbow (redband) trout, bull trout, and other native fish species;
- Provide access to habitat to support a self-sustaining fishery; and
- Support the contribution of salmon, steelhead, and other native species to a healthy ecosystem.

Progress towards achieving ecosystem integrity following reestablishment of fish passage will be evaluated through a long-term monitoring plan to be developed in consultation with the Fish Committee. The monitoring plan will detail specific data-collection protocols and metrics that will provide quantitative information to assess the degree of connectivity, biodiversity, and natural production in the Project area through the term of the New License.

Overall progress towards achieving the objective of self-sustaining harvestable populations of steelhead, chinook, and sockeye will be evaluated by determining the number of returning adults (recruits) per spawning fish (R/S ratio) for each of the species of interest. The R/S ratio will be determined annually for the life of the New License. While runs are building, each generation will need to produce more spawners than the previous generation (R/S>1.0). A self-sustaining population, by definition, must have a median R/S ratio not less than 1.0.

Other specific metrics representing the objectives of the fish passage program relate to facility performance and survival of upstream migrating adult fish and downstream migrating juvenile fish through the Project.

A. Spring-Run Chinook Salmon, Summer-Run Steelhead, and Sockeye Salmon

In addition to monitoring the status of spring chinook, steelhead, and sockeye runs (in terms of R/S), progress towards establishment of self-sustaining harvestable populations of these "target" species above the Project will be evaluated using metrics representing the following objectives specific to each stage of the fish passage program:[5]

- Major interim objectives, associated with initial ("temporary") fish passage facilities:
    - Capture in the temporary downstream-migrant collection facility in the Round Butte forebay of >50 percent of marked smolts (released at the heads of each of the tributary arms of Lake Billy Chinook) from any one of the three tributaries.
    - Safe passage of 93 percent of captured smolts to the Deschutes River below the Reregulating Dam.
    - Safe passage of 95 percent of returning naturally produced adults from the Pelton Fish Trap to Lake Billy Chinook.
- Major long-term objectives, associated with permanent fish passage facilities:
    - Capture in permanent downstream-migrant collection facility in the Round Butte forebay of >75 percent of marked smolts (released at the heads of the arms of Lake Billy Chinook) from each tributary.
    - Safe passage of 96 percent of captured smolts to the Deschutes River below the Reregulating Dam.
    - Safe passage of 98 percent of returning naturally produced adults from the Pelton Fish Trap to Lake Billy Chinook.
    - Ultimately, if feasible and if determined to be appropriate by the Fish Committee, provide volitional upstream passage from below the Reregulating Dam to above Round Butte Dam.

B. Summer-Run / Fall-Run Chinook Salmon, Pacific Lamprey, Bull Trout, and Rainbow (Redband) Trout

The objective for summer-run / fall-run chinook salmon, Pacific lamprey, bull trout, rainbow (redband) trout, and other native fish species is to provide access to and through Project waters.

[5] Fish passage measures of success are described in further detail in section IV.C of this Fish Passage Plan.

Numbers of fish that are passed for each of these non-target species will be monitored, but numerical objectives will not be established or required to define success.

C. Additional Objectives — Fish Habitat and Life-History Diversity

In addition to the interim and long-term objectives specific to fish passage (and their associated metrics, described above in section II.A), the following objectives related to fish habitat and life-history diversity have also been identified to direct the implementation of the fish passage program toward the goal of ecosystem integrity:

- Provide for the maximum utilization of existing and potential fish habitats within and upstream of the Project by providing passage for resident and anadromous fish species with diverse habitat requirements.

- Maintain self-sustaining fish runs and promote species and life-history diversity by:

    - operating facilities during the complete migration times for both upstream and downstream migrating fish.

    - providing connectivity between the diverse habitats of the tributaries to the Project reservoirs and the lower Deschutes River and its tributaries in a manner consistent with managing the risk of spreading fish diseases at a level acceptable to ODFW and the CTWS Branch of Natural Resources ("BNR").

    - uniquely marking wild steelhead and spring chinook smolts produced upstream of the Project so that they can be identified as returning adults and passed upstream, while stray steelhead and spring chinook can be excluded until straying into the Deschutes River is reduced to acceptable levels as determined by ODFW and the CTWS BNR.

- In designing new facilities, explicitly identify any tradeoffs that are made regarding the efficacy of passing different species. Existing information on passage of Pacific lamprey will be incorporated into passage facility design decisions.

III. BACKGROUND / FRAMEWORK

A. Context for Reestablishing Fish Passage at the Pelton Round Butte Project

The ongoing effort to develop a plan for reestablishing fish passage through the Project has been influenced by an understanding of anadromous and resident fish populations that existed above the Project site prior to construction of the Project, the initial efforts at fish passage associated with Project construction, and the evaluation of those initial passage efforts. This historical framework is briefly summarized below. For a thorough historical perspective of fish passage at

the Project, please refer to "Fisheries Program at the Pelton Round Butte Hydroelectric Project (Oregon) 1956–1995" (Ratliff and Schulz 1999a; included on the CD accompanying Appendix I to this Fish Passage Plan).

1. Historic Anadromous and Resident Fish Populations above the Project Site

At the time of Project construction in the 1950s and 1960s, spring chinook salmon spawned mainly in the Metolius River system. Some chinook also spawned in lower Squaw Creek and the Deschutes River up to Steelhead Falls (Nehlsen 1995). Steelhead spawned in the middle Deschutes River and its tributary Squaw Creek, and also in the Crooked River system. Sockeye had essentially been eliminated from the system prior to Project construction, but historically had spawned in Link Creek above Suttle Lake and used Suttle Lake as juvenile rearing habitat (Nehlsen 1995). Runs of these species appeared to be quite depressed at the time of Project construction. Peak counts the first few years of fish passage were 547 spring chinook, 1,618 steelhead, and 57 unmarked sockeye (Table 1).

Table 1. Number of anadromous adult salmonids passed upstream of the Pelton Project during the first 10 years that runs were enumerated (1957–1966). (Source: PGE Fish Facilities Database)

Year	Spring Chinook [1]	Summer Steelhead [2]	Wild Sockeye
1957	259	335	29
1958	366	1,618	57
1959	358	1,017	0
1960	547	520	0
1961	511	480	0
1962	387	355	0
1963	210	377	0
1964	318	274	0
1965	165	431	0
1966	298	434	0
Average	341.9	584.1	8.6

Notes:

1. Includes jacks.
2. Steelhead year starts in June of the year before and ends in May of the year shown.

Pacific lamprey were found in the mainstem of the Deschutes River, the Crooked River, the Warm Springs River, and Shitike Creek. It is assumed they had the same historic distribution as salmon and summer steelhead throughout the Columbia Basin. It is known that historically they

spawned above the Project site, but numbers and spawning locations were not documented. Pacific lamprey have not been observed at the Pelton Fish Trap since the early 1970s.

The extent of historical fall chinook migration past the Project is not certain. Prior to construction of Pelton Dam in the early 1950s, fall migrants were found spawning above Sherars Falls and below the Pelton Dam site. However, although fall chinook spawning surveys were conducted prior to construction, few were found above the Pelton Dam site (Nehlsen 1995).

Up to several hundred maturing adult bull trout were annually passed upstream through the Project during the first few years of its operation (Ratliff et al. 1996). It is thought that all of these adult bull trout were returning to the Metolius River tributaries where bull trout spawning is currently concentrated. By the late 1950s, bull trout populations in the upper Deschutes River above Big Falls had been extirpated (Ratliff and Howell 1992; Buchanan et al. 1997).

2. Project Construction and Historic Fish Passage Facilities

Construction of the Pelton and Reregulating dams on the Deschutes River began in August 1956 at river miles 103 and 100, respectively. A 2.84-mile-long fish ladder was originally constructed between the Reregulating Dam and Pelton Dam to provide upstream fish passage (Figure 1). When constructed in 1957, the Pelton Fish Ladder was the longest in the world with the second highest lift. The ladder is 10-ft wide, 6-ft deep, and originally had a maximum flow capacity of 43 cfs (Gunsolus and Eicher 1962).

For downstream passage from Lake Simtustus (Pelton Reservoir), a horizontal, inclined-plane artificial outlet, referred to as the "Pelton skimmer," was constructed on the right (east) abutment of Pelton Dam. This skimmer used pumps to pull 200 cfs of water through a 15-ft-wide perforated plate. The perforated plate was inclined to allow about 6 cfs of water and downstream-migrating fish to move over the end, through a bypass pipe, and into the fish ladder junction box. The smolts then traveled down the fish ladder to the Deschutes River below the Reregulating Dam.

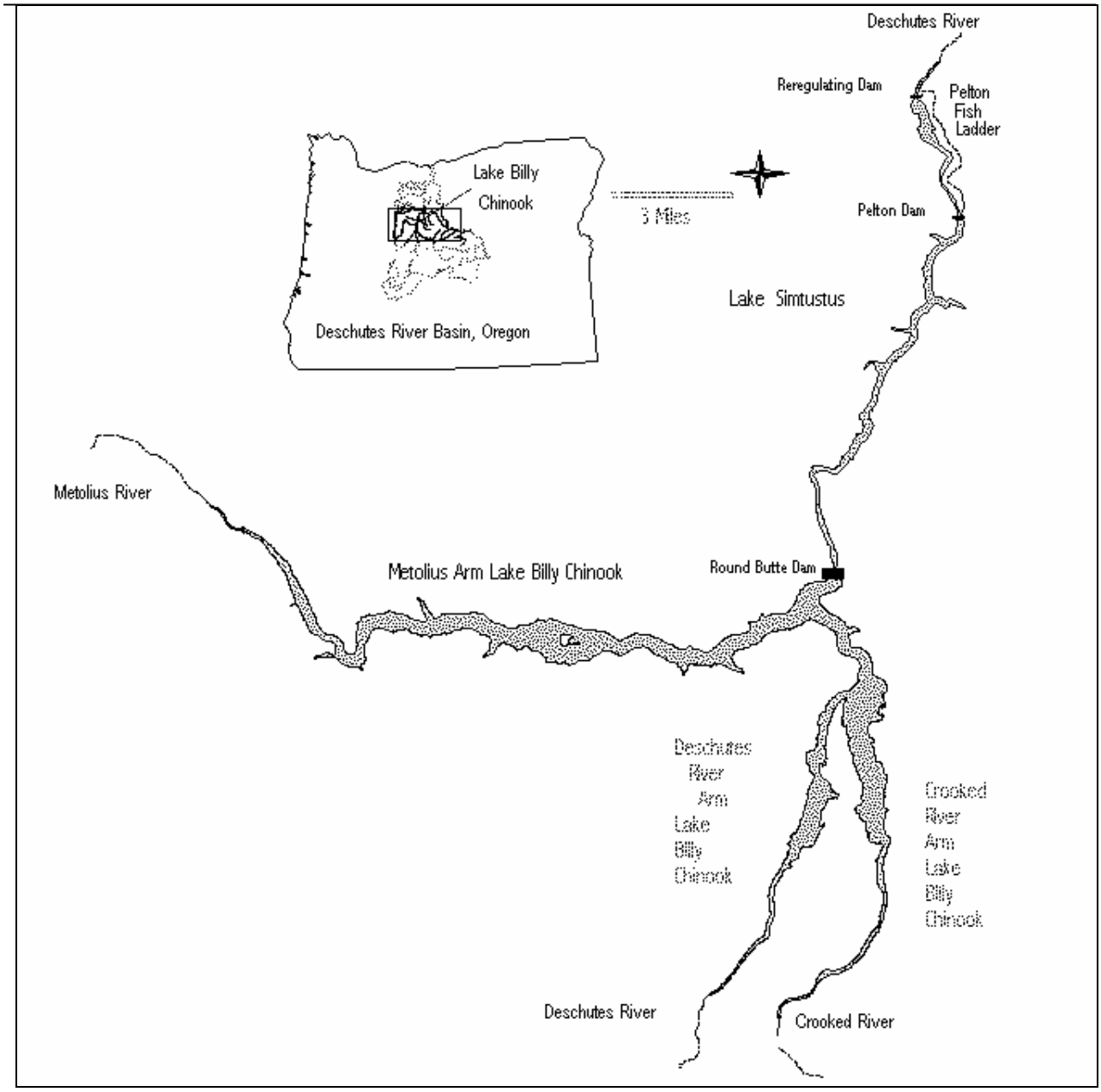


Figure 1. Location of the Pelton Round Butte Project hydroelectric dams and reservoirs on the Deschutes River in Central Oregon.

Construction of Round Butte Dam at the head of Lake Simtustus was completed in 1964, and Lake Billy Chinook was filled during late 1964. The bottom of the power intake in the forebay is 271 ft below full pool. Lake Billy Chinook (Round Butte Reservoir) extends 9 miles up the Deschutes River canyon, 7 miles up the Crooked River, and 13 miles up the Metolius River (Figure 1). Because of the hypolimnic outlet, the temperatures of water flowing out of Lake Billy Chinook vary from approximately 40°F in late winter to 56°F in late summer and early fall.

Because the canyon in the area of Round Butte Dam was too steep for a fish ladder, and to accommodate the 85-ft drawdown of the reservoir allowed by the first license, a tramway system was designed to provide upstream passage. When activated, a vertical winch lifted the tramway bucket up the dam face. After reaching the appropriate height, the vertical winch stopped, and a haul winch moved the 170-cubic-ft capacity bucket over the dam. Once over the forebay, the haul winch was deactivated, and the vertical winch lowered the bucket to about 15 ft below the surface. A Styrofoam float opened the trap door in the bottom of the bucket, allowing the fish to escape.

The original downstream-migrant collection facility for Lake Billy Chinook was located at the east end of Round Butte Dam. To accommodate the majority of the potential 85-ft drawdown, the Round Butte artificial outlet, or "skimmer," was built with a vertical-axis screen instead of a horizontal screen as at Pelton Dam. Four 100-cfs pumps pulled water through the two traveling screens with about 5 cfs of water and smolts passing by the screens, over a weir, and through a pipe to a locking tank. Once collected in the locking tank, smolts could either be loaded into a truck and hauled below the Reregulating Dam to the Deschutes River or shunted into the downstream-migrant pipe and into Lake Simtustus. The downstream-migrant pipe was filled completely with water. Fish were then added to the top of the water column so they rode the water down as the pipe emptied into the Round Butte Dam tailrace (Eicher 1964).

3. Fish Facility Evaluation

Evaluation of the passage facilities was conducted by the Fish Commission of Oregon under the supervision of a multi-agency steering committee. The fish facilities at Pelton Dam were evaluated during the late 1950s and early 1960s (Gunsolus and Eicher 1962). The Round Butte Passage Evaluation measured the capture efficiency at the Round Butte Dam forebay of tagged or marked smolts released into the upper arms of the reservoir (Korn et al. 1967).

The steering committee concluded that downstream fish passage through Lake Billy Chinook was not successful and in 1966 began to discuss hatchery alternatives to maintain anadromous fisheries resources. For a more comprehensive discussion of the historic fish facilities and their evaluation see Ratliff and Schulz (1999a).

B. Relevant Fisheries and Habitat Management Plans

1. ODFW Fisheries Management Plans

ODFW Fisheries Management Plans adopted by the Oregon Fish and Wildlife Commission for the management of the Metolius River (Fies et al. 1996), Upper Deschutes River (Dale et al. 1996), and Crooked River (Stuart et al. 1996), including Lake Billy Chinook, all include policy statements such as the following from the Crooked River Subbasin Plan: "Restore anadromous and migratory resident fish to their historic range in the Crooked River basin by improving upstream and downstream passage over artificial barriers." OAR 635-500-1850.

These subbasin management plans also include policy statements to protect, restore, and enhance fish habitat in the Deschutes basin and tributaries. For example, the Crooked River Subbasin Plan has objectives to protect, restore and enhance fish habitat, maintain or improve instream flow, improve water quality, and reconnect isolated and fragmented populations by restoring and improving passage over manmade barriers. OAR 635-500-1850.

On December 12, 2003, the Oregon Fish and Wildlife Commission adopted amendments to fish management plans to provide management direction for anadromous fish species in the Upper Deschutes, Crooked, and Metolius River subbasins, including areas upstream of the Project.

2. CTWS Fisheries and Land Management Plans

The Deschutes River Subbasin Salmon and Steelhead Production Plan (ODFW and CTWS 1990) was developed in accordance with the Northwest Power Planning and Conservation Council's ("NWPPCC") Columbia River Basin Fish and Wildlife Plan. Its purpose is to guide the NWPPCC's adoption of future salmon and steelhead enhancement projects in the Deschutes River system. The plan also summarizes agency and Tribal management goals and objectives, documents current management efforts, identifies problems and opportunities associated with increasing salmon and steelhead numbers, and presents preferred and alternative management strategies.

The Integrated Resources Management Plan ("IRMP I") for the Forested Area (CTWS and BIA 1992) was developed to guide the development and use of the forested sections of the Reservation. One goal of the plan, the riparian resource management goal, identifies the need to "manage watersheds to protect the unique and valuable characteristics of riparian areas and improve water quality, aquatic habitat, and other water-dependent resources." Several other resource goals in the plan are intended to guide the management of fish and aquatic resources on forested lands of the Reservation to protect specific resource components, including: biological diversity; Threatened, Endangered, and Sensitive species; and Wild and Scenic Rivers. The Integrated Resources Management Plan ("IRMP II") for the Non-forested Areas (CTWS and

BIA 1999) also identifies specific goals for the protection and management of water quality, riparian areas, and resident and anadromous fish. The IRMP II contains elements intended to provide for the protection and enhancement of threatened and endangered fish and aquatic species.

The CTWS have also developed the Warm Springs National Fish Hatchery Operation Plan (CTWS and USFWS 2002). The goals of this operation plan are to cooperatively operate the Warm Springs National Fish Hatchery to protect remaining wild fish populations and preserve their genetic integrity, maintain the existing physical characteristics of Warm Springs River anadromous fish stocks and their production above the hatchery, and not impact fish populations below the hatchery.

The Columbia River Anadromous Fish Restoration Plan of the Nez Perce, Umatilla, Warm Springs, and Yakima Tribes (CRITFC 1995) provides a framework to restore Columbia River salmon, outlining the cultural, biological, legal, institutional, and economic context within which the region's salmon restoration efforts are taking place. Goals of the tribal salmon restoration plan include: (1) Restoring anadromous fishes to the rivers and streams that support the historical cultural and economic practices of the tribes; (2) emphasizing strategies that rely on natural production and healthy river systems; (3) protecting tribal sovereignty and treaty rights; and (4) reclaiming the anadromous fish resource and the environment on which it depends for future generations.

3. Federal Forest and Land Management Plans

The U.S. Forest Service ("USFS") land and resource management plans for the Deschutes National Forest (USFS 1990) and Ochoco National Forest and Crooked River National Grassland (USFS 1989), and the U.S. Bureau of Land Management ("BLM") Two Rivers resource management plan (BLM 1986) all include standards for fisheries habitat protection. These plans also state support for the reintroduction of native fishes to their historical ranges.

4. National Wild and Scenic River Plans

The Metolius, Deschutes, and Crooked rivers, which are the major tributaries to Lake Billy Chinook, are all classified as National Wild and Scenic Rivers in the reaches just above the reservoir. The management plans for each of these federally managed segments support the goal of reintroduction of anadromous fish (USFS et al. 1996; BLM et al. 1992a, 1992b).

The entire 100-mile length of the lower Deschutes River is a component of the Oregon State Scenic Waterways System, as well as National Wild and Scenic River, Recreation River area. The Lower Deschutes River Wild and Scenic River Management Plan (BLM et al. 1993, 1996) establishes recreation management goals for the lower Deschutes River. The recreation

management goals for all segments of the lower river include management to maintain or enhance recreational fisheries values.

5. ESA Recovery Plans

a. Bull Trout and Steelhead

On June 10, 1998, the U.S. Fish and Wildlife Service ("USFWS") listed the bull trout (*Salvelinus confluentus)* Columbia River Distinct Population Segment ("DPS") as a threatened species under the Endangered Species Act ("ESA") (63 FR 31647). This DPS was also included in the November 1, 1999, listing for bull trout in the coterminous United States (64 FR 58909). Subpopulations in the Deschutes River are included in this listing. In November 2002, the USFWS proposed designation of critical habitat for the Klamath River and Columbia River distinct population segments of bull trout (50 CFR Part 17, RIN 1018-AI52). For the Columbia River DPS, the proposed critical habitat designation totals approximately 29,251 km (18,175 miles) of streams, including 5,460 km (3,391 miles) of streams and 18,077 ha (44,670 ac) of lakes and reservoirs in Oregon. Critical habitat proposed for the Lower Deschutes River subunit (extending from Big Falls on the middle Deschutes River above the Project to the confluence with the Columbia River) includes the lower Deschutes River and tributaries; the Project reservoirs; and the Metolius, Deschutes, and Crooked rivers (and their tributaries) above the Project.

A recovery plan for the Deschutes Recovery Unit has been prepared by the USFWS in conjunction with the Deschutes Recovery Unit Team (USFWS 2002). The goal of the Deschutes bull trout recovery plan is to "ensure the long-term persistence of self-sustaining complex interacting groups of bull trout distributed throughout the species' native range, so that the species can be delisted." The recovery plan establishes several objectives toward achieving this goal and identifies specific actions associated with each objective. Among these prescribed actions is restoring fish passage at the Pelton Round Butte Project and implementing a monitoring strategy.

The Middle Columbia River ("MCR") Evolutionarily Significant Unit ("ESU") of steelhead (*Oncorhynchus mykiss)* was listed by the National Marine Fisheries Service ("NOAA Fisheries") as threatened on March 25, 1999 (64 FR 14517). The listing determination was only for naturally spawned, anadromous populations of *O. mykiss* residing below impassable natural barriers. The MCR steelhead occur in the lower Deschutes River below the Project. NOAA Fisheries concluded that the Deschutes River (ODFW stock 66) hatchery stock should be considered part of the ESU but not essential for its recovery.

NOAA Fisheries designated critical habitat for steelhead on February 16, 2000 (65 FR 7764). The lower Deschutes River, up to Pelton Dam (excluding all Tribal lands), was included in the critical habitat designation for MCR steelhead. On April 30, 2002, however, the critical habitat designation for MCR steelhead was withdrawn by NOAA Fisheries (upon approval by the U.S. District Court for the District of Columbia) in response to litigation challenging the process by which NOAA Fisheries established critical habitat. NOAA Fisheries is currently reassessing the MCR steelhead ESU's listing status and critical habitat and plans to re-issue critical habitat designations after that analysis is completed.

b. Salmon: Magnuson-Stevens Fishery Conservation and Management Act (Essential Fish Habitat Provisions)

On October 11, 1996, Congress passed the Sustainable Fisheries Act (Public Law 104-297), which, among other things, amended the Magnuson Act to include provisions related to essential fish habitat ("EFH"). The renamed Magnuson-Stevens Act ("MSA") calls for increased attention to habitat in the conservation of fishery resources, and includes protection of EFH as a necessary component of sustainable fisheries. Toward this end, Congress mandated the identification of habitats essential to managed species and measures to conserve and enhance this habitat. The MSA requires cooperation among NOAA Fisheries, the Fishery Management Councils, and federal action agencies to protect, conserve, and enhance EFH. Congress defined EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity."

Pursuant to the MSA, the Pacific Fisheries Management Council has designated EFH for three species of federally managed Pacific salmon: chinook salmon (*Oncorhynchus tshawytscha*); coho salmon (*O. kisutch*); and Puget Sound pink salmon (*O. gorbuscha*). Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other water bodies currently or historically accessible to salmon in Washington, Oregon, Idaho, and California. Salmon EFH excludes areas upstream of longstanding naturally impassible barriers (i.e., natural waterfalls in existence for several hundred years), but includes aquatic areas above all artificial barriers except specifically named impassible dams. Areas upstream of the Pelton Round Butte Project are included in the EFH designation. Detailed descriptions and identifications of EFH for salmon are found in Appendix A to Amendment 14 to the Pacific Coast Salmon Plan.

Pursuant to the MSA, federal agencies must consult with NOAA Fisheries on all actions or proposed actions that are authorized, funded, or undertaken by the agency, and that may adversely affect EFH. NOAA Fisheries must provide conservation recommendations for any federal or state action that would adversely affect EFH. The federal action agency must respond to NOAA Fisheries within 30 days of receipt of the EFH conservation recommendations, including a description of the measures the agency will take to avoid or mitigate the impact of

the action on EFH. If the action agency does not include the recommendations, the agency must explain its reasons. EFH consultations are typically completed concurrent with Endangered Species Act consultations.

C. Conceptual Foundation and EDT Assessment

The "Conceptual Foundation for the Management of Native Salmonids in the Deschutes River" (Lichatowich 1998) does not specifically propose the reintroduction of anadromous fish upstream of the Project. However, it recommends that future activities be undertaken with an ecosystem perspective and that connectivity of habitats and life-history diversity be promoted. Successful upstream and downstream passage would support these ecological concepts.

The EDT assessment evaluated the ability of existing conditions of the aquatic environment to support identified goals and values based on the effects of certain environmental attributes on chinook salmon, the EDT's diagnostic species. The EDT report (Mobrand Biometrics, Inc. October 1999) concluded that "the conceptual foundation for the Deschutes developed by Lichatowich is in all major respects consistent with the EDT diagnosis, and should be viewed as a valuable source of additional ideas."

D. Structured Decision Making

The Technical Subcommittee developed a structured decision-making process to evaluate fish passage at the Project (Oosterhout 1998). The reasons for developing this process were (1) to develop common objectives among the interested agencies and organizations, (2) to allow information to be developed under controlled rules that would promote common understanding, and (3) to allow the passage decision to be divided into its decision components for evaluation. Perhaps the most important outcome of using the structured decision-making process was Technical Subcommittee consensus on the major uncertainties surrounding the potential reintroduction of each species under consideration. The Technical Subcommittee utilized the identified uncertainties to direct a rigorous study effort to reduce the level of uncertainty inherent in such a complex undertaking.

A stochastic life cycle model (PasRAS) was developed for sockeye and spring chinook (Oosterhout 1999) to support the decision-making process. In addition, a deterministic steelhead model addressing the complicated life history of steelhead and potential inter-relationships between steelhead and rainbow trout was developed as a tool to help evaluate uncertainties associated with reintroduction scenarios (Cramer and Beamesderfer 2001). These models allowed the relative importance of each uncertainty to be evaluated for these species so that experimental efforts could be further focused.

E. Relevant Studies to Reduce Uncertainties

Major uncertainties designated for the various species during the structured decision-making process included:

- Disease agent transfer
- Downstream smolt collection efficacy
- Habitat quality and quantity
- Predation
- Upstream passage

Studies conducted for each of these areas of uncertainty are briefly discussed below. Efforts are continuing in each of these areas of uncertainty to reduce the risk associated with pursuing implementation of the Fish Passage Plan. Study plans, progress reports, and final reports for past study efforts are included in PGE's and Tribes' respective December 1999 final FERC license applications. In addition, an update of Technical Subcommittee related activities between filing of the final license applications and the Joint Amendment, the 2000 progress report for ongoing Experimental Passage Phase activities, and the study plan for Experimental Passage Phase activities in 2001 are included with the Joint Amendment (Attachments III-3, III-4 and III-5, respectively, to the Fish Resources section of Exhibit E of the Joint Amendment).

1. Disease Agent Transfer

The potential for disease agent and disease transfer with reestablishment of passage — and the associated potential for significant losses in resident populations above the dams and for limited success of anadromous reintroduction — was identified early on as a major uncertainty. PGE contracted with the ODFW Fish Health Section to sample fish populations both upstream and downstream of the Project to determine which fish disease agents not currently found above the Project have the potential to become established there. In addition, juvenile fish from stocks upstream of the Project were tested to determine their relative susceptibility to the fish disease agents that might be transferred upstream if fish passage were reinitiated. The two diseases of most concern are Infectious Hematopoietic Necrosis ("IHN") Type 2 and whirling disease. IHN Type 2 is caused by a virus, and whirling disease is caused by *Myxobolus cerebralis*, a myxosporean parasite.

Recent (2001–2002) work for these studies included: continued sampling to determine which fish diseases currently found only downstream of the Project have the potential to become established upstream if fish are able to pass the Project dams; continued fish disease challenges

to evaluate susceptibility of upstream fish populations to diseases or strains of diseases found downstream of the Project; experiments to determine virus loads in Metolius River water and genetic testing of IHN virus isolated during the surveys; studies to assess the suitability of *Tubifex tubifex* worms found upstream of the Project to serve as the alternate host for whirling disease; and evaluation of potential non-lethal methods for detecting whirling disease.

The fish disease risk study program is substantially completed. Results of the fish disease agent studies are summarized in the interim final reports for these studies (Engelking 1999; Bartholomew 1999), progress reports (Engelking 2001, 2002, and 2003a; Bartholomew 2001, 2002, 2003).

The fish disease risk study program culminated in a draft Fish Health Management Plan (Engelking 2003b) that dictates passage and sampling protocols under the different phases of the Fish Passage Plan. A description of the fish health management program is provided later in this Fish Passage Plan (section IV.F), and the draft Fish Health Management Plan is provided as Appendix II.

2. Downstream Smolt Collection Efficacy

Poor downstream collection efficacy from Lake Billy Chinook (due to lack of consistent downstream surface currents toward Round Butte Dam) was identified as one of the major reasons fish passage failed during the 1960s (Korn et al. 1967). To define potential methods for renewing fish passage at the Project, the Technical Subcommittee evaluated different alternatives for downstream passage, their chances for success, and the potential implications for other resources associated with each alternative (Ratliff et al. 1999; included on the CD with Appendix I to this Fish Passage Plan).

The Technical Subcommittee utilized two numerical models, (1) a two-dimensional temperature and water quality model, and (2) a three-dimensional hydrodynamic model of Lake Billy Chinook, to simulate and evaluate the potential consequences of different water withdrawal alternatives on surface currents. These calibrated and verified numerical models are capable of describing the temperature and velocity distributions in the reservoir. Production runs of these models were used to determine what changes in facilities and reservoir operations might alter flow fields and encourage surface currents to move toward the forebay from the three tributary arms (Khangaonkar 1999; Yang et al. 2000). In addition, information concerning downstream migration of smolts of the different species through lakes and reservoirs was studied and summarized (Zabel et al. 1999).

The Technical Subcommittee examined several alternatives for modifying surface currents, including a reservoir curtain and modified reservoir outlet structures. This effort included

computer simulations of reservoir currents and water quality combined with field collection of reservoir current and water quality data. Concurrent with these reservoir studies was the identification of the potential benefits to downstream water quality that might be achieved with a selective water withdrawal ("SWW") system in Lake Billy Chinook, primarily through the management of downstream water temperature as described in section III.F., below.

PGE and the Tribes, with support from agency and consulting engineers and fisheries biologists, are continuing the evaluation of potential SWW structures and fish screening/collection alternatives in Lake Billy Chinook that could provide effective collection of downstream migrants while also allowing for management of downstream water temperature and chemistry (ENSR and Duke Engineering & Services 2001). This effort has included evaluating the potential water quality implications of SWW (in Lake Billy Chinook) on Lake Simtustus and lower Deschutes River water quality through water quality models developed for this purpose (Yang et al. 2001; Breithaupt et al. 2001).

Recent work has included: additional hydrodynamic modeling to refine SWW formulas to maximize fish passage opportunity and retain water quality benefits (Tribes and PGE 2002); engineering and biological evaluation of selected downstream passage facility alternatives, including determination of screening criteria (Ratliff 2001a; 2001b), hydraulic analysis, and evaluation of screen face velocities and structural limitations (PGE et al. 2003); and additional consultation with agency fish passage engineers to identify potential additions or modifications to facility alternatives under active consideration.

3. Habitat Quality and Quantity

To reduce the uncertainty surrounding the quality and quantity of habitats upstream of the Project, stream habitats not previously quantified were surveyed during 1997 and 1998. A database spreadsheet model (HABRATE) was developed using literature values to determine ranges of potential smolt production from different reaches of habitats depending upon the condition of these habitats (Riehle 1998). This information has been entered into a digital geographical information system (GIS). A description of HABRATE and preliminary maps showing the quantity of spawning and rearing habitats (rated for quality) for chinook, steelhead and sockeye (Riehle 1999) are included in the CD provided with Appendix I.

During 2000, the Technical Subcommittee evaluated limiting factors for chinook, steelhead, and sockeye habitat quality using HABRATE (Riehle 2001; also see limiting factors maps included on the CD accompanying Appendix I). This limiting factors analysis will assist managers in assessing the potential for fish production in habitats that would become available upon the successful establishment of fish passage.

Analysis of this GIS database can be used to estimate total potential fish production and to graphically represent river reaches according to their relative production potential for different species and age classes. Analysis of the GIS data can also be used to determine reaches where habitats might be enhanced to increase potential production. HABRATE data have also been used in the PasRAS life-cycle models for spring chinook and sockeye (Oosterhout 1999) and in the deterministic model for simulation of steelhead life cycle (Beamesderfer and Cramer 2001). The HABRATE model is currently being updated to incorporate recently developed information on potential juvenile spring chinook habitat use in the Metolius River system (Lovtang et al. 2003). The updated HABRATE information will continue to be used in conjunction with PasRAS and the deterministic steelhead life cycle model to refine predictions of habitat requirements and population objectives for successful fish passage.

4. Predation

Predation was studied in two systematic efforts. A study of bull trout food habits was conducted to better define the relationship between this predator species and its prey species, especially kokanee (Schulz et al. 1997; Beauchamp and Van Tassell 2001). The food habits of littoral fish species (northern pikeminnow, smallmouth bass, brown trout, and rainbow trout) have also been studied (Lewis 1999). Additional predator studies are planned as part of the Testing and Verification efforts to be conducted during the Interim phase of the fish passage program, when sufficient numbers of smolts will be available to allow evaluation of predation in Lake Billy Chinook. Planned components and timing of the predation studies are discussed under the Interim Passage Phase, section IV.B.3 of this Fish Passage Plan.

5. Upstream Passage

The Technical Subcommittee completed a preliminary evaluation of alternatives for upstream passage, their chances for success, and the potential implications for other resources associated with each alternative (Ratliff et al. 1999). Two engineering efforts were conducted to refine upstream passage alternatives. Existing fish facilities at the Project were investigated to determine if they could be reactivated in either an experimental or long-term program, and concepts for potential new facilities were developed (Duke Engineering & Services 1999a). In addition, existing trap-and-haul and ladder facilities at other dams in the Northwest were surveyed to determine common features of successful and unsuccessful programs (Duke Engineering & Services 1999b).

Some improvements to existing upstream passage facilities have already been implemented. An accumulation pool was constructed at the Pelton Fish Trap in 2000. Initially this pool will allow more frequent processing of fish for transfer to the Round Butte Hatchery and the timely return of wild adults to the Deschutes River. Ultimately this pool will allow for the efficient sorting of

adult fish destined for passage upstream of the Project from those to be transferred to the hatchery. In addition, a finger weir was added to the pool on the east bank of the river below the Round Butte powerhouse to prevent larger fish from leaving the pool after they enter, which allows for more accurate counting of adult bull trout attempting to migrate upstream from Lake Simtustus. The weir has been in place and the pool has been monitored to determine numbers of unmarked bull trout, previous years' tagged bull trout, and the current year's tagged bull trout. The bull trout population in Lake Simtustus is estimated from these counts.

F. Reservoir and Lower Deschutes River Water Temperature

Hydrodynamic and water quality modeling studies conducted in conjunction with the fish passage feasibility evaluation have indicated that selective water withdrawal in Lake Billy Chinook could be used not only to modify water currents in Lake Billy Chinook, but also to move the annual temperature patterns of the water released from the Project's Reregulating Dam towards pre-Project patterns. This would improve water quality in the Project's reservoirs and in the lower Deschutes River (Yang et al. 2000, 2001; Breithaupt et al. 2001). Through multiple model run sequences, an optimum "blend" of surface and deep withdrawal through the year has been identified that appears to have the potential for creating favorable current conditions and year-round surface-collection in Lake Billy Chinook to help downstream migrating smolts, while also achieving lower river water quality standards.[6] Figure 2 shows how "Blend 16" is predicted to shift the water temperature profile for Project outflow to the lower river to allow the Project to be in compliance with the bull trout temperature standard.

Based on the modeling results, the Technical Subcommittee has focused on the use of SWW as the most promising approach for the Project to meet water quality objectives, and SWW has been prescribed by the two § 401 certificates for the FERC licensing of the Project (ODEQ 2002; CTWS WCB 2002).

[6] The Oregon Environmental Quality Commission and the Tribes' WCB have adopted temperature standards consistent with the federal Clean Water Act. These standards do not allow a hydro facility to warm ambient temperatures more than 0.25°F over what they would be if the facility were not present, if the temperature is above the applicable standard for those waters. Because of the presence of bull trout rearing, the standard for the lower Deschutes River is 50°F, or inflow temperatures plus natural warming, during the period in question.

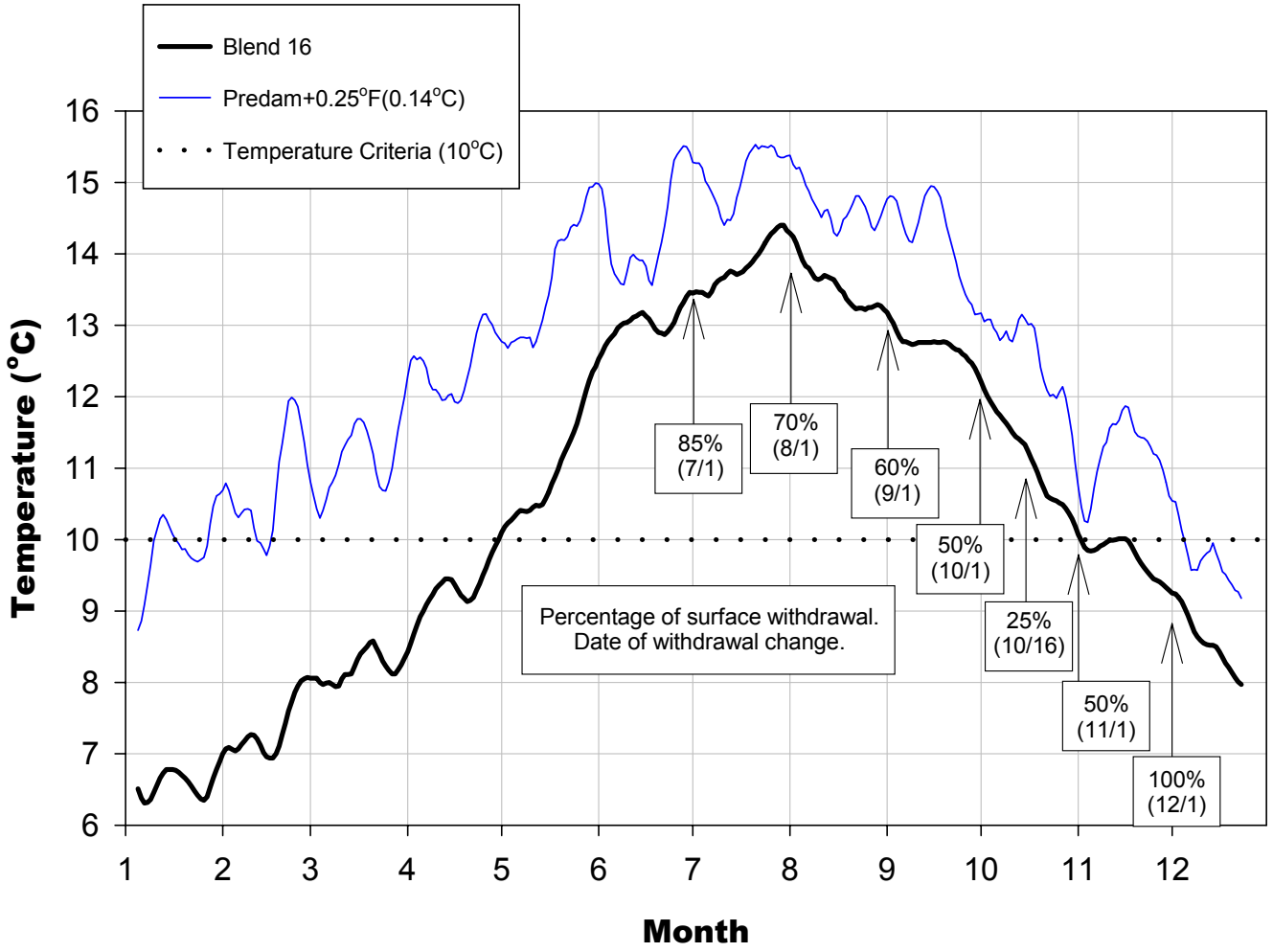


Figure 2. Predicted water temperatures (7-day average daily maximum) in the lower Deschutes River under Blend 16.

IV. PROGRAM COMPONENTS

A number of important program components have been identified for the fish passage effort. These components, which are outlined in detail in this Fish Passage Plan, include:

- Stock selection
- Fish health management
- Lower Deschutes River temperature and water quality management
- Selection, design, approval, construction, and evaluation of facilities
- Evaluating passage program success
- Managing the relationship between the fish passage program and the Round Butte Hatchery program

The activities associated with these components have been organized into four program phases:

1. Baseline
2. Experimental
3. Interim
4. Final

The Baseline Passage Phase was completed by the Technical Subcommittee in 1999, and the Experimental Passage Phase was initiated in early 2000. As currently envisioned, upon successful completion of all activities in the Experimental Passage Phase, the Licensees will initiate the implementation of the Interim Passage Phase, which will include the construction of a preferred alternative for collecting downstream migrant fish in Lake Billy Chinook. Currently, the most likely downstream fish collection facility alternative is a screening facility to be located in the forebay of Round Butte Dam and operated in conjunction with a SWW structure that is to be constructed to meet the water quality requirements of the State and Tribal § 401 certificates. If it is determined pursuant to the decision-making process detailed in this Fish Passage Plan that construction and/or function of the preferred option is not feasible, the Licensees will pursue alternative fish passage measures under the direction of the Fish Committee. (Decision making and measures of success for the fish passage program are detailed in section V.B. of this Fish Passage Plan.)

A. Adaptive Management and Decision Process

1. Overview

This Fish Passage Plan will be implemented according to the principles of adaptive management. Adaptive management involves synthesizing existing knowledge, exploring alternative actions, and making explicit forecasts about their outcomes. Carefully designed management actions and monitoring programs are utilized to generate reliable feedback and clarify the reasons underlying outcomes. Actions and objectives are then adjusted based on this feedback and improved understanding. In addition, decisions, actions, and outcomes are carefully documented and communicated to others, so that knowledge gained through experience is passed on, rather than being lost when individuals move or leave the effort (Nyberg 1999).

The first essential characteristic of adaptive management is that a direct feedback loop exists between science and management. This allows for management and policy decisions to be modified in light of new scientific information. The second essential characteristic of adaptive management is that management includes an experimental component. It is the combination of these two characteristics that distinguishes adaptive management from either traditional science or incremental "learning as you go" (Halbert 1993).

In traditional management, research is ordinarily separated from actual resource management. Rarely is there an explicit procedure governing how the emerging science will be utilized to influence management. Providing a link between science and management requires an inventory, monitoring, and evaluation program. Monitoring is the collection of data used to evaluate progress toward meeting objectives, which in turn can be used to adjust management policies. It is the feedback part of monitoring that distinguishes it from inventory (Salwasser et al. 1983). Monitoring can be considered as both an activity (measuring) and a process (evaluation and refinement). Evaluation is highly dependent on proper conceptual design. It requires clearly defined objectives so proper measurements can be made that evaluate progress toward meeting the stated objectives. The implicit assumption is that the information gained from experimentation will be used to meet management objectives. Only in this manner can science be linked with management (Halbert 1993).

Adaptive management requires the definition of clear objectives and the development of specific decision criteria in order to evaluate different policy options. Development of decision criteria is essential because tradeoffs need often to be made. It is rarely possible to simultaneously maximize multiple objectives. The development of decision criteria can be used not only to measure whether objectives are being met, but also whether identified goals are truly compatible. The compatibility of goals becomes particularly important in management regimes that purport to manage simultaneously for multiple resources (Halbert 1993).

2. Application of Adaptive Management to the Pelton Round Butte Fish Passage Program

There are six main steps of adaptive management as it has been and will continue to be applied to the Pelton Round Butte fish passage program:

1. *Problem assessment* — explicitly recognizing that there are uncertainties regarding the outcome of fish protection/management measures and identifying those uncertainties that are critical to success.

2. *Plan design* — deliberately designing a plan to increase understanding about the system and reveal the best way to reduce the level of uncertainty and meet explicitly stated objectives.

3. *Implementation* — carefully implementing the plan.

4. *Monitoring* — developing and implementing a monitoring program of key indicators of success against which progress toward achieving the objectives of the fish protection/management measures can be measured.

5. *Evaluation* — analyzing data from the monitoring program and assessing results, giving consideration to the objectives and predictions.

6. *Adjustment* — incorporating results into future decisions and actions as needed to modify the fish protection/management measures.

These steps are consistent with the implementation steps recommended by the EDT process (Mobrand Biometrics, Inc. October 1999).

Because of the early efforts by PGE and the Tribes to engage resource agencies and other stakeholders in investigating the feasibility of fish passage at the Pelton Round Butte Project, significant progress has already been made in several of these steps. This progress and the remaining effort to fully develop the adaptive management process are described below.

a. Problem Assessment

In adaptive management, problem assessment involves developing a clear definition of the problem in terms of ecosystem function, rather than in terms of preconceived management solutions. Problem assessment for the feasibility of fish passage at the Project was accomplished in parallel by the EDT process and by the Technical Subcommittee utilizing a structured decision-making process called "multiple attribute utility decision analysis" (Oosterhout 1998).

The problem statement developed by the Technical Subcommittee for fish passage feasibility included the fundamental goal of maximizing ecosystem integrity. (Other fundamental objectives defined [but not analyzed] were: maximizing net economics, maximizing social/personal values, and fulfilling legal obligations.) In addition, uncertainties related to the feasibility assessment have provided the framework for completed and ongoing research efforts.

As discussed above, a number of analytical tools are being utilized to assist in the feasibility evaluation. These tools include the following:

- Three-dimensional hydrodynamic model (Khangaonkar 1999, Yang et al. 2000) to assist in the prediction of juvenile collection efficacy at Lake Billy Chinook.

- Water quality models to evaluate the potential effects of selective water withdrawal on reservoir and downstream water quality (Yang et al. 2001; Breithaupt et al. 2001).

- GIS database (HABRATE) to assist in the evaluation of upstream habitat quality and quantity (Riehle 1998; 1999; 2001).

- Passage Risk Assessment Simulation (PasRAS), a stochastic risk assessment simulation model to assist in the evaluation of the relative impacts of major uncertainties on all life stages of sockeye and spring chinook (Oosterhout 1999).

- Life history simulation model for steelhead to similarly assist in the evaluation of the relative impacts of major uncertainties on all life stages of steelhead (Cramer and Beamesderfer 2001).

- Fish Disease Risk Matrix to assist PGE, the Tribes and the managing agencies in identifying and answering important disease risk questions (Engelking 1998).

b. Designing the Fish Passage Plan

Based on the results of its problem assessment efforts, the Technical Subcommittee concluded in 1999 that sufficient information had been developed regarding management objectives, important uncertainties, and potential alternative management actions to initiate an ongoing program to evaluate the feasibility of fish passage at the Project. The result was the four-phase effort outlined in this Fish Passage Plan. This plan represents the Technical Subcommittee's assessment as to the most appropriate general sequencing of efforts to address critical uncertainties and implement the fish passage program at the Project, and is consistent with the specific recommendations of the EDT process to "begin feasibility studies to address adult and juvenile fish passage at the Project" (Mobrand Biometrics, Inc. October 1999). This Fish Passage Plan also reflects agreement among the Parties to the Pelton Round Butte Settlement

Agreement ("Parties"; "Settlement Agreement") regarding the schedule and sequencing of efforts, measures of success, and decision-making processes that will guide the fish passage program through the term of the New License.

Key aspects of the Fish Passage Plan are monitoring, evaluation, and feedback to management. A substantial part of this adaptive management approach will be accomplished through a program of Testing and Verification evaluations to be conducted primarily within the Interim Passage Phase. The Testing and Verification program is designed as a series of studies to evaluate the effectiveness of temporary and permanent fish passage facilities and to provide information for decision making on near-term and long-term aspects of the fish passage program. For additional details, refer to the Testing and Verification program description provided in section IV.B.3.e.(9) and Appendix III of this Fish Passage Plan.

Beyond the Testing and Verification studies, fish passage performance will be evaluated through a program of long-term monitoring that will extend through the term of the New License. The Technical Subcommittee initially developed a long-term monitoring concept for the passage program intended to provide feedback on the progress of the feasibility evaluation (PGE 1999, Table IV.G-9). This monitoring concept identified key indicators, responsible parties for conducting monitoring activities, the geographic extent of the monitoring effort, and the appropriate intensity (e.g., frequency, timing, duration) of monitoring. The concept for the long-term monitoring plan has since been refined in conjunction with development of this Fish Passage Plan. The long-term monitoring program as currently envisioned is described in section IV.G. and outlined in Appendix IV of this Fish Passage Plan. This framework will be expanded into a Long-Term Monitoring Plan that will set forth all specific monitoring components, locations, measurables, and schedule.

Water quality parameters will also be monitored through the term of the New License to evaluate the effects of SWW. All water quality monitoring during the term of the New License will be performed in accordance with the Water Quality Monitoring and Management Plan ("WQMMP"; Tribes and PGE 2002) required by the State and Tribal § 401 certificates. Throughout this Fish Passage Plan, reference has been made to the WQMMP when water quality decisions will affect fish passage planning.

Further development of the Testing and Verification study plans and Long-Term Monitoring Plan will be accomplished by the Licensees in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies[7] pursuant to their respective statutory authorities. The final plans will specify details such as monitoring protocols, data management, and data interpretation methods. The final plans will also ensure linkages to appropriate resource

[7] Fish Agencies" as used in this document refers to NOAA Fisheries, USFWS, ODFW, and CTWS BNR.

managers, and will define degree of response in specific indicators relative to agreed-upon criteria or other measures of success that will trigger a recommendation to make a change in management actions or objectives.

B. Implementation Schedule / Decision Points

This Fish Passage Plan is being implemented in four distinct phases. The activities within each phase of the fish passage program are described below and presented in a detailed summary table in Appendix V. The following information for each phase of the Fish Passage Plan is included below:

- Prerequisite knowledge/agreements for the initiation of the phase
- Key program elements of the phase
- Expected timing and duration of each study and facility design, construction, and evaluation effort

Any decisions to be made regarding specific activities will be made by the Licensees, in consultation with the Fish Committee and, where specified, with the approval of the appropriate Fish Agencies pursuant to their respective authorities, using the adaptive management approach described above**.** All reporting requirements of the New License regarding progress on fish passage implementation will be met by the Licensees in conjunction with ongoing Fish Committee activities. Nothing in this Fish Passage Plan expands or diminishes any existing authority or confers approval authority or regulatory jurisdiction that does not already exist under applicable federal, state, or Tribal law. The Parties recognize that each Fish Agency has separate and distinct statutory authorities and that no agency is deemed, by virtue of concurrent approvals, to be sharing its statutory authority with any other agency or to be conceding that the approval of any other agency is required for exercise of that agency's authority.

As presented in this Fish Passage Plan, the Baseline Passage Phase is complete and the Experimental Passage Phase is substantially complete. Activities associated with the Interim Passage Phase are expected to begin in 2004 with the issuance by FERC of the New License for the Project, and to continue being implemented over the next 14 years or more. Therefore, the detailed planning set forth and discussed in this Fish Passage Plan focuses largely on the Interim Passage Phase, which will comprise most of the remaining implementation, testing/verification, and decision-making activity in the fish passage program. The dates specified for various activities within the Interim Passage Phase assume timely decision making; if actual progress is delayed due to longer decision making timeframes, the schedule will be adjusted as needed. Description of the major components of the Final Passage Phase is also provided in this section but in less detail than for the Interim Passage Phase. Details regarding specific elements and

timing for the Final Passage Phase will be further developed with time based on results of Testing and Verification studies and adaptive-management-directed decision making during the Interim Passage Phase.

1. Baseline Passage Phase

a. Prerequisite Knowledge/Agreements

- Reestablishment of anadromous fish upstream of the Project is described as a desired future condition in ODFW Fish Management Plans, Tribal management plans, and Federal Wild and Scenic River Management Plans.
- Reestablishment of anadromous fish upstream of the Project is identified as a high priority by agencies in comments on PGE's and the Tribes' initial consultation documents and draft license applications for the FERC relicensing of the Project.

b. Key Program Elements

- Technical Subcommittee established and supported.
- Structured decision-making process developed and applied.
- Major uncertainties for each species identified.
- Studies initiated and/or focused on major uncertainties.
- Alternatives for renewing fish passage identified, evaluated and documented.
- Historic fish passage facilities surveyed for their potential application in a future fish passage program.

c. Schedule

The schedule for the Baseline Passage Phase is presented in Figure 3. This phase was completed in 1999.

Figure 3. Schedule for the Baseline Passage Phase of the Fish Passage Plan.

Program Element	**1996**	**1997**	**1998**	**1999**
Technical Subcommittee established and supported				
Initial structured decision-making process developed and applied				
Life histories evaluated				
Major uncertainties by species identified				
Studies initiated and/or focused on uncertainties:				
• Fish disease transfer risk				
• Collection efficacy:				
-- Reservoir current studies				
-- Hydrodynamic modeling				
• Habitat capacity				
• Predation				
• Water quality/temperature				
Alternatives for renewing fish passage evaluated and documented				
Historic facilities surveyed for operability / use in Experimental phase				

The Baseline Passage Phase involved the initial planning, information gathering, and studies to make an initial determination of the feasibility of reestablishing fish passage. Much of this effort involved separating the decision regarding reestablishing fish passage into its component questions and uncertainties (Oosterhout 1998). Most studies conducted during this phase were designed to identify and begin to reduce the risk associated with major uncertainties identified by the Technical Subcommittee for each species to be passed (Oosterhout 1998).

2. Experimental Passage Phase

a. Prerequisite Knowledge/Agreements

- Based on the results of the reservoir hydrodynamic model, it appears possible to create conditions that would be more conducive to successful downstream passage from Lake Billy Chinook.
- The ability to manage the risk of fish disease transfer appears to be feasible.
- Modifying lower Deschutes River temperatures to more closely reflect pre-Project conditions appears to be feasible with some surface withdrawal from Lake Billy Chinook during smolt emigration periods.
- Eyed eggs / fry / smolts from disease-agent-free parents are approved for introduction upstream of Round Butte Dam for study purposes.
- The historic downstream-migrant fish facility at Round Butte Dam (Round Butte skimmer) can be modified to operate in an experimental capacity.
- Notification to, and confirmation from, FERC that temporary facilities associated with this Experimental Passage Phase do not require specific FERC approval.

b. Key Program Elements

- Round Butte skimmer is reactivated and operated for experimental purposes.
- Smolt handling, marking, and trucking facilities are constructed below the Round Butte skimmer.
- Yearling kokanee smolts are captured at the historic Round Butte skimmer, marked, and safely trucked to the lower Deschutes River to determine return frequency as sockeye.
- Spring chinook eyed eggs, marked sockeye fry, and hatchery steelhead smolts are transferred above Lake Billy Chinook for survival and migration study purposes.
- Smolt migration studies are conducted in Lake Billy Chinook.
- Temporary upstream adult bull trout trap is constructed at the base of Round Butte Dam.

- If disease clearance is gained, adult bull trout captured from Lake Simtustus are trucked upstream to Lake Billy Chinook or to the Metolius River for release at Monty Campground.

- If adult bull trout are moved upstream from Lake Simtustus, then juvenile bull trout captured in the Round Butte skimmer are moved downstream into Lake Simtustus to increase their rearing area.

- If disease clearance is obtained, juvenile bull trout are marked and transported to the lower Deschutes River. Return frequency of marked fish is monitored at the Pelton Fish Trap. Straying of bull trout released into the lower river is documented by monitoring upstream migration into the Warm Springs River and Shitike Creek, in consultation with the CTWS BNR.

- The study of feasibility and preliminary design of Round Butte Dam SWW and downstream-migrant collection and handling facilities is initiated with the development of design concepts in consultation with agency engineers and the Technical Subcommittee.

c. Schedule

The schedule for the Experimental Passage Phase is presented in Figure 4. This phase was initiated in late 1999, is substantially complete, and will continue until the prerequisites for the Interim Passage Phase are achieved. Some activities may carry forward into the Interim Passage Phase.

Figure 4. Schedule for the Experimental Passage Phase of the Fish Passage Plan.

Program Element	1999	2000	2001	2002	2003
Round Butte skimmer reactivated and operated			Note [1]		
Smolt facilities below skimmer designed and constructed					
Yearling kokanee captured, marked, and passed downstream			Note [2]		
Spring chinook eyed eggs moved upstream					
Unfed spring-chinook fry moved upstream					
Marked sockeye eyed eggs moved upstream					
Radio-tagged steelhead smolts moved upstream and tracked					
Modeling analysis of Lake Billy Chinook water quality and lower river water quality continues					
Fish disease agent work continues					
Smolt migration studies in Lake Billy Chinook conducted					
Temporary upstream adult bull trout trap designed and constructed					
Adult bull trout trucked from Simtustus to lower Metolius (if disease clearance is attained)			Note [3]		
Juvenile bull trout captured at Round Butte skimmer and moved to Lake Simtustus and/or lower Deschutes River		Note [4]			
Round Butte SWW and downstream collection facility concepts developed and evaluated					

Notes:

1 Operation of the Round Butte skimmer was determined in 2001 to be unsuccessful for capturing large numbers of downstream migrants and was not continued in 2002.

2 No yearling kokanee were captured in the skimmer during its 2000–2001 operation; this program component was therefore eliminated.

3 Required disease clearance from ODFW and CTWS BNR was not obtained during the Experimental Passage Phase.

4 Because only small numbers of bull trout were captured in the Round Butte skimmer in 2000–2001, all captured bull trout were moved to Lake Simtustus; none were moved to the lower Deschutes River, as had been planned. Experimental use of the skimmer was discontinued after 2001.

The Experimental Passage Phase has encompassed studies and experiments to further evaluate the feasibility of fish passage. In this phase, experiments were completed as part of the fish

disease risk analysis to support development of a Fish Health Management Plan. Eyed eggs from hatchery spring chinook, as well as marked sockeye fry and steelhead smolts, were moved upstream of Round Butte Dam to allow studies of smolt emigration and the testing of experimental facilities. (Hatchery summer-run steelhead smolts have been used for migration studies because wild steelhead in the Deschutes are federally listed as "Threatened" and have not been available for experimental purposes.) The historic downstream-migrant fish facility (skimmer) at Round Butte Dam was operated in an experimental capacity. Bull trout captured in the reactivated Round Butte skimmer were moved to Lake Simtustus; however because of the poor performance of the skimmer, kokanee (sockeye), steelhead, and spring chinook were not collected and moved to the lower Deschutes River as planned.

Adult anadromous salmonids from the lower Deschutes River have not been passed upstream during the Experimental Passage Phase, effectively managing the threat of accidentally passing *Myxobolis cerebralis*, the causative agent for whirling disease, upstream. Research by the ODFW Fish Health Section and Oregon State University ("OSU") Microbiology Department was completed to support development of a Fish Health Management Plan that will be implemented during each remaining phase of the program. A draft of the Fish Health Management Plan (Appendix II to this Fish Passage Plan) has been completed and is attached as Appendix II to this Fish Passage Plan.

During this phase, engineering and biological studies have continued to evaluate options for (a) redirecting surface currents in Lake Billy Chinook to improve smolt migration to the forebay, (b) managing lower Deschutes River temperature and other water quality parameters, and (c) designing facilities to collect anadromous smolts migrating downstream through Lake Billy Chinook, as summarized in section III.E, above. Several engineering concepts were under consideration that could redirect currents in Lake Billy Chinook, attract and collect downstream migrants, and manage downstream water quality and water temperature. Alternatives under consideration for the new downstream passage system would allow generation water to be pulled from the surface of the reservoir as well as from the existing deep intake, while excluding fish from the deep intake and screening/collecting downstream migrants from the surface intake. Conceptual designs for the various alternatives for the SWW structure and downstream-migrant collection facility have been completed. PGE and the Tribes, along with agency and consulting engineers, are continuing to refine the design of the facilities.

Planning for the lower Deschutes River temperature and water quality management program was completed during the Experimental Passage Phase, in conjunction with evaluation of SWW for fish passage. The SWW proposal in the Joint Amendment was adopted as a requirement in the State and Tribal § 401 certificates (ODEQ 2002; CTWS WCB 2002). The Pelton Round Butte Project Water Quality Management and Monitoring Plan (WQMMP; Tribes and PGE 2002), as required by the § 401 certificates, describes the facilities, management approach, monitoring

programs, adaptive management strategies, and reporting of monitoring results and management operations required to comply with the § 401 certificates.

As noted above, the Experimental Passage Phase is substantially complete and will continue until all prerequisites for moving to the next (Interim Passage) phase of the program are achieved. For additional details regarding activities conducted in the Experimental Passage Phase, please refer to the documents referenced in Appendix I and included on the accompanying CD.

3. Interim Passage Phase

a. Prerequisite Knowledge/Agreements

- New License for the Project is issued (final, no longer subject to judicial review), including approval to continue the fish passage program detailed in this Fish Passage Plan.

- Amendments to basin management plans are adopted by the Oregon Fish and Wildlife Commission (adopted December 12, 2003).

- Modeling predicts the ability to reorient surface currents in Lake Billy Chinook to facilitate movement of outmigrants to the Round Butte Dam forebay and to meet water quality requirements in waters affected by the Project.

- Conceptual design and evaluation of potential facility alternatives for the Round Butte SWW structure and downstream-migrant fish collection facility is completed, and preferred facility alternatives are selected.

- Fish Health Management Plan is finalized and approved by the Oregon Department of Fish and Wildlife and the CTWS BNR.

- The portion of the stock selection/supplementation plan (Stock Selection Guidelines) related to the Interim Passage Phase is approved by the CTWS BNR and ODFW. If wild steelhead are utilized for reintroduction, NOAA Fisheries will need to approve this portion of the plan.

- Water temperature and water quality management program (as described in the WQMMP) required by the two § 401 certificates is approved by ODEQ and the CTWS WCB.

- Design for temporary downstream fish passage facilities at Round Butte Dam is finalized and approved.

- Testing and Verification phase study plan outline is developed and approved.

b. Key Program Elements

- Round Butte SWW and downstream-migrant collection and handling facilities are designed, constructed and evaluated, in a two-phased approach, involving construction and evaluation of the temporary downstream-migrant fish collection facility at Round Butte Dam before installation of the permanent downstream-migrant collection facility. The Round Butte downstream-migrant collection facility will be operated in accordance with an approved operations plan.[8]

- Downstream reservoir passage of smolts through Lake Billy Chinook is evaluated. Predation studies and other studies of survival factors in Lake Billy Chinook will be included in this evaluation.

- Eyed eggs /fry / smolts raised at Round Butte Hatchery are released above the Project during testing/verification of the temporary downstream-migrant fish collection facility.

- Water quality and temperature of Project discharges are evaluated to determine if water quality requirements of the § 401 certificates are being met through SWW.

- Round Butte Adult Release Facility is designed, constructed, and evaluated.

- Steelhead and spring chinook smolts are marked so adult returns can be identified for passage upstream.

- Upon a decision to move to permanent screens, selected adult spring chinook, steelhead, and sockeye are released above Round Butte Dam from smolts originating above the Project.

- Summer-run / fall-run chinook are released above the Project at the direction of the Fish Committee. Clearance for fish health concerns must be secured from the Oregon Department of Fish and Wildlife and the CTWS BNR because these two stocks are unmarked and cannot be differentiated from unmarked strays.

- Adult migration and spawning studies are conducted on selected adults above Round Butte Dam.

[8] Operations plans for the fish passage facilities will be developed following completion of final facility designs.

- All juvenile salmonids captured at the Round Butte downstream-migrant collection facility during the primary emigration period (February 1 through July 31) are transported to the lower Deschutes River, bypassing Lake Simtustus and the Reregulating Reservoir.

- If downstream-migrating salmonids are transported into Lake Simtustus, a guidance net system will be installed at Pelton Dam, and the Pelton Dam historical downstream-migrant fish facility (Pelton skimmer) is reactivated and operated during the primary downstream migration season (February 1 through July 31).

- If downstream-migrating salmonids are transported into Lake Simtustus, the Round Butte Dam eastside upstream fish trap at the head of Lake Simtustus will be upgraded and operated annually for part or all of the period May 1 through September 30 to capture and transport maturing adult resident salmonids upstream for release into Lake Billy Chinook.

- Disease agent and disease monitoring efforts continue in adults, downstream migrating smolts, and resident fish species to determine if diseases from below the Project have become established upstream.

- The distribution and spawning success of passed adults is studied, as are the life history, distribution, survival, and downstream passage efficacy of their progeny.

- Potential volitional upstream passage facility concepts are evaluated.

c. Schedule

Preliminary activities for the Interim Passage Phase are currently underway. This phase begins in full with the issuance of the New License and accomplishment of other prerequisites for initiating this phase. A summary schedule for the major activities in the Interim Passage Phase is presented in Table 2. A detailed schedule for this phase is presented in Appendix VI.

Table 2. Summary schedule for the major activities in the Interim Passage Phase.

Activity ID [1]	Activity Description	Early Start	Early Finish
CN 100 000	Feasibility/Constructability of System	10/01/02	1/30/04
MS 900 100	Tribal Council and ODFW Clearance		11/03/03
MS 900 200	Reintroduction Plan Complete		11/03/03
MS 900 400	Receive New License		05/03/04
PF 100 100	Trucking and Adult Release Facility Design	05/03/04	04/29/05
MS 900 300	SWW/Collection System Selection		05/03/04
MD 100 110	Near Field CFD Model	05/03/04	08/31/04
GT 200 100	Field Investigation (June–September)	06/01/04	08/23/04
TD 100 000	SWW Design, Consultation and Permitting	05/04/04	01/05/06
MD 100 120	Physical Model of SWW and Screening	08/24/04	03/01/05
TF 100 100	Temporary Screening/Collection Facility Design	01/03/05	12/30/05
TF 100 110	Temporary Handling/Marking Facility Design	01/03/05	12/30/05
PF 100 110	Trucking and Adult Release Facility Construction	05/26/05	07/31/06
SC 100 000	Evaluate Surface Currents	03/01/06	11/01/10
WQ 100 000	Evaluate Water Temperature/Quality	04/03/06	12/31/10
FP 100 000	Reintroduction of Salmon and Steelhead	10/02/06	03/29/11
TC 200 000	SWW Construction	05/26/06	09/13/07
TF 100 130	Temporary Screening/Collection Facility Construction	05/26/06	09/13/07
TF 100 140	Temporary Handling/Marking Facility Construction	05/26/06	09/13/07

Table 2, continued…

Activity ID [1]	Activity Description	Early Start	Early Finish
TV 300 100	Evaluation Trucking and Adult Release Facility (March–June)	03/01/07	06/28/11
FP 400 100	Adult Returns Evaluated	07/02/07	05/31/13
PF 100 120	Pelton Fish Trap Modifications Design	06/01/08	12/29/08
FP 200 100	Downstream Juvenile Migration Studies	02/01/08	06/28/11
TV 100 100	Evaluate Temporary Screen/Collection Facilities (March–June)	03/03/08	06/28/11
TV 200 100	Evaluate Temporary Handling/Marking Facilities (March–June)	03/03/08	06/28/11
PF 100 130	Pelton Fish Trap Modifications Construction	01/01/09	12/31/09
TV 900 900	T&V Phase Complete — Decision Point		06/28/11
PF 300 000	Permanent Fish Screening/Collection Design	06/29/11	09/12/12
PF 400 000	Permanent Fish Screening/Collection Construction	09/13/12	08/28/13
TV 100 225	Evaluate Permanent Screening/Collect Facilities (March–June)	03/03/14	06/27/16
TV 100 255	Evaluate Permanent Handling/Marking Facilities (March–June)	03/03/14	06/30/15

Note:
1 Activity ID numbers correspond to activities shown in Appendix VI (Detailed Fish Passage Plan Schedule).

The schedule shown in Appendix VI represents agreement among the Parties regarding the appropriate schedule for the design, construction, and testing of downstream fish passage at the Project. The Parties agree that the Round Butte Dam SWW structure, with temporary downstream fish passage facilities, should be operational in the spring of 2008.

A planning and construction schedule with temporary downstream passage facilities will be implemented with a 2008 startup target for downstream passage. A period of hydraulic testing, verification of surface currents, and downstream passage efficacy testing is scheduled to begin immediately following the 2008 startup. If objectives are achieved, implementation of the permanent downstream fish passage facilities would then commence, with a final completion target date for all downstream facilities in 2013.

The information in the schedule presented in Appendix VI provides the detail and scope of the work and studies necessary to implement fish passage through the Project. The scope of the work depicted in Appendix VI and described in this section, along with logical progression for the design, construction, and testing of the facilities (including evaluating the biological effectiveness) justify the need for the established timeline.

Testing and Verification evaluations of the various components of fish passage encompass a significant portion of the activities outlined in Appendix VI. Testing and Verification phase activities will focus initially on the temporary facilities at Round Butte Dam and downstream movement through Lake Billy Chinook. When initial reservoir passage criteria are achieved, permanent collection and handling facilities will be constructed and evaluated.

The schedule for the Interim Passage Phase has been developed on an "if/then" basis; in other words, if prerequisites for future steps are accomplished as outlined in the schedule, then the elements of the Interim Phase will continue as described. However, if there is a delay in accomplishing any of the required steps, then the schedule of future activities will be revised to the extent necessary, in consultation with and subject to approval by the Fish Committee.

d. Implementation of Selective Water Withdrawal and Fish Passage at Round Butte Dam – Overall Sequencing, Facility Design Criteria, and Review / Approval Requirements

Implementation of SWW and development of effective downstream fish passage facilities at Round Butte Dam are the focus of activities during the initial years of the Interim Passage Phase. As such, planning, construction, and testing of the SWW structure and downstream-migrant collection facility will follow a carefully laid-out sequence of steps, comprising two major phases — construction, operation, and testing of SWW and temporary fish passage facilities in the first phase, followed by construction, operation, and testing of permanent fish passage

facilities in the second phase — to ensure that the facilities are best suited to the site and meet agreed-upon criteria. Consultation during the implementation of SWW / fish passage at Round Butte Dam will include several designated cycles of agency review and approval. The sequence of steps and consultation involved in the implementation of SWW and downstream fish passage at Round Butte Dam are described in this section.

(1) Design

Construction of the Round Butte SWW / downstream passage facilities will be preceded by final modeling and design. The Licensees shall complete the following modeling and design steps prior to the construction of the SWW facilities and the downstream fish passage facilities:

- *Constructability and Feasibility*: Constructability/feasiblility design is the first step needed to select a design option and facility location.

- *Design Consultation*: After the contructability/feasibility design is complete and a preferred option is identified, the Licensees will consult with the Fish Committee, ODEQ, and the CTWS WCB prior to starting detailed design.

- *Modeling*: If the contructability/feasibility studies do not result in a clear-cut recommended design selection, then computational fluid dynamics ("CFD") modeling may be used to provide additional input into the selection.

- *Design Selection*: If the CFD modeling is not required to make the design selection, CFD modeling and the progression to the 25 percent design stage will be conducted concurrently. The CFD modeling results will be used to optimize facility geometry and to review design features to provide the best attraction currents in the forebay and around the facility.

- *Physical Model*: After the 25 percent design stage and the CFD modeling has been completed, the results will be used to construct a physical model of the structure. The primary purpose of the physical modeling is to investigate the internal hydraulics of the structure and to evaluate entrance hydraulic conditions. Concurrently the design will progress to the 50 percent stage.

- *Design Consultation and Review*: After the physical modeling is complete and the design has progressed to the 50 percent design stage, consultation with the Fish Committee (and with FERC for dam safety purposes) will be undertaken prior to proceeding with further design.

- *Final Consultation*: After consultation is complete, the design will progress to the 90 percent stage, and then to final status. The Licensees shall file the final design with FERC after consultation with the Fish Committee and with approval by the appropriate Fish Agencies pursuant to their respective statutory authorities. Upon FERC approval, the Licensees shall construct the SWW structure and temporary downstream passage facilities.

These steps will maintain flexibility in the design process, capture the necessary design tools to ensure an adequate design of the SWW and temporary passage facilities, and allow for agency review and input. Design work for the permanent fish passage facilities is described in section IV.B.3.e.(11), and would occur through the consultation, review, and approval protocol described in section IV.B.3.d.(4), below.

(2) Construction

As noted above, the Interim Passage Phase schedule is premised on the construction of the Round Butte SWW structure and downstream passage facilities in two phases. The Licensees shall prepare, in consultation with the Fish Committee and with approval by the appropriate Fish Agencies pursuant to their respective statutory authorities, and file with FERC a design and schedule to construct the SWW and downstream passage facilities in the following two phases in accordance with the approved schedule: (1) construction of the SWW structure, which shall include a temporary downstream passage facility, and (2) construction of the permanent downstream passage facility. The temporary and permanent facilities shall both include a sampling area to support biological evaluation of the fish screens and fish bypass facilities, and a mechanical screen cleaner or some other suitable device to prevent the accumulation of sediment and debris that might otherwise impair screen function and cause the delay, injury, or mortality of downstream migrating fish at Round Butte Dam. Upon FERC approval, the Licensees shall construct the SWW and downstream passage facilities.

The two-phased approach to the construction of the SWW structure and downstream passage facilities is described in further detail as follows:

<u>First Phase</u>:

- The surface and bottom withdrawal portions of the SWW structure will be constructed with exclusion plating (perforated plate).

- A temporary smolt handling facility will be constructed.

- A temporary smolt pipe will transfer fish from the temporary downstream-migrant collection facility to the temporary handling facility.

- The SWW will be constructed in front of the existing intake tower. The surface withdrawal section of the SWW will be constructed with a V-shaped screening configuration for fish collection. The screening will be made of perforated plate in lieu of wedge wire screening for this phase. This method will allow the orientation of the collector entrance to be adjusted during Testing and Verification to optimize collection. A conceptual design for this option is shown in Figure 5.

Second Phase:

- Depending on the results of the Testing and Verification evaluations (see section IV.B.3.e.(9), below), the Licensees shall install and operate a permanent downstream fishway that meets NOAA Fisheries' smolt criteria (see subsection (3), following) within the forebay at the Round Butte Dam, including fish screens, guidance devices, and fish bypass facilities as described below. Construction of the permanent facilities will include the following:

    - The perforated plate screening on the *downstream-migrant collection facility* will be replaced with wedge-wire screening to upgrade to a permanent facility. The design for the permanent facility may be modified based on results of the Testing and Verification evaluations of the temporary downstream-migrant collection facility.

    - The temporary *downstream-migrant handling facility* will be upgraded to a permanent facility. The permanent facility will be designed to best suit the requirements of the overall system.

    - The temporary *smolt conveyance system* will be upgraded to a permanent facility. This facility will deliver fish from the collection facility to the final handling facility.

- The Licensees shall construct the permanent downstream passage facilities after determining, in consultation with the Fish Committee, ODEQ, and CTWS WCB, that the blend of surface/deep water withdrawal through the SWW facility will (a) satisfy the criteria for safe, timely, and effective downstream passage associated with the temporary passage facilities (see section IV.C.1.a, below), and (b) currently meet water quality criteria set forth in the § 401 certificates, or likely meet the water quality criteria within a reasonable time through continued iterative adjustments of the SWW system as constructed with permanent downstream passage facilities and/or through implementation of other water quality management strategies.

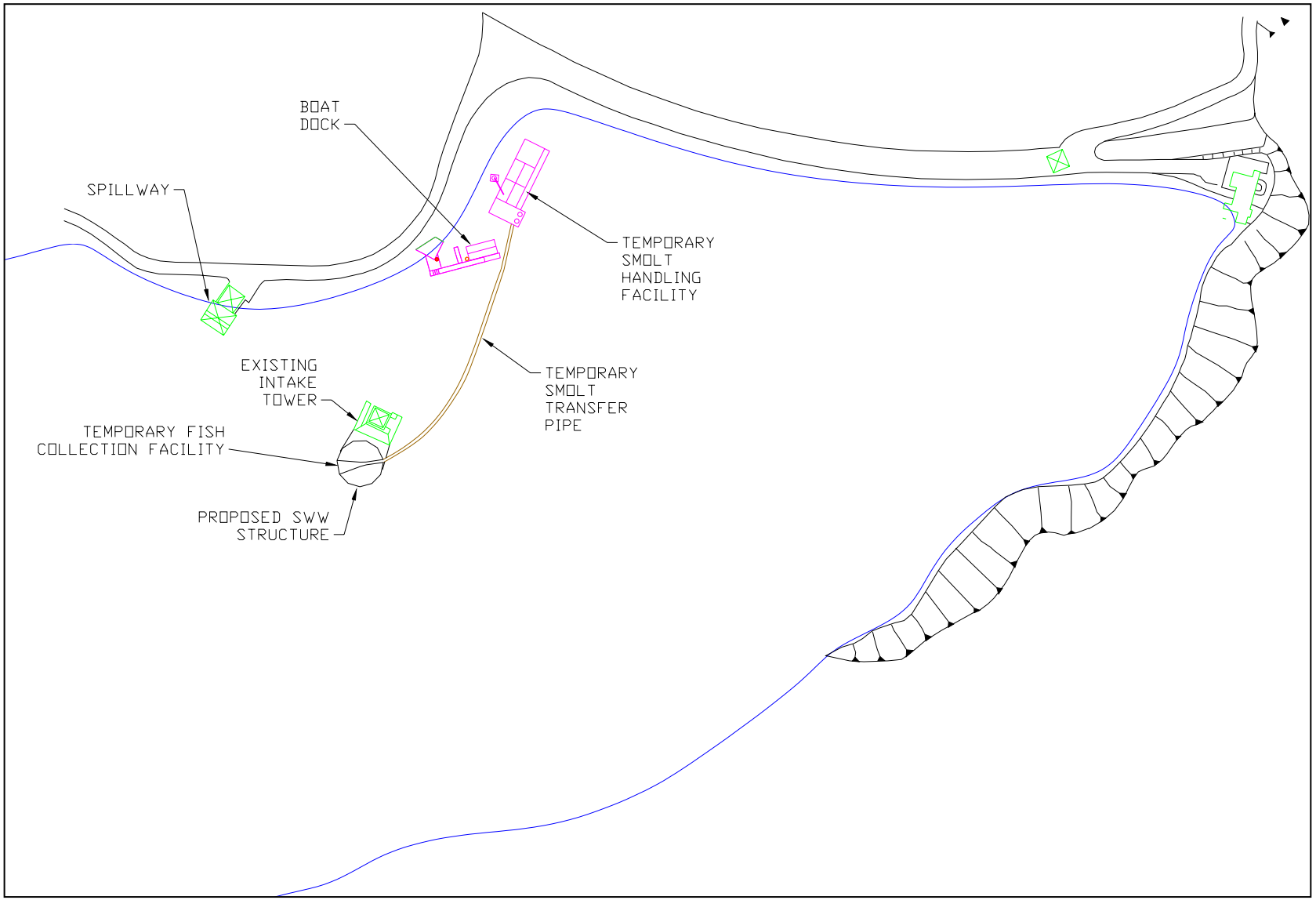


Figure 5. Conceptual design for SWW and temporary downstream-migrant fish collection facility (Option 1).

(3) Facility Design Criteria and Considerations

Fish screening/collection, transfer, and handling facilities will be designed in consultation with the Fish Committee. The temporary and permanent downstream-migrant collection facilities at Round Butte Dam shall meet NOAA Fisheries' juvenile screen criteria for fingerling-sized (≥60 mm) salmonids ("smolt criteria"); however, the facilities' exclusion plates do not have to meet the NOAA Fisheries criteria for sweeping velocity and contact time. The smolt criteria include, but are not limited to, a maximum approach velocity perpendicular to the screens and exclusion plate of 0.80 feet per second ("fps"), screen openings no larger than 0.25 inches, a screen sweeping velocity component no less than 0.80 fps, and a screen contact time no greater than 60 seconds. (See NOAA Fisheries criteria, available online at: www.nwr.noaa.gov/1hydrop/hydroweb/ferc.htm)

Due to the size of the structure and the experimental nature of safely attracting and capturing juvenile migrants from Lake Billy Chinook, some components of a fish screening and passage system may be difficult to design and construct to NOAA Fisheries' smolt criteria, and the Licensees shall design the fish screening and collection facilities in consultation with the Fish Committee based on the best available scientific information. For instance, the leading conceptual design at this time is a surface withdrawal structure that is circular in shape and consists of exclusion screens and one bypass entrance. The surface exclusion screen could be designed to meet the 0.80 fps criterion at maximum powerhouse hydraulic capacity and the 0.25-inch opening criterion, but likely would not have a sweeping velocity component of any significance and may induce a screen exposure time of greater than 60 seconds. NOAA Fisheries typically recommends that multiple bypass entrances be used when fish cannot be passively transported by the sweeping velocity component to the bypass within 60 seconds. The 60-second criterion was established to prevent healthy fish from becoming impinged on screens due to fatigue. Because the exclusion plate would meet NOAA Fisheries' smolt criteria at maximum powerhouse capacity (except, as noted, for sweeping velocity and contact time) and would expose fish to velocity components normal to the exclusion plate of greater than 30 percent of the 0.80 fps criterion level less than 10 percent of the time, it is not expected that healthy smolts would become impinged on the exclusion plate. The concern then becomes whether fish will be guided efficiently to the single bypass entrance.

During the design activities, site-specific decisions will be based on the best available scientific information and rationale. For instance, if a single entrance is proposed, CFD modeling, including, if appropriate, the use of the "numerical fish surrogate" technology, will be used to predict whether fish will be effectively guided to a single entrance. Modeling will allow orientation of the bypass entrance to make optimum use of the circulation patterns in the Round Butte forebay for fish collection. Modeling would also be used to predict whether guidance might be improved by use of a guidance curtain or net.

The Licensees shall design screening facilities to screen less than 14,000 cfs only if water quality modeling verifies that flows above 9,000 cfs can be routed through the deep intake without impact to the Project's ability to meet water quality standards and without detrimental impact to the flow pattern and fish attraction in Lake Billy Chinook.

The Licensees shall design the permanent downstream collection facility at Round Butte Dam to include the ability to add pumps with a total capacity of 3,000 cfs and all appurtenant devices. The Licensees shall, before construction of the permanent downstream collection facility, prepare and provide the Fish Committee a report on the need to add pumped attraction flow. The report shall be based on information gathered during the Testing and Verification studies and prepared in consultation with the Fish Committee. If the Fish Agencies conclude that it is necessary to add pumped attraction flow, the Licensees shall, in consultation with the Fish Committee and with approval by the appropriate Fish Agencies pursuant to their respective statutory authorities, develop a plan to design, construct, and operate pumps to provide appropriate attraction flow to the permanent downstream collection facilities. Upon approval by the appropriate Fish Agencies pursuant to their respective statutory authorities, the Licensees shall submit the plan to FERC for approval. Upon FERC approval, the Licensees shall implement the plan.

In addition to meeting the criteria outlined above, the temporary and permanent facilities shall include a sampling area to support biological evaluation of the fish screens downstream-migrant collection facility, and a mechanical screen cleaner or some other suitable device to prevent the accumulation of sediment and debris that might otherwise impair screen function and cause the delay, injury, or mortality of downstream migrating fish at Round Butte Dam.

The SWW structure and the temporary and permanent downstream-migrant collection facilities shall be installed and operated in consultation with the Fish Committee, ODEQ, and the CTWS WCB. In addition, the facilities shall be operated year-round to protect resident and anadromous fish species.

(4) Consultation, Review and Approval

Throughout the implementation of SWW and fish passage at Round Butte Dam, and in accordance with the schedule described above and shown in Appendix VI, the Licensees will consult with the Fish Committee and will submit design drawings and other information for review and approval, as follows:

- *Downstream Fishway Design*: The Licensees shall submit for the review by the Fish Committee, and for approval by the appropriate Fish Agencies pursuant to their respective statutory authorities, the results of all downstream fishway design

investigations, preliminary design plans and specifications, and final design plans and specifications for the construction and operation of temporary and permanent downstream fishways at Round Butte Dam. Facilities will meet NOAA Fisheries' smolt criteria (see subsection (3), above).

- *Operation, Maintenance, and Monitoring Plans*: The Licensees shall notify the Fish Committee in writing when the downstream fishways are fully operational. Operation, maintenance, and monitoring of downstream fishways shall be conducted in accordance with the Downstream Fishway Operation and Maintenance Plan and Downstream Fishway Monitoring Plan, which the Licensees shall file with FERC after consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities. Upon FERC approval and coincident with the initiation of downstream fishway operations, the Licensees shall implement the plans.

e. Description of Major Activities

The major activities taking place in the Interim Passage Phase are described below. These activities are shown on the Interim Passage Phase schedule (Figure 4 and Appendix VI).

(1) Constructability/Feasibility Evaluation and Preliminary Design of Round Butte Selective Water Withdrawal (SWW) and Downstream Fish Passage Facilities

The constructability/feasibility evaluation and design of the SWW and temporary downstream fish passage facilities at Round Butte Dam began in fall 2002. Several promising SWW / fish collection alternatives that were under consideration by the Technical Subcommittee were evaluated for engineering feasibility and constructability, and the results were discussed with the Technical Subcommittee in early 2003. In addition, in May 2003, a final brainstorming session was held among Licensee and agency fish passage engineers and biologists to ensure that no options or important fish collection aspects had been overlooked. Cost estimates will be prepared for one or two system options, and design criteria for the overall system will be developed. In 2004, a feasibility-level design for the preferred SWW facility and temporary downstream-migrant fish collection system will be developed based on structural, hydraulic, construction and economic feasibility, and a final Concept Development Report will be assembled. Specific consultation and review requirements for the constructability/feasibility evaluation and preliminary design are described in section IV.B.3.d., above.

Receipt of the New License, amendments to the Deschutes subbasin fish management plans by the Oregon Fish and Wildlife Commission (adopted December 12, 2003), approval of fish

passage from ODFW and the CTWS BNR,[9] and completion of the Reintroduction Plan (as described below) are prerequisites to beginning final selection and design for the SWW structure / downstream-migrant collection facility. Once the selection is made, the SWW structure / downstream-migrant collection facility final design process and modeling will begin.

(2) Reintroduction Plan

A plan for the reintroduction of anadromous fish species upstream of the dam will guide efforts to establish chinook, steelhead, and sockeye populations. This Reintroduction Plan will include proposed release numbers by location and life stage as well as a strategy to phase out releases as the populations become established. The Reintroduction Plan will be completed in 2004 by ODFW and the CTWS BNR, with assistance from the Licensees.

(3) Numerical and Physical Modeling for Selected SWW / Downstream Fish Passage System

A combination of near-field CFD model results and the water quality model results will be used to evaluate the ability of the final SWW structure configuration to adequately meet lower Deschutes River temperature, pH, and dissolved oxygen requirements. As a secondary function, if there are two comparable SWW structure / downstream-migrant collection facility options still under consideration at the end of the Feasibility/Constructability process, then the CFD modeling may be used to predict which system (if any) produces the most desirable near-field fish attraction/collection. The CFD modeling will also be used to investigate potential need for supplemental features (guidance curtains, etc.) in the forebay.

A physical model of the SWW structure / downstream-migrant collection facility will be constructed to facilitate the design of the internal structural members to reduce or eliminate hydraulic disturbances. The physical model must be completed before the SWW structure / downstream-migrant collection facility design can proceed past the 50 percent completion point. The schedule is based on beginning the physical model in late August 2004 and completing the model by March 2005.

(4) Geotechnical Field Work and Final Design Recommendation

Any geotechnical field exploration requiring underwater work will be performed during the summer months (June–September) of 2004. After the field exploration is completed, a field

[9] The CTWS Branch of Natural Resources and ODFW are co-managers of fisheries resources in the Deschutes River Basin, on behalf of CTWS and the State, respectively. Because re-initiation of passage will be a change in fisheries management that will include some risk, the Oregon Fish and Wildlife Commission has amended subbasin management plans to manage for anadromous fish and the CTWS Branch of Natural Resources will need to provide similar clearance, for fish passage to commence.

report will be issued. The final SWW structure foundation design will be completed after the field report is issued.

(5) SWW / Fish Passage System Design, Consultation and Permitting

The final SWW structure / downstream fish passage facility design, consultation and permitting activities are scheduled to begin in May 2004 and extend through the end of 2005. Progress of the design work will depend upon the physical modeling and any geotechnical field investigation that may be performed. Sufficient data must be gathered in both of these areas before the design can be completed. Engineering consultation periods will be incorporated in the design schedule to address issues that arise from the modeling, field exploration and construction methodology. Specific consultation and review requirements for the final system design are described in section IV.B.3.d, above.

The temporary downstream-migrant collection facility will be designed as part of the surface water withdrawal component of the SWW structure. The primary difference between the temporary and permanent structures is that the temporary structure will have perforated plate screens instead of the wedge-wire screens required in the permanent structure. Both the temporary and permanent structures will meet NOAA Fisheries smolt criteria (see section IV.B.3.d.(3), above). The facility may be designed to allow rotation/reorientation of the collection opening, if Testing and Verification evaluation results indicate adjustments could improve fish collection. Additionally, the temporary and permanent collection facilities will be designed to allow for 3,000 cfs of attraction-flow pumping, if necessary.

(6) SWW / Fish Passage System Construction

Construction of the SWW structure / downstream-migrant collection facility will take place from approximately late May 2006 through mid-September 2007. Caution must be taken with staging the different phases of the construction such that Round Butte Dam maintains its flood storage and flood passage capabilities during the winter months. Some in-water work may be scheduled to occur during nighttime hours to allow normal operation of the Project.

The temporary downstream-migrant collection facility will be constructed as part of (and thus, during the same timeframe as) the overall SWW system. During the SWW mechanical/electrical installation and startup period (see Appendix VI), louver adjustments will be made and "hotspots" (i.e., localized areas exceeding hydraulic criteria) on the screens will be identified and the porosity management louvers behind the screens will be adjusted to correct them.

The temporary handling/marking facilities will be designed to float in a relatively protected area of the forebay. The design may incorporate fish sorting facility concepts from other hydro facilities such as the Rocky Reach and Baker Lake projects.

(7) Round Butte Adult Release Facility Design and Construction

The Round Butte Adult Release Facility will be designed to release upstream summer-migrating adults below the thermocline in the forebay of Round Butte Dam so that they will not experience heat shock due to rapid temperature change. The adults will be trucked from the Pelton Fish Trap to the Adult Release Facility, which will be located on or near Round Butte Dam. The facility will be designed to provide for safe transfer of the fish from the truck to the Adult Release Facility. This facility and reservoir passage of adults will be evaluated using radio-tag studies with details of these studies delineated in annual work plans and reviewed by the Fish Committee.

The Licensees shall, in consultation with the Fish Committee and with approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, develop and file with FERC preliminary design, final design, and construction plans for the Adult Release Facility at the Round Butte forebay. Upon FERC approval, the Licensees shall implement the plans.

Design and construction activities for the Adult Release Facility will extend from May 2005 through July 2006. The Adult Release Facility will be operational for bull trout releases from Lake Simtustus in mid-summer 2006.

(8) Upgrade and Reactivation of Existing Fish Passage Facilities in Lake Simtustus

For the term of the New License, the Licensees shall transport all juvenile salmonids captured at the Round Butte downstream-migrant collection facility during the primary emigration period (February 1 through July 31) to the lower Deschutes River, bypassing Lake Simtustus and the Reregulating Reservoir. During the remainder of the year (August 1 through January 31), the Licensees shall, at the request of the Fish Committee, transport downstream-migrating salmonids into Lake Simtustus to utilize the lentic habitat it provides.

If downstream-migrating salmonids are transported into Lake Simtustus, the Licensees shall, in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, file with FERC a plan to upgrade the Round Butte Dam east side upstream fish trap at the head of Lake Simtustus, and operate it annually for part or all of the period May 1 through September 30 to capture and transport maturing adult resident salmonids upstream for release into Lake Billy Chinook. Upon FERC approval, the Licensees shall implement the plan.

If downstream-migrating salmonids are transported into Lake Simtustus, the Licensees shall, in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, file with FERC a plan to install a guidance net

system at Pelton Dam and shall operate the Pelton Dam historical downstream-migrant fish facility (Pelton skimmer)[10] during part or all of the primary migration season (February 1 through July 31) to transport downstream migrants to the lower Deschutes River. Upon FERC approval, the Licensees shall implement the plan.

In the event any Party requires or requests another agency to require the Licensees to take, without the Licensees' agreement, additional measures regarding these facilities, beyond those specified in Section IV(B)(3)(d)(8) (Upgrade and Reactivation of Existing Fish Passage Facilities in Lake Simtustus), including to evaluate or improve passage efficiency at the Pelton skimmer; to construct or retrofit fish protection, guidance or collection facilities at Pelton Dam during the term of the New License; or to evaluate or improve the Round Butte Dam Upstream Fish Trap before volitional passage is established, the costs for such measures or evaluations that the Licensees are required to undertake or implement shall be deducted from the amount remaining unallocated or uncommitted to specific projects or yet to be contributed to, the Pelton Round Butte Fund ("PRB Fund") General Fund, provided for in the Pelton Round Butte Fund Implementation Plan, Exhibit H to the Settlement Agreement. If the total amount remaining unallocated or uncommitted in the General Fund and yet to be contributed to the General Fund is not sufficient to undertake the required measures or evaluations, the remaining cost shall be deducted from the Water Rights Fund. If the total amount remaining unallocated or uncommitted in the PRB Fund and yet to be contributed to the PRB Fund is not sufficient to undertake the required measures or evaluations, the remaining cost shall be an obligation of the Licensees.

Since the Round Butte Dam temporary downstream migrant collection facility is expected to be operational by 2008, anadromous outmigrants will not be moved into Lake Simtustus before 2008. Initially, very few outmigrants are expected to be collected during the August 1 through January 31 period. Most are expected to be subadult and adult bull trout, as well as some kokanee and fall migrating spring chinook. Thus, even after release of these outmigrants into Lake Simtustus begins if requested by the Fish Committee, the vast majority will be resident and not anadromous salmonids. This should minimize the exposure of these fish to any downstream passage risks. Additional Lake Simtustus management measures include the operation of a weir to prevent northern pikeminnow from spawning in Willow Creek and the continuation of the steelhead post smolt hatchery program to enhance the resident sport fishery. Collectively these measures will meet the Fish Passage Plan's resource management needs for Lake Simtustus until the decision is made whether or not to transition to the Plan's final phase, which may include volitional passage. Any request for additional measures regarding these facilities shall consider data from the Fish Passage Plan's program of Testing and Verification studies, including but not

[10] The reactivated Pelton Skimmer is intended to provide for the sorting, counting, and marking of downstream outmigrant juveniles, which will be transported to the base of the Reregulating Dam for release.

limited to those on disease, predation, and outmigrant movement during both Temporary and Permanent Downstream Passage, as well as the Fish Passage Plan's Permanent Downstream Passage recruits per spawner evaluation and any other pertinent information.

(9) Testing and Verification of SWW and Temporary Round Butte Dam Downstream Fish Passage Facilities

Testing and verification of the SWW structure and temporary downstream-migrant collection facility at Round Butte Dam will be conducted through a comprehensive program of biological and engineering studies and measurements. The Licensees shall, within one year of license issuance, file with FERC a schedule for the development of plans for Testing and Verification studies as described below and in Appendix III. The Licensees shall develop the schedule in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities.

Upon FERC approval of the schedule, the Licensees shall develop the Testing and Verification study plans in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities. The study plans shall provide that the Licensees shall conduct these studies with continued involvement of the Fish Committee through the annual work planning and reporting process, as discussed in section V.F of this Fish Passage Plan. Each study plan will include objectives, tasks and evaluation/decision criteria. Where appropriate, study plans will be designed to evaluate the effectiveness of individual fish passage facilities in achieving the criteria and goals set forth in section IV.C of this Fish Passage Plan. Such effectiveness evaluations shall include, at a minimum, the number of fish, by species and life stage, captured and released by the facility and a record of observations on the physical condition of the fish using the facility fishways. The Licensees shall develop the Testing and Verification study plans for the following study areas:

- Facility Evaluation
- Physical Reservoir Changes with Selective Water Withdrawal
- Juvenile Salmonid Studies – Reintroduction of Anadromous Stocks Upstream of the Project
- Juvenile Salmonid Studies – Rearing, Juvenile Densities, Habitat
- Juvenile Salmonid Studies – Juvenile Migration
- Juvenile Salmonid Studies – Reservoir Survival/Predation, Fishery, Disease

- Juvenile Salmonid Studies – Round Butte Dam Juvenile Collection, Downstream Transportation and Release

- Adult Salmonid Studies – Adult Upstream Trap-and-Haul, including the Adult Release Facility

- Adult Salmonid Studies – Adult Migration/Survival/Spawning

Study plans for multi-year studies shall provide that the Licensees may implement minor modifications to the study methodology in consultation with the Fish Committee. The need for any such minor modifications to the study methodology will be described in the annual progress report and will be based on the results of the studies to date. Following approval by the appropriate Fish Agencies pursuant to their respective statutory authorities, the Licensees shall file the study plans with FERC. Upon FERC approval, the Licensees shall implement the plans.

Based on results of the individual Testing and Verification studies, the Licensees shall, after consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, file plans with FERC for making any modifications to the facilities needed to ensure safe, timely and effective fish passage. Upon FERC approval, the Licensees shall implement the plans.

A description of the Testing and Verification program evaluations of the temporary Round Butte Dam fish passage facilities is provided below. Study plan outlines for these studies are presented in Appendix III.

(a) Surface Currents

The Licensees will conduct evaluations of the effects of selective water withdrawal on reservoir surface currents, focusing on the direction and velocity of currents in the lower reaches of Lake Billy Chinook's tributary arms and in the Round Butte forebay. Initial current studies conducted in the forebay before construction using acoustic Doppler current profile ("ADCP") instruments to measure currents will help investigators develop and calibrate the detailed CFD model of the forebay. The evaluations of currents (using drogues) following implementation of SWW will seek to establish whether the direction and velocity of the reservoir currents achieve the conditions predicted by hydrodynamic modeling (Khangaonkar 1999; Yang et al. 2000), and whether reservoir currents may be significantly affecting smolt outmigration. Prior to conducting the post-SWW evaluation of surface currents, the Licensees will file a detailed study plan, in consultation with and for approval by the Fish Committee.

The evaluation of surface currents will include the following elements:

1. *Use of the CFD model*:

   The CFD model will be used to provide information on current movement immediately adjacent to the SWW structure / temporary downstream-migrant collection facility. If necessary, the CFD model will be used to modify the SWW structure design and/or operations to improve fish collection performance. The primary purpose of the CFD model will be as a design tool for the downstream-migrant collection facility. The CFD model is especially important for verifying the elevation of surface withdrawals from the reservoir to meet water quality. However, it will be available, if needed, for additional studies after the SWW and downstream-migrant collection facilities are in operation. The ADCP and drogue data may be used to verify the CFD model if the model is used after the SWW is in operation.

2. *Current monitoring using drogues*:

   Drogue data will consist of a sufficient number of drogue releases in each arm of Lake Billy Chinook (and possibly the Round Butte Dam forebay) to allow the results to be used to confirm the CFD model results for reservoir currents. The length of time for drogue monitoring, number of drogues, and drogue release locations will all be selected to provide a statistically valid verification of the CFD model results for flow conditions in the three reservoir arms during the primary period of smolt outmigration. This will allow correlation of data collected on both water movement and smolt movement. Wind, inflow, outflow, and temperature data will also be collected concurrently with the data collection for the drogue monitoring.

Baseline surface current studies of existing reservoir and forebay conditions will be conducted before the SWW system is constructed. After construction, less intense drogue studies will run for three years (through 2010) to evaluate reservoir and forebay surface currents following implementation of selective water withdrawal. Two different surface withdrawal conditions will be monitored and evaluated during each of the three years: 100 percent surface withdrawal (March through June) and blended surface/deep withdrawal (July through October). This drogue data collection will also be conducted concurrently with studies of radio- and PIT-tagged steelhead and spring chinook outmigrants. This will allow correlation of data collected on both water movement and smolt movement.

(b) Water Quality

Reservoir and lower Deschutes River water quality parameters that modeling has predicted will occur with SWW will be verified under actual reservoir operations with selective water withdrawal. Planned evaluations of water quality, as described in detail in the September 2002 WQMMP (Tribes and PGE 2002), include continuous and periodic (monthly to quarterly)

monitoring of a suite of water quality parameters to determine whether the Project is in compliance with ODEQ and WCB water quality standards and the § 401 certificates.

Baseline temperature and water quality data for the existing reservoir and forebay conditions will be collected at established sampling stations for two years prior to SWW system construction. Changes in temperature and water quality will be monitored for three years following installation of the SWW system to verify the system is working properly. Some sampling stations will be permanent to monitor conditions throughout the New License.

If water quality conditions as required under the § 401 certificates are not achieved, adjustments to reservoir surface/deep water withdrawal blending operations will be made, as necessary, to achieve desired reservoir and lower river conditions. During the first several years of operation, it is anticipated that iterative adjustments in the percentage of deep vs. shallow water may be required to fine-tune the relative percentages of water withdrawn to develop the proper mixing criteria to accurately control temperature. However, modeling results indicate that no deep withdrawal will commence until July, after the primary smolt emigration period has passed. Concurrently, the Licensees will also evaluate other potential causes of diminished water quality. If water quality criteria are not met within the SWW pattern deemed necessary for downstream passage, the Licensees will consult with the Fish Committee, ODEQ, and the CTWS WCB to identify and test other water management strategies.

Before the Licensees proceed with construction of permanent downstream passage facilities, the Licensees, Fish Committee, ODEQ, and WCB will consult and determine that the blend of surface/deep water withdrawal through the annual cycle will: (a) meet the criteria for downstream reservoir passage described in section IV.C.1.a.(3) below; and (b) currently meet water quality criteria set forth in the 401 certificates, or likely meet the water quality criteria within a reasonable time through continued iterative adjustments of the SWW system as constructed with permanent downstream passage facilities and/or through implementation of other water quality management strategies.

(c) Temporary Screen Hydraulics

Hydraulic conditions of the temporary fish screening / downstream-migrant collection facility will be measured to ensure they meet NOAA Fisheries smolt criteria. Hydraulic conditions on the screening/collection facility can be adjusted to a certain extent during the Testing and Verification phase to seek the best settings for the facility. Adjustments could include fine-tuning of the effective screen porosity distribution using the louver system and possible rotation/reorientation of the surface collector entrance.

(d) Biological Performance of Temporary Screens, Handling Procedures, and Transport

In addition to the hydraulic testing of the temporary screening / downstream-migrant collection facility, the temporary screens, handling procedures, and transport will also be evaluated to determine if they are causing adverse effects to juvenile fish that are collected and passed downstream. Captured fish will be inspected to be certain that they are not being injured, descaled, or killed within the screening/collection facility. If injured, descaled or dead fish are found (aside from those that are determined to have succumbed to disease), the screens and fish conduits will be inspected and any problems will be corrected.

Because all fish moving downstream will be captured, the temporary handling and marking facility will be evaluated on a continuing basis. Any injured or dead fish will prompt actions to improve facilities or procedures. Large numbers of smolts are expected to be passed through this facility during peak migration periods. The facility will be sized and constructed to allow safe, efficient crowding, handling, marking, and loading of juvenile fish. The temporary handling/marking facility and procedures will be modified as needed to address any problems and improve survival of downstream migrants, with the intent being to exceed the 93 percent safe passage standard proposed (see section IV.C.1, below). Information gained during use of the temporary handling/marking facility will be used to ensure that the final facility is properly sized and designed.

(e) Performance of Deep Exclusion Screens

The Licensees shall design the Round Butte deep exclusion screen to meet NOAA Fisheries smolt criteria except for the criteria for sweeping velocity and contact time. In addition, outmigrant collection facilities will not be required at the deep exclusion screen. The Licensees shall evaluate hydraulic performance as soon as possible after the deep exclusion screen has been installed. If the screen does not meet applicable NOAA Fisheries smolt criteria at full hydraulic capacity, the Licensees shall take any necessary measures to meet applicable NOAA Fisheries smolt criteria. The Licensees shall continuously monitor differential pressure though the deep exclusion screen while the lower withdrawal system is in operation.

The Licensees shall conduct studies of fish impingement at the Round Butte deep exclusion screen using monitoring methods that may include, but are not limited to, sonic or radio-tags, hydroacoustic monitoring, and remote video inspection of the deep exclusion screen. Monitoring will be conducted during the first year after installation of the deep exclusion screen when deepwater withdrawal has been initiated, and when deepwater withdrawal is maximized. The duration of monitoring will depend on the monitoring method selected, but must be for a period

sufficient for evaluating the possibility of impingement. Duration and method of monitoring will be determined in consultation with the Fish Committee.

The Licensees shall monitor the hydrodynamic and biological effects of Project operations during the first season after installation of permanent screens for the Round Butte downstream fish passage facility, and at least once every five years thereafter. The Licensees will also install differential pressure sensors on the lower exclusion screens. Differential pressure through the lower exclusion screening will be monitored continuously by the plant computer control system while the lower withdrawal system is in operation. A high differential pressure setpoint will be established, and the control system will automatically alarm if the setpoint is exceeded. The Licensees shall, in consultation with the Fish Committee, evaluate the need for additional monitoring based on the previous monitoring data.

If biological monitoring indicates that there is impingement of fish at the Round Butte deep exclusion screen, the Licensees shall consult with the Fish Committee to determine if the effects are significant. Impingement is significant if it impedes the Licensees' ability to achieve the objectives for fish passage. If the Fish Committee determines that the effects are significant, the Licensees shall, in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective authorities, take any feasible measures or implement modifications within their control that are necessary to reduce impingement below the level of significance. These measures include but are not limited to operations modifications, cleaning system modifications, louver adjustments, and deterrent systems such as strobe lights or sound to keep fish away from the exclusion screening. After taking any such corrective measures, the Licensees shall re-evaluate the deep exclusion system the next time deepwater withdrawal has been initiated or maximized. If there are no feasible structural or operational measures within the Licensees' control that will reduce impingement below significant levels, the Licensees shall, in consultation with the Fish Committee, investigate and implement alternative mitigation measures.

(f) Downstream Juvenile Fish Migration through Lake Billy Chinook

(i) Migration Through Lake Billy Chinook

The Licensees will conduct evaluations of the biological effects of selective water withdrawal. The biological evaluations will focus on the movement of statistically significant samples of tagged steelhead and spring chinook outmigrants from Lake Billy Chinook's tributary arms to the Round Butte forebay. The evaluations will seek to establish the effect of selective water withdrawal on smolt outmigration. The evaluations will be repeated annually during Testing and Verification of the temporary downstream passage facilities for at least four consecutive years, as described in section IV.C.1.a., below.

The timing of reintroduction is scheduled so that naturally reared smolts will be moving downstream by the time the SWW structure and temporary downstream-migrant collection facility are completed at Round Butte Dam. As such, reintroduction is scheduled to commence in 2006 with steelhead, followed by reintroduction of spring chinook salmon early in 2007. Steelhead will be introduced into the middle Deschutes River watershed in Squaw Creek, and into the Crooked River watershed in Ochoco and McKay creeks (and possibly other locations). Spring chinook salmon will be introduced into the upper Metolius River watershed in a number of locations and possibly into lower Squaw Creek and the lower Crooked River. Release locations will be determined by ODFW and the CTWS BNR and delineated in the Reintroduction Plan. Most of these introductions will likely be through releases of unfed fry from adults that have been screened for disease, although some may be introduced as eyed eggs into hatch boxes. All eyed eggs / fry / smolts placed upstream will be from adults screened for disease agents to reduce the probability of disease agent transfer as called for in the Fish Health Management Plan. Sockeye will be reintroduced into the Metolius Basin under a schedule determined by ODFW and CTWS BNR.

Smolts entering Lake Billy Chinook will be captured in traps located on all three major tributaries. A portion of those captured will be fitted with radio transmitter tags. Numbers of fish to be radio-tagged will be delineated in the annual work plans with oversight and approval of the Fish Committee. Tracking these tagged fish will allow evaluation of patterns of migration, responses to current patterns, and possibly identify mortality locations and causes. Radio tracking will also allow an evaluation of the efficiency of the Round Butte downstream-migrant collection facility in capturing smolts that enter the Round Butte forebay. A statistically significant sample of the remaining spring chinook and steelhead smolts and fingerling juvenile bull trout captured in tributary traps will receive passive integrated transponder ("PIT") tags. The recapture of PIT-tagged juveniles at the Round Butte Dam will allow evaluation of reservoir migration and progress toward meeting interim and final smolt passage objectives.

As described above in section IV.B.3.d.(3), if these Testing and Verification evaluations indicate the need for additional attraction flow to improve downstream fish migration, the Licensees, in consultation with the Fish Committee, will add pumping facilities to the permanent downstream-migrant collection facility.

(ii) Predation in Lake Billy Chinook

Attempts will be made to recover all stationary radio tags to determine predation impacts (including identifying the predator species in each case when a radio-tagged smolt has been consumed). Radiotelemetry analysis of predation impacts will be conducted on an annual basis (in conjunction with smolt migration studies) until the respective downstream migration objectives (percentage recovery of smolts released at the heads of Lake Billy Chinook tributary

arms / below Round Butte Dam), as described in the Fish Passage Plan, are achieved. In addition, using methods similar to those employed in the bull trout food habits study (Beauchamp and Van Tassell 2001), the relative frequency of salmonid smolts in the stomach contents of predatory fish in Lake Billy Chinook will be determined. This frequency will be related to the abundance of predatory fish to provide an estimate of the number of smolts that did not survive reservoir passage because of predation. Stomach content analysis of predatory fish in Lake Billy Chinook will be conducted annually for the first three years after smolts are present, or as otherwise determined by the Fish Committee.

(iii) Angler Impacts in Lake Billy Chinook

The impact of the sport fishery in Lake Billy Chinook on downstream migrant salmon and steelhead smolts will be determined by conducting angler surveys the first three years after smolts are present in the reservoir. This angler survey on Lake Billy Chinook will be based upon statistical subsampling in a manner similar to surveys conducted during the Lake Billy Chinook Kokanee Study (Thiede et al. 2002). Results of this survey will provide an estimate of the number of steelhead smolts harvested, and the number of sublegal-size steelhead and spring chinook salmon caught and released. This information will help determine whether angling regulations will need to be modified to protect smolts in Lake Billy Chinook. Evaluation of angling impact may continue to be conducted on a periodic basis (to be determined by the Fish Committee) until the downstream migration objectives (percentage recovery of smolts released at the heads of Lake Billy Chinook tributary arms / below Round Butte Dam), as described in section IV.C.1.a, below, are achieved.

(g) Fish Health Management Implications

The Fish Health Management Program is scheduled to start three to six months prior to the reintroduction of juvenile steelhead and spring chinook salmon upstream of the Project. Brood adults will be sampled for viral diseases, and eggs from adults carrying viral diseases not currently found upstream will be culled. This will reduce the potential disease risks within introduced populations upstream of the Project. It will also allow the Fish Committee to evaluate smolt production and reservoir passage success prior to actual passage of adult fish upstream of the project with its attendant risk of disease transmittal. When smolt passage begins, sampling will be conducted to distinguish any fish that succumb to disease agents within the facilities from those that are injured or killed during capture and handling.

(h) Decision Making Regarding Construction of Permanent Downstream Passage Facilities

The results of the Testing and Verification evaluations of the SWW structure and Round Butte temporary downstream-migrant collection facility described above will be used by the Fish

Committee to identify adjustments that may be needed to the system and as the basis to make the decision as to whether, and when, construction of permanent Round Butte Dam downstream fish collection facilities should proceed. Measures of success to be applied in this decision making are described in section IV.C.1.a, below. Consultation procedures for the decision making are outlined in section V.C.

Based on the results of the Testing and Verification evaluations, if the Fish Committee determines that permanent downstream fish passage facilities at Round Butte Dam should not be constructed, then the Fish Committee will consider alternatives to the passage program, as described below in section IV.C.3.

(10) Operation, Monitoring, and Evaluation of Upstream Passage Facilities

(a) Operation of Trap-and-Haul Facilities

Upstream passage will initially be provided using trap-and-haul facilities. The Pelton Fish Trap, located at the Reregulating Dam, was evaluated for capture efficiency in the early 1980s when the Reregulating Dam Powerhouse was constructed. The entrance configuration for the Pelton Fish Trap will again be evaluated prior to the return of adults that were passed as downstream migrants to ensure that the trap will provide for efficient upstream passage. Additional modifications will be made as needed. The trap has already been modified, with the addition of an accumulation pool in 1999, to allow the efficient sorting of adults into two containers. Fish put directly into the hopper can be loaded immediately, while fish placed in the accumulation pool can be crowded directly into the hopper using water-to-water loading for transfer to a different destination. This will allow brood stock for the hatchery to be obtained from maturing adults to be passed upstream. Any further modifications needed are scheduled to be completed by the end of the 2009 calendar year, so that the trap will be ready for the spring chinook, steelhead and sockeye returning in 2010, as well as the 2009 fall chinook run. If fish passage is successful and a significant sockeye run is established, the capacity of the brail pool in the Pelton Fish Trap may need to be enlarged in the future (if determined necessary by the Licensees in consultation with the Fish Committee), because large numbers of sockeye may arrive over a relatively short interval during late summer.

The Licensees shall, in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, file with FERC a final monitoring plan for the operation and maintenance of trap-and-haul fishways at the Project. The plan shall provide for the submission of an annual monitoring report to the Fish Committee for the duration of the operation of the interim trap-and-haul fishways. Upon FERC approval, the Licensees shall implement the plan.

(b) Operation of Adult Release Facility

The Licensees shall, in consultation with the Fish Committee and with approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, develop and file with FERC an operation and maintenance plan for the Round Butte Adult Release Facility for the safe, timely and effective upstream passage of anadromous fish when Lake Billy Chinook is thermally stratified. Upon FERC approval, the Licensees shall implement the plan.

(c) Evaluation

Upon the initiation of adult fish transport from the Pelton Fish Trap to release at the Round Butte Adult Release Facility, evaluations will be made of the effectiveness of the upstream passage effort and the condition of released fish. The trucking and release portion of the initial upstream passage facilities will be evaluated in two ways. First, some returning adults will be trucked to Round Butte Hatchery for use as brood stock. Holding these fish will allow evaluation of any delayed injury or mortality associated with trapping and hauling. Second, a portion of the adults released into the Round Butte Adult Release Facility will be radio tagged. Radio tagging will allow the tracking of adults through Lake Billy Chinook to their respective spawning locations and allow an evaluation of any migration delay or mortality associated with the release facility.

These evaluations will also include an assessment of adult fish for signs of disease as well as sampling of fish at Round Butte Hatchery that are held for brood stock, to test for presence of disease agents (some of which are only expressed when the fish mature at spawning). A significant sample of adults spawned at the hatchery and post-spawning adult carcasses observed in the wild will be sampled to allow monitoring of disease-carrier rates in these populations and monitoring of new disease agents upstream of the Project.

The Licensees shall, in consultation with the Fish Committee and with approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, develop and file with FERC a monitoring and evaluation plan for the Round Butte Adult Release Facility. Upon FERC approval, the Licensees shall implement the plan.

(d) Modifications to Adult Release Facility

The Licensees shall prepare and provide the Fish Committee reports in accordance with the monitoring and evaluation plan for the Round Butte Adult Release Facility. The reports shall be based on monitoring of the Adult Release Facility, shall describe any possible need to modify the Adult Release Facility, and shall be prepared in consultation with the Fish Committee. If the Fish Agencies conclude that the Adult Release Facility must be modified to ensure safe, timely, and effective upstream passage, the Licensees shall, in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory

authorities, develop a plan to modify the Adult Release Facility to ensure safe, timely, and effective upstream passage, which plan may include, but need not be limited to, measures or modifications required to meet the survival standard applicable to collection at the Pelton Fish Trap, transportation to the Adult Release Facility, and release through this facility into Lake Billy Chinook. Upon approval by the appropriate Fish Agencies pursuant to their respective statutory authorities, the Licensees shall submit the plan to FERC for approval. Upon FERC approval, the Licensees shall implement the plan.

(11) Permanent Round Butte Downstream Passage Facilities Design and Construction

The Round Butte permanent downstream-migrant collection facility will be similar in design to the temporary facility, except that wedge-wire screens will be used. Additionally, any beneficial modifications that may have been made during the Testing and Verification phase will be incorporated into the permanent facility design. The design work for the permanent facility is scheduled to begin in summer 2011 and continue through fall 2012. Construction of the permanent facility will begin following completion of the design work and be completed by late summer 2013, and construction activities will be coordinated to avoid interruption to the downstream migration season.

The permanent handling and marking facility will be designed and constructed during the same timeframe, and the benefit of several years of previous operation and evaluation of the temporary facility will inform the design of the permanent facility. Together, the permanent downstream-migrant screening/collection, transport, and handling/marking facilities (including trucking to the lower Deschutes River) will be required to perform at a higher level of efficiency and meet stricter safe passage criteria (96 percent for the permanent downstream passage facilities vs. 93 percent for the temporary downstream passage facilities; see section IV.C., below) than the temporary facilities. Evaluation of the permanent downstream passage facilities will entail examination of all collected fish for injury/descaling and mortality.

(12) Testing and Evaluation of Permanent Round Butte Fish Passage Facilities

Evaluation of the permanent downstream passage facilities will be similar to the evaluation of the temporary facilities. Hydraulic conditions of the permanent fish screening / downstream-migrant collection facility will be measured and adjusted as needed to ensure that all aspects of the facility meet applicable NOAA Fisheries criteria. Fish captured in the permanent downstream-migrant collection facility will be inspected to be certain that fish are not being injured, descaled, or killed within the facility. If injured, descaled or dead fish are found (aside

from those that are determined to have succumbed to disease), the screens and fish conduits will be inspected and any problems will be corrected.

Other evaluations will also be conducted, similar to the Testing and Verification studies of the temporary downstream-migrant collection facility. Downstream smolt migration studies will continue, including radio-tagging and PIT-tagging evaluations similar to those described in section IV.B.3.e.(9)(f)(*i*) above for evaluation of downstream migration with the temporary facilities, to determine the percentage recovery of marked smolts. The purpose of these evaluations is to determine the effectiveness of the permanent screening and collection facilities in capturing smolts entering the Round Butte Dam forebay.

As with the Testing and Verification of the temporary downstream passage facilities, effectiveness of the permanent facilities will be determined according to the established measures of success. Any changes will be made as determined necessary based on the facility performance standards described in section IV.C.1.a., below, and in consultation with the Fish Committee.

Also as described above for the temporary downstream passage facilities, studies of predation will be conducted with the permanent facilities in place, if needed to evaluate factors that may be affecting reservoir passage survival (in terms of percentage recovery of smolts released at the heads of Lake Billy Chinook tributary arms, as described in section IV.C.1.a, below).

Evaluations of the permanent facilities will also include an assessment of fish health, as provided under the Fish Health Management Plan. Adult fish will be evaluated for signs of disease, and brood stock held at Round Butte Hatchery will be sampled to test for infection with disease agents. Sampling of adults spawned at the hatchery and post-spawning adult carcasses collected in the wild will allow monitoring of disease carrier rates in these populations, and will also allow monitoring for the presence of new disease agents upstream of the Project.

(13) Modification of Downstream Facilities

The Licensees shall, in consultation with the Fish Committee and with approval by the appropriate Fish Agencies pursuant to their respective statutory authorities, develop plans for measures or modifications to the existing facilities needed to achieve the criteria and goals for safe, timely and effective fish passage set forth in section IV.C.1.a. of this Fish Passage Plan. The Licensees shall file such plans with FERC and upon approval implement the measures or modifications.

(14) Evaluation of Adult Fish Returning to the Pelton Fish Trap, Adult Migration and Spawning Success

Under the fish passage schedule described above, the first adult returns back into the Deschutes River from smolts produced upstream of the Project may arrive in 2009. After consultation with the Fish Committee and Fish Agencies, these returning marked adults that originated upstream will be passed back upstream to spawn naturally, consistent with management direction identified in the amended ODFW Deschutes Basin Fisheries Management Plans, unless the initial target for reservoir passage of 50 percent of the PIT tagged smolts surviving through collection has not been achieved. The return frequency will be calculated by determining the percentage of marked smolts of each species passed downstream that return to the Pelton Fish Trap as maturing adults. This will be compared to the return frequency of smolts released from Round Butte Hatchery as a gauge of relative survival. In addition, as described in section IV.C.1.a., the median recruits-per-spawner ratio will be evaluated statistically using a methodology approved by the Fish Committee to monitor ongoing effectiveness of the fish passage program.

(15) Evaluate Feasibility of Volitional Upstream Passage Facilities

Unless otherwise directed by the Fish Agencies, the fish passage program will transition to volitional upstream passage after the Interim Passage Phase is complete, downstream passage is determined to be successful, and the risk of introducing diseases from returning adults upstream has been addressed to the satisfaction of ODFW and the CTWS BNR. Amendments to the three upper Deschutes subbasin management plans (Crooked River, Metolius River, and Upper Deschutes River basin plans) by the Oregon Fish and Wildlife Commission will be necessary in the future to implement volitional passage of all adults.

Evaluation to determine whether the requirements for initiating volitional upstream passage have been met will be conducted as part of the Testing and Verification program during the Interim Passage Phase, and will include assessment of disease agent transfer, out-of-basin stray rates, and injury/mortality associated with trap-and-haul methods ("trap-and-haul"). Evaluation and decision-making steps for initiating volitional upstream passage through the Project are described in section V.C.1.c, below.

The Licensees shall provide upstream passage using trap-and-haul until volitional upstream passage is implemented. Upon a determination that construction of volitional upstream fish passage facilities should proceed, the Licensees will take necessary steps, as determined in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, to obtain FERC approval to undertake the proposed action.

4. Final Passage Phase

a. Prerequisite Knowledge/Agreements

- Operation of SWW and downstream passage facilities is determined to be compatible with lower Deschutes River water quality and temperature objectives and in compliance with the § 401 certificates.

- Downstream passage of smolts from Lake Billy Chinook is determined to be successful according to established measures of success.

- Risk of introducing disease agents and diseases from returning adults to waters above Round Butte Dam is addressed to the satisfaction of ODFW and the CTWS BNR. Amendments to the three upper Deschutes subbasin management plans (Crooked River, Metolius River, and Upper Deschutes River basin plans) by the Oregon Fish and Wildlife Commission have been approved to implement volitional passage of all adults, rather than selected passage of returning marked adults from upper basin production.

- Upstream passage of adults to Lake Billy Chinook is determined to be successful according to established criteria / measures of success.

- Determination is made as to whether volitional upstream passage is feasible and desirable.

b. Key Program Elements

- Long-term monitoring and evaluation of downstream and upstream passage continues.

- Pelton Fish Ladder is enhanced and reactivated for volitional upstream fish passage (assumes decision is made that volitional upstream passage is feasible and appropriate).

- New Round Butte fish ladder or other volitional upstream passage facility is designed and constructed (assumes decision is made that volitional upstream passage is feasible and appropriate).

- Enhanced and new volitional upstream fish passage facilities are evaluated (assumes decision is made that volitional upstream passage is feasible and appropriate).

- Unmarked salmon and steelhead adults are allowed free passage upstream (assumes decision is made that volitional upstream passage is feasible and appropriate).

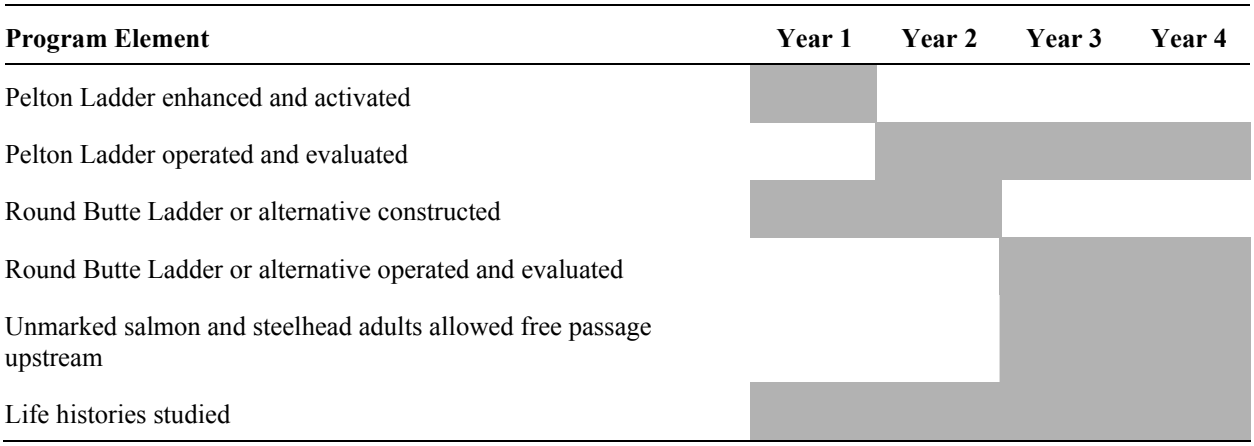
- Life histories of anadromous populations continue to be studied to document the emergence of new life history variations.

c. Schedule

The schedule for the Final Passage Phase is presented in Figure 6. The Final Passage Phase would be implemented after the Interim Passage Phase is complete, downstream passage is determined to be successful, and the risk of introducing diseases from returning adults upstream has been addressed to the satisfaction of ODFW and the CTWS BNR, which could involve a determination that whirling disease will not become established above the Project or a determination that the benefits of passage will outweigh the potential losses if this disease does become established. The Final Passage Phase will focus on developing and implementing volitional upstream passage facilities that will allow for free upstream passage for most anadromous and resident fish species. An exception to free passage might be the sorting out of stray steelhead so the Deschutes steelhead population can continue to adapt to habitats upstream of the Project without the negative input of maladapted genes from other systems.

This phase would continue through the balance of the term of the New License. In the event that volitional upstream passage is determined during the Interim Passage Phase to be infeasible (through the evaluation described in section IV.B.d.(15), above), or if the decision as to whether it is feasible/appropriate is deferred, upstream passage using trap-and-haul facilities will be continued during the Final Passage Phase.

Figure 6. Schedule of implementation of the Final Passage Phase.



C. Measures of Success

1. Interim Passage Phase Measures of Success

Specific measures of success have been developed to guide the progression of the fish passage program through the Interim Passage Phase. These measures of success correspond to various components of the extensive fish passage Testing and Verification program to be conducted during this phase, as described above in section IV.B.3.e.(9). of this Fish Passage Plan.

The measures of success discussed in this section also constitute the criteria and goals for safe, timely and effective downstream and upstream passage for fish. Toward this end, the Licensees shall:

- Provide that upstream and downstream passage facilities will be functional during all months of the year to provide safe, timely and effective passage for resident and anadromous fish.

- Keep all fishways in proper order and shall keep all fishway areas clear of trash, sediment, logs, debris, and other material that would hinder passage.

- Perform maintenance in sufficient time before a migratory period such that fishways can be tested and inspected and will operate effectively prior to and during the migratory periods.

The subsections below describe the evaluation criteria that will be used to determine progress, direction, and ultimately, success of the fish passage program. Protocol and responsible parties for the decision making that will occur using the results of the evaluations, as judged against the measures of success, are described in section V.B, below.

a. Downstream Passage Efficiency for Round Butte Dam Facilities and Lake Billy Chinook

As described above in section IV.B.3.d.(9), downstream fish passage efficiency through Lake Billy Chinook will be determined during the Testing and Verification evaluations by releasing identifiably marked salmon and steelhead smolts in the upstream arms of Lake Billy Chinook and determining the percentage of each species that are successfully and safely captured at the new downstream-migrant collection facility. This percentage will be determined using the PIT-tagged sample.

Radio-tagged salmon and steelhead smolts will be followed to determine individual travel times and routes. An accounting will be made of all radio-tagged salmon and steelhead smolts to attempt to determine other mortality factors, such as predation and angling, which may be

impacting the success of the fish passage effort. Also to be conducted as part of the Testing and Verification phase studies is evaluation of effectiveness of the Round Butte temporary downstream passage facilities (section IV.B.3.d.(9)). The facilities evaluation will be based on hydraulic performance of the temporary fish collection screens and survival of downstream migrant fish from collection at Round Butte Dam to release in the lower Deschutes River.

Results of monitoring during the Testing and Verification evaluations of the temporary downstream passage facilities at Round Butte Dam will be utilized to determine if, and when, the fish passage program should proceed to the design and installation of permanent screens/facilities at Round Butte Dam. The specific evaluation criteria that will be used to make this determination are summarized in Table 3 and are described below.

As described in section IV.B.3.d.(12), if the decision is made to construct permanent downstream migrant screening/passage facilities at Round Butte Dam, Testing and Verification evaluations will also be conducted during the Interim Passage Phase to evaluate downstream passage with the permanent Round Butte Dam facilities. Measures of success for evaluating reservoir survival and effectiveness of these permanent downstream fish passage facilities also are summarized in Table 3 and described below.

Table 3. Measures of success for evaluation of downstream passage with operation of downstream passage facilities at Round Butte Dam. Refer to text below, as referenced, for detailed explanations.

Passage Component	**Measure of Success** [1]
Screen Hydraulics [*(subsection (1), below*]	NOAA Fisheries' smolt criteria
Downstream Passage Facility Survival (from Round Butte collection to lower Deschutes River release point) [*(subsection (2), below*]	93 percent smolt survival for temporary downstream passage facility during first five years of operations; 96 percent smolt survival for permanent facility
Round Butte Reservoir Downstream Passage associated with temporary facilities [*(subsection (3), below*]	>50 percent of a statistically significant sample of tagged steelhead or spring chinook outmigrants from any Project tributary averaged over 4 years of study
Round Butte Reservoir Downstream Passage associated with permanent facilities [*(subsection (4), below*]	>75 percent survival of PIT-tagged smolts calculated as a rolling 4-year average during the first 12 years

Note:
1 These measures of success also represent the criteria and goals for safe, timely and effective downstream passage for fish.

(1) Screen Hydraulic Standards for Temporary and Permanent Facilities

The Licensees will develop a plan, in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, for monitoring the temporary and permanent downstream-migrant screening/collection facility for compliance with NOAA Fisheries' Juvenile Fish Screen hydraulic standards for anadromous smolts. The plan will provide for conducting tests as soon as possible after construction, and will use standard methodology. In consultation with the Fish Committee, the Licensees will take any feasible measures or implement modifications within their control that are necessary to correct deficiencies, and then re-test the facility to ensure compliance with the standards for screen hydraulics. After compliance with screen hydraulic standards is verified, additional retesting will only be required if deficiencies are observed. The plan will identify the methods of observation used to detect deficiencies.

(2) Downstream Passage Survival for Temporary and Permanent Facilities

The Licensees will conduct tests of survival through temporary and permanent downstream passage facilities as soon as possible after screen hydraulic standards are achieved, and will use standard methodology for assessing direct injury and mortality, delayed mortality, predation, and other factors. The survival standards listed under "downstream passage facility survival" in Table 3 above apply, respectively, to the temporary and permanent downstream-migrant collection facilities, together with the sorting, handling, and trucking elements of downstream passage after outmigrants have passed through the collection facilities. In consultation with the Fish Committee, the Licensees will take any feasible measures or implement modifications within their control that are necessary to meet the 93 percent survival standard for the temporary downstream passage facilities, and the 96 percent survival standard for the permanent facilities. After correcting any deficiencies, the Licensees will re-test the facilities to ensure compliance with the applicable downstream passage facility survival standard. After compliance with the downstream passage facility survival standards is verified, additional retesting will only be required if deficiencies are observed. The plan will identify the methods of observation used to detect deficiencies.

(3) Reservoir Downstream Passage Survival Associated with Temporary Facilities

The Licensees will concurrently perform the following studies, in accordance with the Testing and Verification program described in section IV.B.3.e.(9), above:

- A comprehensive evaluation (repeated annually for a minimum of four consecutive years) of downstream juvenile fish migration of steelhead and spring chinook through Lake Billy Chinook with operation of the temporary downstream passage facilities

- A study of predation impacts on steelhead and spring chinook smolts in Lake Billy Chinook

- A study of angling impacts on steelhead and spring chinook smolts in Lake Billy Chinook

- Feasibility analyses of the proposed Permanent Downstream Fish Passage Facility, with particular attention to the likelihood that such a facility would achieve 75% reservoir passage

The results of these Testing and Verification studies will be evaluated according to the measures of success in Table 3, and actions will be taken as appropriate, according the following provisions:

A. If >50 percent of a statistically significant sample of tagged steelhead or spring chinook outmigrants, averaged over any four consecutive years of study, from any of the three major tributaries to Lake Billy Chinook are captured at the temporary downstream-migrant collection facility, then the Licensees will construct the permanent downstream-migrant collection facility in accordance with the schedule set forth in Appendix VI.

B. If >50 percent of a statistically significant sample of tagged steelhead or spring chinook outmigrants from any Lake Billy Chinook tributary, averaged over any four consecutive years of study, are not captured with the temporary downstream-migrant collection facility, then the Licensees will further investigate the cause, and, in consultation with Fish Committee, the Licensees will take any feasible measures or implement modifications within their control that are necessary to meet or exceed the >50 percent objective. These actions or modifications will be made as soon as possible after Testing and Verification studies identify that they are necessary to meet or exceed the >50 percent objective. The Licensees will cooperate with other entities to reduce mortality factors that are not within the Licensees' direct control.

Seven years after the construction of the temporary downstream-migrant collection facility, if >50 percent of a statistically significant sample of tagged steelhead or spring chinook outmigrants from any of the three major tributaries, averaged over any four consecutive years of study, are not captured, the Licensees shall provide a comprehensive report, for review and approval by the Fish Committee, discussing the results of studies to

date, the modifications that have been made as a result of those study results and recommendations (if any) for additional modifications.

C. The Licensees will implement the measures required in item B, above, unless the Fish Committee determines that passage effectiveness and survival are adequate to proceed with construction of permanent facilities.

D. If, after the completion of at least four years of study, the >50 percent capture objective has not been achieved and all steps to improve collection efficacy and reservoir passage or survival have been taken, as described above, the Licensees will initiate the appropriate consultation actions, as set forth in section IV.C.3, below.

(4) Reservoir Downstream Passage Survival Associated with Permanent Passage Facilities

As described in section IV.B.3.e.(12) above, Testing and Verification studies will continue to be conducted to evaluate downstream passage after construction of the permanent downstream passage facilities at Round Butte Dam. The objective for the capture of smolts through Lake Billy Chinook with permanent downstream passage facilities has been set initially at 75 percent of a statistically significant sample of tagged steelhead and spring chinook outmigrants from each tributary averaged over any four consecutive years. This objective will apply to PIT-tagged steelhead smolts passing from the Deschutes and Crooked rivers, and to PIT-tagged yearling spring chinook smolts passing from the Deschutes, Crooked and Metolius rivers, to the permanent downstream migrant-collection facility at Round Butte Dam. Decision-making criteria to be applied to the results of the Testing and Verification of the permanent downstream-migrant collection facility, and corresponding actions to be taken for potential scenarios, are as follows:

A. If >75 percent of a statistically significant sample of tagged smolts from a particular tributary averaged over any four consecutive years are captured at the permanent downstream-migrant collection facility, then the Licensees' Testing and Verification studies involving tributary trapping will end for that tributary. The Licensees will continue the tributary trapping and smolt-tagging reservoir passage evaluation program in tributaries where the >75 percent objective has not been reached.

After the >75 percent objective has been met, the Licensees will continue to monitor smolt emigration numbers at the Round Butte permanent downstream passage facilities through the remainder of the license period. Numbers of spring chinook and/or steelhead smolts captured at the permanent downstream-migrant collection facility will be reported to the Fish Committee. If the numbers of spring chinook and/or steelhead smolts

captured at Round Butte Dam trend downward, (which will be determined in consultation with Fish Committee) the Licensees, in consultation with Fish Committee, will investigate the cause(s), including reevaluation of reservoir passage survival, and take any feasible measures or implement modifications within the Licensees' control to increase smolt production, survival, and passage.

If >75 percent of a statistically significant sample of tagged smolts from a particular tributary, averaged over a four-year period, are not captured at the permanent downstream-migrant collection facility, the Licensees will consult with the Fish Committee regarding possible adjustments in study efforts to investigate the cause(s), including the identification of mortality factor(s), and regarding the implementation of any feasible measures or modifications within the Licensees' control necessary to meet or exceed the >75 percent objective. The Licensees will cooperate with other entities to reduce mortality factors that are not within the Licensees' direct control.

B. For all cases in which the Testing and Verification studies do not indicate that the >75 percent objective for downstream passage with the permanent downstream-migrant collection facility is being achieved, the Licensees, in consultation with the Fish Committee, will take any feasible measures or implement modifications within the Licensees' control that are necessary to improve outmigrant guidance and to reduce mortality. These actions or modifications will be made as soon as possible after the Testing and Verification studies identify that such actions or modifications are necessary. The Licensees will cooperate with other entities to reduce mortality factors that are not within the Licensees' direct control.

C. In addition to the Testing and Verification studies of the permanent downstream passage facilities, the Licensees will calculate the ratio of recruits per spawner (*R/S*), based on annual counts of adult returns at the Pelton Fish Trap as compared to the number of spawners in the previous generation, for the life of the license. Beginning after three generations (approximately 12 years depending on species and life history), the Licensees will evaluate *R/S* for spring chinook, steelhead and sockeye to determine if runs are building. Median *R/S* needs to be >1.0 while runs are building. The methodology for determining *R/S* will be approved by the Fish Committee. If, at any time during the life of the New License, the median *R/S* is less than 1.0, the Licensees will evaluate the causes using existing Project-specific data and existing information from other sources. The Licensees shall report their findings and recommendations to the Fish Committee. Based on the results of the evaluation, the Licensees shall, in consultation with the Fish Committee, take any feasible measures or implement modifications within their control to help build anadromous runs. If reservoir factors cannot be eliminated as a potential cause of the decline based on existing information, the Licensees may initiate further research

in consultation with the Fish Committee. The Licensees will cooperate with other entities to reduce mortality factors that are not within the Licensees' direct control.

D. The Licensees will implement the measures required in items A and B above, as appropriate, unless the Fish Committee determines that, based on the study results from the Testing and Verification activities and Project data on *R/S*, passage effectiveness and survival are adequate to support self-sustaining, harvestable populations of anadromous species. Potential modifications to the above measures can include adjustment of the >75 percent downstream reservoir passage objective or changes in the frequency or extent of future reservoir downstream passage survival studies.

b. Upstream Passage Efficiency (Trap-and-Haul Approach)

Upstream passage above the Project of adults that originated above the Project returning to the Pelton Fish Trap will be undertaken no sooner than a determination has been made that downstream passage is successful and consistent with management direction in the amended ODFW Deschutes Basin Fisheries Management Plans. Upstream passage efficiency will be determined separately for the Interim Passage Phase, in which a trap-and-haul approach will be used, and the Final Passage Phase, when volitional passage will be used. As described in section IV.B.3.e.(10), testing/verification of upstream passage facilities and methods during the Interim Passage Phase will include evaluation of capture, trucking and release of adults, and will be based primarily on biological evaluation of the captured and released adults. Specific facility survival standards have been established for temporary and permanent upstream passage facilities, as summarized in Table 4 and described below.

Table 4. Measures of success for evaluation of upstream passage facilities, from collection in the lower Deschutes River at the Reregulating Dam to release in Lake Billy Chinook.

Passage Component	**Measures of Success** [1]
Upstream Passage Survival (from lower Deschutes River collection point through Adult Release Facility)	95 percent during first 5 years of operations. 98 percent after 5 years.

Note:
1 These measures of success also represent the criteria and goals for safe, timely and effective upstream passage for fish.

The Licensees shall, in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, file with FERC a plan for conducting tests of upstream passage facility survival using standard methodology for evaluation of direct injury and mortality, and other factors, as described in section

IV.B.3.(e)(10), above. The Plan shall provide that, in consultation with the Fish Committee, the Licensees shall take any feasible measures or implement modifications within their control that are necessary to meet the 95 percent survival standard for the upstream passage facilities during the first five years of operations, and the 98 percent survival standard after five years. This survival standard applies to collection at the Pelton Fish Trap, transportation to the Adult Release Facility, and release through this facility into Lake Billy Chinook. After correcting any deficiencies, the Licensees shall re-test the facilities to ensure compliance with the applicable upstream passage facility survival standard. After compliance with the upstream passage facility survival standards is verified, additional retesting will only be required if deficiencies are observed. The plan will identify the methods of observation used to detect deficiencies through long-term monitoring. Upon FERC approval, the Licensees shall implement the plan.

The Licensees will file a plan, for review and approval by the Fish Committee, for evaluation of any volitional upstream passage facilities utilized as part of the Final Passage Phase. At a minimum, the plan will call for evaluation of the facilities during initial operations, and other evaluations necessary to determine whether the standards for upstream passage facilities which will be established in consultation with the Fish Committee are being met, and will identify the methods of observation used to detect deficiencies. In consultation with the Fish Committee, the Licensees will take any feasible measures or implement modifications within their control that are necessary to meet the volitional upstream passage facility standards. After correcting any deficiencies, the Licensees will re-test the facilities to ensure compliance with volitional upstream passage facility survival standards. After compliance with the upstream passage facility survival standards is verified, additional retesting will only be required if deficiencies are observed.

In addition, as described in section IV.B.3.d.(14), the Testing and Verification program for the Interim Passage Phase will also include evaluation of upstream passage success based on monitoring adult migration and spawning success. For the evaluation, a subset of salmon and steelhead adults passed will be radio-tagged and followed after their release to determine the number that reach spawning areas and spawn successfully. Known spawning areas will also be monitored, and redds will be counted to be certain that pre-spawning mortality does not appear excessive. Together with monitoring of adult returns to the Pelton Fish Trap from smolts of above-Project origin, the results of this evaluation will be used to evaluate the fish passage program's overall progress toward achieving sustainable, harvestable populations of salmon and steelhead.

c. Decision-Making Criteria for Moving to Volitional Upstream Passage

Following the installation of the permanent downstream facilities at Round Butte Dam, and within 24 months of when the downstream survival targets for Lake Billy Chinook (as described

above) have been achieved, the Licensees shall conduct a study through the study program described in section IV.B.3.d.(15) and provide the Fish Committee a report on the feasibility of volitional upstream passage. The scope of the feasibility investigation shall be determined in consultation with the Fish Committee. Factors to be addressed in this study shall include, but not be limited to:

- Engineering feasibility
- Biological effectiveness, including but not limited to risk of disease transfer and stray rate for out-of-basin fish
- Cost
- Performance, including efficiency, of the existing trap-and-haul operation

Following submission of this report to the Fish Committee, the Licensees shall prepare a plan to implement volitional upstream passage at the Project, which plan shall include appropriate Testing and Verification studies, unless the appropriate Fish Agencies determine pursuant to their respective statutory authorities that volitional upstream passage facilities should not be installed because:

- ODFW and CTWS BNR have determined that the risk of disease transfer is too great,
- The stray rate for out-of-basin fish is not acceptable,
- Volitional upstream passage is infeasible, as determined utilizing the results of the feasibility study, or
- It is preferable, due to concerns with the state-of-the-art for volitional upstream passage facilities combined with high efficacy of trap-and-haul operations) to continue the trap-and-haul operation for some additional specified period of time.

The plan shall be completed within 24 months of the Fish Agencies' determination that volitional upstream passage should proceed, and shall be prepared in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities. Upon approval by the Fish Agencies, the Licensees shall file the plan with FERC. Upon FERC approval, the Licensees shall implement the plan.

Upon any determination that volitional upstream passage should not be installed for the reasons specified above, the Licensees shall, within six months of such determination, and in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, file with FERC a plan to continue trap-and-haul operations for a specified number of years and to conduct a future feasibility investigation as

provided above. During any such continued trap-and-haul operation, the Licensees shall continue to monitor survival as required under section IV.C.1.b of this Fish Passage Plan and shall take any feasible measures or implement modifications within their control to the trap-and-haul facilities that are necessary to comply with the survival standard in section IV.C.1.b. Upon FERC approval, the Licensees shall implement the plan.

2. Final Passage Phase — Measures of Success for Volitional Upstream Passage

Any volitional upstream passage facilities utilized as part of the Final Passage Phase will be thoroughly evaluated, and upstream passage facility standards will be established in consultation with the Fish Committee. Each volitional passage facility will be evaluated by counting adults entering and leaving, determining individual travel times, and recording mortality frequencies by species and tendencies to hold in or reject the facility. Study plans for evaluation of volitional upstream passage facilities will be developed and reviewed by the Fish Committee concurrent with the development of plans for each facility.

3. Failure to Achieve Measures of Success with Temporary Fish Passage Facilities

The Parties recognize that after a number of years of implementation, there is the potential that, despite all best efforts, the fish passage program as detailed in this Fish Passage Plan is ultimately deemed to be unsuccessful. The provisions set forth in this section are intended to outline the decision-making criteria, consultation steps, prioritization of available alternatives, and planning/implementation procedures in the event that it is determined the fish passage program should be abandoned in favor of alternative mitigation (either an alternative fish passage approach or a non-passage alternative). The consultation and decision-making process[11] outlined by these provisions would be initiated before permanent downstream passage facilities are installed at Round Butte Dam but after all agreed-upon measures have been taken to try to make the temporary downstream passage facilities achieve successful performance according to the measures of success described in section IV.C.1.a. of this Fish Passage Plan.

In the event that all steps to improve collection efficacy and reservoir passage or survival have been implemented, as required in section IV.C.1.a., and the criteria and goals for downstream passage stated in section IV.C.1.a. have not been achieved, the Licensees shall implement the following process:

1. *Notification*. The Licensees shall notify FERC and the Fish Committee that the temporary downstream passage facilities have not achieved the standards set out in section IV.C.1.a. and that all steps designed to improve collection efficacy and reservoir

[11] This process includes all necessary review and approval of facility drawings, plans, etc., as required by FERC under the terms of the New License.

passage or survival have been taken, as prescribed in that section of this Fish Passage Plan.

2. *Meeting*. The Licensees shall notice a meeting of the Fish Committee within 60 days of the notice to FERC.

3. *Information and Analyses from Testing and Verification Studies*. Not less than 45 days before the meeting, the Licensees shall provide the Fish Committee a report, including analysis of the information gathered during the operation of the temporary downstream passage facilities pursuant to the Testing and Verification provisions outlined in section IV.B.3.e.(9) of this Fish Passage Plan, to inform a determination by the Fish Committee whether (i) testing and/or modification of the temporary downstream passage facilities should continue, (ii) an alternative fish passage methodology should be implemented, or (iii) fish passage is currently scientifically and technologically infeasible.

4. *Plan with Passage Options*. Based on this information, the Fish Committee shall determine whether the Licensees should develop a plan to continue operation and testing of the temporary downstream fish passage facilities, begin implementing an alternative fish passage plan, or to pursue non-passage mitigation. The Licensees shall develop a plan to implement the passage option selected under this paragraph according to the following procedures:

    a. *Temporary Collection Facilities*: If the Fish Committee determines that the information provided pursuant to paragraph 3 above shows demonstrable progress related to reservoir passage and survival, the Licensees shall, within 60 days following the meeting, develop a plan for the continued operation, any needed modification, and testing of the temporary downstream passage facilities. The Licensees shall prepare the plan in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities. After approval by the appropriate Fish Agencies, the Licensees shall file the plan with FERC. Upon FERC approval, the Licensees shall implement the plan.

    b. *Alternative Fish Passage Plan*: If the Fish Committee determines that information provided pursuant to paragraph 3 above supports selection of an alternative fish passage plan, including but not limited to tributary trapping, substantially new proposals based on the SWW system, or any other scientifically supported fish passage methodology, the Licensees shall, within 12 months of the meeting provided under paragraph 2 above, develop an alternative fish passage plan. Any alternative fish passage plan shall be consistent with maintaining relevant water quality standards, including, but not limited to, continued operation of the SWW facility, if

the SWW facility is necessary to achieve water quality standards. The Licensees shall prepare the plan in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities. After approval by the appropriate Fish Agencies, the Licensees shall file this plan with FERC. Upon FERC approval, the Licensees shall implement the plan.

c. *Non-Passage Mitigation*: If the Fish Committee determines that information provided pursuant to paragraph 3 above demonstrates that it is currently scientifically and technically infeasible for fish to be collected and passed around the Project, the Licensees shall, within 120 days of the meeting provided under paragraph 2 above, develop a non-passage mitigation plan. Any non-passage mitigation must be consistent with the goals of providing ecosystem integrity and self-sustaining, harvestable populations of fish, and must provide alternative mitigation valued at an amount equivalent to the net present value of the cost that would otherwise have been incurred in the construction of permanent downstream fish passage facilities at Round Butte Dam and the net present value of the operations and maintenance of fish passage facilities that would have otherwise been incurred over the remaining term of the License. The Licensees shall prepare the plan in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities. After approval of the appropriate Fish Agencies, the Licensees shall file the plan with FERC. Upon FERC approval, the Licensees shall implement the plan.

5. *Feasibility*. The Licensees shall implement any plans developed under paragraph 4 above according to the schedule and procedures set out in those plans. If a plan to continue operation and testing of the temporary downstream passage facilities or an alternative fish passage plan is determined to be infeasible according to the schedule and procedures set out in any plan developed under paragraph 4, then the Licensees shall utilize the procedures of this section IV.C.3 to initiate further proposals.

6. *New Information Regarding Fish Passage*. If, after the Licensees have begun implementing non-passage mitigation, new information demonstrates that downstream fish passage may be feasible, the Licensees shall, within 60 days of receiving such information, notice a meeting of the Fish Committee to determine whether fish passage should be reinitiated. If the Fish Committee determines that fish passage should be reinitiated, the Licensees shall develop a fish passage plan based on the new information then available. Such plan shall be developed in consultation with the Fish Committee, and be consistent with least-cost alternatives that meet the goals and objectives of this Fish Passage Plan, and, upon approval by the appropriate Fish Agencies pursuant to their

respective statutory authorities, the Licensees shall file the plan with FERC. Upon FERC approval, the Licensees shall implement the plan.

4. Failure to Achieve Measures of Success with Permanent Fish Passage Facilities

In the event that all steps identified in this Fish Passage Plan to improve collection efficiency of the permanent downstream facilities and reservoir passage or survival have been implemented, and the criteria and goals for downstream passage stated in section IV.C.1.a. have not been achieved, the Licensees shall implement the following process:

1. *Notification*. The Licensees shall notify FERC and the Fish Committee that the permanent downstream passage facilities have not achieved the standards set out in the criteria and goals for downstream passage stated section IV.C.1.a. and that all steps designed to improve collection efficacy and reservoir passage or survival have been taken as prescribed in this Fish Passage Plan.

2. *Meeting*. The Licensees shall notice a meeting of the Fish Committee within 60 days of the notice to FERC.

3. *Information and Analyses from Testing and Verification Studies*. Not less than 45 days before the meeting, the Licensees shall provide the Fish Committee a report, including analysis of the information gathered during the operation of the permanent downstream passage facilities pursuant to the Testing and Verification provisions of this Fish Passage Plan, to inform a determination by the Fish Committee whether (i) testing and/or modification of the permanent downstream passage facilities should continue, or (ii) fish passage is currently scientifically and technologically infeasible for some or all species.

4. *Plan with Passage Options*. Based on the information provided pursuant to paragraph 3., the Fish Committee shall determine whether the Licensees should develop a plan to continue operation and testing of the permanent downstream passage facilities, or pursue non-passage mitigation. The Licensees shall develop a plan to implement the passage option selected under this paragraph according to the following procedures:

    a. *Permanent Collection Facilities*: If the Fish Committee determines that the information provided pursuant to paragraph 3 above shows demonstrable progress related to reservoir passage and survival, the Licensees shall, within 60 days following the meeting, develop a plan for the continued operation, any needed modification, and testing of the permanent downstream passage facilities. The Licensees shall prepare the plan in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory

authorities. After approval by the appropriate Fish Agencies, the Licensees shall file the plan with FERC. Upon FERC approval, the Licensees shall implement the plan.

b. *Non-passage Mitigation*: If the Fish Committee determines that the information provided pursuant to paragraph 3 above demonstrates that it is currently scientifically and technically infeasible for fish to be collected and passed around the Project, the Licensees shall, within 120 days of the meeting, develop a non-passage mitigation plan. Any non-passage mitigation plan must be consistent with the fish passage objective of providing ecosystem integrity and self-sustaining harvestable populations of fish and must provide alternative mitigation as provided in paragraphs 5 or 6 below, as appropriate. The Licensees shall prepare the plan in consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities. After approval by the appropriate Fish Agencies, the Licensees shall file the plan with FERC. Upon FERC approval, the Licensees shall implement the plan.

5. *Fish Passage Infeasible after Permanent Facility Construction*. If fish passage is determined pursuant to paragraph 4 above to be totally infeasible after permanent downstream fish passage facilities have been constructed at Round Butte, the Licensees shall provide alternative mitigation in an amount equivalent to the net present value of the cost of the operations and maintenance of fish passage facilities that would have otherwise been incurred over the remaining term of the License.

6. *Partial Passage Success after Permanent Facility Construction*. If fish passage is determined pursuant to paragraph 4 above to be infeasible for some but not all species, the Licensees shall provide alternative mitigation related to those species for which passage is infeasible in an amount equivalent to the net present value of the reduction in the cost of operations and maintenance of the fish passage facilities as a result of this determination.

7. *Feasibility*. The Licensees shall implement any plans developed under paragraph 4 above according to the schedule and procedures set out in those plans. If continued operation and testing of the permanent downstream passage facilities is determined to be infeasible according to the schedule and procedures set out in any plan developed under paragraph 4, then the Licensees shall utilize the procedures beginning with 4 to initiate further proposals.

8. *New Information Regarding Fish Passage*. If, after the Licensees have begun implementing non-passage mitigation, new information demonstrates that downstream fish passage may be feasible, the Licensees shall, within 60 days of receiving such

information, notice a meeting of the Fish Committee to determine whether downstream fish passage should be reinitiated. If the Fish Committee determines that downstream fish passage should be reinitiated, the Licensees shall develop a fish passage plan based on the new information then available. Such plan shall be developed in consultation with the Fish Committee and be consistent with least-cost alternatives that meet the goals and objectives of this Fish Passage Plan, and, upon approval by the appropriate Fish Agencies pursuant to their respective statutory authorities, the Licensees shall file the plan with FERC. Upon FERC approval, the Licensees shall implement the plan.

D. Stock Selection

Reintroduction of anadromous fish in the Deschutes River Basin upstream of the Project is scheduled to begin in 2006, with the first smolts passed downstream in the spring of 2008. Proper stock selection will be an important component of the reintroduction. As now planned, the reintroduction will take place using eyed eggs or swim-up fry from adults screened to prevent the passage of diseases of concern. Stock selection for reintroduction is primarily the responsibility of ODFW and the CTWS BNR, the fishery management agencies. However, because of their responsibilities in connection with the federal Endangered Species Act and their fish passage authority under the Federal Power Act, the federal fisheries agencies (USFWS and NOAA Fisheries) also have jurisdiction. This section of the Fish Passage Plan discusses priority stocks of each species to be used for reintroduction; however, stock availability will be determined each year by ODFW and the CTWS BNR, in accordance with their overall management goals and directives. A discussion of stock selection will be included in the Anadromous Fish Reintroduction Plan.

1. Chinook Salmon

a. Background

Prior to the construction of the Project, wild anadromous salmonids moved freely past this location to spawn in middle basin tributaries and the mainstem Deschutes River. Stream-type spring chinook salmon utilized the cooler waters of the Metolius River Basin much as they currently use the upper Warm Springs Basin. These fish for the most part move to the Pacific Ocean as yearling smolts during their second spring of life. The chinook that used the mainstem Deschutes River, lower Squaw Creek, and the Crooked River were more likely “ocean-type” chinook that emigrate as age-0 smolts their first spring or summer. This life history is similar to that of the wild summer/fall chinook that currently spawn in the mainstem lower Deschutes River below the Project.

When the Round Butte Hatchery program first started in 1968, the stock used was spring chinook that had been destined for the Metolius River. However, in the mid-1970s, the numbers of

spring chinook entering the Pelton Fish Trap that could be used for brood stock were very low. To allow the spring chinook hatchery program to continue, permission was granted from the CTWS BNR to capture brood stock from the fish ladder trap at Sherars Falls. From 60 to 194 adult spring chinook were captured annually from 1977 through 1980 and taken to Round Butte Hatchery to maintain the program. Additional brood stock was also secured one year from Warm Springs National Fish Hatchery when extra eggs were needed for the BPA funded Hood River program. Thus, the direct legacy of Metolius-stock spring chinook could not be maintained in the Deschutes River system.

Warm Springs National Fish Hatchery brood stock guidelines call for the inclusion of at least 10 percent of the brood stock annually from wild fish. Because there is no component of wild spring chinook moving up the Deschutes River into the Pelton Fish Trap, there is no way to incorporate native wild fish into the Round Butte Hatchery Program.

b. Preferred Chinook Salmon Stocks for Reintroduction Upstream of the Project

(1) Spring Chinook Salmon

There are three stocks of spring chinook salmon currently available for reintroduction into the cooler waters of the system: wild Warm Springs River stock, hatchery Warm Springs River stock, and Round Butte Hatchery stock. Because this effort is aimed at developing wild, naturally reproducing chinook in the Metolius River, it is advisable to use the stock that is likely the most adapted to the wild. Therefore, the order of preference of stocks for use in reintroduction of spring chinook is as follows:

1. Warm Springs Wild Spring chinook – if available.
2. Warm Springs Hatchery Spring chinook – if available.
3. Round Butte Hatchery Spring chinook – if the other two stocks are not available.

(2) Fall Chinook Salmon

With the exception of a few years in the mid-1970s, summer/fall chinook salmon have never been reared in Deschutes River Basin hatcheries. The summer/fall run enters the lower Deschutes River from June through December, with most fish spawning from mid-October through November. The early portion of this run moves up over Sherars Falls early in the summer, and some fish enter the Pelton Fish Trap during June and July. These fish may be related to summer/fall chinook that historically spawned in mainstem reaches at and upstream of the Project. If it is decided to reintroduce summer/fall chinook above the Project, these early-run

wild chinook entering the Pelton Fish Trap during June and July should be the priority for brood stock.

2. Steelhead

a. Background

Some Deschutes-stock steelhead were collected from Squaw Creek and reared at Wizard Falls Hatchery on the Metolius River in the early 1960s (King 1966). The present hatchery program began in 1967 with the termination of passage at Pelton Dam. Steelhead were reared at State facilities until completion of facilities at Round Butte Hatchery, and then all production shifted to the new facility. Brood was initially taken from wild Deschutes steelhead entering the Pelton Fish Trap. With increasing numbers of out-of-basin strays, including unmarked fish, presently only returning Round Butte Hatchery steelhead are being used for brood stock. Wild steelhead in the lower Deschutes River have been federally listed as a Threatened Species since the mid-1990s, although recent runs have been substantial.

b. Preferred Steelhead Stock for Reintroduction Upstream of the Project

If it is possible to distinguish wild Deschutes steelhead from stray unmarked steelhead in the lower Deschutes, and it is not precluded by the outcome of ESA consultation with NOAA Fisheries, it is preferable to take eggs from wild steelhead to establish upstream runs of wild steelhead. Increased wild adaptation is likely represented in the wild stock, and they would be the best stock for reintroduction. It may be possible to capture enough wild steelhead from the trap in the Sherars Falls Fish Ladder for this purpose. However, there are potential challenges to overcome if these fish are to be used as stock for reintroduction: it is not currently feasible to eliminate the uncertainty regarding identity (origin), and large numbers of stray hatchery fish from other basins have spawned in the lower Deschutes River during the past decade. If wild Deschutes steelhead are not available, Round Butte Hatchery steelhead would be the next logical choice.

Therefore, the order of preference of stocks for use in reintroduction of steelhead is as follows:

1. Wild steelhead captured from the Lower Deschutes – if available.
2. Round Butte Hatchery stock steelhead captured in Pelton Fish Trap.

3. Sockeye Salmon

a. Background

Anadromous sockeye salmon historically ascended the Deschutes and Metolius rivers, and then migrated up Lake Creek and through Suttle Lake to spawn in Link Creek (Nehlsen 1995). With the construction of small dams on Lake Creek early in the century, the anadromous portion of this run was lost. However, resident *O. nerka* (kokanee) still populated Suttle Lake. From 1948 through 1961, sockeye were reared at the Oregon Fish Commission Metolius Hatchery on Spring Creek in the upper Metolius Basin. In 1947, the sockeye released into the Metolius River Basin originated from Bonneville Hatchery, and the 1949 brood originated from Winthrop (Washington) Hatchery; all the other releases were of Levenworth Hatchery origin (Wallis 1960). The last significant return of these fish was in 1955 (Nehlsen 1995).

With the construction of Round Butte Dam and creation of Lake Billy Chinook in 1964, kokanee, apparently from Suttle Lake, naturally seeded this large reservoir (Ratliff and Schulz 1999a). In some years large numbers of yearling kokanee leave the reservoir during early spring (Ratliff and Schulz 1999b). A few sockeye adults ascend the Deschutes River and enter the Pelton Fish Trap each year. Using otolith microchemistry it has been shown that a portion of these were the progeny of kokanee, based on the fact that maternal strontium signature was not found in their otolith (Zimmerman and Ratliff 1999).

b. Preferred Sockeye Stock for Enhancement Upstream of the Project

The Technical Subcommittee has determined that it would be preferable to attempt to build a sockeye run from the native wild kokanee population that has colonized Lake Billy Chinook. Some fish do emigrate and return as adult sockeye. However, if the Fish Committee determines that hatchery supplementation is necessary in order to reestablish an anadromous population of sockeye above Round Butte Dam, the Licensees will provide funding for the necessary changes in equipment to convert an agreed-upon amount of the existing capacity at Round Butte Hatchery to the production of sockeye.

4. Pacific Lamprey

a. Background

Pacific lamprey currently ascend the Deschutes River, and are known to spawn in Shitike Creek and the Warm Springs River (Graham and Brun 2003). Some Pacific lamprey historically moved upstream above the Pelton Round Butte Project, but the number is unknown. No lamprey have been captured in the Pelton Fish Trap or observed below the Reregulating Dam since the early 1970s.

b. Preferred Pacific Lamprey Stock for Enhancement Upstream of the Project

It is anticipated that the native Deschutes population of Pacific lamprey will be enhanced, and potentially reintroduced upstream of the Project, as part of the fish passage program. However, at this time there are many remaining uncertainties surrounding status and potential passage of this species. Therefore, the first step toward determining potential Pacific lamprey stock for enhancement/reintroduction above the Project will be to build the knowledge base regarding Pacific lamprey in the Deschutes River Basin, through the approach described in the following section.

E. Pacific Lamprey Passage Evaluation and Mitigation

Pacific lamprey are a culturally significant resource for the Tribes and as such, a Pacific lamprey passage component of this Fish Passage Plan has been developed to (1) increase the knowledge base for Deschutes lamprey; (2) study and inventory potential habitat for Pacific lamprey both upstream and downstream of the Project; (3) develop and implement a reintroduction and passage program if results of studies indicated passage of Pacific lamprey could be successful; and (4) trigger alternative mitigation if studies indicated that Pacific lamprey passage would not be successful.

The Licensees shall, within one year of license issuance, file with FERC, after consultation with the Fish Committee and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, a Pacific lamprey passage evaluation and mitigation plan as described below. Upon FERC approval, the Licensees shall implement the plan. The plan shall provide for the following mitigation program for Pacific lamprey:

1. *Assessment of Lamprey Habitat*. The Licensees, in consultation with the Fish Committee, shall either fund and implement an expansion of ongoing Pacific lamprey studies in the Deschutes Basin, or fund and implement a 3-year additional study to (a) further define Pacific lamprey spawning and juvenile rearing habitat in the Deschutes River Basin; and (b) survey stream and reservoirs upstream and downstream of the Project to quantify habitats suitable for production of Pacific lamprey.

2. *Assessment of Lamprey Passage*. Within one year after the completion of the Assessment of Lamprey Habitat, if sufficient habitats are found above the Project, the Licensees shall implement a 3-year Pacific lamprey passage feasibility study. The purpose of this study is to assess the potential for juvenile and adult Pacific lamprey passage through the Project with existing fish passage facilities. The determination to perform an Assessment of Lamprey Passage and the development of the assessment study shall be done in consultation with the Fish Committee.

3. *Experimental Reintroduction of Lamprey*. Within one year after the completion of the Assessment of Lamprey Passage, if passage is determined by the Fish Committee to be feasible with existing facilities, the Licensees shall develop and implement a plan for the experimental reintroduction of Pacific lamprey into identified habitats upstream of the Project. This plan shall be developed to evolve into a permanent plan to maintain populations of Pacific lamprey above the Project. The determination of whether Pacific lamprey passage is feasible and the development and implementation of this plan shall be done in consultation with the Fish Committee. No new construction or retrofit of existing upstream or downstream passage facilities will be required for the experimental Pacific lamprey reintroduction.

4. *Alternative Lamprey Mitigation*. If Pacific lamprey passage is determined by the Fish Committee to be infeasible with existing facilities, the Licensees shall develop and implement an alternative Pacific lamprey mitigation and enhancement plan. This purpose of this plan shall be to enhance Pacific lamprey populations in the Deschutes River system downstream of the Project. The determination that Pacific lamprey passage is infeasible and the development and implementation of this alternative enhancement plan shall be done in consultation with the Fish Committee.

5. *Reinitiation of Passage Efforts.* If alternative Pacific lamprey mitigation is implemented, attempts to pass Pacific lamprey may be reinitiated if substantial new information demonstrates that passage is feasible. The determination whether to reinitiate passage efforts shall be made in consultation with the Fish Committee. As with the experimental reintroduction, any renewed Pacific lamprey passage efforts will not require new construction or retrofit of existing upstream or downstream passage facilities.

F. Fish Health Management

Fish disease questions are complex in the Project area. The potential to spread fish disease agents to important native resident fish resources upstream of the Project was identified as a critical uncertainty early in the discussion of the feasibility of anadromous fish reintroduction. In addition to this concern, other important questions addressed by the Pelton Round Butte Fish Disease Risk Analysis have included whether achieving sustainable natural production above the Project may be constrained by infectious disease and what the potential infectious disease impacts to the lower river and the Round Butte Hatchery program might be from the anadromous fish reintroduction effort. The goal of the fish disease risk analysis study program was to reduce these uncertainties in a systematic manner while minimizing the risk that serious disease agents might be inadvertently introduced, by development of a fish health management program. The fish disease risk analysis was guided by a Fish Disease Risk Matrix developed in 1997 as a

collaborative effort by ODFW and PGE biologists for framing disease agent studies (Engelking 1998). This matrix defined areas where key information was lacking and served to guide decision making for the reintroduction of anadromous fish above the Project relative to disease risk.

The fish disease agents that emerged as the most consequential and having the most significant potential to negatively impact fish stocks are the Type 2 strain of Infectious Hematopoietic Necrosis ("IHN") virus and *Myxobolus cerebralis* (the causative agent of whirling disease). In addition, bacterial kidney disease, furunculosis and Erythrocytic Inclusion Body Syndrome ("EIBS") virus represent diseases that could have serious impacts on certain groups of resident and anadromous fish stocks.

The initial purpose of the fish health management program is to minimize the risk that certain significant and virulent fish disease agents might become established upstream of the Project before the success of reintroducing anadromous runs has been determined and a final decision to pass returning adult fish above Round Butte Dam has been made. These risks will be minimized through the disease screening of brood stock and through limiting upstream releases to progeny (eyed eggs / fry / smolts) of these fish until the downstream passage system has achieved the necessary measures of success to warrant upstream passage of returning adults.

The fish health management program as it will be carried out through the remainder of the fish passage program is described in the draft Fish Health Management Plan (Appendix II), developed in conjunction with the ODFW Fish Health Section and Oregon State University ("OSU") microbiologists with expertise in fish disease agents.

As described in Appendix II, the fish health management program will be responsible for supporting fish health needs during implementation of the Fish Passage Plan. This support will include identifying where fish disease is impacting anadromous and resident adult and juvenile salmonids. It will be especially important for fish health professionals to help researchers determine where poor fish health has predisposed smolts to predation or led to injury or mortality in fish facilities. It is anticipated that the fish health management program will have the following responsibilities:

- Characterizing the health status of fish:
    - Fish health records
    - Monitoring disease and infection

- Identifying and managing risks to fish health:
    - Water quality

- Factors that predispose fish to disease
- Vaccination
- Broodstock health management

- Reducing exposure to, or spread of, disease causing agents:
  - Outbreak investigation and management
  - Management of dead fish
  - Bio-security
  - Release or escape of fish from a culture facility
  - Movement of fish

- Use of drugs and chemicals in fish health management
  - Diagnostic support
  - Drug, chemical and biological use for disease treatment and prevention
  - Use of drugs and chemicals in compliance with FDA Regulations
  - Compliance with ODEQ regulations on the release of chemicals/drugs into waters of the State.

The Licensees shall continue the fish health management program throughout the Interim Passage Phase and the first five years of the Final Passage Phase (or for the first 15 years of the Interim Passage Phase if transition to the Final Passage Phase does not occur). The Licensees shall file the plan with the Commission within 18 months of license issuance. Upon Commission approval, the Licensees shall implement the plan.

G. Long-Term Monitoring

1. Components of Long-Term Monitoring

The success of fish passage at the Project, and the corresponding status of related aspects of the ecological system, will be tracked on a long-term basis (through the term of the New License term) as part of a long-term monitoring program. This program will include monitoring of fish passage and ecosystem integrity. This information will be used by the Fish Committee, agency resource managers, and decision makers to determine whether modifications in management approach may become necessary or desirable to meet established goals and objectives and to ensure compliance with license conditions related to the fish passage program.

The long-term monitoring program will take effect when the measures of success for permanent passage facilities have been achieved, as determined through the Testing and Verification program described in section IV.B.3.e.(9) of this Fish Passage Plan. The long-term monitoring

program is envisioned as a follow-up to Testing and Verification program, and will include many of the same types of studies, but at a lesser intensity.

Within one year after activating the permanent downstream collection facilities at Round Butte Dam, the Licensees shall file with FERC, after consultation with the Fish Committee, and with the approval of the appropriate Fish Agencies pursuant to their respective statutory authorities, a plan for a long-term program to monitor downstream fish passage performance, as described in Appendix IV to this Fish Passage Plan. The plan shall provide that the Licensees shall begin the long-term monitoring of the downstream passage facilities as soon as practicable after the Testing and Verification studies have demonstrated that the permanent downstream collection facilities are meeting the survival criteria and goals set forth in section IV.C.1 of this Fish Passage Plan. Upon FERC approval, the Licensees shall implement the plan.

Water quality monitoring throughout the term of the New License will be conducted under the terms of the September 2002 WQMMP (and future approved amendments thereof), as described in subsection 4, below. Data from this monitoring program will be used to confirm the effects of SWW on water quality in the Project reservoirs and in the lower Deschutes River. This SWW-related water quality information will be used for evaluation and decision making in conjunction with the fish passage Testing/Verification and long-term monitoring programs.

2. Fish Passage

Long-term evaluation of fish passage success involves monitoring of a variety of parameters falling within three main categories: biological, habitat capacity, and passage efficacy. These categories, their components and subcomponents, and their relation to specific measurables are described in Appendix IV. As described in Appendix IV, monitoring the *biological* measures of success will involve monitoring of parameters related to reservoir passage and tributary spawning, smolt production, escapement, harvest, competition, and disease. Monitoring components related to *habitat capacity* include habitat availability, instream habitat, bank stability and riparian vegetation. Finally, monitoring of *passage efficacy* will be accomplished by monitoring parameters related to migration delays, smolt injury/descaling, smolt mortality, and facility efficiency.

3. Ecosystem Integrity

Appendix IV also includes a description of the monitoring components and specific measurables that will be used to define, track, and evaluate ecosystem integrity within the Project area as the fish passage program progresses. Briefly, *connectivity* will be monitored by analyzing the number of links between distinct habitat areas (in terms of native species and life-history types). *Biodiversity* will be monitored by evaluating the number of native fish species per trophic level

and the number of functional feeding groups. The third component of ecosystem integrity, *natural production*, will be monitored by determining the number of life histories per species; the population sizes of wild spawners, juveniles, and smolts for each native fish species; and the number of recruits per spawner for each native salmonid species over time.

4. Lower Deschutes River Water Quality

The temperature of the lower Deschutes River is critical to its function as a salmonid rearing area. To protect fisheries and ecological values in Oregon, the Oregon Environmental Quality Commission and the CTWS WCB have established water temperature and other water quality standards consistent with the federal Clean Water Act. Toward this end, the ODEQ and WCB § 401 certificates prescribe measures at the Project to manage and monitor water quality parameters in Project-affected waters, including the requirement to implement SWW in Lake Billy Chinook to help the Project comply with temperature standards for the lower Deschutes River.

To help ensure compliance with the provisions of the § 401 certificates, ODEQ and the WCB required development of the WQMMP (Tribes and PGE 2002), which encompasses measures to monitor water temperature and other water quality parameters (including dissolved oxygen and pH), on a long-term basis. Among the objectives of the WQMMP is to continue to collect water quality data at sites that have been used to collect baseline data, so that data collected after implementation of SWW and other water quality management measures can be compared with baseline data to identify trends associated with modified Project operations. This monitoring approach will be used to help evaluate the success of SWW in achieving the predicted compliance with water quality standards. If post-construction monitoring indicates compliance is not being achieved, then DEQ or the CTWS WCB may require the Licensees to modify the blend of surface/deep water being discharged from the SWW facility, within a specified range of blends (Tribes and PGE 2002). The Licensees shall consult with the Fish Committee regarding the potential effects of any such request on all water quality and fish passage parameters (Tribes and PGE 2002).

H. Relationship between Round Butte Hatchery and the Passage Program

Round Butte Hatchery is an integral part of the Fish Passage Plan. During the Experimental Passage Phase, adults were held, spawned, and sampled for disease at the hatchery. Eyed spring chinook eggs raised at the hatchery were moved to streamside incubation troughs in the Metolius River basin. During the Interim Passage Phase, eyed eggs and fry will be used to reintroduce salmon and steelhead upstream of the Project, and parr/smolts raised at the hatchery will be used in the Testing and Verification program to evaluate temporary Round Butte downstream fish passage facilities. In addition to activities directly integral to the fish passage program, the

current spring chinook and steelhead smolt program at Round Butte Hatchery will continue through the term of the New License. Agreements and responsibilities for hatchery operations related to the fish passage program are described below.

The Licensees will fund the operation of Round Butte Hatchery, at no more than current production levels, of spring chinook and summer steelhead for the life of the New License. However, ODFW and the CTWS BNR may reduce hatchery production levels if necessary to meet fishery management objectives, including, but not limited to, allowing for natural selection and adaptation of naturally spawning salmonids. In addition, as discussed above in section IV.D.3.b, if the Fish Committee determines that hatchery supplementation is necessary in order to reestablish an anadromous population of sockeye above Round Butte Dam, the Licensees will provide funding for the necessary changes in equipment to convert an agreed-upon amount of the existing capacity at Round Butte Hatchery to the production of sockeye. During the term of the New License, the hatchery will function both to support the goals of the Fish Passage Plan and to support the goals of self-sustaining and harvestable fisheries in the lower Deschutes River. Any decisions to reduce production will consider both functions of the hatchery.

Round Butte Hatchery will be operated by ODFW personnel according to the terms of a Hatchery Agreement among ODFW and the Licensees. The Hatchery Agreement will require ODFW to submit an annual operating plan (AOP) for Round Butte Hatchery. The (AOP) will be:

- developed in consultation with the Fish Committee and will be consistent with the annual work plan developed under the Fish Passage Plan.
- subject to approval by the Licensees.
- in accord with then-in-existence ODFW and Tribal fish management policies and directives and consistent with any Hatchery Genetics Management Plan or other directive developed between ODFW and NOAA Fisheries pursuant to the Endangered Species Act.
- consistent with the priority objective of restoring and recovering wild stocks in the basin.

Every five years after issuance of the New License, the Licensees, in cooperation with ODFW and CTWS BNR, shall conduct a periodic review, to be funded by the Licensees, of the hatchery program to determine whether it is meeting its goals. The review shall consider federal, ODFW and CTWS BNR fish management policies and plans, any Hatchery Genetics Management Plan or other directive developed between ODFW and NOAA Fisheries pursuant to the Endangered Species Act, relevant best practices, and existing information regarding recent scientific

advances, and shall include recommendations for ongoing management of the hatchery program for the next five years. The Licensees shall make the draft hatchery review available to the Fish Committee for review and comment.

The Licensees also shall make the draft hatchery review available for public review and comment through their annual workshop or other appropriate forum. The Licensees shall provide notice of the annual workshop to all Parties to the Settlement Agreement. Taking into account Fish Committee and public comment, the Licensees shall finalize the review document in coordination with ODFW and the CTWS BNR.

If the Licensees, ODFW, and CTWS BNR determine in the final review that the hatchery program is not meeting either or both of its goals — supporting the goals of the Fish Passage Plan and supporting the goals of self-sustaining and harvestable fisheries in the lower Deschutes River — ODFW shall consult with the Licensees and CTWS BNR regarding changes that should be made to the AOP and will negotiate with the Licensees to achieve changes to the AOP pursuant to the hatchery operating agreement. The AOP shall identify those review recommendations that have not been incorporated into the plan with a brief statement explaining why the changes were not made.

V. PLAN IMPLEMENTATION AND DECISION MAKING

A. Subcommittee Structure and Responsibilities for Fish Passage Plan Implementation

This section is intended to capture all of the elements of decision making within the ongoing phases of implementation of the Fish Passage Plan. Ongoing implementation of this Plan during the term of the New License will be carried out under the guidance/direction of the Fish Committee. Membership of this committee will consist of representatives from the following entities:

- U.S. Fish and Wildlife Service
- NOAA Fisheries
- Confederated Tribes of the Warms Springs Reservation of Oregon, Branch of Natural Resources
- U.S. Bureau of Indian Affairs
- U.S. Forest Service
- U.S. Bureau of Land Management
- Oregon Department of Fish and Wildlife
- Oregon Department of Environmental Quality

- Non-governmental Organizations (NGOs) [12]
- Licensees

Problem identification and analysis will continue to be addressed using structured decision making and adaptive management guidance. In its continuing role in overseeing the implementation of this Fish Passage Plan, the Fish Committee will be responsible for monitoring progress against the activities identified in this plan, reviewing annual work plans, providing expert advice regarding work plan implementation, and evaluating the results of ongoing fish passage efforts. A key role of the Fish Committee will be determining progress towards achieving specific measures of success identified in this Fish Passage Plan.

1. Licensees' Responsibilities

The Fish Passage Plan will be implemented by the Licensees in consultation with the Fish Committee. In the implementation of the Fish Passage Plan, the Licensees are responsible for aspects of fish passage that are directly under their control. In addition, the Licensees will cooperate with other entities to reduce mortality factors that are not within the Licensees' direct control.

The Licensees are also responsible for providing administrative and logistical support for the Fish Committee.

2. Responsibility of Other Parties

The non-Licensee members of the Fish Committee will have broad responsibilities for overseeing the efforts by the Licensees to implement this Fish Passage Plan. Specific involvement by the Fish Committee is described in this Fish Passage Plan and may include:

- Review and approval of facility designs and annual work plans
- Review and approval of Testing and Verification study designs and protocols
- Review of Testing and Verification results against performance standards and other measures of success established in this Fish Passage Plan
- Making final determinations of whether:
    - Testing and Verification results are sufficient to conclude that the applicable performance standards and other measures of success have been met
    - Additional testing and evaluation is required
    - Applicable performance standards and other measures of success cannot be met

[12] The NGO representative will represent the following organizations that are Parties to the Settlement Agreement: Trout Unlimited, American Rivers, Oregon Trout, and the Native Fish Society.

- Modifications should be made to the Testing and Verification protocols
- Modifications to this Fish Passage Plan are appropriate

Regarding the Testing and Verification program, the non-Licensee entities represented on the Fish Committee are responsible for supporting the actions identified as needed based on the Testing and Verification study results or other applicable information. Such actions could include supporting changes in fishing regulations to reduce smolt losses, and reviewing actions affecting ESA-listed species such as bull trout. Regarding adult salmon returns, some of the factors that affect adult returns are outside of the Project boundary and beyond the Licensees' control. The CTWS BNR and the NGOs and agencies represented on the Fish Committee are responsible for addressing factors within their responsibility that affect adult returns.

Non-Licensee members of the Fish Committee will also continue to provide communication links with their respective management-level personnel regarding the progress of the fish passage program. Routine (day-to-day) project management decisions regarding disposition of the fish used in the passage program will be handled by the CTWS BNR and ODFW, with appropriate involvement of NOAA Fisheries and the USFWS for ESA species.

B. Decision Making

Members of the Fish Committee will make best efforts to reach decisions by consensus, which for purposes of this Fish Passage Plan shall mean that any decision reached is acceptable to all representatives of the entities participating in the Fish Committee. It is assumed that members of the Fish Committee have the requisite authority to make the decisions assigned to the Fish Committee, will keep their management informed of the ongoing fish passage efforts, and will use necessary expertise within their respective organizations to support their participation in the Fish Committee. Decisions of the Fish Committee shall not usurp the statutory authority of the individual entities represented on the Fish Committee or of agencies specifically identified in the Settlement Agreement as having approval authority regarding specific measures required by this plan.

Major decision points have been identified, including decisions on design, determining performance during Testing and Verification (e.g., need for more evaluation, vs. moving to next phase of permanent screen design/construction; decisions on testing of alternative routes from Lake Billy Chinook to the lower Deschutes River and what specific route and related actions to take), and decisions on volitional upstream passage evaluation/implementation.

The basic philosophy of this plan is that activity proceeds on an "if/then" basis; that is, if the Fish Committee's review of Testing and Verification data confirms that license-mandated criteria and standards are being achieved, then minor modifications to steps and schedules can be made and

documented. However, given the possibility of reaching an "if not/then" situation of significance (e.g., a need to continue the Testing and Verification activities longer than currently scheduled), each representative on the Fish Committee would undertake the level of review/approval they deem necessary within their own organization for the specific decision at issue.

Decisions made by the Fish Committee regarding the ongoing implementation of the activities included in this Fish Passage Plan will be summarized in an annual report prepared by the Licensees and submitted to the Fish Committee on a schedule established either by the New License or the Fish Committee.

C. Consultation

The Fish Passage Plan will be implemented on an ongoing basis in consultation with the Fish Committee. Opportunities for notice and comment periods in support of Fish Committee decision making will occur through the normal process of setting meeting agendas and distributing information for review prior to meetings of the Fish Committee. Some decisions may require more formal consultation with specific members of the Fish Committee (e.g., review and approval of facility design drawings by the USFWS and NOAA Fisheries, and determining compliance with the Fish Health Management Plan by ODFW and the CTWS BNR). Specific consultation requirements are described in this Fish Passage Plan. For cases in which consultation or review/approval is not specifically required of a particular agency or organization, that entity may opt to not participate in the consultation and decision making. If an entity does not respond to written notice of opportunity for consultation within 30 days of the notice, or to follow-up request for consultation after an additional period of 30 days, it may be assumed that the entity has chosen to opt out of the consultation and decision making.

D. Dispute Resolution

Decision making and consultation in the context of this Fish Passage Plan involves specific review and approval processes, each with several potential points at which resolution of disagreements — through continued consultation and/or use of formal dispute resolution as described above — may become necessary. Except to the extent that FERC or another agency with jurisdiction of a particular issue has a procedure that precludes implementation of dispute resolution, or an agreement related to this plan (e.g., the Round Butte Hatchery Agreement) provides for different dispute resolution, all disputes regarding the implementation of the requirements of this plan shall, at the request of any member of the Fish Committee, be subject to dispute resolution. Specific dispute resolution procedures are contained in the Settlement Agreement. The members of the Fish Committee agree to devote such time, resources, and attention to dispute resolution as are needed and as can be reasonably provided to attempt to resolve the dispute at the earliest time possible; and each member shall cooperate in good faith to

promptly schedule, attend, and participate in the dispute resolution. Each member shall implement promptly all final agreements reached, consistent with its applicable statutory and regulatory responsibilities. Nothing herein is intended or shall be construed to affect or limit the authority of FERC, the governmental members of the Fish Committee, or other agency with jurisdiction over the Project to resolve a dispute brought before it in accord with its own procedure and applicable law.

E. Funding and Administrative Support

The passage program will be funded by the Licensees on an annual budget cycle. Budgets including facilities construction, maintenance, operation, and passage evaluation will be developed approximately 6 months before they take effect (by June for the following year).

To the extent necessary, the Licensees will provide the Fish Committee with administrative assistance.

F. Annual Work Plans and Reports

The Licensees shall utilize annual work plans to document actions to be implemented, develop monitoring and evaluation studies, and propose management, monitoring and evaluation strategies consistent with the Fish Passage Plan. The annual work plans shall include separate study plans for each Testing and Verification study being conducted. The Licensees shall issue a draft annual work plan to the Fish Committee for review by no later than January 1, and based on consultation with the Fish Committee shall issue to the Fish Committee a final annual work plan by April 1.

The Licensees shall also file an annual report with FERC before June 1 of each year, documenting the activities of the previous year. The annual report will follow the format of the previously approved annual work plan. The annual report will include, but not be limited to:

- Numbers of fish by species moved upstream and downstream.
- Upstream and downstream passage survival rates.
- Estimates of fish mortality by species associated with the fish passage facilities.
- A description and evaluation of any supplementation programs.
- Any changes in the work plan from adaptive management recommendations to the fish passage program that might resolve problems that have been identified.

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APPENDIX II

DRAFT FISH HEALTH MANAGEMENT PLAN

Draft Fish Health Management Plan for the Pelton Round Butte Project

PELTON ROUND BUTTE HYDROELECTRIC PROJECT

FERC No. 2030

Prepared by

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OUTLINE OF CONTENTS

I. INTRODUCTION

Managing the health of fish in a watershed requires a program to determine health status and a system of recording mortality and disease. This allows fisheries managers to monitor trends and detect changes in disease status of fish that, in turn, may enable early intervention to minimize health impacts. A cornerstone of fish health management is the reduction or elimination of risk factors that could make fish more susceptible to disease. By identifying these risk factors, fisheries managers can take action before negative health effects occur. Factors include handling, movement, feeding, anesthesia, predator interactions, water quality management, vaccination, and broodstock management. Spread of disease-causing agents and disease impacts can be minimized within and among groups of fish by managing disease outbreaks, careful handling of dead fish, good hygiene and disinfection practices, and limiting fish movements.

Drugs and chemicals used for disease control must be properly administered and monitored to protect the public, environment and fish. This requires adequate diagnostic support, and safe storage, use and handling. To ensure that fish culture facility fisheries managers are employing good fish health practices, a written, current Fish Health Management Plan is required that outlines the actions or procedures that fisheries managers must use to meet fish health requirements. This document describes a Fish Health Management Plan for the Pelton Round Butte Hydroelectric Project.

A. Fish Health Monitoring of Fish Passage at Pelton Round Butte Hydroelectric Project

If fish passage (reintroduction) is attempted, a fish health specialist and some assistance (EBA) will be required to maintain a fish health monitoring project for adult fish passed, outmigrants, and resident fish during the interim phase.

- *Pathology*: involvement in planning, monitoring, evaluation and review.
- *Personnel*: Fish health specialist and some assistance.
- *Length of study*: During Interim Phase to assess the fish health issues, depending on how the process proceeds (adaptive management). Anticipated for five years with review at the end of this time.

These requirements are based on current knowledge developed during the experimental phase of the fish passage studies, as follows:

1. Interim Phase of Fish Passage

- Passage will require monitoring of viruses above the project.
- Passage will require monitoring of the passed fish prior to transport and post spawning.
- The risk posed by this IHN virus Type 2 strain to resident and anadromous fish will continue to be evaluated.
  - Passage may require vaccination of fish prior to transport above the projects. (If and when vaccines become available to IHN virus.)
- The risk to native stocks from *Myxobolus cerebralis* will require continued evaluation.
  - Passage will require monitoring of stocks above and below at a statistically valid level to determine the prevalence of this fish disease agent (*M. cerebralis*) within the system.
  - Losses within the system will need to be analyzed to determine causes.
- Other significant diseases that have caused losses among fish in the PRB Project areas and are of concern are furunculosis, bacterial kidney disease (BKD), and ceratomyxosis.
  - Vaccination for furunculosis is possible.
  - Passage may require antibiotic treatment to reduce losses from bacterial disease agents (BKD, furunculosis).

2. Final Phase of Fish Passage

Fish health monitoring will be required during the remainder of the licensing period (Final Phase of Fish Passage) at some level to be determined from the studies during this interim phase of fish passage.

Monitoring of fish health, selection of fish to transport, holding, treatment with antibiotics, chemicals and/or vaccines are issues that need to be addressed by a fish health specialist. The success of fish passage and natural reproduction will in part require good fish health procedures. The responsibility for this effort must come from the Licensees, as this work is beyond the scope of the routine monitoring done by the Oregon Department of Fish and Wildlife Fish Health Section. Currently, Portland General Electric is responsible for a fish health specialist, fish health services and supplies associated with the production of hatchery fish at Round Butte Hatchery. We do not anticipate a difference in commitment from the Licensees to fish health with fish passage. Additional experimental fish health work would be outside the scope of the Licensees' responsibility unless directly related to the fish passage.

3. Guidelines and Procedures for Monitoring

Fish disease control guidelines and surveillance procedures applicable to rearing, transport and release of fish are found in Oregon Revised Statutes, the Integrated Hatchery Operation Team Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries (IHOT 1995), American Fisheries Society Fish Health Blue Book (Procedures for the Detection and Identification of Certain Fish Pathogens (1994), and the Pacific Northwest Fish Health Protection Committee Model Comprehensive Fish Health Protection Program (September 1989).

II. GOALS OF A FISH HEALTH MANAGEMENT PLAN

A Fish Health Management Plan aims to:

1. prevent the introduction of exotic diseases or disease causing agents;
2. reduce the occurrence of disease in fish held in the holding facility;
3. minimize the spread of disease to stocks within and outside the facility;
4. maintain an environment that promotes the health and productivity of fish and reduces the susceptibility of fish to disease;
5. protect public health and minimize disease risks to cultured and wild fish through judicious use of drugs and chemicals; and
6. provide culturists, managers and regulators with appropriate information from which rational, scientifically based fish health management decisions can be made.

III. DEFINITIONS

The definitions provided below reflect how the following terms are used in this document.

Cultured fish: Fish that have spent part or all of their life cycle within a fish culture facility.

Disease: Problems caused by infectious agents, such as parasites or pests, and by other conditions that impair the performance of the body or one of its parts.

Disease screening: Testing for evidence of early signs of disease or factors that could predispose a fish or population to disease.

Disinfection: Actions undertaken to destroy infectious and parasitic disease-causing agents.

Drug: Any substance or mixture of substances manufactured, sold or represented for use in (a)

the diagnosis, treatment, mitigation or prevention of a disease, disorder or abnormal physical state, or its symptoms (b) restoring, correcting or modifying organic functions.

Epidemiologically-linked: Epidemiological links result when groups of animals share risk factors for the disease of concern.

Fish Culture Facility: A location or facility that alters the normal movements, feeding and ecology of fish in order to affect their productivity in terms of reproductive success, growth or marketable fish products for commercial and/or stock enhancement purposes. In addition, a fish culture facility holds fish for a period of time.

Fish Health Management Plan: A written document that outlines the actions or procedures that will be used to meet the goals and requirements of these guidelines.

Fish Health Staff: ODFW agency staff assigned the responsibility for fish health monitoring and management at a fish culture facility.

Holding Unit: The basic, physical structures containing fish. These include netpens, tanks, troughs, spawning channels, brood lakes, fish traps. fish ladders and incubation units.

Fisheries Managers: A collective term used to describe those responsible for the management, health, and welfare of fish at culture facilities and in the environment.

Outbreak (Epizootic): An unexpected occurrence of mortality or disease. This can mean (1) disease occurring outside of the typical geographic or host range, (2) a previously unrecognized problem, (3) disease occurring at a rate higher than expected.

Qualified Fish Health Professional: A term used to describe those persons with adequate post-secondary training and experience in the recognition of diseases in fish. They are qualified to diagnose and prescribe treatment of fish diseases. Fish health specialists therefore serve as qualified fish health professionals.

Treatment: Management actions, drugs, chemicals or biological agents given or applied to fish, to prevent or mitigate the impacts of disease on a fish or group of fish.

Vaccine: A preparation or adjuvanted preparation of killed microorganisms; living attenuated, fully virulent, or related nonvirulent microorganisms; or parts of micro- or macroorganisms that are administered to produce or increase immunity to a particular disease.

IV. REQUIRED ELEMENTS OF A FISH HEALTH MANAGEMENT PLAN

A. Characterizing the Health Status of Fish at a Holding Facility

1. Fish Health Records

Facilities must have an information management system that provides managers with timely information to identify and assess changes in fish health to allow them to make fish health management decisions.

For individual groups of fish in the facility, fisheries managers must:

a) keep up-to-date fish health records including:
   - disease history and management;
   - pattern of morbidity and mortality, sampling and diagnosis of disease;
   - actions taken to prevent, control, and treat disease;
   - records of movements of fish within the facility; and
   - health risk factors specific to the site and/or the affected fish group;
b) keep records, at a minimum, for the entire time that the fish are being cultured (i.e., until they have been released to the wild or harvested); and
c) be able to link fish health records to other production records (i.e., feed, environment, transfers).

2. Monitoring Disease and Infection

Fisheries managers must have a plan for routine assessment of fish to determine their disease status and an action plan to prevent the spread of disease that will minimize the impact on fish and other organisms.

Fisheries managers must:

a) regularly and systematically inspect fish and fish holding units for signs of disease;
b) increase monitoring efforts for groups of fish showing unusual mortality rates, signs of morbidity, or subjected to stressful events that could predispose them to disease;
c) routinely evaluate fish health and other production records; and
d) develop an action plan to prevent, control or treat disease.
e) Fish Health Monitoring
   (1) All stocks will be monitored regularly for the presence of fish disease agents and

causes of fish loss. In cases where disease agents can be identified before large mortalities occur, procedures to reduce or eliminate the disease agent will be put into effect.

(2) Naturally reared broodstocks and hatchery origin broodstocks will be sampled for disease agents when these fish are used as sources of eggs for reintroduction programs.

(3) When fish losses occur, the fish health specialist will be notified. An examination will be conducted as soon as possible and various techniques may be implemented to return the fish to a healthy status.

a. Modifications of transport regimes may be instituted.

b. Treatment of fish with approved chemicals or drugs

c. Where high loss occurs due to untreatable diseases, fish may be destroyed.

(4) Health examinations will be conducted on fish prior to their transfer to other watersheds and before release of the fish.

(5) Fish health results of these monitoring examinations shall be recorded on a standard fish health form and incorporated into a fish health database.

B. Identifying and Managing Risks to Fish Health

Risk factors must be identified and managed to minimize their effect on fish health and their role in predisposing fish to disease.

1. Water Quality

Maintaining good water quality is vital to good fish health. Fisheries managers must have a:

a) regular program for monitoring and recording water quality (i.e., temperature, oxygen, effluent); and

b) contingency plan to restore water quality.

2. Factors That Predispose Fish to Disease

Certain activities can have a negative impact on fish, the effectiveness of their immune system and their ability to combat infections and disease. Fisheries managers will:

a) minimize the time fish are exposed to stressful events such as anesthesia/sedation, crowding, and out-of-water events (i.e., handling, counting, grading, tagging, injecting);

b) minimize predator interactions;
c) provide fish with suitable rearing conditions and appropriate nutrition; and
d) ensure equipment and methods used to handle fish will not result in significant injury or predispose fish to disease.

3. Vaccination

Vaccination is not a substitute for other aspects of fish health management, but part of an integrated disease prevention program. Fisheries managers must use:
a) vaccination procedures that minimize injury, secondary disease or losses to fish; and
b) vaccination programs based on local disease/infection conditions and information on the safety and efficacy of vaccines.

4. Broodstock Health Management

Broodstock should be transported in a manner that recognizes and manages disease risks specific to this life stage and their progeny. Fisheries managers must:
a) use a system to identify individual or select groups of brood fish and their respective gametes from other production fish;
b) address the hygienic, nutritional and handling concerns unique to broodstock; and
c) use protocols for hygienic handling of broodstock or their gametes to prevent the transmission of disease causing agents to other fish.

C. Reducing Exposure to, or Spread of, Disease Causing Agents

Minimizing the exposure of fish to disease causing agents will reduce the spread of disease agents and disease.

1. Outbreak Investigation and Management

Detecting and managing outbreaks will help reduce the spread of disease or disease causing agents. Fisheries managers must:
a) have access to the resources and qualified personnel needed to detect and manage a disease outbreak;
b) develop a rapid response plan to reduce the spread of disease and initiate it when a disease

outbreak is detected;

c) detail all monitoring activities during and after an outbreak to establish the distribution of the disease and monitor the effectiveness of control and treatment measures;
d) keep details of investigations and verification of all outbreaks (this must be under the supervision of a qualified fish health professional); and
e) notify responsible parties, including ODFW, in the event of outbreaks in accordance with existing regulations or surveillance agreements.

2. Disease Prevention Methods

a) Various techniques will be implemented by the Department to prevent serious fish losses and improve fish survival.
   (1) Avoid disease problems by providing specific disease-agent-free water supply for fish holding units where feasible
   (2) When feasible, the use of commercial vaccines to stimulate a protective response against a specific disease agent will be used.
   (3) Injection of broodstock with antibiotics to reduce loss due to bacterial disease agents and water treatment with chemicals to reduce fungus infections will be performed as necessary.

3. Management of Dead Fish

Fisheries managers must:

a) regularly remove dead fish from holding units and dispose of the fish in a manner that will not facilitate the spread of disease; and
b) plan for the removal and disposal of increased levels/numbers of mortalities during unexpected disease outbreaks or loss of fish.
c) monitor and recover dead fish in the upper watershed where broodstock are released and juveniles develop and rear. Notify the ODFW fish health specialist when these fish are likely to be found and save samples for monitoring as requested by the fish health specialist.
d) keep records of fish losses and inform the ODFW fish health specialist.

4. Sanitation and Bio-security Procedures

Maintaining a clean, safe work environment reduces the potential for spread and exposure of fish

to infectious or parasitic disease causing agents. Fisheries managers must:

a) reduce the potential movement of infectious or parasitic agents within and between facilities by:
   - using good hygiene and sanitation protocols that manage the movement and disinfection of staff, contractors, visitors, vessels or vehicles; and
   - routinely cleaning and disinfecting equipment and holding units;
b) safely handle and dispose of disinfectants (in accordance with occupational safety waste management and pollution regulations).
c) Sanitation Procedures:
   (1) Each fish holding area will implement the following sanitation procedures.
      a. Footbaths containing disinfectant must be present at the facility's entrance and exit.
      b. Sanitize equipment and rain gear utilized in fish handling, transport and after leaving one area and before using in other units, areas, or buildings.
      c. Disinfect equipment, including vehicles used to transfer eggs or fish among facilities or areas, before using with any other fish lot or at any other location. Disinfecting and disinfected water will be disposed in areas where the treated water will not enter state waters. (see Attachment below)

5. Release or Escape of Fish

Fisheries managers must:

a) minimize the risk of escape or release of sick or infectious fish from fish culture facilities; and
b) consider disease and treatment status when planning deliberate release or relocation of fish stocks.

6. Movement of Fish

Fish Health status must be considered when evaluating the risks of moving fish stocks. Fisheries managers must:

a) ensure all equipment used to transport fish:
   - safeguards the health of the fish being moved;
   - minimizes the risk factors that may predispose the fish to disease;
   - minimizes transfer of disease causing agents; and
   - reduces the risk of accidental loss of fish and gametes during transport activities;

b) assess and mitigate the disease risks from cultured fish that are known to be, or are suspected to have, a disease or infection;
c) assess and mitigate the risks associated with intentional release of fish to the wild;
d) minimize the transfer of disease agents between stocks within and in the vicinity of the holding or trap facilities; and
e) ensure optimal water quality during transport events.

D. Use of Drugs and Chemicals in Fish Health Management

1. Diagnostic Support

The fish health specialist will ensure that:
a) reliable diagnoses are obtained; and
b) prescriptions for treatments can be obtained in an effective manner.

2. Drug, Chemical and Biological Use for Disease Treatment and Prevention

Fisheries managers must:
a) ensure staff have access to information on the drugs, chemicals and biologics that are used on site;
b) ensure safe handling and storage of drugs and chemicals;
c) keep records of the amounts of drugs, chemicals, biologics and medicated feeds purchased or moved into a fish culture facility and/or used during treatment;
d) ensure groups of fish that are treated can be identified during treatment and subsequent withdrawal times; and
e) keep records of treatment for the entire time that the fish are being cultured or until they have be released or harvested.

3. Drug and Chemical Use for Prevention and Control of Fish Diseases

a) During fish health monitoring visits or if fish losses occur, fish health specialists will recommend appropriate drug or chemical treatments and changes in fish culture practices to help maintain fish health and prevent losses.
b) Treatments will be either prophylactic, preventative measures against future loss, or therapeutic, measures to reduce loss from an ongoing disease outbreak.

c) Only chemicals that are approved or permitted by the U.S. Food and Drug Administration (FDA), U.S. Environmental Protection Agency and Oregon Department of Environmental Quality (DEQ) will be used for treatment of fish at hatcheries. These chemicals must be:
   (1) FDA labeled and approved for use on food fish.
   (2) Allowed by the FDA as an Investigational New Animal Drug.
   (3) Obtained by extra-label prescriptions from veterinarians.
   (4) Allowed by FDA as low regulatory priority.
   (5) Chemicals not permitted on food fish but approved through the U.S. Fish and Wildlife Service for fish listed under the federal Endangered Species Act.
d) All chemical use at hatcheries must follow labeled environmental precautions and meet standards specified by DEQ Waste Discharge permits.

ATTACHMENT 1:
Disinfection of Fish Transport Truck Tanks

The Department of Environmental Quality requires that water containing chlorine (sodium hypochlorite) is not released into streams or lakes of the state. The Fish Health Section reviewed our previous recommendations for disinfections procedures and provides the following revisions:

1. Use 10 ppm sodium hypochlorite for a minimum of 10 minutes.

We have reviewed information on what level of chlorine is lethal to fish disease agents and generally bacteria, viruses and parasites should be killed in less than 10 minutes when exposed to 10 ppm chlorine. **A noted exception is the spore of *Myxobolus cerebralis* the agent of whirling disease** that is found in infected fish. Researchers report chlorine levels of 5,000 ppm may be required to kill this spore and that is not practical for use in truck disinfection. Procedures for dealing with this parasite are discussed later in this memo.

Sodium hypochlorite solution is generally available at 5.25% (Chlorox) or recently is sold as a more "concentrated" form of ~6.56%.

For every 100 gallon of water in the tank use:

72 ml of 5.25% sodium hypochlorite
58 ml of 6.56% sodium hypochlorite

Make sure all surfaces in the tank are exposed to the disinfectant for 10 minutes.

2. Hoses used to unload the fish from the tank should also be disinfected at the same time as the tank itself. These hoses should be placed in the tank or in a container containing the 10 ppm sodium hypochlorite and after the 10 minutes they should also be exposed to the neutralizing solution.

3. Areas on the tank or truck that get wet from the water in which the fish are transported should be sprayed with 25 ppm iodophor.
The disinfectant should be maintained on the surface for 10 minutes and allowed dry in the sun if possible. We are not recommending that the underside of the truck or inside of the cab be treated routinely but if gross contamination of these areas occurs disinfection should be done.

4. Neutralize with sodium thiosulfate at a 25 ppm concentration for 10 minutes.
Use the form of sodium thiosulfate that dissolves quickly in water. This is available from the following sources:
- Argent

For every 100 gallons of 10 ppm sodium hypochlorite water add 9.5 g of sodium thiosulfate.

5. Discard the neutralized disinfectant solution from the tanks onto the ground or a pit where it will not drain into the stream. Rinse the tank with water from the new location where fish are to be hauled or use spring or specific disease-agent-free water if available.

6. Disinfection procedures should be conducted in the following situations:

a. Before beginning the loading of fish from a different facility, different species at the same hatchery, or if different stocks of the same species having a known occurrence of a disease agent such as bacterial kidney disease or IHN virus.
b. If adult salmon or brood fish are transported then disinfection should occur before any juvenile fish are transported.
c. Anytime a group of fish known to be infected with a serious fish disease agent or having recovered from a serious disease is transported before hauling ponds that did not experience that problem.
d. When lake or stream water has been used for adjusting water temperature.
e. Disinfection is not necessary between loads of adult fish or brood fish to one or more facility if the loading of water is used at the originating facility each time. Also, when hauling fish of the same species but of different stocks from the same facility if all lots are healthy or have the same disease agents.

7. Procedures to follow to minimize the risk of spreading *M. cerebralis*.

a. The infective stage of this parasite and infected fish are currently found in the Grande Ronde and Imnaha watersheds of Northeast Oregon and in Clear Creek of the Clackamas River watersheds. Our policy has been to not transport known infected fish from these locations to watersheds where we have not found the infection in wild fish. Since the parasite occurs in anadromous steelhead and salmon in the Snake River basin including Northeast Oregon the potential for this parasite to spread to anywhere in the Columbia River basin and coastal streams exists. The water source to be used for hauling fish should be reviewed at each facility. Update information on the occurrence of the parasite needs to be disseminated.

ATTACHMENT 2:
Regulations/Policies Directly Related to Fish Health Management

Oregon Administrative Rules

OAR635-007-0501
Definitions

As used in this Division and Division 40

(13) "Disease" means problems caused by infectious agents, such as parasites or pests, and by other conditions that impair the performance of the body or one of its parts.

(46) :Risk" means the extent to which, a management practice may reduce population productivity or cause an undesirable change in genetic characteristics of a population.

Stat. Auth: ORS Ch. 496.138, 496.162, 497.252, 498.022,506.700 and 508.704
Stats. Implemented ORS Ch. 496.138, 496.162, 497.252, 498.022, 506.700 and 508.704
Hist: FWC 25-1984, f. 6-21-84, ef. 7-1-84; FWC 6-1990, f. & cer. ef. 1-29-90; FWC 2-1992, f. 1-28-92, cer. ef. 2-1-92; FWC 37-1992, f. 5.29-92, cert. ef 6-1-92

OAR635-007-0523
Operating Principles for Natural Production Management

(2) Competition, predation, and disease: Introduction of fishes of the same or different species as those already present may seriously reduce natural production through competition for food space or through predation. Introduction of disease also may reduce natural production. The Department shall oppose any actions that allow competition, predation, or disease to prevent meeting natural production objectives of management plans.

OAR635-007-0527
Operating Principles for Wild Fish Management

(7) Competition, predation, and disease: Releases or transplants of fish of the same or different species, including hybrid fish may seriously reduce the survival of wild fish through competition for food and space or through predation. Introductions of disease may also deplete a wild population. An extreme level of mortality from these sources poses a risk to conserving and utilizing the genetic resources of wild populations. The Department shall oppose any actions that allow mortality from competition, predation or disease to cause a population to experience a decline in abundance that if continued would likely reduce the number of spawners to 300 breeding fish. In addition where a population has been depressed to level of 300 or fewer spawners, the Department shall support and advocate actions to correct the cause of such population decrease.)

OAR635-007-0527

(13) Aggregate stock fishery management: .... To bring individual populations into compliance with wild fish management, priority shall be given to correcting problems through the development, listing, selection, and implementation of corrective actions as they relate to use of hatchery fish, habitat, competition, predation, disease, and other known sources of mortality before harvest restrictions on any aggregate stock fishery shall be considered.)

OAR635-007-0555
Transport of Diseased Fish

(1) Live fish suspected by the Department to have a disease infection may not be transported from one watershed to another within this state or exported from this state without the written consent of the Department.

(2) The Department may restrict or prohibit transport of infected fish, or fish which may be infected, to or from certain watersheds or areas.

Stat. Auth: ORS Ch. 496, 497, 498, 506 and 508
Stats. Implemented ORS Ch 496, 497, 497, 506 and 508
Hist: FWC 27-1982, f. & ef. 4-30-82;FWC 25-1984, f. 6-21-84, ef. 7-1-84;
Renumbered from 635-43-505

OAR635-007-0565
Fish Disease Control Policy

It shall be the policy of the Oregon Department of Fish and Wildlife to protect the fish resources of the state by preventing the importation or introduction, to new waters or areas, those fish disease agents known to adversely affect hatchery or natural production of fish.

Stat. Auth.: ORS Ch. 496 & 506
Stats. Implemented ORS Ch. 496 & 506
Hist.: FWC 25-1984, f. 6-21-84, ef. 7-1-84

OAR635-007-0585
Import or transfer of Fish Restricted

(5) No fish which have, or are from a station or area with a recent or continuing history of Category II disease (IHNV, *Myxobolus cerebralis*) may be imported, exported, or transferred except as authorized by the Department for transfer to locations where the same disease agent already occurs.

Stat. Auth: ORS Ch. 496.138, 496.146,506.119
Stats. Implemented ORS 506.124
Hist: FWC 25-1984, f. 6-21-84, ef. 7-1-84;FWC 3-1991, f. & cert. ef. 1-18-91;
FWC 66-1996, f. 11-27-96, cer. ef. 12-1-96

OAR635-007-0600
Permit Required to Transport, Hold or Release Fish

(5) The Department may refuse to issue a Fish Transport Permit on the following grounds:

(b) the Department finds the holding or release of the fish specified, either singly or in combination with the holding or release of fish under other permits, would tend to adversely affect existing fish populations in or below the holding or release site;

Stat. Auth.: ORS Ch. 496 & 506
Stat. Auth: ORS Ch. 496, 497, 498, 506 and 508
Stats. Implemented ORS Ch. 496, 497, 497, 506 and 508
Hist: FWC 27-1982, f. & ef. 4-30-82;FWC 25-1984, f. 6-21-84, ef. 7-1-84;
Renumbered from 635-43-300; FWC 3-1991, f. & cert. ef. 1-18-91
OAR635-007-0501

APPENDIX III

TESTING AND VERIFICATION PROGRAM STUDY PLAN OUTLINES (BY CATEGORY OF STUDY)

APPENDIX III

PELTON ROUND BUTTE FISH PASSAGE PROGRAM
TESTING AND VERIFICATION PROGRAM STUDIES
FOR INITIATION OF FISH PASSAGE
STUDY PLAN OUTLINES BY CATEGORY OF STUDY

The following study plan outlines will provide guidance in proceeding with the initiation and early evaluation of the fish passage effort at the Pelton Round Butte Project. Each year, these outlines will guide the writing of detailed study plans with the oversight of the Fisheries Committee.

Facility Evaluations

1. Objectives

- Evaluate Operations/Mechanics (do facilities function as designed?)
- Evaluate Physical/ Hydraulic Response (flows, velocities, etc.)
- Evaluate Fish Response
- Evaluate Fish Health/Safety

2. Tasks

- Operations/mechanics — Conduct set of operations checks and calibration
- Physical/hydraulic response — Measure physical responses
- Fish response — Evaluate effectiveness with experimental marked/tagged fish
- Fish health/safety — Evaluate health of fish after using facility

3. Evaluation/Decision Criteria

- Each of the objectives would be evaluated to eventually be able to reach facility target passage efficiencies. See juvenile and adult study outlines for more detail.

Fish Health

The fish health management program as it will be carried out through the remainder of the fish passage program is described in the draft Fish Health Management Plan (Appendix II to this Fish Passage Plan), developed in conjunction with the Oregon Department of Fish and Wildlife Fish Health Section and Oregon State University microbiologists with expertise in fish disease agents.

Physical Reservoir Changes with Selective Water Withdrawal

1. Objectives

- Measure changes in surface currents in Lake Billy Chinook.

2. Tasks

- Use drogues to follow surface currents in the forebay and all three arms of Lake Billy Chinook.

- Use an Acoustic Doppler Current Profiler to measure the depth, velocity, and direction of the current patterns in the three arms of Lake Billy Chinook and in the Round Butte Dam forebay.

3. Evaluation/Decision Criteria

- Does surface withdrawal result in surface current patterns predicted by the 3-dimensional hydrodynamic model?

<u>Water Quality Changes, Lake Billy Chinook and Downstream with Selective Water Withdrawal</u>

Evaluation of water quality changes is detailed in the Water Quality Monitoring and Management Plans required by the § 401 Water Quality Certificates issued by the State of Oregon and the Confederated Tribes of the Warm Springs Reservation of Oregon.

<u>Juvenile Salmonid Studies</u> –- Reintroduction of Anadromous Stocks Upstream of the Project

1. Objectives

- Reintroduce spring chinook, summer/fall chinook, summer steelhead, anadromous sockeye, and Pacific lamprey upstream of the Pelton Round Butte Project.

2. Tasks

- Develop a reintroduction plan with a chapter detailing and providing rationale for stocks to be used, and chapters for each stock/species (currently being drafted).
- Implement reintroduction plan in each of the three tributaries upstream of the Project, with initial large-scale fry liberations for summer steelhead in 2006, for spring chinook in 2007, and summer/fall chinook in 2009.

3. Evaluation/Decision Criteria

- Juvenile densities for each species will be monitored in target habitats by reach to determine if releases were successful.

<u>Juvenile Salmonid Studies</u> — Rearing, Juvenile Densities, Habitat

1. Objective

- Determine rearing densities of target anadromous salmonids in various juvenile habitats before and after reintroduction.

2. Tasks

- Determine densities of juvenile *O. mykiss* in study reaches of Squaw and McKay creeks before and after large-scale introduction.
- Determine densities and growth rates of juvenile spring chinook in the upper Metolius chinook habitat before and after large-scale reintroduction efforts.

- Determine the densities and growth rates of juvenile summer/fall chinook in rearing habitats in the lower Crooked River, the Deschutes River above Lake Billy Chinook, and lower Squaw Creek before and after large-scale releases.

3. Evaluation/Decision Criteria

- If predetermined densities of juveniles or growth rates are not achieved, evaluate reasons why. Make adjustments to program, which may include discontinuing releases into some habitats if desired densities of juveniles or growth rates cannot be established.

<u>Juvenile Salmonid Studies</u> — Juvenile Migration

1. Objectives

- Estimate the number of salmon and steelhead smolts and bull trout entering Lake Billy Chinook from each tributary.
- Determine the timing and numbers of salmon and steelhead smolts emigrating from Lake Billy Chinook.
- Determine travel times and relative survival of each species to the Dalles and Bonneville Dams.

2. Tasks

- Install and operate smolt traps on each of the three tributaries to Lake Billy Chinook.
- Determine efficiencies for each trap for each species.
- Expand trap catch by operating time and efficiency to estimate total annual production of each species in each tributary.
- Determine the timing of emigration from each tributary for each stock of fish.
- Enumerate downstream migrants from Lake Billy Chinook.
- Using passive integrated transponder (PIT) tags, tag a sample of each species for recovery/recording of individuals at the bypasses at the Dalles and Bonneville dams.

3. Evaluation/Decision Criteria

- Results of these studies will be included in the annual fish passage report, used in the evaluation of efforts to reintroduce these stocks, and used to evaluate the effectiveness of the downstream collection facility.
- If emigration from tributaries is determined to be insufficient to meet reintroduction goals, develop additional study methods (e.g., tagging further up in tributaries) to evaluate causes.

<u>Juvenile Salmonid Studies</u> — Reservoir Survival/Predation, Fishery, Disease

1. Objectives

- Determine survival of salmon and steelhead from the heads of the arms to the new Round Butte Dam collection facility.
- Study losses to predation by predatory fish.
- Determine losses to angler harvest.
- Determine disease incidence in smolts captured at the Round Butte downstream facility.

2. Tasks:

- Radio-tagging smolts at tributary traps. Track to determine migration routes, survival into forebay, and any delay in movement into the temporary smolt collection facilities. Compare movements of radio-tagged smolts to the movement of drogues during simultaneous water current studies.
- Tagging smolts at tributary traps using PIT tags. Determine survival of each group to forebay collection facility.
- Predation Study. Using methods similar to the Lake Billy Chinook bull trout feeding habits study conducted in the late 1990s (Beauchamp and Van Tassell 2001), sample bull trout, northern pikeminnow, and smallmouth bass in Lake Billy Chinook. Flush stomach contents. Use laboratory methods and bioeneregetics modeling to determine the relative impact of these three predators to migrating salmonid smolts in Lake Billy Chinook.
- Angler Survey. Conduct survey to determine the number of anadromous smolts being harvested by anglers.
- Disease Monitoring. Conduct disease monitoring to determine the impact of disease on anadromous smolts and bull trout.

3. Evaluation/Decision Criteria

- Criteria that will be used to evaluate reservoir survival for downstream-migrant smolts with the Temporary and Permanent collection facilities are described in section IV.C of the Fish Passage Plan.

<u>Juvenile Salmonid Studies –</u> Round Butte Dam Juvenile Collection, Downstream Transportation, and Release

1. Objective

- Minimize loss of smolts during capture, handling, marking, and downstream transport at the Round Butte Downstream Fish Facility

2. Tasks

1. Monitor loss and injury at each location within the temporary smolt collection, marking and transport facility.
2. Correct any problems with temporary facilities as soon as possible after they are detected.
3. Monitor loss and injury at each location within the permanent smolt collection, marking and transport facility.
4. Correct any problems with permanent facilities as soon as possible after they are detected.

3. Evaluation/Decision Criteria

- Criteria that will be used to evaluate survival associated with downstream passage of smolts through the Temporary and Permanent collection facilities are described in section IV.C of the Fish Passage Plan.

Adult Salmonid Studies — Adult Upstream Passage, including Adult Release Facility

1. Objective

- Pass selected adult salmonids upstream safely using the Pelton Fish Trap, a fish-transport truck, and the new Round Butte Dam release facility.

2. Tasks

- Develop a detailed upstream passage operation plan by 2008.
- Operate the Pelton Trap continuously and transport fish upstream daily.
- Record and report mortality of any individuals from anadromous stocks. Target stocks will be recorded separately as they will be used to evaluate passage criteria.
- Operate the Round Butte Dam Adult Release Facility.
- Radio-tag a portion of the adults released into the Adult Release Facility, and track these radio-tagged adults through Lake Billy Chinook to their respective spawning locations to evaluate any migration delay or mortality associated with the release facility.

3. Evaluation/Decision Criteria

- Criteria that will be used to evaluate survival of adults associated with upstream passage through the Pelton Fish Trap, fish-transport truck, and Round Butte Dam Adult Release Facility are described in section IV.C of the Fish Passage Plan.

Adult Salmonid Studies — Adult Migration/Survival/Spawning

1. Objective

- Determine the post-passage adult migration pattern, spawning distribution, and survival to spawning for each stock of adult salmonids passed upstream.

2. Tasks

- Radio tag a subset of each group of adults passed and release these with their cohorts into the forebay of Round Butte Dam.
- Track radio-tagged individuals to determine migration timing and distribution patterns by stock.
- Relocate radio-tagged individual on the spawning grounds. Determine survival to spawning as well as spawning location.
- Using spawning distribution information, locate stream reaches suitable for monitoring relative spawning for each stock of fish.
- Conduct annual redd counts for each stock to monitor spawning abundance.
- Monitor spawning locations for potential inter and intra specific competition for spawning habitat.

3. Evaluation/Decision Criteria

- If post-passage survival to successful spawning is abnormally low, study and/or review potential causes of pre-spawning mortality, and make changes to achieve higher spawning success.

APPENDIX IV

DESCRIPTION OF LONG-TERM MONITORING PROGRAM for PELTON ROUND BUTTE FISH PASSAGE PROGRAM

DESCRIPTION OF LONG-TERM MONITORING PROGRAM FOR PELTON ROUND BUTTE FISH PASSAGE PROGRAM

This document provides a description of a program to monitor fish passage performance and associated ecosystem integrity through the term of the New License for the Pelton Round Butte Project (Project). The primary objectives of the long-term monitoring program are as follows:

1. To collect data on established "measurables" to gauge long-term progress of the fish passage program.

2. To provide information for decision making and adaptive management to direct the fish passage program through the term of the New License.

The long-term monitoring program for fish passage will comprise two main categories: Fish Passage and Ecosystem Integrity, both designed to monitor progress and success of the fish passage program. The long-term monitoring program will take effect when the measures of success for permanent passage facilities have been achieved, as determined through the Testing and Verification program of the Fish Passage Plan. The long-term monitoring program is envisioned as a follow-up to Testing and Verification program, and will include many of the same types of studies, but at a lesser intensity.

The components of the Fish Passage and Ecosystem Integrity monitoring are described briefly in the following sections. A formal Long-Term Monitoring Plan will be developed in consultation with the Pelton Round Butte Fisheries Committee (Fish Committee).[13] This Plan will establish the agreed-upon monitoring requirements and will specify details regarding monitoring locations, frequency, and protocols. Specific reporting requirements associated with the long-term monitoring program will also be set forth in the Long-Term Monitoring Plan.

FISH PASSAGE MONITORING

The elements of long-term monitoring of the fish passage program are described below. These elements are, at least to some extent, the responsibility of the Licensees. In some cases, responsibility for funding and/or conducting the monitoring is intended to be shared among the Licensees and one or more of the resource management agencies. The final Long-Term Monitoring Plan will specify joint responsibilities, where applicable, consistent with the New License and the Pelton Round Butte Settlement Agreement.

[13] The Fish Committee will be established to provide guidance and oversight for the fish passage program, and will be composed of representatives from the following entities: U.S. Fish and Wildlife Service, NOAA Fisheries, Confederated Tribes of the Warms Springs Reservation of Oregon – Branch of Natural Resources, U.S. Bureau of Indian Affairs; USDA Forest Service; U.S. Bureau of Land Management, Oregon Department of Fish and Wildlife, Oregon Department of Environmental Quality, Non-governmental Organizations (Trout Unlimited, American Rivers, Oregon Trout, and the Native Fish Society), and Licensees.

The components of the fish passage long-term monitoring program, as described below, fall into three primary categories: Biological, Habitat Capacity, and Passage Efficacy. The Biological and Habitat Capacity components are outlined below but will be detailed in a separate Native Fish Monitoring Program.

Biological Components

Spawning

Spawning will be quantified through the following monitoring activities:

- Radiotelemetry tracking of upstream-migrating adult salmon and steelhead.
- Spawning surveys (sockeye, steelhead, and spring chinook).
- Redd counts in tributaries to Lake Billy Chinook, including the Metolius River system and Squaw Creek.

The salmon/steelhead spawning monitoring will continue on an annual basis until the ratio of recruits to spawners (R/S ratio) is $\geq$1. Thereafter, as long as the R/S ratio remains $\geq$1, the spawning monitoring will be discontinued (unless otherwise determined by the Fish Committee). In the event that the R/S ratio decreases to <1, annual spawning monitoring will be resumed until the R/S ratio is $\geq$1.

Smolt Production / Emigration

Smolt production will initially be estimated annually through monitoring of the screw traps near the mouths of the three major rivers entering Lake Billy Chinook, until downstream passage success criteria are achieved such that tributary trapping is no longer required (see section IV.C of the Fish Passage Plan). This monitoring of smolt production will be part of the Testing and Verification evaluation. Thereafter, as part of the long-term monitoring program, the Licensees will monitor smolt emigration numbers at the Round Butte permanent downstream passage facilities through the remainder of the term of the New License.

Escapement

Escapement will be monitored through annual counts of returning adult salmon and steelhead to the Pelton Fish Trap. The annual counts will continue for term of New License.

Predation

As part of the Testing and Verification studies, fish stomach content analysis will be conducted annually for the first three years after smolts are present in the reservoir, or as otherwise determined by the Fish Committee. Radiotelemetry analysis of predation impacts will be conducted on an annual basis (in conjunction with smolt migration studies) in Lake Billy

Chinook until the downstream migration goals described in the Fish Passage Plan are achieved. Thereafter, if conditions warrant a longer-term investigation of predation impacts, similar predation studies may be conducted on a periodic basis through the remainder of the term of the New License, as determined by the Fish Committee.

Harvest

Evaluation of potential impact of the sport fishery on reservoir passage for downstream-migrating smolts will also be conducted in Lake Billy Chinook as part of the Testing and Verification studies. The impact of the sport fishery on downstream-migrant salmon and steelhead smolts will be determined by conducting angler surveys the first three years after smolts are present in each reservoir. Evaluation of angling impact may continue to be conducted on a periodic basis (to be determined by the Fish Committee) at each reservoir until the respective downstream migration goals, as described in the Fish Passage Plan, are achieved. Thereafter, if conditions warrant a longer-term investigation of impacts due to the sport fishery, angler surveys may be conducted on a periodic basis through the remainder of the term of the New License, as determined by the Fish Committee.

Competition

Following reintroduction of steelhead and salmon upstream of the Project, competition among anadromous and resident fish species will be monitored in the Metolius and middle Deschutes river systems through a combination of population monitoring and redd counts. These evaluations, including the following, may be conducted periodically beyond completion of the Testing and Verification program if determined necessary by the Fish Committee:

- Resident redband trout population monitoring in Squaw and McKay creeks.
- Redband trout redd counts in Squaw Creek and the Metolius River basin.
- Determination of relative abundance of redband trout and steelhead.
- Bull trout evaluations (e.g., bull trout redd counts, angler surveys, enumeration/timing of bull trout at Project fish passage facilities).
- Sockeye salmon and bull trout spawning interactions (observations for spawning site overlap).

Disease

Monitoring for disease in fish at the Project will be conducted upon initiation of the reintroduction program for steelhead and spring chinook salmon and will continue throughout the term of the New License in accordance with the Fish Health Management Plan (see draft Fish Health Management Plan, provided as Appendix II to this Fish Passage Plan).

Sustainability of Anadromous Runs

Monitoring of the overall effectiveness of the fish passage program will be based upon determining the ratio of recruits to spawners (R/S ratio), using primary data collected for monitoring evaluations described above. The R/S ratio will be determined by comparing the number of returning and spawning adults to the number in the previous generation. This information will be used to evaluate progress toward establishment of self-sustaining anadromous runs upstream of the Project (R/S ratios >1 indicate a run is building, and an R/S ratio of 1 over an extended period of time indicates a run that is being sustained). For this purpose, the R/S ratio will be expressed as the average R/S ratio of four consecutive years (running average).

Habitat Capacity Components

Habitat Availability

The Licensees will periodically monitor the quantity of habitat available upstream of the Project throughout the term of the New License, on a 50/50 cost sharing basis with the land managing agencies. Habitat availability will be determined in terms of miles of accessible stream above the Project. Milestones for habitat availability monitoring will be (a) before upstream passage (as baseline), (b) immediately after initiation of upstream passage, and (c) whenever changes in the quantity of accessible habitat occur (e.g., in the event passage is initiated at upstream non-Project facilities), or as otherwise determined by the Fish Committee.

Habitat Effectiveness

The Licensees will also monitor habitat effectiveness and riparian conditions above the Project. Habitat effectiveness will be monitored during the term of the New License through fish habitat surveys and production capacity estimates. This information will be incorporated into a geographic information system (GIS) database and used, in consultation with the Fish Committee, as a basis for developing, prioritizing, and implementing fish habitat mitigation projects and evaluating success for passage efforts.

Riparian Condition

Together with habitat effectiveness monitoring, as described above, monitoring of riparian condition will be another tool to evaluate habitat quality upstream of the Project. Monitoring programs will be determined in consultation with the Fish Committee and will be consistent with the strategies detailed in the Terrestrial Resources Management Plan (TRMP).

Passage Efficacy Components

Adult Upstream Bypass Efficiency

The components of upstream passage efficiency for returning adult salmon and steelhead will be evaluated through the series of Testing and Verification studies listed below. Following completion of the Testing and Verification program, similar studies may be conducted periodically as determined by the Fish Committee.

- Facility-related injury, descaling, and mortality.

    - Initial fish passage facilities. Evaluation of the initial upstream passage facilities will occur until it is determined that the facilities meet the applicable upstream passage facility standard established in the Fish Passage Plan. After compliance with the upstream passage facility survival standards is verified, additional retesting will only be required if deficiencies are observed. Regular observations to check for deficiencies will be made during truck-and-haul operations; the protocol for these observations will be detailed in the final Long-Term Monitoring Plan.

    - Volitional passage facilities. Evaluation of volitional upstream passage facilities will occur until it is determined that the facilities meet the volitional upstream passage facility standards established in the Fish Passage Plan. After compliance with the upstream passage facility survival standards is verified, additional retesting will only be required if deficiencies are observed. The protocol for regular observations to check for deficiencies will be detailed in the final Long-Term Monitoring Plan.

- Adult migration and spawning success. Adult migration and spawning success will be quantified by comparing the total counts of adult fish released into the Round Butte Adult Release Facility to the numbers of adult fish reaching the spawning grounds and successfully spawning in the tributaries upstream of the Project. For this evaluation, a subset of salmon and steelhead adults released into the Adult Release Facility will be radio-tagged and followed after their release (as described above) to determine the number that reach spawning areas and spawn successfully.

Smolt Downstream Bypass Efficiency

The components of passage efficiency for downstream migrating smolts through Lake Billy Chinook and at Round Butte Dam will be evaluated through the following series of tests and studies:

- Facility-related injury, descaling, and mortality. Fish captured in the permanent downstream passage facilities at Round Butte Dam will be inspected to be certain that fish are not being injured, descaled, or killed within the facilities. If injured, descaled, or

dead fish are found (aside from those that are determined to have succumbed to disease), the screens and fish conduits will be inspected and any problems will be corrected. Once it has been verified that the permanent facilities meet the standards established in the Fish Passage Plan, additional retesting will only be required if deficiencies are observed. The protocol for regular observations to check for deficiencies will be detailed in the final Long-Term Monitoring Plan.

- Reservoir passage. Radiotelemetry and PIT-tagging studies of downstream-migrant smolts will be conducted for a period of at least four consecutive years following construction of the permanent passage facilities, and will continue until the smolt passage goals established in the Fish Passage Plan are achieved. Thereafter, radiotelemetry and PIT-tagging studies of downstream-migrant smolts may be conducted on a periodic basis if the Fish Committee determines there is a need for these studies.

- Smolt capture in the Round Butte Dam forebay. Smolt emigration numbers, based on capture at the Round Butte downstream-migrant collection facility, will be monitored through the term of the New License.

ECOSYSTEM INTEGRITY MONITORING

As discussed in the Fish Passage Plan, ecosystem integrity is identified as one of the fundamental goals of the fish passage program. A condition of ecologic integrity in the Project area involves a broader set of elements than would be encompassed by establishment of fish passage; however, progress toward ecosystem integrity is closely tied to the degree of achievement of fish passage program objectives. Specifically, the components of ecosystem integrity have been defined as connectivity, biodiversity, and natural production, each of which depends in large part on the establishment of successful fish passage. Parameters ("measurables") that will be monitored to gauge the degree of ecosystem integrity generally rely on primary data from the fish passage long-term monitoring described above. The components and corresponding measurables for long-term monitoring of ecosystem integrity, and how these relate to the fish passage long-term monitoring, are described briefly below. Monitoring for all parameters described below would be conducted on a periodic basis, as determined by the Fish Committee, through the term of the New License.

Connectivity

Connectivity will be assessed by monitoring of the following two factors:

- Habitat links. The number of links between distinct habitat areas, in terms of native species and life-history types, will be calculated. A link will be considered established when (a) a naturally recruiting population of anadromous fish is established in a particular tributary (one link for each separate life-history type); and (b) when regular interchange between the upper and lower basin is established for native resident and

freshwater-migratory species (one link for each species that can move between areas downstream and upstream of the Project).

- Nutrient contribution. Connectivity will also be evaluated in terms of the role of salmonid carcasses in nutrient dynamics within the basin. The measurable in this case will be the calculated average energy/nutrient contribution per adult (by species) in the watershed above the Project.

Biodiversity

Biodiversity will be evaluated in terms of the following:

- Number of native species per trophic level. When a naturally recruiting population has been established above the Project, the trophic levels occupied by various life-stages of that species will be determined. Using this information, the number of native species per trophic level will be calculated.

- Number of functional feeding groups upstream of the Project. Monitoring of production and fish passage will provide information needed to identify the number of functional feeding groups (e.g., filter feeders, piscivores, insectivores, planktivores) present in the upper basin for each established anadromous species.

Natural Production

Natural production of anadromous fish with access to passage above the Project will be measured in terms of the following parameters:

- Number of life-history types. The number of life-history types present upstream of the Project will be determined by species.

- Population size. The number of outmigrating smolts and successful spawners of each species will be tracked, as described above for fish passage long-term monitoring.

- Self-sustaining populations. Also as described above for fish passage long-term monitoring, the index that will be used to determine whether populations are building, being sustained at a particular population level, or declining will be the recruits per spawner ratio (i.e., R/S >1, R/S = 1, and R/S <1, respectively, for the three scenarios).

APPENDIX V

COMPONENTS OF THE FOUR PHASES OF THE FISH PASSAGE PROGRAM BY MAJOR GROUP

Appendix V. Components of the four phases of the fish passage program by major group.

BASELINE PASSAGE PHASE

Planning/Design/Approval

- Initial proposal developed
- Structured decision- making process developed and applied
- Conceptual Foundation developed
- PasRAS developed and applied
- Fish passage alternatives identified and evaluated
- HABRATE/GIS database compiled
- Fish Passage Plan developed
- Development of fish health management program initiated

Physical Measures

- Reservoir current studies conducted
- Historic fish facilities surveyed for operability/ use
- Hydrodynamic model developed and applied
- BETTER Temperature Model developed and applied
- Temperature studies conducted
- Water quality studies conducted

Biological Work

- Historic anadromous fish runs documented
- Kokanee study conducted
- Habitat surveys conducted
- Kokanee passage through the turbines studied
- Smolt passage through lakes and reservoirs studied (literature review)
- Stock selection guidelines drafted

Disease Work

- Literature reviewed
- Disease agent surveys conducted:
  - Downstream
  - Upstream
- Parasite alternate host surveys conducted
- IHN challenges conducted
- *M. cerebralis* challenges conducted
- *C. shasta* challenges conducted

Appendix V. Components of the four phases of the fish passage program by major group.

EXPERIMENTAL PASSAGE PHASE[14]
Planning/Design/Approval
• Smolt migration in Lake Billy Chinook evaluated
• Facility alternatives for selective water withdrawal and downstream fish passage facilities at Round Butte Dam designed and evaluated
• Using water quality models, potential changes to Project reservoirs and the lower Deschutes River are predicted for implementation of different alternatives for downstream fish passage and associated changes in how water is withdrawn from Lake Billy Chinook
• 401 certificates issued
• Water Quality Management and Monitoring Plan developed and approved by ODEQ and the Tribes' Water Control Board
• Conceptual designs developed for selective water withdrawal facilities
• Conceptual design developed for Adult Release Facility at Round Butte Dam forebay
• Portion of the stock selection/supplementation plan related to the Interim Passage Phase is approved by Tribes' DNR and ODFW
• Fish Health Management Plan approved
• Quarantine pond and other improvements at the Pelton Fish Trap for fish health monitoring designed
• Permanent holding pond for sockeye salmon adults at Round Butte Hatchery designed
• Long-term monitoring plan approved
• New License issued by FERC

[14] A number of planned program components of the Experimental Passage Phase (as described in the Second Edition of the Fish Passage Plan) were initiated but not successful or were not undertaken because necessary approvals were not received. These include the following:

- Determine travel times and relative survival of yearling kokanee/sockeye from the Reregulating Dam to Bonneville Dam.
- Determine return fraction (survival) of yearling kokanee/sockeye as adult sockeye return to the Pelton Round Butte Project.
- Timing and migration patterns for spring chinook smolts into and through Lake Billy Chinook determined; results compared to those obtained during the original evaluation of fish passage in the 1960s (Korn et al. 1967).
- Compare growth and survival of bull trout moved into Lake Simtustus with growth and survival of bull trout in Lake Billy Chinook and the lower Deschutes River.
- Estimate the number of bull trout transferred into Lake Simtustus that emigrate downstream through the turbines at Pelton Dam.
- Estimate survival, growth rate, and straying frequency for bull trout transferred from Lake Billy Chinook to the lower Deschutes River.
- Determine movements of adult bull trout transported from the Temporary Round Butte Upstream Fish Trap to the lower Metolius River (If permission to transfer upstream is received).

Appendix V. Components of the four phases of the fish passage program by major group.

Physical Measures

- Round Butte skimmer reactivated
- Temporary smolt collection/marking facility constructed
- Temporary Round Butte upstream adult bull trout trap constructed
- Hydrodynamic modeling continued
- Temperature/WQ model continued and extended to Lake Simtustus, Reregulating Reservoir and lower Deschutes River
- Modifications made to Round Butte jump pool (finger weir)
- Downstream migrant sorting facility completed for the efficient holding and marking of fish operated on an experimental basis

Biological Work

- Marked sockeye fry moved upstream
- Spring-run chinook eyed eggs moved upstream
- Hatchery summer-run steelhead smolts moved upstream
- Smolt migration studies conducted
- Timing and relative numbers of juvenile bull trout moving downstream into Lake Billy Chinook determined
- Yearling spring chinook smolts captured to utilize in migration studies in Lake Billy Chinook.
- Timing of kokanee/sockeye fry immigrating to Lake Billy Chinook determined
- Relative numbers and timing of yearling kokanee/sockeye and juvenile and subadult bull trout emigrating from Lake Billy Chinook determined
- Determination made of whether spring chinook fry liberated into the upper Metolius River will survive at a high enough level to produce reasonable number to the yearling smolts for experimental purposes
- Determine the migration patterns for steelhead smolts through Lake Billy Chinook determined; results compared to modeled and measured flow patterns, and also to results of studies during the original evaluation of fish passage in the 1960s (Korn et al. 1967).
- Timing of migration of maturing adult bull trout into the upstream fish traps at the Pelton Reregulating Dam (Pelton) Fish Trap and the Temporary Round Butte Dam Upstream Fish Trap
- Monitoring of water quality in Project reservoirs and in the lower Deschutes River continued as baseline for potential facility or operational changes that may occur due to fish passage, and for input to modeling efforts
- Baseline established for the macroinvertebrate populations in the Spring and the Fall to compare to the populations that become established after surface water withdrawal is initiated during the Interim Passage Phase
- Long-term monitoring plan developed.

Appendix V. Components of the four phases of the fish passage program by major group.

Disease Work

- Risk of disease caused by fish disease agents in the Deschutes River system from the proposed reintroduction of anadromous fish above the Pelton Round Butte Project assessed (see Engelking 2001a, 2001b, 2003; Bartholomew 2001a, b)
- Baseline information concerning the presence, prevalence, and virulence of specific fish disease agents isolated from fish in the Deschutes River Basin upstream and downstream of the Pelton Round Butte Project collected
- Information necessary to evaluate and monitor changes in the epizootiology of certain fish disease agents above the Project after anadromous fish are reintroduced obtained
- Methods evaluated for detecting fish disease agents that will reduce the necessity of lethal sampling of valuable fish
- Adults/gametes culled for studies
- *M. cerebralis* surveys continued
- *T. tubifex* surveys continued
- *M cerebralis* challenges continued
- Fish Health Management Plan completed

Appendix V. Components of the four phases of the fish passage program by major group.

INTERIM PASSAGE PHASE

Planning/Design/Approval

- Selective water withdrawal facilities designed (final design)
- Adult Release Facility at Round Butte Dam forebay designed (final design)
- Conceptual designs developed for volitional upstream passage facilities
- Decision as to whether to construct permanent fish passage facilities at Round Butte Dam, based on testing and verification of fish passage with temporary downstream passage facilities

Physical Measures

- Selective water withdrawal and downstream smolt collection facilities at Round Butte Dam constructed in two phases:
  (1) SWW and temporary downstream passage (smolt screening and collection) facilities;
  (2) permanent downstream passage facilities
- Pelton Skimmer reactivated and guidance net system installed
- Truck-and-haul transport of downstream migrating smolts to the lower Deschutes River during testing and verification of temporary downstream passage facilities at Round Butte Dam
- Adult Release Facility at Round Butte Dam forebay constructed

Biological Work

- Spring-run chinook, summer-run steelhead, and sockeye eyed eggs placed above Lake Billy Chinook
- Interim downstream fish passage is evaluated through Testing and Verification study program (including collection efficacy, migration success, predation, angling)
- Permanent Round Butte downstream passage facilities evaluated
- Selected adult spring-run chinook, summer-run steelhead, and sockeye released above Round Butte Dam
- Fall-run chinook and Pacific lamprey released above Round Butte Dam at the direction of the managing agencies
- Passed adults and their progeny are studied
- Species life histories studied
- Water quality monitored to evaluate compliance with 401 certificates

Disease Work

- Fish health management program implemented
- Whirling disease risk evaluated

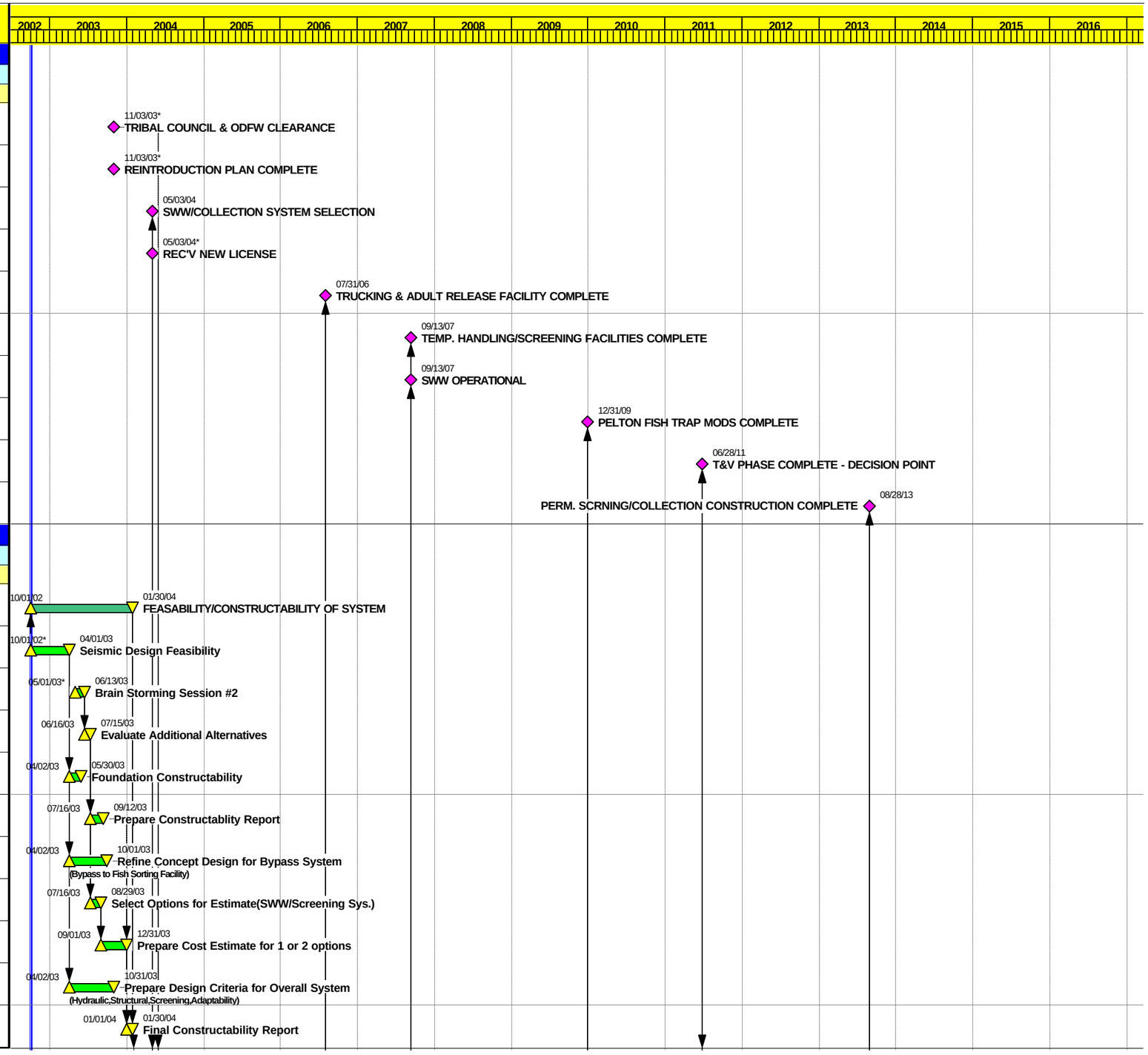
Appendix V. Components of the four phases of the fish passage program by major group.

FINAL PASSAGE PHASE
Planning/Design/Approval
• Final fish passage operations plan(s) developed
• Volitional upstream passage facilities designed (if determined feasible/desirable)
Physical Measures
• Volitional upstream facilities constructed (if determined feasible/desirable)
• Downstream facilities adapted/modified as needed
Biological Work
• Upstream and downstream facilities evaluated
• Species life histories studied
Disease Work
• Fish health management program implemented
• Disease transfer monitored

APPENDIX VI

DETAILED FISH PASSAGE PLAN SCHEDULE

Activity ID	Activity Description	Orig Dur	Early Start	Early Finish
DECISION POINTS/MILESTONES				
MS 900 100	TRIBAL COUNCIL & ODFW CLEARANCE	0		11/03/03*
MS 900 200	REINTRODUCTION PLAN COMPLETE	0		11/03/03*
MS 900 300	SWW/COLLECTION SYSTEM SELECTION	0		05/03/04
MS 900 400	RECV NEW LICENSE	0		05/03/04*
MS 900 402	TRUCKING & ADULT RELEASE FACILITY COMPLETE	0		07/31/06
MS 900 405	TEMP. HANDLING/SCREENING FACILITIES COMPLETE	0		09/13/07
MS 900 410	SWW OPERATIONAL	0		09/13/07
MS 900 420	PELTON FISH TRAP MODS COMPLETE	0		12/31/09
MS 900 500	T&V PHASE COMPLETE - DECISION POINT	0		06/28/11
MS 900 510	PERM. SCRNING/COLLECTION CONSTRUCTION COMPLETE	0		08/28/13
CONSTRUCTABLITY				
CN 100 000	FEASABILITY/CONSTRUCTABILITY OF SYSTEM	349*	10/01/02	01/30/04
CN 100 100	Seismic Design Feasibility	131	10/01/02*	04/01/03
CN 100 110	Brain Storming Session #2	32	05/01/03*	06/13/03
CN 100 120	Evaluate Additional Alternatives	22	06/16/03	07/15/03
CN 100 130	Foundation Constructability	43	04/02/03	05/30/03
CN 100 150	Prepare Constructablity Report	43	07/16/03	09/12/03
CN 100 160	Refine Concept Design for Bypass System	131	04/02/03	10/01/03
CN 100 170	Select Options for Estimate(SWW/Screening Sys.)	33	07/16/03	08/29/03
CN 100 180	Prepare Cost Estimate for 1 or 2 options	88	09/01/03	12/31/03
CN 100 190	Prepare Design Criteria for Overall System	153	04/02/03	10/31/03
CN 100 200	Final Constructability Report	22	01/01/04	01/30/04



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Data Date	10/01/02
Run Date	04/01/04 12:09

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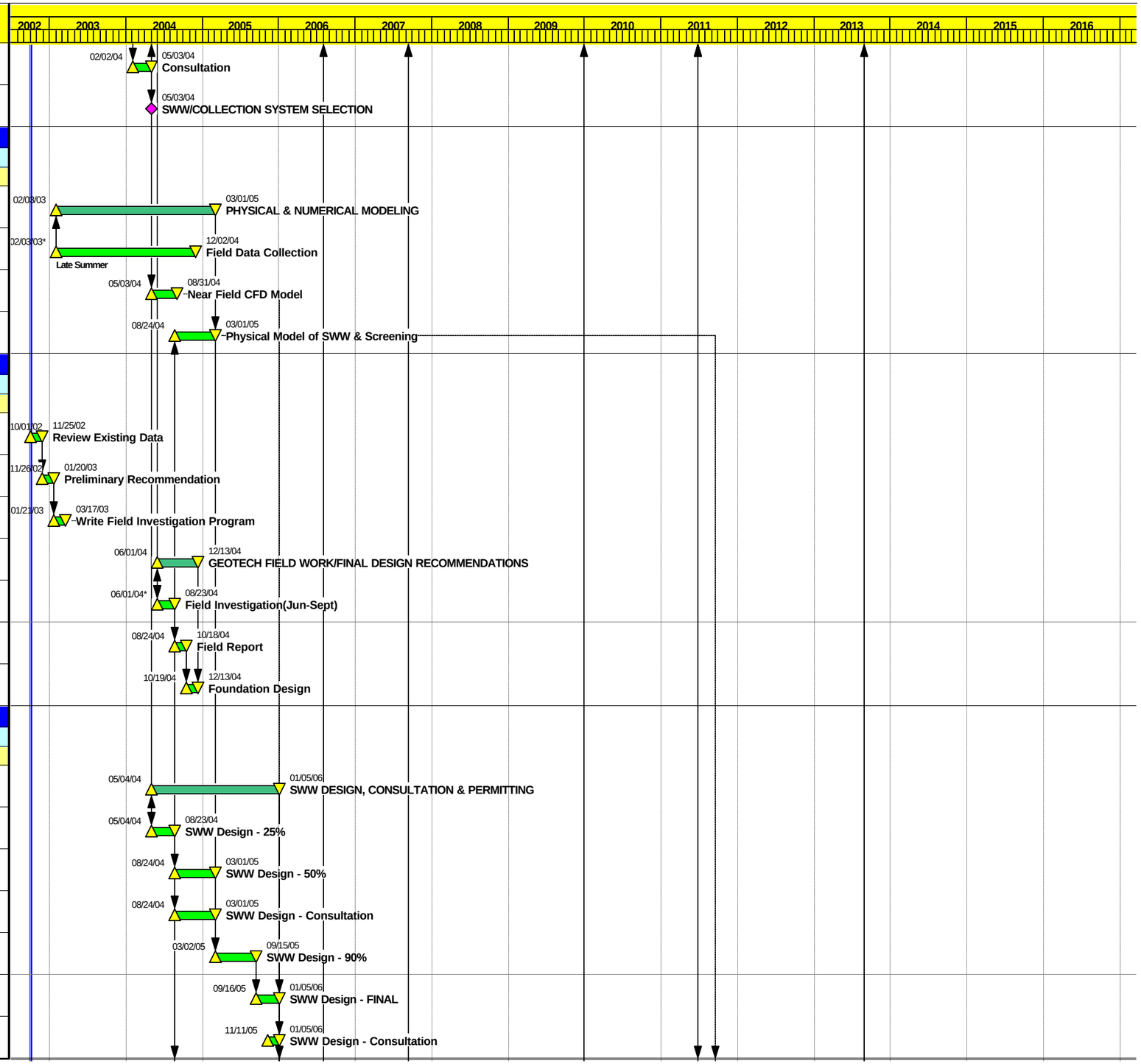
ROUND BUTTE FISH PASSAGE
(REV. 1)
5/16/03

Date	Revision	Checked	Approved
05/16/03	Rev. 1		

Activity ID	Activity Description	Orig Dur	Early Start	Early Finish
CN 100 210	Consultation	66	02/02/04	05/03/04
CN 100 220	SWW/COLLECTION SYSTEM SELECTION	0		05/03/04
MODELING				
MD 100 000	PHYSICAL & NUMERICAL MODELING	542*	02/03/03	03/01/05
MD 100 100	Field Data Collection	109	02/03/03*	12/02/04
MD 100 110	Near Field CFD Model	87	05/03/04	08/31/04
MD 100 120	Physical Model of SWW & Screening	136	08/24/04	03/01/05
GEOTECHNICAL				
GT 100 100	Review Existing Data	40	10/01/02	11/25/02
GT 100 110	Preliminary Recommendation	40	11/26/02	01/20/03
GT 100 120	Write Field Investigation Program	40	01/21/03	03/17/03
GT 200 000	GEOTECH FIELD WORK/FINAL DESIGN RECOMMENDATIONS	140*	06/01/04	12/13/04
GT 200 100	Field Investigation(Jun-Sept)	60	06/01/04*	08/23/04
GT 200 110	Field Report	40	08/24/04	10/18/04
GT 200 120	Foundation Design	40	10/19/04	12/13/04
SELECTIVE WATER WITHDRAWAL(SWW) DESIGN				
TD 100 000	SWW DESIGN, CONSULTATION & PERMITTING	438*	05/04/04	01/05/06
TD 100 100	SWW Design - 25%	80	05/04/04	08/23/04
TD 100 110	SWW Design - 50%	136	08/24/04	03/01/05
TD 100 120	SWW Design - Consultation	136	08/24/04	03/01/05
TD 100 130	SWW Design - 90%	142	03/02/05	09/15/05
TD 100 140	SWW Design - FINAL	80	09/16/05	01/05/06
TD 100 150	SWW Design - Consultation	40	11/11/05	01/05/06



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(REV. 1)
5/16/03

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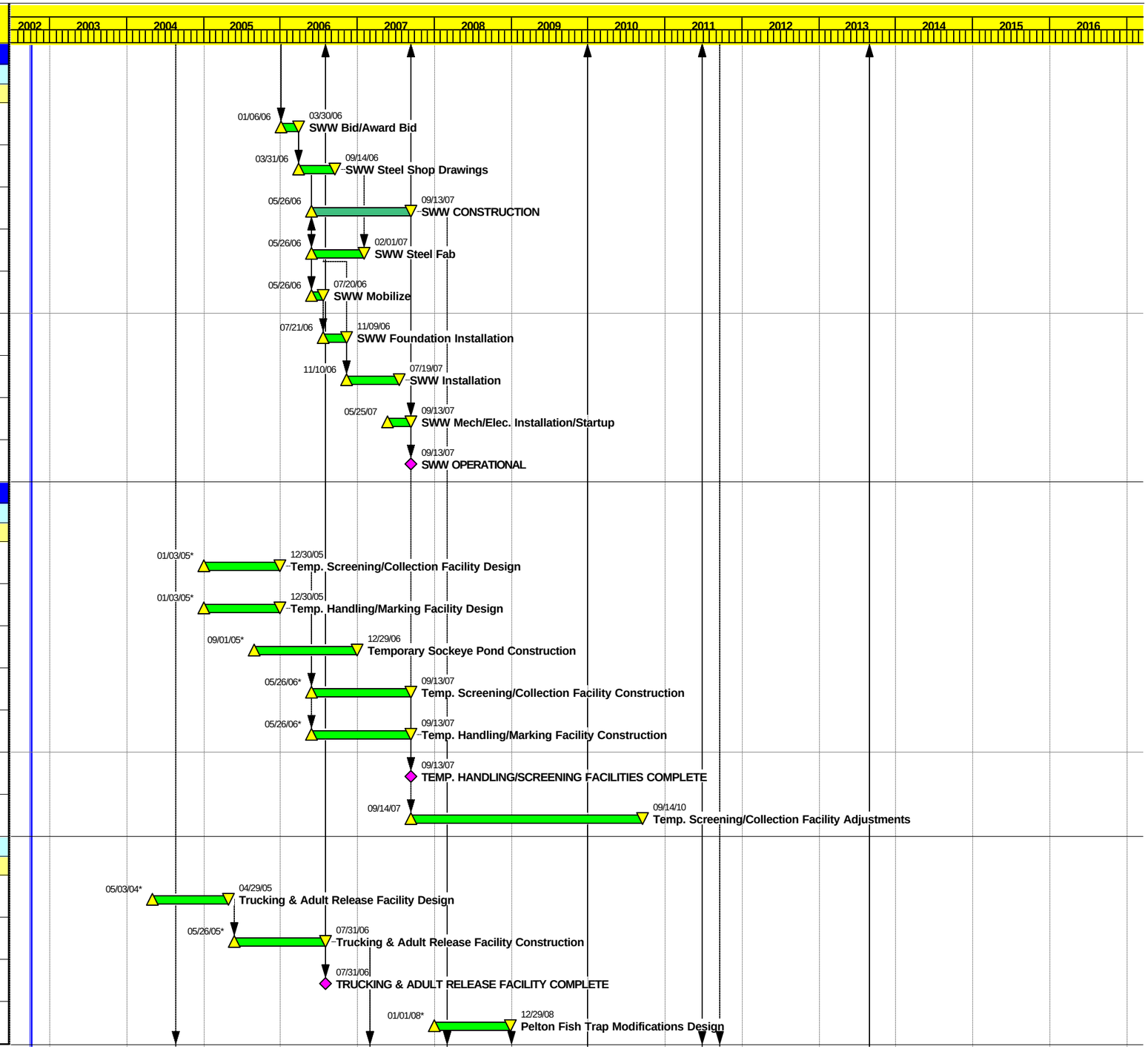
05/16/03	Rev. 1		

Activity ID	Activity Description	Orig Dur	Early Start	Early Finish
SWW CONSTRUCTION				
TC 100 100	SWW Bid/Award Bid	60	01/06/06	03/30/06
TC 100 110	SWW Steel Shop Drawings	120	03/31/06	09/14/06
TC 200 000	SWW CONSTRUCTION	340*	05/26/06	09/13/07
TC 200 100	SWW Steel Fab	180	05/26/06	02/01/07
TC 200 110	SWW Mobilize	40	05/26/06	07/20/06
TC 200 120	SWW Foundation Installation	80	07/21/06	11/09/06
TC 200 130	SWW Installation	180	11/10/06	07/19/07
TC 200 140	SWW Mech/Elec. Installation/Startup	80	05/25/07	09/13/07
TC 200 150	SWW OPERATIONAL	0		09/13/07
FISH SYSTEMS				
TEMPORARY FACILITIES				
Design/Construct				
TF 100 100	Temp. Screening/Collection Facility Design	260	01/03/05*	12/30/05
TF 100 110	Temp. Handling/Marking Facility Design	260	01/03/05*	12/30/05
TF 100 120	Temporary Sockeye Pond Construction	347	09/01/05*	12/29/06
TF 100 130	Temp. Screening/Collection Facility Construction	340	05/26/06*	09/13/07
TF 100 140	Temp. Handling/Marking Facility Construction	340	05/26/06*	09/13/07
TF 100 145	TEMP. HANDLING/SCREENING FACILITIES COMPLETE	0		09/13/07
TF 100 150	Temp. Screening/Collection Facility Adjustments	783	09/14/07	09/14/10
PERMANENT FACILITIES DESIGN/CONSTRUCT				
Design/Construct				
PF 100 100	Trucking & Adult Release Facility Design	260	05/03/04*	04/29/05
PF 100 110	Trucking & Adult Release Facility Construction	308	05/26/05*	07/31/06
PF 100 115	TRUCKING & ADULT RELEASE FACILITY COMPLETE	0		07/31/06
PF 100 120	Pelton Fish Trap Modifications Design	260	01/01/08*	12/29/08



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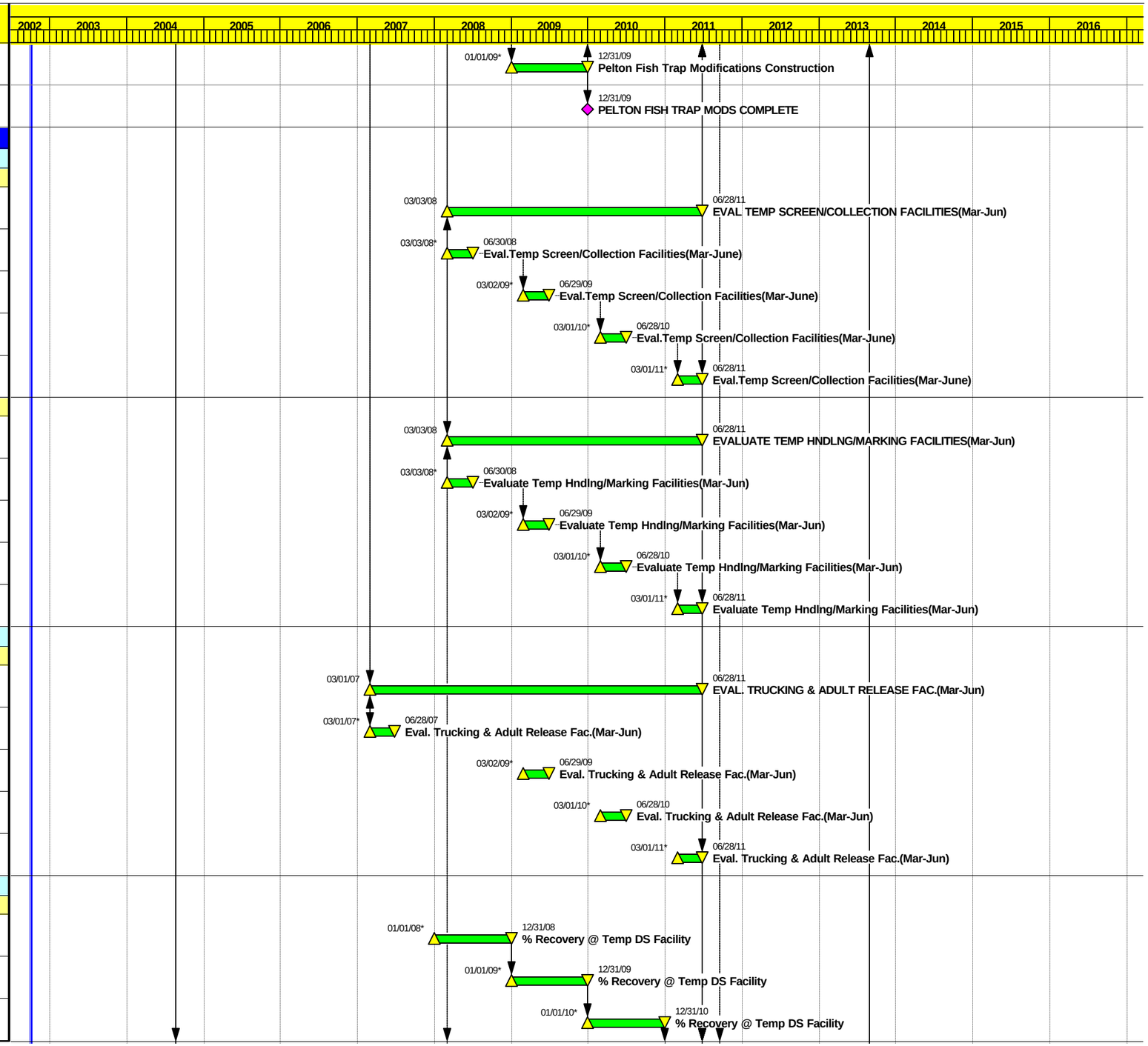
(REV. 1)
5/16/03

Date	Revision	Checked	Approved
05/16/03	Rev. 1		

Activity ID	Activity Description	Orig Dur	Early Start	Early Finish
PF 100 130	Pelton Fish Trap Modifications Construction	261	01/01/09*	12/31/09
PF 100 140	PELTON FISH TRAP MODS COMPLETE	0		12/31/09
TEST & VERIFICATION				
BIOLOGICAL EVALUATION OF TEMPORARY FACILITIES				
Bioligical Evaluation-Temp Screen/Coll.Facility				
TV 100 100	EVAL TEMP SCREEN/COLLECTION FACILITIES(Mar-Jun)	857*	03/03/08	06/28/11
TV 100 110	Eval.Temp Screen/Collection Facilities(Mar-June)	86	03/03/08*	06/30/08
TV 100 120	Eval.Temp Screen/Collection Facilities(Mar-June)	86	03/02/09*	06/29/09
TV 100 130	Eval.Temp Screen/Collection Facilities(Mar-June)	86	03/01/10*	06/28/10
TV 100 140	Eval.Temp Screen/Collection Facilities(Mar-June)	86	03/01/11*	06/28/11
Biological Evaluation-Handlng & Marking Facility				
TV 200 100	EVALUATE TEMP HNDLNG/MARKING FACILITIES(Mar-Jun)	857*	03/03/08	06/28/11
TV 200 110	Evaluate Temp Hndlng/Marking Facilities(Mar-Jun)	86	03/03/08*	06/30/08
TV 200 120	Evaluate Temp Hndlng/Marking Facilities(Mar-Jun)	86	03/02/09*	06/29/09
TV 200 130	Evaluate Temp Hndlng/Marking Facilities(Mar-Jun)	86	03/01/10*	06/28/10
TV 200 140	Evaluate Temp Hndlng/Marking Facilities(Mar-Jun)	86	03/01/11*	06/28/11
BIOLOGICAL EVALUATION OF PERM. FACILITIES				
Trucking & Release Facility				
TV 300 100	EVAL. TRUCKING & ADULT RELEASE FAC.(Mar-Jun)	1,129*	03/01/07	06/28/11
TV 300 110	Eval. Trucking & Adult Release Fac.(Mar-Jun)	86	03/01/07*	06/28/07
TV 300 120	Eval. Trucking & Adult Release Fac.(Mar-Jun)	86	03/02/09*	06/29/09
TV 300 130	Eval. Trucking & Adult Release Fac.(Mar-Jun)	86	03/01/10*	06/28/10
TV 300 140	Eval. Trucking & Adult Release Fac.(Mar-Jun)	86	03/01/11*	06/28/11
LAKE BILLY CHINOOK SMOLT PASSAGE				
Temp. DS Facility				
TV 400 100	% Recovery @ Temp DS Facility	262	01/01/08*	12/31/08
TV 400 110	% Recovery @ Temp DS Facility	261	01/01/09*	12/31/09
TV 400 120	% Recovery @ Temp DS Facility	261	01/01/10*	12/31/10



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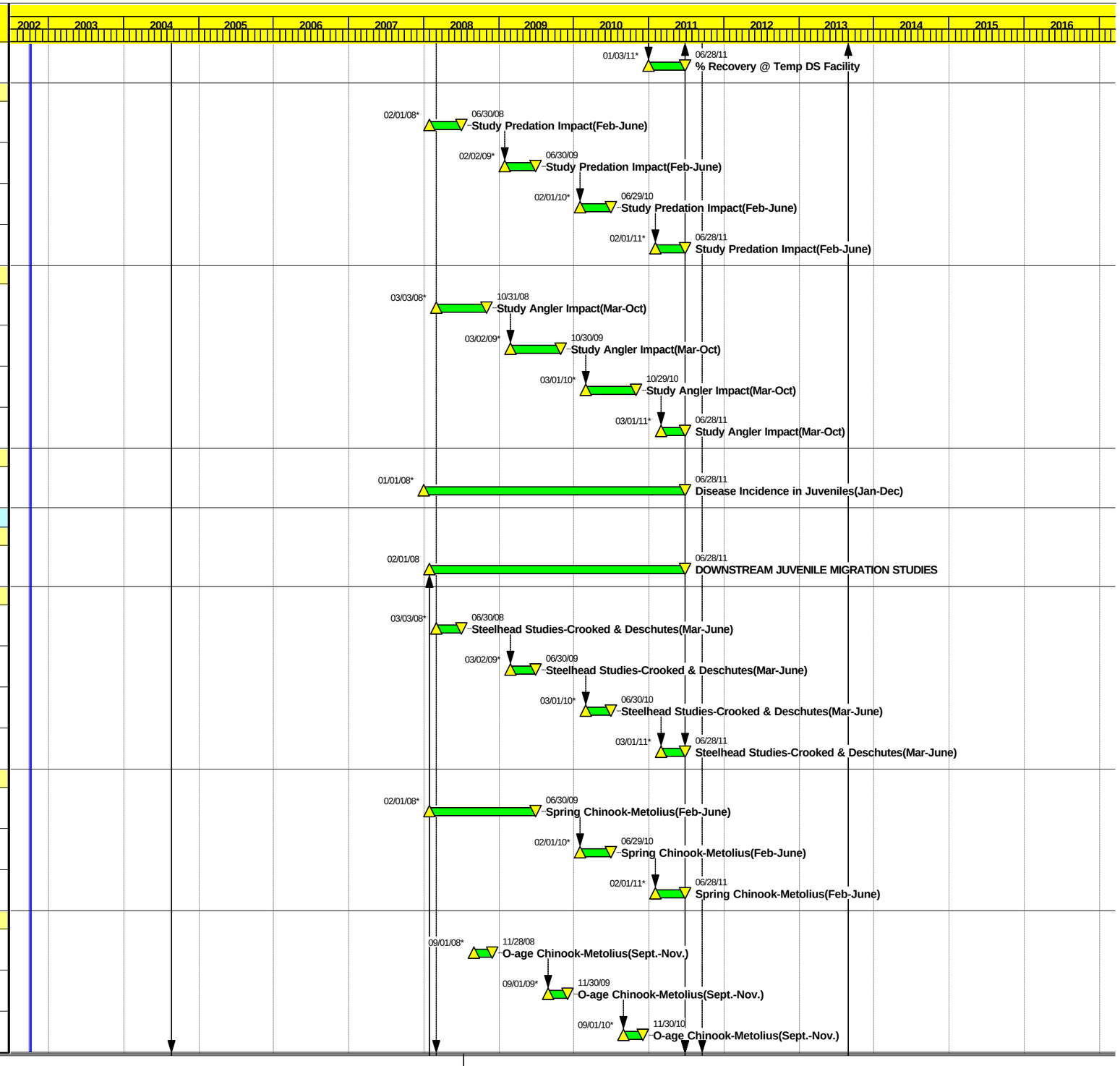
ROUND BUTTE FISH PASSAGE
(REV. 1)
5/16/03

Sheet 4 of 12

Date	Revision	Checked	Approved
05/16/03	Rev. 1		

Activity ID	Activity Description	Orig Dur	Early Start	Early Finish
TV 400 130	% Recovery @ Temp DS Facility	127	01/03/11*	06/28/11
Study Predation Impact				
TV 500 100	Study Predation Impact(Feb-June)	107	02/01/08*	06/30/08
TV 500 110	Study Predation Impact(Feb-June)	107	02/02/09*	06/30/09
TV 500 120	Study Predation Impact(Feb-June)	107	02/01/10*	06/29/10
TV 500 130	Study Predation Impact(Feb-June)	106	02/01/11*	06/28/11
Study Angler Impact				
TV 600 100	Study Angler Impact(Mar-Oct)	175	03/03/08*	10/31/08
TV 600 110	Study Angler Impact(Mar-Oct)	175	03/02/09*	10/30/09
TV 600 120	Study Angler Impact(Mar-Oct)	175	03/01/10*	10/29/10
TV 600 130	Study Angler Impact(Mar-Oct)	86	03/01/11*	06/28/11
Disease Incidence-Juveniles				
TV 700 100	Disease Incidence in Juveniles(Jan-Dec)	911	01/01/08*	06/28/11
DOWNSTREAM JUVENILE MIGRATION				
.				
FP 200 100	DOWNSTREAM JUVENILE MIGRATION STUDIES	888*	02/01/08	06/28/11
Steelhead				
FP 200 110	Steelhead Studies-Crooked & Deschutes(Mar-June)	86	03/03/08*	06/30/08
FP 200 120	Steelhead Studies-Crooked & Deschutes(Mar-June)	87	03/02/09*	06/30/09
FP 200 130	Steelhead Studies-Crooked & Deschutes(Mar-June)	88	03/01/10*	06/30/10
FP 200 140	Steelhead Studies-Crooked & Deschutes(Mar-June)	86	03/01/11*	06/28/11
Spring Chinook				
FP 200 150	Spring Chinook-Metolius(Feb-June)	368	02/01/08*	06/30/09
FP 200 160	Spring Chinook-Metolius(Feb-June)	107	02/01/10*	06/29/10
FP 200 170	Spring Chinook-Metolius(Feb-June)	106	02/01/11*	06/28/11
O-age Chinook				
FP 200 180	O-age Chinook-Metolius(Sept.-Nov.)	65	09/01/08*	11/28/08
FP 200 190	O-age Chinook-Metolius(Sept.-Nov.)	65	09/01/09*	11/30/09
FP 200 200	O-age Chinook-Metolius(Sept.-Nov.)	65	09/01/10*	11/30/10



Start Date	07/01/02
Finish Date	06/27/16
Data Date	10/01/02
Run Date	04/01/04 12:09

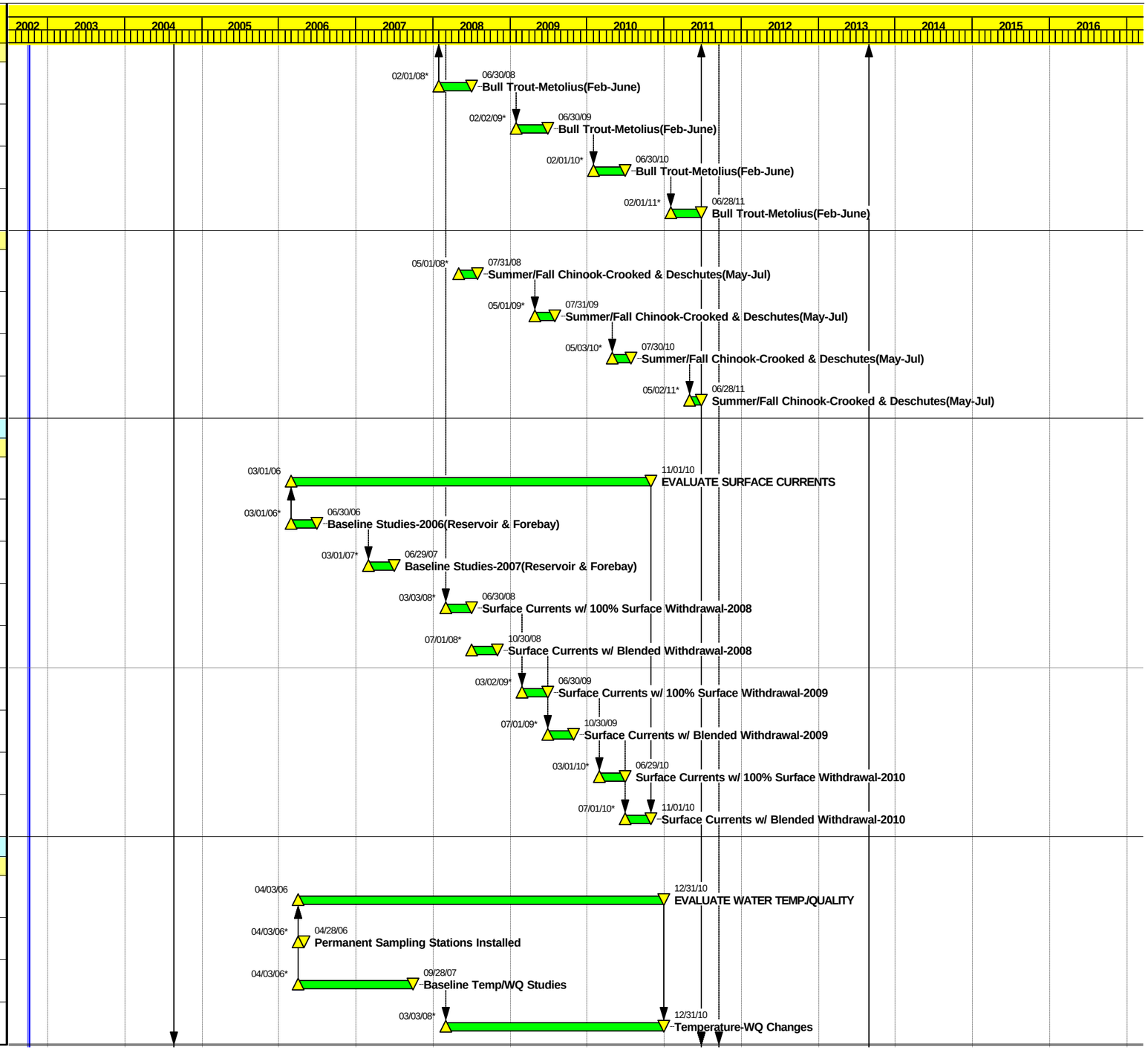
Early Bar
Progress Bar
Critical Activity

ROUND BUTTE FISH PASSAGE
(REV. 1)
5/16/03

Sheet 5 of 12

Date	Revision	Checked	Approved
05/16/03	Rev. 1		

Activity ID	Activity Description	Orig Dur	Early Start	Early Finish
Bull Trout				
FP 200 220	Bull Trout-Metolius(Feb-June)	107	02/01/08*	06/30/08
FP 200 230	Bull Trout-Metolius(Feb-June)	107	02/02/09*	06/30/09
FP 200 240	Bull Trout-Metolius(Feb-June)	108	02/01/10*	06/30/10
FP 200 250	Bull Trout-Metolius(Feb-June)	106	02/01/11*	06/28/11
Summer/Fall Chinook				
FP 200 260	Summer/Fall Chinook-Crooked & Deschutes(May-Jul)	66	05/01/08*	07/31/08
FP 200 270	Summer/Fall Chinook-Crooked & Deschutes(May-Jul)	66	05/01/09*	07/31/09
FP 200 280	Summer/Fall Chinook-Crooked & Deschutes(May-Jul)	65	05/03/10*	07/30/10
FP 200 290	Summer/Fall Chinook-Crooked & Deschutes(May-Jul)	42	05/02/11*	06/28/11
HYDRAULIC EVALUATION OF SURFACE CURRENTS				
SC 100 000	EVALUATE SURFACE CURRENTS	1,219*	03/01/06	11/01/10
SC 100 110	Baseline Studies-2006(Reservoir & Forebay)	88	03/01/06*	06/30/06
SC 100 120	Baseline Studies-2007(Reservoir & Forebay)	87	03/01/07*	06/29/07
SC 100 130	Surface Currents w/ 100% Surface Withdrawal-2008	86	03/03/08*	06/30/08
SC 100 140	Surface Currents w/ Blended Withdrawal-2008	88	07/01/08*	10/30/08
SC 100 150	Surface Currents w/ 100% Surface Withdrawal-2009	87	03/02/09*	06/30/09
SC 100 160	Surface Currents w/ Blended Withdrawal-2009	88	07/01/09*	10/30/09
SC 100 170	Surface Currents w/ 100% Surface Withdrawal-2010	87	03/01/10*	06/29/10
SC 100 180	Surface Currents w/ Blended Withdrawal-2010	88	07/01/10*	11/01/10
EVALUATE WATER TEMP./QUALTITY				
WQ 100 000	EVALUATE WATER TEMP./QUALITY	1,240*	04/03/06	12/31/10
WQ 100 100	Permanent Sampling Stations Installed	20	04/03/06*	04/28/06
WQ 100 110	Baseline Temp/WQ Studies	390	04/03/06*	09/28/07
WQ 100 120	Temperature-WQ Changes	740	03/03/08*	12/31/10



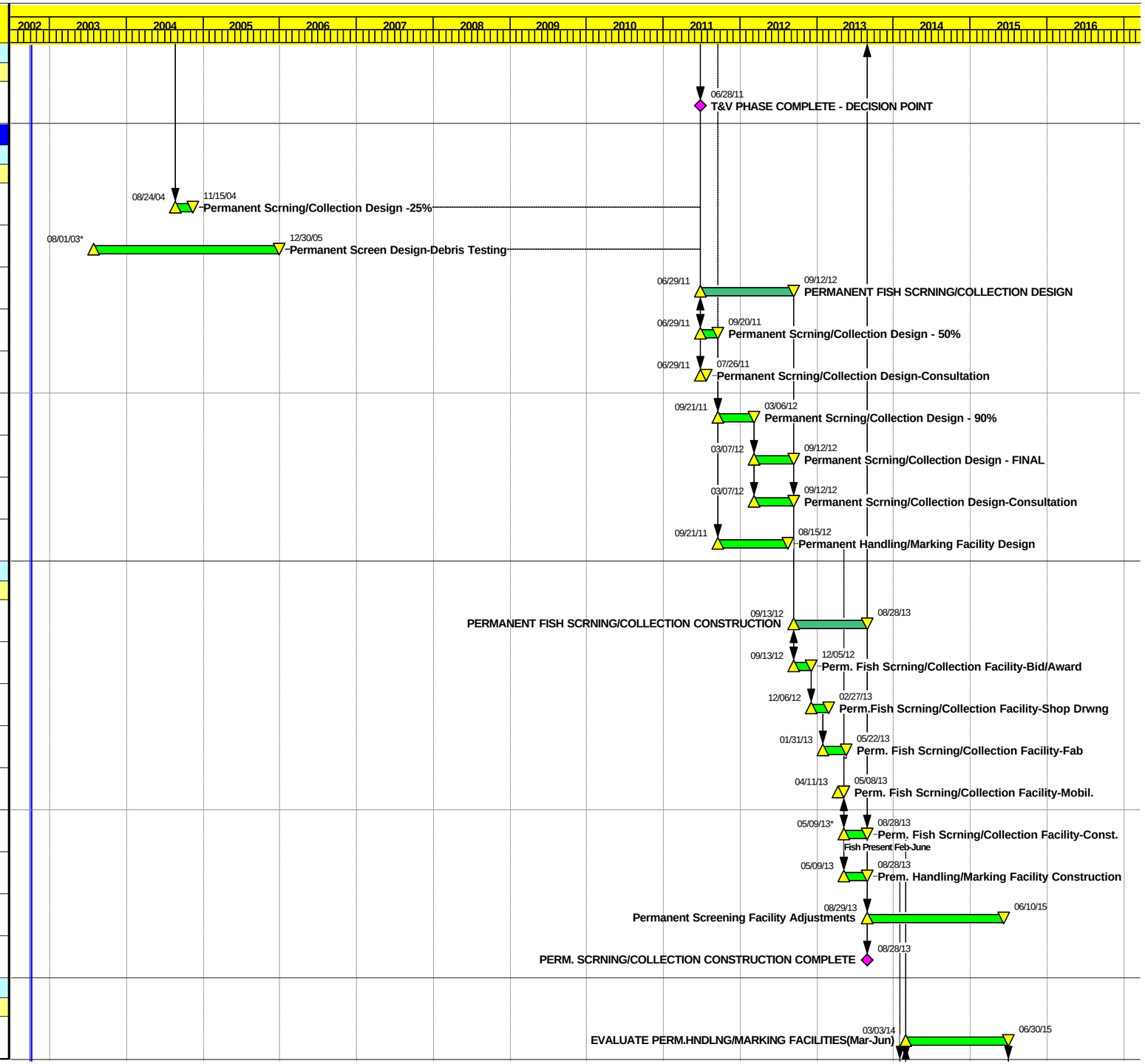
Start Date	07/01/02
Finish Date	06/27/16
Data Date	10/01/02
Run Date	04/01/04 12:09

Early Bar
Progress Bar
Critical Activity

ROUND BUTTE FISH PASSAGE
(REV. 1)
5/16/03

Date	Revision	Checked	Approved
05/16/03	Rev. 1		

Activity ID	Activity Description	Orig Dur	Early Start	Early Finish
TV 900 900	T&V PHASE COMPLETE - DECISION POINT	0		06/28/11
PERMANENT FISH SYSTEMS				
PERMANENT FISH COLLECTION - DESIGN				
PF 200 100	Permanent Scrning/Collection Design -25%	60	08/24/04	11/15/04
PF 200 110	Permanent Screen Design-Debris Testing	631	08/01/03*	12/30/05
PF 300 000	PERMANENT FISH SCRNING/COLLECTION DESIGN	316*	06/29/11	09/12/12
PF 300 100	Permanent Scrning/Collection Design - 50%	60	06/29/11	09/20/11
PF 300 110	Permanent Scrning/Collection Design-Consultation	20	06/29/11	07/26/11
PF 300 120	Permanent Scrning/Collection Design - 90%	120	09/21/11	03/06/12
PF 300 130	Permanent Scrning/Collection Design - FINAL	136	03/07/12	09/12/12
PF 300 140	Permanent Scrning/Collection Design-Consultation	136	03/07/12	09/12/12
PF 300 150	Permanent Handling/Marking Facility Design	236	09/21/11	08/15/12
PERMANENT FISH COLLECTION - CONSTRUCTION				
PF 400 000	PERMANENT FISH SCRNING/COLLECTION CONSTRUCTION	250*	09/13/12	08/28/13
PF 400 100	Perm. Fish Scrning/Collection Facility-Bid/Award	60	09/13/12	12/05/12
PF 400 110	Perm.Fish Scrning/Collection Facility-Shop Drwng	60	12/06/12	02/27/13
PF 400 120	Perm. Fish Scrning/Collection Facility-Fab	80	01/31/13	05/22/13
PF 400 130	Perm. Fish Scrning/Collection Facility-Mobil.	20	04/11/13	05/08/13
PF 400 140	Perm. Fish Scrning/Collection Facility-Const.	80	05/09/13*	08/28/13
PF 400 150	Prem. Handling/Marking Facility Construction	80	05/09/13	08/28/13
PF 400 160	Permanent Screening Facility Adjustments	465	08/29/13	06/10/15
PF 400 170	PERM. SCRNING/COLLECTION CONSTRUCTION COMPLETE	0		08/28/13
BIOLOGICAL EVALUATION OF PERM. FACILITIES				
Permanent Handling/Marking Facilities				
TV 100 255	EVALUATE PERM.HNDLNG/MARKING FACILITIES(Mar-Jun)	347*	03/03/14	06/30/15



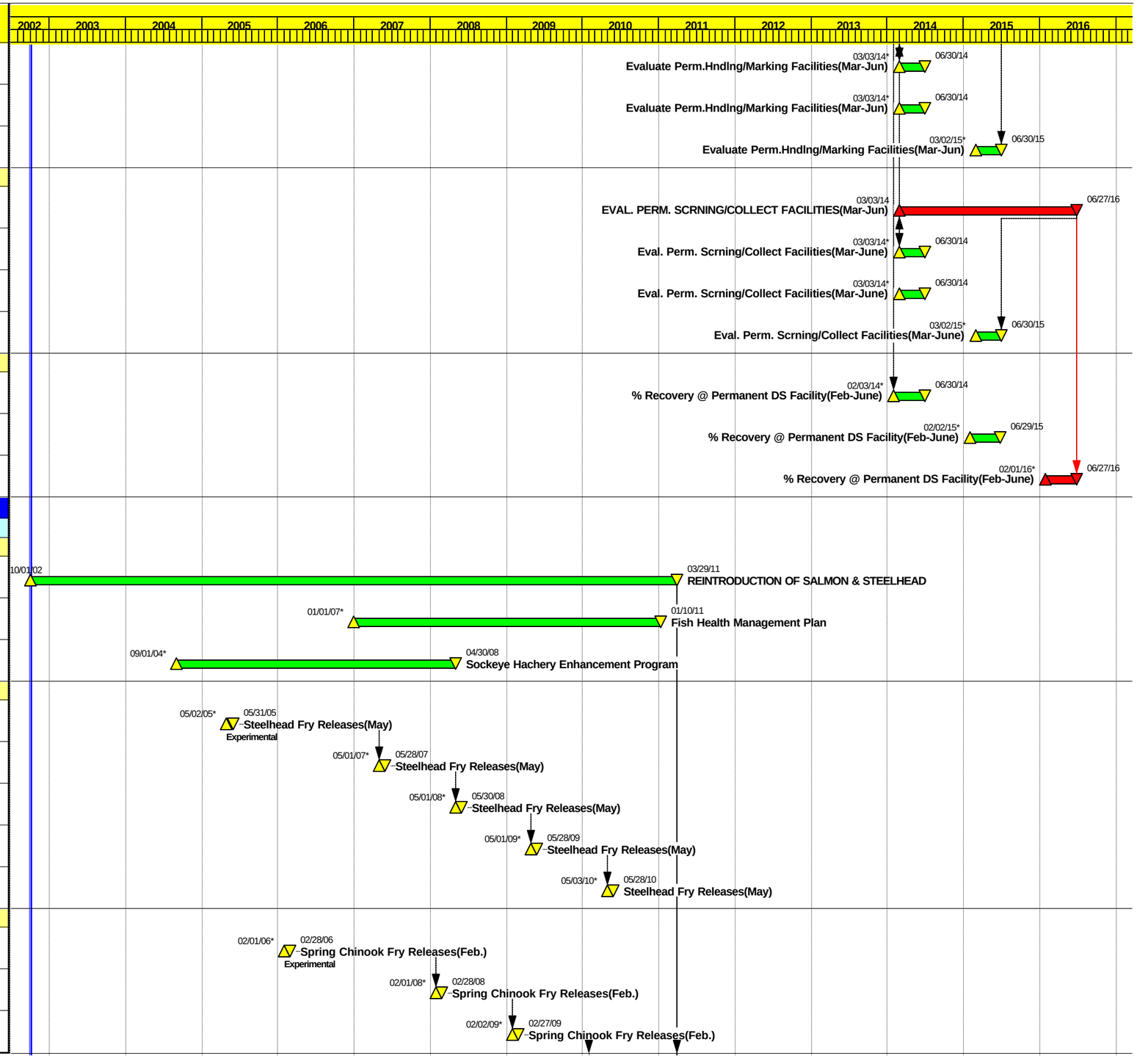
Start Date	07/01/02
Finish Date	06/27/16
Data Date	10/01/02
Run Date	04/01/04 12:09

Early Bar
Progress Bar
Critical Activity

ROUND BUTTE FISH PASSAGE
(REV. 1)
5/16/03

Date	Revision	Checked	Approved
05/16/03	Rev. 1		

Activity ID	Activity Description	Orig Dur	Early Start	Early Finish
TV 100 260	Evaluate Perm.Hndlng/Marking Facilities(Mar-Jun)	86	03/03/14*	06/30/14
TV 100 270	Evaluate Perm.Hndlng/Marking Facilities(Mar-Jun)	86	03/03/14*	06/30/14
TV 100 280	Evaluate Perm.Hndlng/Marking Facilities(Mar-Jun)	87	03/02/15*	06/30/15
Permanent Collection Facilites				
TV 100 225	EVAL. PERM. SCRNING/COLLECT FACILITIES(Mar-Jun)	606*	03/03/14	06/27/16
TV 100 230	Eval. Perm. Scrning/Collect Facilities(Mar-June)	86	03/03/14*	06/30/14
TV 100 240	Eval. Perm. Scrning/Collect Facilities(Mar-June)	86	03/03/14*	06/30/14
TV 100 250	Eval. Perm. Scrning/Collect Facilities(Mar-June)	87	03/02/15*	06/30/15
Permanent Downstream Facility				
FP 300 240	% Recovery @ Permanent DS Facility(Feb-June)	105	02/03/14*	06/30/14
FP 300 250	% Recovery @ Permanent DS Facility(Feb-June)	105	02/02/15*	06/29/15
FP 300 260	% Recovery @ Permanent DS Facility(Feb-June)	105	02/01/16*	06/27/16
FISH PRESENCE				
REINTRODUCTION OF SALMON & STEELHEAD				
.				
FP 100 000	REINTRODUCTION OF SALMON & STEELHEAD	2216*	10/01/02	03/29/11
FP 100 105	Fish Health Management Plan	1051	01/01/07*	01/10/11
FP 100 110	Sockeye Hachery Enhancement Program	956	09/01/04*	04/30/08
Steelhead Fry Releases				
FP 100 120	Steelhead Fry Releases(May)	22	05/02/05*	05/31/05
FP 100 130	Steelhead Fry Releases(May)	20	05/01/07*	05/28/07
FP 100 140	Steelhead Fry Releases(May)	22	05/01/08*	05/30/08
FP 100 150	Steelhead Fry Releases(May)	20	05/01/09*	05/28/09
FP 100 160	Steelhead Fry Releases(May)	20	05/03/10*	05/28/10
Spring Chinook Fry Releases				
FP 100 170	Spring Chinook Fry Releases(Feb.)	20	02/01/06*	02/28/06
FP 100 180	Spring Chinook Fry Releases(Feb.)	20	02/01/08*	02/28/08
FP 100 190	Spring Chinook Fry Releases(Feb.)	20	02/02/09*	02/27/09



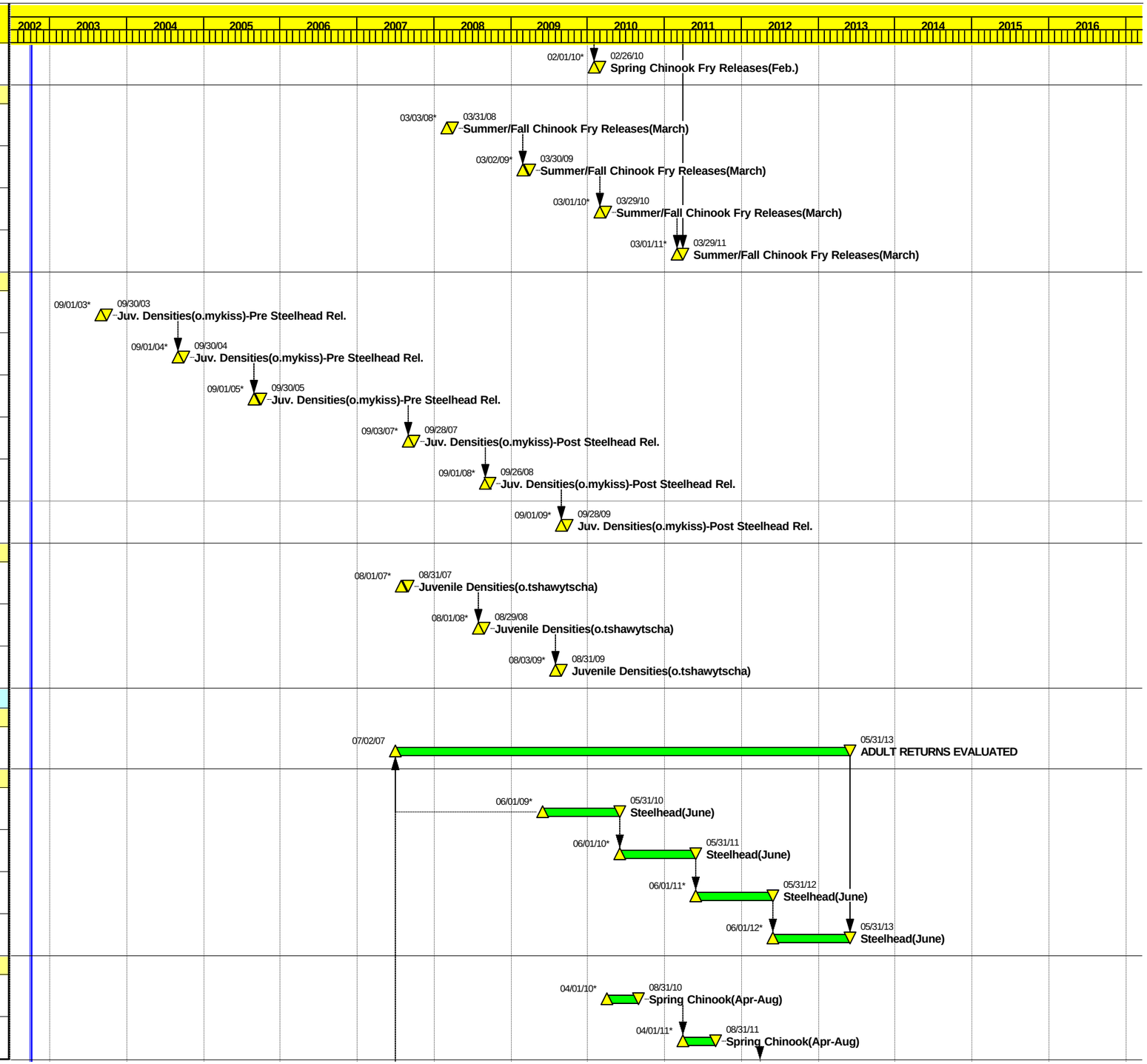
Start Date	07/01/02
Finish Date	06/27/16
Data Date	10/01/02
Run Date	04/01/04 12:09

Early Bar
Progress Bar
Critical Activity

ROUND BUTTE FISH PASSAGE
(REV. 1)
5/16/03

Date	Revision	Checked	Approved
05/16/03	Rev. 1		

Activity ID	Activity Description	Orig Dur	Early Start	Early Finish
FP 100 200	Spring Chinook Fry Releases(Feb.)	20	02/01/10*	02/26/10
Summer/Fall Chinook Fry Releases				
FP 100 210	Summer/Fall Chinook Fry Releases(March)	21	03/03/08*	03/31/08
FP 100 220	Summer/Fall Chinook Fry Releases(March)	21	03/02/09*	03/30/09
FP 100 230	Summer/Fall Chinook Fry Releases(March)	21	03/01/10*	03/29/10
FP 100 240	Summer/Fall Chinook Fry Releases(March)	21	03/01/11*	03/29/11
Juv. Densities(o.mykiss)				
FP 100 250	Juv. Densities(o.mykiss)-Pre Steelhead Rel.	22	09/01/03*	09/30/03
FP 100 260	Juv. Densities(o.mykiss)-Pre Steelhead Rel.	22	09/01/04*	09/30/04
FP 100 270	Juv. Densities(o.mykiss)-Pre Steelhead Rel.	22	09/01/05*	09/30/05
FP 100 280	Juv. Densities(o.mykiss)-Post Steelhead Rel.	20	09/03/07*	09/28/07
FP 100 290	Juv. Densities(o.mykiss)-Post Steelhead Rel.	20	09/01/08*	09/26/08
FP 100 300	Juv. Densities(o.mykiss)-Post Steelhead Rel.	20	09/01/09*	09/28/09
Juv. Densities(o.tshawytscha)				
FP 100 310	Juvenile Densities(o.tshawytscha)	23	08/01/07*	08/31/07
FP 100 320	Juvenile Densities(o.tshawytscha)	21	08/01/08*	08/29/08
FP 100 330	Juvenile Densities(o.tshawytscha)	21	08/03/09*	08/31/09
ADULT RETURNS EVALUATED				
.				
FP 400 100	ADULT RETURNS EVALUATED	1,545*	07/02/07	05/31/13
Steelhead				
FP 400 110	Steelhead(June)	261	06/01/09*	05/31/10
FP 400 120	Steelhead(June)	261	06/01/10*	05/31/11
FP 400 130	Steelhead(June)	262	06/01/11*	05/31/12
FP 400 140	Steelhead(June)	261	06/01/12*	05/31/13
Spring Chinook				
FP 400 150	Spring Chinook(Apr-Aug)	109	04/01/10*	08/31/10
FP 400 160	Spring Chinook(Apr-Aug)	109	04/01/11*	08/31/11



Start Date	07/01/02
Finish Date	06/27/16
Data Date	10/01/02
Run Date	04/01/04 12:09

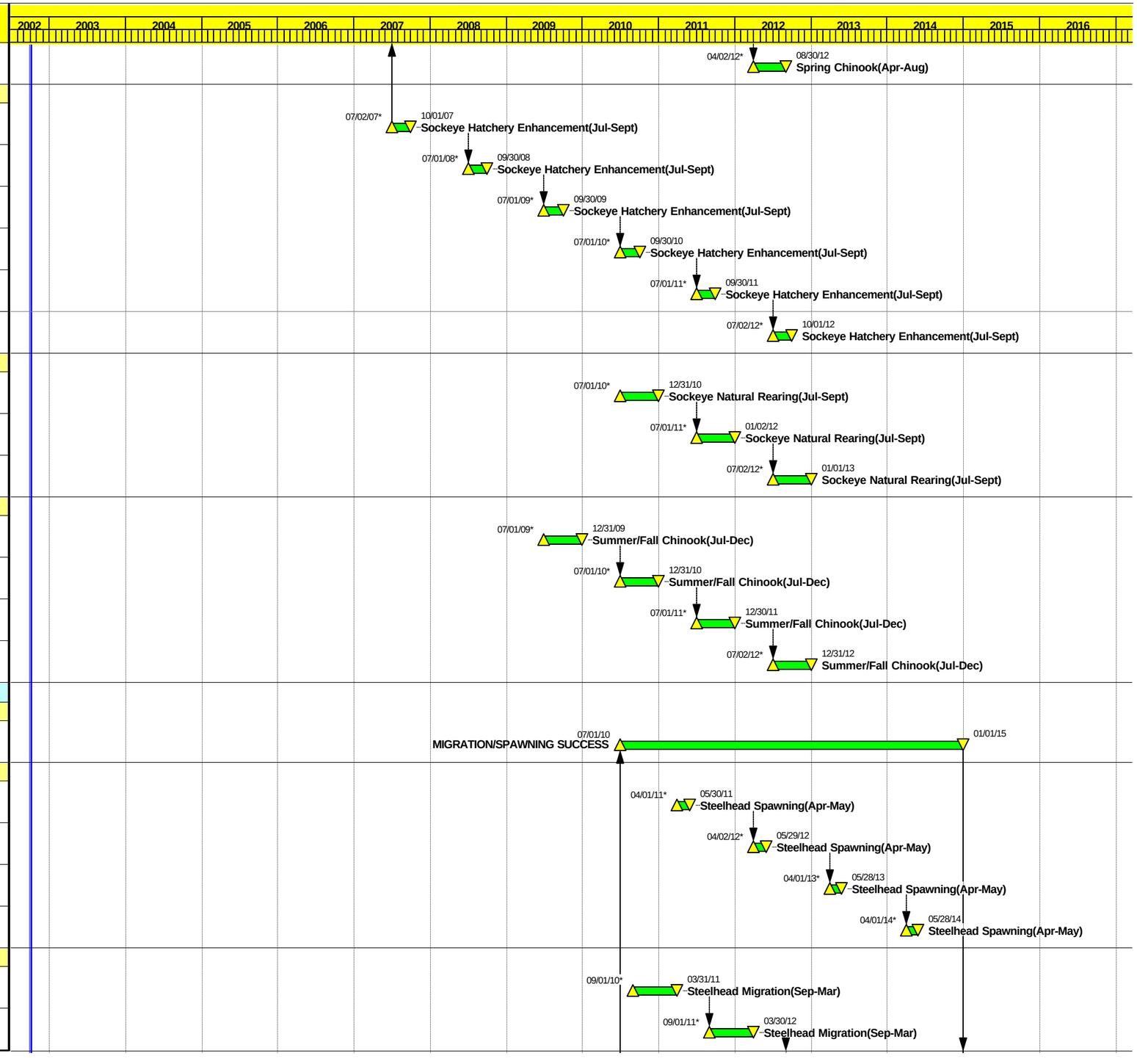
Early Bar
Progress Bar
Critical Activity

ROUND BUTTE FISH PASSAGE
(REV. 1)
5/16/03

Sheet 9 of 12

Date	Revision	Checked	Approved
05/16/03	Rev. 1		

Activity ID	Activity Description	Orig Dur	Early Start	Early Finish
FP 400 170	Spring Chinook(Apr-Aug)	109	04/02/12*	08/30/12
Sockeye(Hatchery)				
FP 400 180	Sockeye Hatchery Enhancement(Jul-Sept)	66	07/02/07*	10/01/07
FP 400 190	Sockeye Hatchery Enhancement(Jul-Sept)	66	07/01/08*	09/30/08
FP 400 200	Sockeye Hatchery Enhancement(Jul-Sept)	66	07/01/09*	09/30/09
FP 400 210	Sockeye Hatchery Enhancement(Jul-Sept)	66	07/01/10*	09/30/10
FP 400 220	Sockeye Hatchery Enhancement(Jul-Sept)	66	07/01/11*	09/30/11
FP 400 230	Sockeye Hatchery Enhancement(Jul-Sept)	66	07/02/12*	10/01/12
Sockeye(Natural)				
FP 400 240	Sockeye Natural Rearing(Jul-Sept)	132	07/01/10*	12/31/10
FP 400 250	Sockeye Natural Rearing(Jul-Sept)	132	07/01/11*	01/02/12
FP 400 260	Sockeye Natural Rearing(Jul-Sept)	132	07/02/12*	01/01/13
Summer/Fall Chinook				
FP 400 270	Summer/Fall Chinook(Jul-Dec)	132	07/01/09*	12/31/09
FP 400 280	Summer/Fall Chinook(Jul-Dec)	132	07/01/10*	12/31/10
FP 400 290	Summer/Fall Chinook(Jul-Dec)	131	07/01/11*	12/30/11
FP 400 300	Summer/Fall Chinook(Jul-Dec)	131	07/02/12*	12/31/12
ADULT MIGRATION/SPAWNING SUCCESS				
.				
MS 100 100	MIGRATION/SPAWNING SUCCESS	1,176*	07/01/10	01/01/15
Steelhead Spawning				
MS 100 150	Steelhead Spawning(Apr-May)	42	04/01/11*	05/30/11
MS 100 160	Steelhead Spawning(Apr-May)	42	04/02/12*	05/29/12
MS 100 170	Steelhead Spawning(Apr-May)	42	04/01/13*	05/28/13
MS 100 180	Steelhead Spawning(Apr-May)	42	04/01/14*	05/28/14
Steelhead Migration				
MS 100 110	Steelhead Migration(Sep-Mar)	152	09/01/10*	03/31/11
MS 100 120	Steelhead Migration(Sep-Mar)	152	09/01/11*	03/30/12



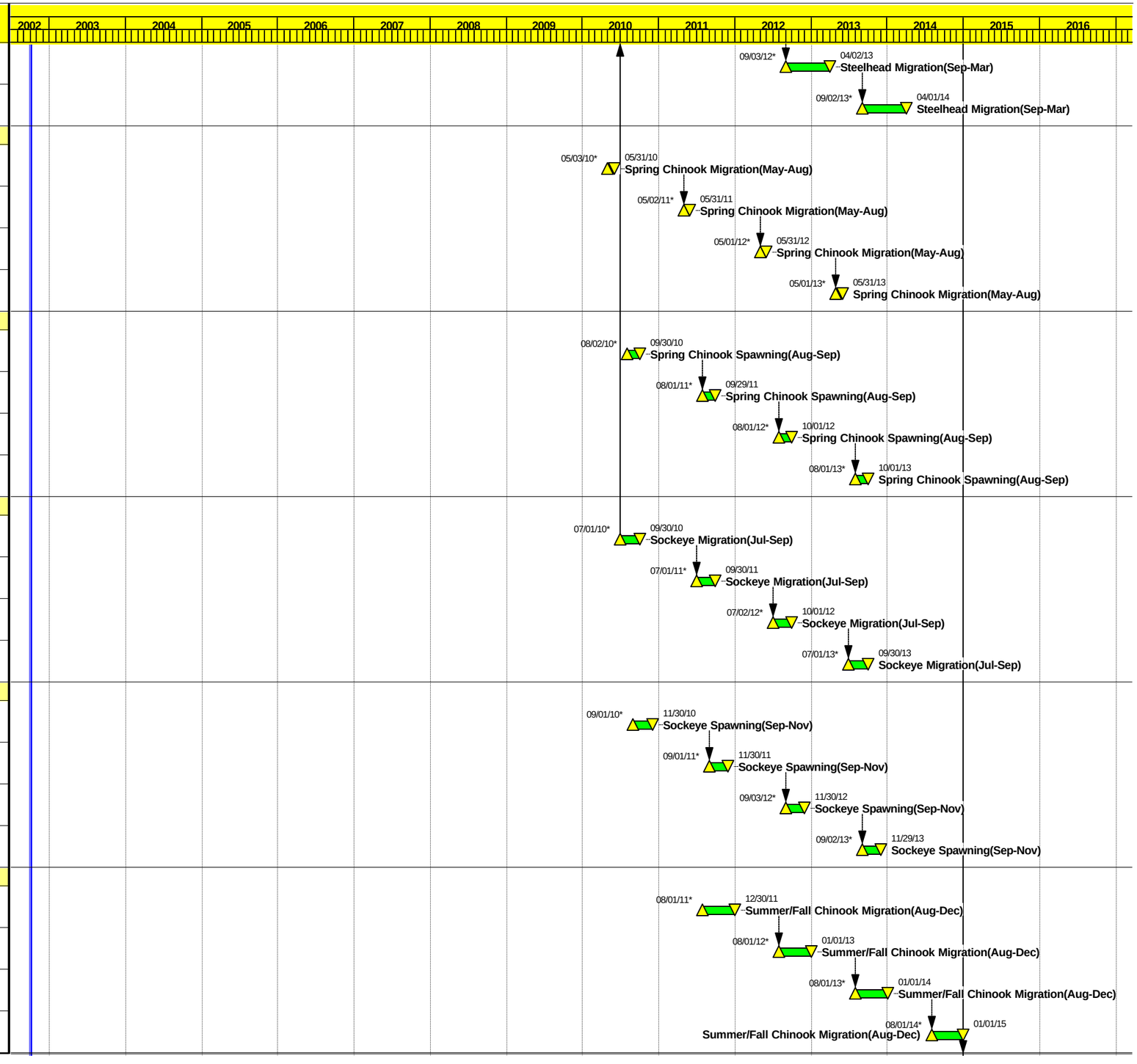
Start Date	07/01/02
Finish Date	06/27/16
Data Date	10/01/02
Run Date	04/01/04 12:09

Early Bar
Progress Bar
Critical Activity

ROUND BUTTE FISH PASSAGE
(REV. 1)
5/16/03

Date	Revision	Checked	Approved
05/16/03	Rev. 1		

Activity ID	Activity Description	Orig Dur	Early Start	Early Finish
MS 100 130	Steelhead Migration(Sep-Mar)	152	09/03/12*	04/02/13
MS 100 140	Steelhead Migration(Sep-Mar)	152	09/02/13*	04/01/14
Spring Chinook Migration				
MS 100 190	Spring Chinook Migration(May-Aug)	21	05/03/10*	05/31/10
MS 100 200	Spring Chinook Migration(May-Aug)	22	05/02/11*	05/31/11
MS 100 210	Spring Chinook Migration(May-Aug)	23	05/01/12*	05/31/12
MS 100 220	Spring Chinook Migration(May-Aug)	23	05/01/13*	05/31/13
Spring Chinook Spawning				
MS 100 230	Spring Chinook Spawning(Aug-Sep)	44	08/02/10*	09/30/10
MS 100 240	Spring Chinook Spawning(Aug-Sep)	44	08/01/11*	09/29/11
MS 100 250	Spring Chinook Spawning(Aug-Sep)	44	08/01/12*	10/01/12
MS 100 260	Spring Chinook Spawning(Aug-Sep)	44	08/01/13*	10/01/13
Sockeye Migration				
MS 100 270	Sockeye Migration(Jul-Sep)	66	07/01/10*	09/30/10
MS 100 280	Sockeye Migration(Jul-Sep)	66	07/01/11*	09/30/11
MS 100 290	Sockeye Migration(Jul-Sep)	66	07/02/12*	10/01/12
MS 100 300	Sockeye Migration(Jul-Sep)	66	07/01/13*	09/30/13
Sockeye Spawning				
MS 100 310	Sockeye Spawning(Sep-Nov)	65	09/01/10*	11/30/10
MS 100 320	Sockeye Spawning(Sep-Nov)	65	09/01/11*	11/30/11
MS 100 330	Sockeye Spawning(Sep-Nov)	65	09/03/12*	11/30/12
MS 100 340	Sockeye Spawning(Sep-Nov)	65	09/02/13*	11/29/13
Summer/Fall Chinook Migration				
MS 100 350	Summer/Fall Chinook Migration(Aug-Dec)	110	08/01/11*	12/30/11
MS 100 360	Summer/Fall Chinook Migration(Aug-Dec)	110	08/01/12*	01/01/13
MS 100 370	Summer/Fall Chinook Migration(Aug-Dec)	110	08/01/13*	01/01/14
MS 100 380	Summer/Fall Chinook Migration(Aug-Dec)	110	08/01/14*	01/01/15



Start Date	07/01/02
Finish Date	06/27/16
Data Date	10/01/02
Run Date	04/01/04 12:09

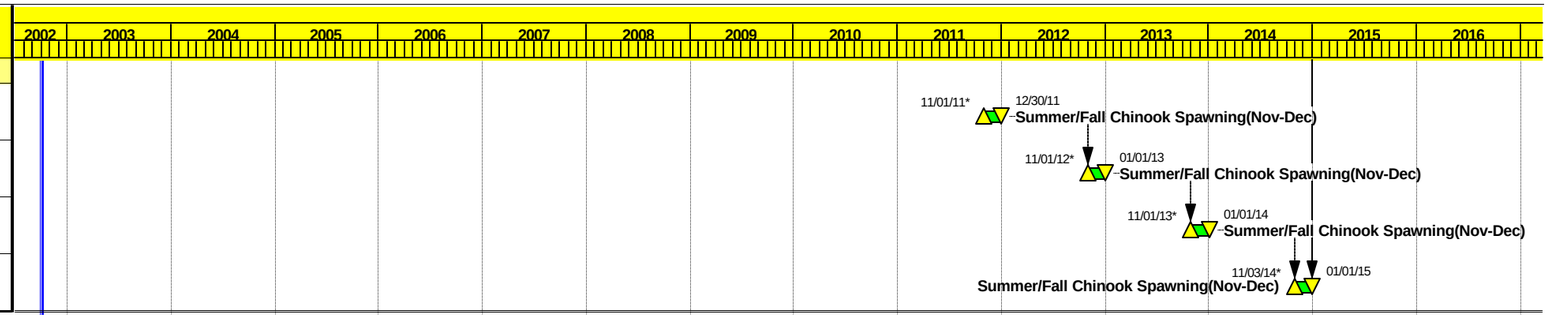
Early Bar
Progress Bar
Critical Activity

ROUND BUTTE FISH PASSAGE
(REV. 1)
5/16/03

Sheet 11 of 12

Date	Revision	Checked	Approved
05/16/03	Rev. 1		

Activity ID	Activity Description	Orig Dur	Early Start	Early Finish
Summer/Fall Chinook Spawning				
MS 100 390	Summer/Fall Chinook Spawning(Nov-Dec)	44	11/01/11*	12/30/11
MS 100 400	Summer/Fall Chinook Spawning(Nov-Dec)	44	11/01/12*	01/01/13
MS 100 410	Summer/Fall Chinook Spawning(Nov-Dec)	44	11/01/13*	01/01/14
MS 100 420	Summer/Fall Chinook Spawning(Nov-Dec)	44	11/03/14*	01/01/15



Start Date	07/01/02
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Early Bar
Progress Bar
Critical Activity

ROUND BUTTE FISH PASSAGE
(REV. 1)
5/16/03

Date	Revision	Checked	Approved
05/16/03	Rev. 1		

Pelton Round Butte Project
Settlement Agreement

E X H I B I T E

PELTON ROUND BUTTE PROJECT
TERRESTRIAL RESOURCES MANAGEMENT PLAN

Proposed Table of Contents and
Annotated Outline

Pelton Round Butte Project – FERC No. 2030

July 2004

EXHIBIT E

Proposed Table of Contents and Annotated Outline
for a
TERRESTRIAL RESOURCES MANAGEMENT PLAN

Terrestrial Resources Management

To minimize and mitigate impacts to terrestrial wildlife and vegetation related to the Pelton Round Butte Project (Project), the Licensees shall develop, fund, and implement a *Terrestrial Resources Management Plan* (*TRMP*) within one year of license issuance. The *TRMP* shall provide for the protection, maintenance, and enhancement of terrestrial resources affected by the Project on lands owned and/or administered by the U.S. Forest Service (USFS), Bureau of Land Management (BLM), State of Oregon, Licensees, and other private landowners. The *TRMP* shall also include measures for the protection and utilization of the Warm Springs Reservation of Oregon.

The *TRMP* shall be consistent with the table of contents and annotated outline that follow. In general, the outline provides an indication of the substance and text that will appear in each section of the *TRMP*. The Licensees, in consultation with a Terrestrial Resources Work Group, shall use the table of contents and annotated outline as a guide to complete the *TRMP*. In addition, the annotated outline also sets out the details of specific resource strategy components, including lists of individual protection, mitigation, and enhancement measures (PMEs), that the Licensees, agencies, and Confederated Tribes of the Warm Springs Reservation of Oregon (CTWS) re-evaluated during the pre-license settlement process and subsequently reached agreement on. These specific resource strategy components and individual PMEs, as set out in this outline, shall be included in the final TRMP. This outline also includes a number of other PMEs that the Licensees included in their Final Joint Application Amendment (2001) to the Federal Energy Regulatory Commission (FERC), and that have the general consensus of the Licensees, agencies, and CTWS.

The Licensees shall develop the *TRMP* in consultation and agreement with the CTWS Branch of Natural Resources, USFS, Bureau of Land Management (BLM), Bureau of Indian Affairs (BIA), U.S. Fish and Wildlife Service (USFWS), and Oregon Department of Fish and Wildlife (ODFW), and submit the agreed upon and completed *TRMP* to FERC within one year of license issuance. The *TRMP* shall document all consultation between the Licensees, agencies, and Tribes. The Licensees shall provide funding during the first year of the New License to support USFS, BLM, and ODFW resources committed to the development of the *TRMP*.

The *TRMP* shall be the principal instrument for implementing PMEs for terrestrial resources affected by or related to the Project. The *TRMP* will include the following resource management strategies for implementing specific PMEs:

- Riparian and wetland restoration and protection strategy
- Vegetation management strategy
- Exotic and invasive vegetation management strategy
- Comprehensive bald eagle management strategy
- Raptor protection strategy
- Threatened, endangered, and sensitive (TES) species and habitats of special concern protection strategy
- Wildlife control strategy
- Travel and access management strategy
- Public access strategy
- Pelton Fish Ladder wildlife protection strategy
- Wildlife monitoring strategy

The *TRMP* shall include specific goals for terrestrial resources, as well as clearly defined objectives for achieving the goals. The goals and objectives will apply largely to lands within the Project boundary (e.g., Project lands) and to habitat lands owned by the Licensees and considered part of the Project. The Project boundary encompasses lands owned and/or administered by the CTWS, USFS, BLM, State of Oregon, Licensees, and other private landowners. In specific instances, the *TRMP* shall also apply to off-site locations on Reservation, federal, state, and private lands. In addition, the *TRMP* will list construction standards and best management practices (BMPs) for minimizing or mitigating the impacts of Project-related construction activities on terrestrial and aquatic resources. In association with the construction standards and BMPs, the Licensees shall develop and implement a 'worker environmental program' for Project employees, as well as employees of contractors and subcontractors engaged in work or operations at the Project.

TERRESTRIAL RESOURCES MANAGEMENT PLAN

TABLE OF CONTENTS

ACRONYMS AND ABBREVIATIONS

BIA	Bureau of Indian Affairs (USDI)
BLM	Bureau of Land Management (USDI)
BMPs	best management practices
BNR	Bureau of Natural Resources (CTWS)
CTWS	Confederated Tribes of the Warm Springs Reservation of Oregon
FERC	Federal Energy Regulatory Commission
USFS	U.S. Forest Service (USDA)
USFWS	U.S. Fish and Wildlife Service (USDI)
GIS	geographic information system
NOAA	National Oceanic and Atmospheric Administration
ODA	Oregon Department of Agriculture
ODFW	Oregon Department of Fish and Wildlife
ODOF	Oregon Department of Forestry
OPRD	Oregon Parks and Recreation Department
RRIP	Recreation Resources Implementation Plan
SMP	Shoreline Management Plan
SOP	Standard operating procedure
TRMP	Terrestrial Resources Management Plan
TRWG	Terrestrial Resources Work Group
TES	Threatened, endangered, and sensitive
USDA	U.S. Department of Agriculture
USDI	U.S. Department of the Interior

ANNOTATED OUTLINE

1.0 INTRODUCTION

This section will introduce the *TRMP* and discuss the following subjects:

- Background of the Project
- Project description (including operational aspects)
- Purpose and scope of the *TRMP*
- Overview of the *TRMP* (including management approach and plan organization)

2.0 TERRESTRIAL RESOURCES WORK GROUP (TRWG)

A Terrestrial Resources Work Group (TRWG) will be established and conduct its business as described in the August 2004 Settlement Agreement and Exhibit A, Proposed License Articles, which are intended to be included in the New License for the Project. According to those documents, the TRWG is intended to coordinate implementation of the *TRMP* throughout the life of the New License and facilitate consultation between the Licensees, agencies, and CTWS. The Licensees, agencies, and CTWS shall each appoint a representative to serve on the TRWG.

The TRWG will meet at least once per year, generally in March-April, to review the previous year's achievements and activities, and discuss and approve a final annual work plan for the current year. The TRWG may choose to meet at other times of the year, as needed, to address specific *TRMP* activities or unanticipated matters or circumstances.

3.0 COMMUNICATION AND COORDINATION

Timely and effective communications and coordination between members of the TRWG is crucial to the successful implementation of the *TRMP* and achievement of resource goals and objectives. Annual work plans and progress reports, *TRMP* updates, recognition and acceptance of the respective participant roles and responsibilities, and ongoing and active participation from all parties, are essential to good communications and coordination.

3.1 Annual Progress Reports and Work Plans

Each year, the Licensees shall prepare and submit annual progress reports to FERC by June 1, with copies sent to the TRWG. The annual report shall document the previous calendar year's management activities, monitoring results, and compliance with the license terms and conditions. The progress report shall also include a proposed annual work plan that describes planned activities for the current year. The Licensees, in consultation with TRWG, shall complete and submit a final work plan to FERC with copies sent to the TRWG by April 30 each year. The final work plan shall document this consultation.

3.2 *TRMP* Reviews and Updates

The Licensees, in consultation with the TRWG, shall review, update, and/or revise as needed the *TRMP* every 5 years. The updated or revised *TRMP* shall document this consultation. The Licensees shall submit 5-year *TRMP* updates to FERC by the end of each calendar year (December 31) in which the review and updates occur, with copies sent to the TRWG. The initial 5-year update of the *TRMP* will be completed during the 5th calendar year of the New License. Changes or revisions to the *TRMP* would be expected if terrestrial resource conditions change as a result of any unforeseen effects from new or existing Project-related activities. Changes may also be in order if monitoring feedback indicates that resource objectives are not being met and/or it is determined that a specific PME is not providing the intended result and needs to be revised or replaced.

3.3 Roles and Responsibilities

This section describes the roles and responsibilities of the Licensees, agencies, CTWS, and TRWG in the implementation of this *TRMP*. While working in consultation with the TRWG, the Licensees shall be responsible for the following:

- Funding and implementing all aspects of the *TRMP*.
- Coordinating all aspects of the *TRMP* with the agencies, CTWS, and TRWG.
- Consulting with the agencies, CTWS, and TRWG when necessary and as directed in the *TRMP*.
- Preparing, submitting to FERC, and distributing to the agencies, CTWS, and TRWG, the annual progress report, including any monitoring results and a proposed annual work plan.
- Preparing, submitting to FERC, and distributing to the agencies, CTWS, and TRWG, a final annual work plan for the current year.
- Updating the *TRMP* every 5 years; submitting the update to FERC, and distributing it to the agencies, CTWS, and TRWG.
- Appointing a Licensees' representative to the TRWG.
- Coordinating the annual TRWG meeting, including (1) notifying the TRWG participants of the annual meeting at least one month in advance of the meeting, (2) preparing and distributing to the TRWG membership an agenda for the annual meeting, (3) providing arrangements for the annual meeting, including a facility in which to hold the meeting, (4) recording and distributing notes from the meeting that summarize the substance of the meeting (i.e., issues, discussions, decisions), and (5) providing supporting documents and material as needed for the meeting.
- Coordinating additional TRWG meetings as needed throughout the year.
- Participating with the TRWG in the adaptive management process.

Agencies (including BIA, BLM, CTWS-BNR, USFWS, USFS, and ODFW) – the agencies shall be responsible for the following:

- Appointing a representative to the TRWG.
- Participating (i.e., review and comment) in the 5-year *TRMP* update.

- Providing available technical data and expertise as needed to assist in achieving *TRMP* resource management objectives.

Confederated CTWS of the Warm Springs Reservation of Oregon – the CTWS shall be responsible for the following:

- Appointing a representative to the TRWG.
- Participating (i.e., review and comment) in the 5-year *TRMP* updates.
- Providing available technical data and expertise as need to assist in achieving *TRMP* resource management objectives.

Terrestrial Resources Work Group (TRWG) – the TRWG shall be the primary entity providing management direction for the Licensees' terrestrial resources program and shall be responsible for the following:

- Establishing communication protocols for the TRWG and its members.
- Assisting in the development of the initial *TRMP*.
- Attending the annual TRWG meeting in March-April to review the Licensees' activities during the previous year.
- Reviewing and evaluating terrestrial resource compliance and effectiveness monitoring results from the previous year.
- Participating with the Licensees in the adaptive management process.
- Participating with the Licensees in preparation of a final annual work for the current year, including monitoring proposals.
- Participating in the 5-year *TRMP* updates.
- Attending additional TRWG meetings scheduled as needed.

4.0 TERRESTRIAL RESOURCE GOALS AND OBJECTIVES

This section will discuss the terrestrial resource goals and objectives that provide the basis for the *TRMP*. The Licensees, in consultation with the TRWG, will develop resource goals and objectives for plant and animal species and their habitats, consistent with state, federal, and tribal agency goals and objectives.

5.0 SPECIAL MANAGEMENT GUIDELINES

The Licensees shall implement the following programs and standards and guidelines during Project-related construction, habitat improvement activities, and erosion control projects.

5.1 Work Environmental Awareness

The Licensees shall develop and implement a Worker Environmental Awareness Program for their employees, as well as employees of contractors and subcontractors who work at the Project, including related facilities, during construction and operation. Through this program, the

Licensees shall ensure that the above workers are informed about the sensitive biological resources associated with the project or work area.

5.2 Best Management Practices (BMPs)

The *TRMP* shall include BMPs to be used in developing and implementing terrestrial resource activities under the *TRMP* and the Construction Standards. These BMPs shall apply to Project-related construction, which may affect Reservation lands or waters. The Licensees may choose to apply some or all of the BMPs to Project-related construction on non-Reservation lands or waters where appropriate. At a minimum, the BMPs shall address the following:

1. Minimizing ground disturbance in or near wetland and riparian habitats.
2. Prohibiting the fueling of equipment within 500 feet of streams, lakes, and any storm drains or ditches that drain into streams or lakes, except for boats, barges, cranes or other semi-mobile equipment.
3. Avoiding disturbance to nesting birds protected under the federal Migratory Bird Treat Act.
4. Specifications for such restoration undertaking pursuant to the *TRMP*, including suitable species, plant form (e.g., seeds, cuttings, pot-grown), timing of planting, substrate enhancement, performance criteria, and intervention procedures for unmet performance criteria.
5. Guidelines for determining whether post-activity restoration is needed, including extent of disturbance, season of disturbance, type of vegetation disturbed, potential for invasion by exotic species, and specifications for such restoration.
6. Methods for controlling invasion by exotic species, including relevant recommendations from the USFS Region 6 Managing Competing and Unwanted Vegetation Methods Information Profile (USDA FS 1994).
7. The relevant recommendations from the Integrated Resource Management Plan for the Warm Springs Reservation (CTWS and BIA 1997).
8. Standards for other ground-disturbing activities associated with *TRMP* activities.
9. Management guidelines established in the Cultural Resources Management Plan.

5.3 Construction Standards

The *TRMP* shall include Construction Standards for minimizing or mitigating the impacts from Project-related construction activities. These Construction Standards shall apply to Project-related construction, which may affect Reservation lands or waters. The Licensees may choose to apply some or all of the Construction Standards to Project-related construction on non-Reservation lands or waters where appropriate. At a minimum, these Construction Standards shall:

1. Require storm water pollution prevention and control measures for each construction project as needed.
2. Comply with any raptor protection measures outlined in the *TRMP*'s comprehensive bald eagle management and raptor protection strategies.
3. In suitable species habitat, require pre-construction, in-season surveys according to USFWS protocols for any federally listed species specified by the USFWS, including mapping the

location of any sensitive biological resources observed and designating avoidance areas on project construction plans.

4. In suitable species habitat, require that pre-construction surveys for special status plants, as defined by resource agencies in consultation with the Licensees, shall be conducted at the appropriate time of year. In addition, the location of any sensitive plant species observed will be mapped and designated for avoidance on project construction plans.
5. Require mitigation and monitoring for adverse effects to aquatic and terrestrial resources from Project-related construction, including both construction and operations phases of each construction project.
6. Include procedures to avoid taking any federal or state-listed species, or allowed according to appropriate permits and approvals.
7. Require an emergency spill containment kit to contain and remove spilled fuels, hydraulic fluids, and other potential pollutants when working within or near streams, lakes, or ponds,
8. For Project-related construction projects, require that equipment re-fueling or storage of fuels, hydraulic fluids, and potential pollutants will not occur within 500 feet of streams, lakes, or ponds, except for boats, barges, cranes and other semi-mobile equipment.
9. Require personnel to identify and clearly mark sensitive resources for avoidance, educate construction contractors about sensitive biological resource issues and areas intended for avoidance, and monitor construction activities for compliance.
10. Require maximum wetland and riparian vegetation avoidance within the constraints of downstream habitat, fish passage, erosion control, riparian, and wetland habitat improvement project design.
11. Require that all trash will be properly disposed of, and that food-related trash will be removed from the site at the end of each day.
12. Require that no pets will be permitted on downstream habitat or fish passage construction sites.
13. Require that any dead or injured animals observed by the construction crew will be promptly reported to the designated biological monitor.
14. Require, to the extent possible, that any necessary vegetation removal will occur in the non-nesting season.
15. Require appropriate pre-construction surveys and avoidance measures in suitable nesting habitats to protect migratory birds that may nest in vegetation, cliffs, or man-made habitats within the project area during construction and operation.
16. Require wildlife passage where construction activities may result in obstruction of wildlife migration corridors or normal wildlife movement.
17. Require mitigation for unavoidable direct or indirect impacts to riparian vegetation.
18. Require that temporary construction disturbance areas shall be allowed to naturally re-vegetate with pre-disturbance species, if the pre-disturbance species were native. Grades and soil surfaces shall be maintained to support this type of natural vegetation. Where natural re-vegetation is likely to be slow or to be compromised by invasion of the site by exotics, re-vegetation and noxious weed control measures shall be implemented.
19. Require coordination with management practices established in the Cultural Resources Management Plan.

5.4 Sensitive Species Habitat Guidelines

The *TRMP* shall include specific guidelines for avoiding the habitats of known populations of sensitive species where possible and for restoring or replacing any such habitat when disturbance is unavoidable.

5.5 Applicable Agency Guidelines

The *TRMP* shall identify specific USFS, BLM, and tribal standards and guidelines that may apply to Project-related activities. The following documents will be the likely sources for relevant agency standards and guidelines:

1. *IRMP II for the Non-forested and Rural Areas, Integrated Resources Management Plan and Project Assessment*, CTWS.
2. *Land and Resource Management Plan, Ochoco National Forest and Crooked River National Grassland*.
3. *Land and Resource Management Plan, Deschutes National Forest*.
4. *Two Rivers Resource Management Plan*, BLM-Prineville District.
5. *Lower Deschutes River Management Plan*, BLM-Prineville District.
6. Relevant management plans for specific species and habitats, ODFW.

6.0 PROJECT HABITAT LANDS

This section of the *TRMP* shall focus on Project habitat lands acquired by the Licensees to benefit terrestrial plant and animal communities. It will include an overview of the Licensees' previous acquisition program (1993-1995) and a description of the ecological processes and human pressures that have affected the Project habitat lands throughout the years. Each habitat property, or management tract, will be discussed in detail, and include the following components:

- A legal and physical (location) description of the management tract.
- A description of the management tract's existing vegetation communities and structural conditions, as well as the ecological site potential or potential climax vegetation community.
- A discussion of the previous land-uses, management practices, and ecological processes that have occurred on the management tract.
- A description of the Licensees' existing habitat improvements and previous management practices.
- A description of the species value(s) assigned to the management tract. Species values will be determined by the Licensees in consultation with the TRWG.
- A discussion of the desired future condition and habitat objectives for the management tract. Habitat objectives and the desired future condition shall be developed by the Licensees in consultation with the TRWG.
- A discussion of any management constraints that must be considered in achieving the habitat objectives and desired future condition.

- A discussion of the specific management practices and protection, mitigation, and enhancement measures prescribed for the management tract. Management prescriptions will be developed by the Licensees in consultation with the TRWG.

The *TRMP*, and the resource objectives, management strategies, management prescriptions, guidelines, and standards embodied in the *TRMP*, shall apply to the following Project habitat lands, or management tracts:

- *Burnt Ridge* – approximately 2,290 ac, located about 10 mi. southwest of Round Butte Dam in the Metolius Mule Deer Winter Range.
- *Geneva* – approximately 1,130 ac, located about 10 mi. of Round Butte Dam in the Metolius Mule Deer Winter Range.
- *Lower Desert* – approximately 580 ac, located about 3 mi. west of Lake Billy Chinook in the Metolius Mule Deer Winter Range.
- *Wheeler Ranch* – approximately 1,700 ac, located south and west of the confluence of the Metolius and Deschutes river arms of Lake Billy Chinook in an area known as Canadian Bench, in the Metolius Mule Deer Winter Range.
- *Fly Lake* – approximately 590 ac, located 3 mi. south of the upper Metolius River Arm of Lake Billy Chinook in the Metolius Mule Deer Winter Range; includes approximately 13 ac of Fly Lake, an 18-ac shallow lake and wetland.
- *Fly Creek* – approximately 1,350 ac, extending south about 2 mi. from the upper Metolius River Arm of Lake Billy Chinook in the Metolius Mule Deer Winter Range.
- *Campbell Creek* – approximately 97 ac, located just east of the Reregulating Reservoir.
- *Trout Creek Ranch* – approximately 3000 ac, located in the Trout Creek drainage about 18 mi. northeast of Round Butte Dam; includes approximately 3.4 mi. of Trout Creek.

7.0 IMPLEMENTATION MANAGEMENT STRATEGIES

The Licensees, agencies, and CTWS have identified 11 resource management strategies that are considered essential for protecting and/or enhancing terrestrial resources associated with Project. The following sections describe each strategy's intent, as well as its fundamental components. Six of the strategies were re-evaluated by the Licensees, agencies, and CTWS during the pre-license settlement process (marked by an asterisk [*]). The result was agreement by all parties on the substance and text for each of these strategies and the specific PMEs that accompany them. Though the remaining strategies and PMEs (unmarked) were not subjected to the same rigorous re-evaluation as the others, there is general consensus among all parties regarding their intent and scope. The Licensees, in consultation with the TRWG, shall use the following strategy sections as a basis for drafting the final strategies in the *TRMP*. In addition, where specific resource measures or monitoring are listed, the Licensees shall include those measures and monitoring in the TRMP.

7.1 Riparian and Wetland Restoration and Protection

The Riparian and Wetland Restoration and Protection Strategy shall 1) describe appropriate management practices for restoring, managing, and protecting on-site wetlands and riparian

habitats (e.g., within the Project boundary) directly affected by the Project, and 2) describe similar practices for off-site wetlands and riparian habitats on acquired, leased, and/or conserved lands managed for mitigation or enhancement purposes (e.g., Project habitat lands). Riparian habitat and wetland restoration, management, and protection, both on-site and off-site, shall commence within one year of license issuance and continue throughout the life of the license. Riparian areas shall be managed to 80 percent site potential based on a current riparian classification system such as the Proper Functioning Condition Assessment Process (USDI BLM 1993), and to provide the necessary vegetative structural components and complexity to maintain functioning riparian habitat for the New License term. Under the Strategy, the Licensee shall complete the following:

- Identify and quantify the goals, objectives, BMPs, and desired vegetative condition for riparian habitats and wetlands.
- Identify the location and amount of all Project- and recreation-related riparian damage. Where feasible, implement restoration measures to achieve desired riparian conditions.
- Restore, manage, and protect on-site riparian habitats and wetlands, by including the following:

  Project reservoir shoreline riparian habitats - conduct a "Project reservoir shoreline planting feasibility assessment" during years 2 and 3 of the New License to identify suitable shoreline planting and propagation sites. At a minimum, assess endemic native plant phenology, the oxygen and substrate requirements (e.g., soil depth and soil moisture) of various riparian plant species, and the impacts of reservoir draw down regimes on riparian species establishment and propagation. Results of the feasibility assessment will serve as the basis for a shoreline riparian planting program. Fifty percent of the suitable planting sites will be planted within 3 years of completing the feasibility assessment; the remaining suitable sites will be planted during the subsequent 5-year period.

  Shoreline management – maintain ongoing coordination with the Shoreline Management Plan (SMP) for the Project reservoirs to ensure consistency with *TRMP* goals and objectives. The SMP shall include standards and guidelines for new shoreline development, installation of new docks, and modification of existing docks. The SMP shall also include a shoreline erosion control plan that identifies measures for controlling erosion and restoring eroded sites.

  Shoreline wood management – participate in the development of a Shoreline Wood Management Plan as it relates to reservoir shoreline riparian plantings and wildlife habitat in the upper Metolius River Arm (above Rattlesnake Point).

  Recreation resources management – maintain ongoing coordination with the Recreation Resources Implementation Plan (RRIP) to ensure consistency with *TRMP* goals and objectives.

  Riparian area protection fence – with approval from the CTWS and BIA and consent of the allotment owners, construct a livestock exclusion fence to protect and restore riparian habitat on Reservation land adjacent to the Reregulating Reservoir, and provide an alternative water

source for livestock at the site. Maintain the exclusion fence and alternate water source throughout the life of the license.

Cottonwood stand enhancement – with approval from the CTWS and BIA and consent of the allotment owners, cut juniper trees growing within the cottonwood gallery on Reservation land adjacent to the Reregulating Reservoir. Remove young junipers as necessary at 10-year intervals throughout the life of the license.

Pelton waterfowl pond – maintain the existing 2.9-ac pond as a functioning wetland throughout the life of the license so that it provides additional nesting habitat for waterfowl and other wetland related species. Manage the pond to achieve an even mix (50:50) of cover and open water area with good interspersion. Within 5 years of license issuance, reduce the size of existing islands in the pond to increase the amount of open water available to wildlife; and if technically feasible and not limited by other resource constraints (i.e. cultural), expand the overall size of the pond on the south end by approximately 0.9 ac.

Pelton waterfowl pond standard operating procedure (SOP) – in consultation with the TRWG, complete a written SOP for the waterfowl pond within 3 years of license issuance. In consultation with the TRWG, update the SOP as necessary every 5 years.

Invertebrate structures – within 3 years of license issuance, sink and secure 5 bundles of cut juniper trees or other woody debris in the upper Metolius Arm of Lake Billy Chinook (between Rattlesnake Point and the mouth of the Metolius River) to enhance the production of invertebrates as forage for waterfowl and other aquatic/wetland species. Maintain and replenish the wood bundles as necessary throughout the life of the license.

Aquatic emergent vegetation plantings – within 5 years of license issuance, plant hardstem bulrush and/or common cattail at suitable (e.g., shallow, slow moving, or standing water) sites within the Project reservoirs to increase the quantity and distribution of aquatic emergent vegetation available to wildlife. Monitor and maintain the plantings for up to 5 years following the initial planting.

Goose nesting platform – within 2 years of license issuance, install one goose nesting platform near the mouth of Seekseequa Creek (Lake Simtustus). Monitor and maintain the nesting platform throughout the life of the license.

Future riparian habitat and wetland measures – in consultation with the TRWG, develop, fund, and implement new measures as needed to achieve *TRMP* goals and objectives for on-site riparian habitats and wetlands throughout the life of the New License.

- Restore, manage, and protect off-site riparian habitats and wetlands, by including the following:

  Project habitat lands – incorporate all off-site Licensees-owned riparian habitats and wetlands (acquired lands) into the Project. These include 1) approximately 55 ac of riparian habitat on Trout Creek Ranch, including riparian habitat along 3.4 mi. of Trout Creek; 2)

approximately 39 ac of riparian habitat on 'winter range' lands south and west of Lake Billy Chinook, including riparian habitat along 2.3 mi. of Fly Creek and 0.3 mi. of Juniper Canyon Creek; 3) approximately 2 ac of riparian habitat along 0.68 mi. of Campbell Creek; 4) approximately 13 ac of wetlands on 'winter range' lands; 5) approximately 2 ac of wetlands in the Campbell Creek drainage; and 6) 0.2 ac of wetlands on the Trout Creek Ranch.

Fly Lake wetland – throughout the life of the New License, continue the Licensees' existing program of wetland restoration and maintenance at Fly Lake. Maintain existing measures that prohibit livestock grazing and watering and off-road-vehicle use at the lake.

Potter Springs – maintain existing measures that prohibit livestock grazing and watering at several small, partially developed springs, known collectively as Potter Springs. Within 3 years of license issuance, construct and maintain a 'mini' wetland with water piped from the main spring headbox. The exact location and design for this 'mini' wetland project will be determined in consultation with the TRWG. Maintain existing closure of the primitive road that provides access to the site to protect the springs from motor vehicle use. Remove (cut) juniper trees in the vicinity of the springs to increase the potential flow of surface water.

Burnt Snag Pond - maintain existing measures that prohibit livestock grazing and watering at the site and motor vehicle access (permanent closure of spur road). In consultation with the TRWG, and if soil and moisture conditions allow, plant willow or other plant species suited to the site's seasonal wetland character within 3 years of license issuance.

Off-site riparian habitats - throughout the life of the New License, continue the Licensees' existing program of riparian habitat protection, restoration, and maintenance along portions of Trout Creek, Fly Creek, Campbell Creek, and Juniper Canyon.

Future riparian habitat and wetland measures – in consultation with the TRWG, develop, fund, and implement new measures as needed to achieve *TRMP* goals and objectives for off-site riparian habitats and wetlands throughout the life of the New License.

7.2 Vegetation Management

The Vegetation Management Strategy shall provide the long-term framework to improve, protect, and maintain terrestrial plant and wildlife habitat diversity on 1) lands within the Project boundary (e.g., on-site USFS, BLM, Reservation, State, and Project lands) directly affected by the Project, including approximately 0.5 mi. of right-of-way (ROW) for the Pelton (Powerhouse)-Round Butte Switchyard 230-kV transmission line on USFS (CRNG) lands, and 2) lands outside the Project boundary acquired, leased, conserved, and/or managed for mitigation or enhancement purposes (e.g., off-site Project habitat lands). The strategy shall describe appropriate vegetation management practices for restoring, protecting, and maintaining upland terrestrial habitats. Upland vegetation management, both on-site and off-site, shall commence within one year of license issuance and continue throughout the life of the license. Under the Vegetation Management Strategy, the Licensees shall complete the following:

- Identify and quantify the goals, objectives, BMPs, and desired vegetative condition for upland terrestrial plant and animal habitats.

- Restore, manage, and protect on-site upland mosaics through time and space to achieve optimal habitat conditions, and protect and maintain unique and/or sensitive plant and wildlife habitats, by including the following:

  Future upland terrestrial habitat measures – in consultation with the TRWG, design, fund, and implement new vegetation management measures as needed to achieve *TRMP* goals and objectives for on-site upland terrestrial habitats throughout the life of the New License.

- Restore, manage, and protect off-site upland mosaics through time and space to achieve optimal habitat conditions, and protect and maintain unique and/or sensitive plant and wildlife habitats, by including the following:

  Project habitat lands – incorporate all off-site Licensees-owned upland habitats into the Project. These include 1) approximately 7,700 ac of 'winter range' lands in the Metolius Mule Deer Winter Range; 2) 3,000 ac associated with the Trout Creek Ranch (Trout Creek drainage); and 3) 97 ac in the Campbell Creek drainage.

  Existing habitat improvements – maintain existing off-site habitat improvements, including 1) 10 wildlife water guzzlers on 'winter range' lands; 2) 50 bluebird nest boxes on 'winter range' lands; 3) juniper control at 11 sites (197 ac) on 'winter range' lands; and 4) bitterbrush seedings at several sites (200 ac) on 'winter range' lands.

  Future upland terrestrial habitat measures – in consultation with the TRWG, design, fund, and implement new vegetation management measures as needed to achieve *TRMP* goals and objectives for off-site upland terrestrial habitats throughout the life of the New License. These measures may include such activities as grass and shrub seedings, tree plantings, tree thinning, juniper control, and prescribed burns.

- Describe vegetation objectives, desired vegetative condition for terrestrial plants and animals, and BMPs for the Pelton-Round Butte Switchyard 230-kV transmission line ROW on USFS lands. ROW vegetation management shall be consistent with the Licensees' primary goals of providing 1) uninterrupted power line service, 2) fire prevention, and 3) safety.

7.3 Exotic and Invasive Vegetation Management*

The Licensees shall develop, fund, and implement an Exotic/Invasive Vegetation Management Strategy for the prevention, suppression, and containment of exotic and/or invasive plant species, including noxious weeds. The management strategy shall be developed in consultation with the TRWG and incorporated in the TRMP. The strategy shall include an integrated weed management plan developed in coordination with the agencies, CTWS, Oregon Parks and Recreation Department (OPRD), Jefferson County, and Oregon Department of Agriculture (ODA). The Jefferson County and ODA listings of noxious weeds shall be used to define which species are so classified. The strategy and integrated weed management plan shall be

implemented for the life of the license. It shall require the Licensees to undertake and complete, at a minimum, the following activities:

- Within one year following the issuance of the New License and annually thereafter, inventory and map noxious weed presence, distribution, and density.*
- Annually detect and eradicate existing and new infestations of noxious weeds.*
- Identify appropriate management tools based on the plant species involved, location of the infestation, and current management constraints. Control, suppress and contain large-scale infestations.*
- Maintain native plant composition and re-vegetate weed-infested and disturbed sites.*
- Prevent establishment of new invaders by limiting weed dispersal, minimizing soil disturbances, properly managing desirable vegetation.*
- Develop and implement an effectiveness-monitoring program for control of noxious weeds.
- Coordinate with USFS, BLM, BIA, Jefferson County, ODA, OPRD, and CTWS.*
- In addition to Project lands, Licensees-owned Project habitat lands, and Project-related State recreation facilities, the following USFS and BLM roads, campgrounds, trails, and sites adjacent to these facilities where infestations have spread, are treatment areas where the Licensees have responsibility for exotic/invasive plant management and noxious weed control: *

Road Number	**Licensees, USDA Forest Service & DOI BLM Agreement**		**Physical Description of USDA Forest Service and DOI BLM lands along Identified Roads**
	DOI BLM Mi.	**USDA Forest Service Mi.**	
1170		1.7	From the junction with Rd 64, west to junction of Rd 1170-600
35		2.0	From the junction with Rd 6670, south to junction of Rd 64
63	1.0		Rd 63 on BLM lands when crossing the Crooked River
64	.25	2.15	From the junction with Rd 63, west to junction of Rd 1170
64-400, 410, 420, 430, & 460	0.5	2.5	Treatment as follow-up to Rd obliteration
65		1.0	From seasonal closure gate east to Deschutes canyon rim
6510-160		0.5	Treatment as follow up to Rd obliteration
6520		1.5	That portion of 6520 on Canadian Bench
6670		1.5	From the junction of Rd 35, west
6620		0.5	Rd leading to Project HQ
Subtotal	**1.75**	**13.35**	

Campground or Trail Name	DOI BLM Ac.	USDA Forest Service Ac.	Total Ac.
USDA Monty Campground	0	15	15
USDA Perry South Campground	0	25	25
USDA Street Creek Day Use	0	3	3
CPSP Marina & Cabins	20	20	40
CPSP Crooked River Day Use	0	25	25
BLM & CRNG associated with CSP Lower Deschutes Day Use, Upper Deschutes Day Use & Deschutes River Campground	30	40	70
Un-named trails associated with campgrounds	60	60	120
Tam-a-lau Trail	0	90	90
Perry South rope swing trail	0	9	9
TOTALS	**110**	**287**	**397**

- On the Warm Springs Reservation, the Licensees are responsible for exotic/invasive plant management and noxious weed control along: 1) a 2.5-mi. section of the M-110 road that runs west-southwest-northwest from Round Butte Dam, 2) the 2.3-mi. spur road that loops northeast off the M-110 road, and 3) the 0.8-mi. road that provides access to Warm Springs Power Enterprises.*

7.4 Comprehensive Bald Eagle Management*

The Licensees shall develop in consultation with the TRWG, a Comprehensive Bald Eagle Management Strategy. The Licensees shall fund and implement this management strategy. The management strategy and any associated plans and surveys shall be developed in consultation with the TRWG. The Comprehensive Bald Eagle Management Strategy shall provide protection, maintenance and management of bald eagles and their habitats in the vicinity of the Project consistent with the guidelines established in the *Pacific Bald Eagle Recovery Plan* (USFWS 1986). This shall generally be accomplished by protecting and/or enhancing existing habitats for nesting and wintering bald eagles. The strategy shall include the following elements:

- *Annual Nesting Productivity Surveys** - Commencing within one year following the issuance of the New License and then annually thereafter, the Licensees shall conduct bald eagle nesting surveys to monitor trends in nesting productivity and success, and the status of bald eagle nesting pairs that use the Project reservoirs. The Licensees shall conduct the surveys using generally accepted methods that minimize the risk of disturbance to the nesting bald eagles. At least one survey shall be conducted in March/April each year to determine the occupancy rate of nest sites included in the inventory; a follow-up survey shall be conducted in June/July to determine nesting outcome at occupied sites.

- *Potential Nesting Habitat Surveys** - Within three years following the issuance of the New License, the Licensees shall begin aerial or ground surveys of suitable bald eagle nesting habitat to identify any new sites that may be established in the future. Suitable bald eagle

nesting habitat definitions are found in the *Pacific Bald Eagle Recovery Plan* (USFWS 1986). The surveys shall include the tributary canyons of the Metolius River Arm of Lake Billy Chinook, and the tributary canyons of the Metolius River between Lake Billy Chinook and Bean Creek. Surveys for new nest sites shall be repeated every three years throughout the life of the New License.

- *Nest Site Management Plans** – The Licensees shall develop nest site management plans for all bald eagle nest sites associated with the Project reservoirs located on Licensees-owned habitat, Federal, and Tribal lands. Management plans for nest sites on private lands shall be developed if agreed to by the landowner. Nest site management plans for two nest sites (Box Canyon and Seekseequa Creek) on the Warm Springs Reservation shall be completed within two years following the issuance of the New License; nest site management plans for all other nest sites shall be completed within four years of license issuance. Nest site management plans shall also be developed for any new nest sites established during the term of the license. At a minimum, nest site management plans shall include the following:

- Location description (physical);
- Setting (description of nest territory, i.e. lake, roads, campgrounds, etc)
- History (how long used, success, etc)
- Description of the current site (habitat) conditions (a description of essential habitat components within each breeding territory, including the nest site, perch sites, and foraging areas used by the breeding pair);
- Description of the desired habitat conditions;
- Discussion of existing measures that have been taken to protect the nest site and other essential habitat components;
- Discussion of existing and/or potential impediments (risks) to successful breeding outcomes;
- Recommendations for additional protection measures—the Licensees, with approval from the TRWG, shall fund and implement additional protection measures within their control, and cooperate with other landowners and land management agencies to implement measures outside their control; and
- Provisions for a site-specific monitoring program—the purpose of site-specific monitoring is to address Project operations or related activities that may disturb and/or harass bald eagles at bald eagle sites; before site-specific monitoring is considered, the following criteria shall be evaluated by the TRWG:

    1) The nest site or breeding territory was occupied, but failed during the previous 2 breeding seasons, or
    2) The nest site or breeding territory was occupied during at least 3 of the last 5 breeding seasons, but failed in at least 3 of those seasons; and
    3) At a minimum, all reasonable and prudent measures as per ESA have been implemented to protect the site from human disturbance during the nesting season; and
    4) The factors contributing to nesting failure are unknown.

    After evaluating all relevant information and potential factors that might be responsible for nesting failure, the TRWG, in consultation with the Licensees, shall determine whether site-specific monitoring is warranted. A generally accepted methodology shall be selected by the

TRWG in consultation with the Licensees, and used for site-specific monitoring; however, the preference is to use trained observers. Information from site-specific monitoring will be used to formulate recommendations for additional protection measures. The Licensees shall implement additional protection measures where the site-specific monitoring indicates Project-related effects to nesting bald eagles.

- *Annual Fall and Winter Communal Roost Site Surveys** - Commencing within one year following the issuance of the New License, and then annually thereafter, the Licensees shall conduct fall and winter communal roost surveys at known communal roosts associated with the Project reservoirs. There is currently one fall communal roost site and two winter communal roost sites. New sites might develop over time, while use at existing sites might cease. If bald eagle use at an existing roost site ceases and does not reoccur over a 5-year period, then surveys shall no longer be required at the site. The winter roost sites shall be surveyed monthly during February and March. The monthly surveys shall consist of an evening count of bald eagles flying into the roosts, followed by a count the next morning of eagles leaving the roosts. If evidence indicates use of a new communal roost site may be occurring, the Licensees shall undertake measures approved by the TRWG to identify the new roost site. The fall roost(s) shall be surveyed once during the latter part of October and a second time in November. The fall surveys shall be conducted in the same manner as the winter roost surveys.

- *Communal Roost Site Management Plans** – The Licensees shall develop communal roost site management plans for all bald eagle communal roosts associated with the Project reservoirs on Licensees-owned habitat, Federal, and Tribal lands. There are currently two winter roost sites and one fall roost site on National Forest System lands, Deschutes National Forest. The management plans shall be completed within 4 years following the issuance of the New License. Management plans shall also be developed for any new roosts identified during the term of the license. At a minimum, communal roost site management plans shall include the following:

- Location description (physical);
- Setting (description of communal roost, i.e. lake, roads, campgrounds, etc);
- History (how long used, success, etc);
- Description of the existing use by wintering bald eagles;
- Description of the current site (habitat) conditions (a description of essential habitat components within each communal roost);
- Description of the desired habitat conditions;
- Discussion of existing measures that have been taken to protect the communal roosts and other essential habitat components;
- Discussion of existing and/or potential impacts (risks) to the roost sites; and
- Recommendations related to additional protection measures—the Licensees, with approval from the TRWG, shall fund and implement additional protection measures within their control, and cooperate with other landowners and land management agencies to implement measures outside their control.

- *Annual Project Reservoirs Winter-use Surveys** - Commencing within one year following the issuance of the New License, and then annually thereafter, the Licensees shall monitor winter use of the Project reservoirs by bald eagles. The Licensees shall conduct monthly surveys in January, February, and March to accomplish this task. The January survey shall be timed to coincide with the statewide Oregon mid-winter bald eagle count; the February and March surveys shall be scheduled to coincide with the winter communal roost surveys.

7.5 Raptor Protection*

The Licensees shall develop, in consultation with the TRWG, a Raptor Protection Strategy. The Licensees shall fund and implement this management strategy. The management strategy and any associated plans and surveys shall be developed in consultation with the TRWG. The primary purpose of the Raptor Protection Strategy is to provide a safe environment where all raptors can live, breed, forage, and winter. The strategy shall include the following elements:

- *Golden Eagles** – Commencing within one year following the issuance of the New License and then annually thereafter, the Licensees shall conduct golden eagle nesting surveys to monitor trends in nesting productivity and success, and the status of golden eagle nesting pairs associated with the Project reservoirs. The Licensees shall conduct the surveys using generally accepted methods that minimize the risk of disturbance to the nesting eagles. At least one survey shall be conducted in March/April each year to determine the occupancy rate of nest sites included in the inventory; a follow-up survey shall be conducted in June/July to determine nesting outcome at occupied sites. Site-specific monitoring may be required for individual breeding territories that develop or demonstrate a history of poor nesting success; before site-specific monitoring is considered, the following criteria shall be evaluated by the TRWG:

  1) The nest site or breeding territory was occupied, but failed during the previous 2 breeding seasons, or
  2) The nest site or breeding territory was occupied during at least 3 of the last 5 breeding seasons, but failed in at least 3 of those seasons; and
  3) All reasonable and prudent measures have already been implemented to protect the site from human disturbance during the nesting season; and
  4) The factors contributing to nesting failure are unknown.

  After evaluating all relevant information and potential factors that might be responsible for nesting failure, the TRWG, in consultation with the Licensees, shall decide whether site-specific monitoring is warranted. A generally accepted methodology shall be selected by the TRWG in consultation with the Licensees, and used for site-specific monitoring; however, the preference is to use trained observers. Information from site-specific monitoring shall be used to develop recommendations for additional protection measures. The Licensees shall fund and implement additional protection measures where the site-specific monitoring indicates Project-related effects to nesting golden eagles.

- *Ospreys** – The Licensees shall monitor every other year, the nesting productivity of ospreys that nest in the Project vicinity. Nesting productivity surveys will commence within one year

of issuance of the New License. The Licensees shall conduct the surveys using generally accepted methods that minimize the risk of disturbance to the nesting ospreys. Surveys shall be conducted in early July each year to determine the number, location, and productivity of all active nest sites included in the inventory.

- *Prairie Falcons** – The Licensees shall monitor the nesting productivity of prairie falcons encountered incidentally during the golden eagle nesting surveys.

- *Avian Power Line Electrocution and Collision** – Within one year following issuance of the New License, the Licensees shall survey Project-related distribution lines to identify the potential for avian electrocution. These include the following: (1) 12.5-kV line to Round Butte Powerhouse, Station Service Feeder; (2) 12.5-kV line to Round Butte Dam, Spillway, and Auxiliary Station Feeder; and (3) 12.5-kV line to the Reregulating Dam. The Licensees shall "raptor-proof" (i.e. rebuild or retrofit) any line or power pole involved in a bird fatality or injury, following guidelines in the publication "Suggested Practices for Raptor Protection on Power Lines: The State of The Art in 1996" (APLIC 1996), or the most current Avian Power Line Interaction Committee (APLIC) publication for avian protection. The Licensees shall keep records (species, location, etc) of any raptor fatalities.

  Electrocutions are rare or nonexistent (none have been reported) along the 7.9-mi. Pelton-Round Butte Switchyard 230-kV transmission line because the distances between conductors, and between conductors and grounded hardware, are greater than the wingspan of any avian species. Collisions between birds and transmission lines are difficult to document, however, there are a number of factors that suggest the Pelton-Round Butte Switchyard transmission line does not represent a significant collision risk to avian species in the vicinity. Should electrocutions or collisions occur in the future, the Licensees shall follow APLIC guidelines in implementing measures to correct the problem.

- *Eagle Protection Study** - Within 5 years following issuance of the New License, the Licensees shall develop, fund, and implement an eagle protection study. The eagle protection study might provide information that can be used to develop additional protection measures, if data indicate Project-related effects to adult and juvenile eagles. The study shall focus on the following: (1) fledgling survival and use of Project reservoirs for foraging; and (2) juvenile survival and dispersal patterns and use of Project reservoirs for foraging. The TRWG, in consultation with the Licensees, shall determine the exact purpose of the study, methodology, and whether the focus should be on bald eagles and/or golden eagles. The preferred methodology is radio tracking and observing juvenile eagles fitted with GPS/VHF/satellite radio transmitters. Two annual cohorts of 3-5 eaglets would be fitted with transmitters and monitored for 3 years following fledging.

7.6 Threatened, Endangered, and Sensitive (TES) Species and Habitats of Special Concern

The TES Species and Habitats of Special Concern Strategy shall include various measures for protecting and maintaining TES species and designated habitats of special concern that occur in the Project vicinity and are affected or potentially affected by Project-related activities. The strategy shall also address TES species and habitats of special concern protection and

maintenance on Project habitat lands. The Licensees, in consultation with the TRWG, shall complete the following:

- Identify and quantify the goals, objectives, and desired conditions for TES species and their habitats and habitats of special concern.
- Identify the occurrence and location of TES species and habitats of special concern and any potential impacts from Project-related activities.
- Identify specific guidelines for avoiding the habitats of known populations of sensitive species where possible and for restoring or replacing any such habitat when disturbance is unavoidable.
- Protect, maintain, and manage TES species and habitats of special concern, including the following:

  Geographic information system (GIS) map and database - develop, fund, and maintain a GIS map and database for TES species and habitats of special concern throughout the life of the New License. If an outside source, such as the CTWS, is used for the GIS work, then the Licensees shall fund up to 0.5 FTE annually for outside technical support (CTWS) to develop and maintain the system. The GIS map and database will be accessible to Jefferson County, federal and state agencies, and the CTWS for planning and habitat protection purposes.

  Recreation development suitability analysis – to assist in planning for future recreation development in a way that ensures protection for TES species and habitats of special concern, provide county, state and federal agency, and tribal access to the Recreation Development Suitability Analysis completed by the Licensees in 1999 (EDAW 1999). Using GIS technology, a composite suitability map was developed from a number of 'opportunity' and 'constraint' layers. The composite suitability map ranks various areas in the Project vicinity as to their suitability for future recreation development, using an assessment of a variety of physical and ecological factors.

  Law enforcement – provide funding for additional law enforcement personnel, 1.0 FTE sheriff's deputy or state police officer annually for the life of the New License, to ensure that protection measures for TES species, sensitive plant communities, wildlife habitats, and habitats of special concern are respected by the public. The Licensees shall provide adequate funding to underwrite the salaries, benefits, training, watercraft, vehicles, and associated law enforcement supplies to support the additional enforcement personnel. At a minimum, the list of enforcement activities for accountability shall include compliance with seasonal and permanent road closures, ATV use restrictions, eagle nest site and winter range protection, dispersed camping restrictions, shooting ordinances, wildlife harassment, and coordination with Oregon State Police and Coordinated Enforcement Programs.

  Endangered species alert program – fund, develop, and implement an Endangered Species Alert Program that includes a manual and training program for Project personnel. The manual and training program shall provide information on protected species and legal requirements, as well as illustrations and descriptions of the species, their habitats, and maps of their occurrence or potential occurrence within the Project boundaries, specific

instructions on preliminary evaluation of a site prior to surface-disturbing activity, and instructions on whom to contact if protected species may occur in the proposed activity area.

Recreational activity on Project reservoirs – the Licensees shall not undertake or fund any action that would increase recreation capacity of the Project reservoirs and significantly impact wildlife or wildlife habitats as a result. This policy of supporting no net increase in recreation capacity on Project reservoirs is consistent with the Licensees' recreation management goals (*Pelton Round Butte Comprehensive Management Plan*, March 1999).

Biological evaluations/assessments – before taking actions to construct new Project features (including but not limited to proposed recreation developments) that may affect a USFS, BLM or Tribal sensitive species or its habitat, or a federally listed species, the Licensees, if necessary, shall prepare a biological evaluation or assessment (whichever is deemed appropriate), evaluating the potential impact of the action on the species or its habitat and submit it to the appropriate governmental agency. These agencies may require mitigation measures for the protection of the sensitive species.

Dispersed recreation management – develop, fund, and implement specific measures designed to reduce and/or limit the effects of dispersed recreation on shoreline vegetation and bank stability at the Project reservoirs. These actions may include 'hardening' some well-use dispersed sites, while eliminating others and restoring the sites (refer to RRIP).

Interpretation and education program – develop, fund, and implement an interpretation and education (*I&E*) program that emphasizes TES species, sensitive habitats, and habitats of special concern. The Licensees shall give preference to cooperative *I&E* opportunities involving the agencies, CTWS, conservation groups, educational and scientific organizations such as the Oregon Museum of Science and Industry, and private landowners. Potential themes for *I&E* programs include resource stewardship, TES species biology and protection, sensitive plant communities protection, riparian habitat restoration, winter range protection, mule deer biology and habitat requirements, and causes and effects of human disturbance.

On-site protection of bat habitats – protect and maintain the Yuma myotis maternity and night roost sites at Round Butte Dam (fish channel and west abutment grout tunnel, respectively).

Additional protection measures – develop, fund, and implement additional protection measures as needed throughout the life of the New License to protect TES species, sensitive habitats, and habitats of special concern. Identify additional measures for research, mitigation measures and habitat enhancement opportunities if additional species are listed during the New License period.

Bald eagles – see 7.4, Comprehensive Bald Eagle Management.

Golden eagles, ospreys, other raptors – see 7.5, Raptor Protection.

7.7 Wildlife Control*

The Licensees shall cooperate with ODFW on the management of wildlife control by granting the agency or its agent(s) access to Project lands outside of the CTWS Reservation for the purpose of alleviating wildlife damage and/or depredation associated with Round Butte Fish Hatchery, the Pelton Fish Ladder and Fish Trap, or nearby non-Project lands, such as agricultural damage. This may include access for state-sponsored emergency hunts when such activities do not compromise Project safety and security. The Licensees shall provide this cooperation throughout the term of the license.

7.8 Travel and Access Management*

Within one year following the issuance of the New License, the Licensees shall develop, fund, and implement a Travel and Access Management Strategy designed to: 1) improve habitat effectiveness in the Metolius Mule Deer Winter Range, 2) protect sensitive wildlife from human interference during critical times of the year, and 3) protect and enhance sensitive plant and animal habitats. The management strategy shall be developed in consultation with and approval by the TRWG. The strategy shall require the Licensees to:

- Improve and maintain the current travel and access management program on Licensees-owned Project habitat lands (see FJAA, E-IV) throughout the life of the New License.*
- Continue participation in cooperative road closure programs with the Crooked River National Grassland (CRNG) and BLM, particularly seasonal road closures near Geneva and on Canadian Bench.*
- Work cooperatively with the CRNG, BLM, County, and adjacent landowners in an effort to expand the existing seasonal winter range road closure program on Canadian Bench.*
- Close or obliterate and decommission to agency standards the following identified USFS and DOI-BLM roads within 5 years following issuance of the New License: *

Road/Spur No.	Ownership	Location	Closure Type	Est. Road miles
6520-140	USDA Forest Service	T.11 S., R.12 E, sec. 34	Obliterate & Decommission	0.75
6670-060,and 100	USDA Forest Service	T.11 S., R.12 E, sec. 22, 23 & 26	Gate	0.75
6510-160	USDA Forest Service	T.11 S., R.12 E, sec. 32	Obliterate & Decommission	0.75
6510-100	USDA Forest Service	T.12 S., R.12 E, sec. 5	Obliterate & Decommission	0.25
6510-020	USDA Forest Service	T.12 S., R.12 E, sec. 9	Gate	1.5
6400-400, 410, 420, 430, and 460	USDA Forest Service	T.11 S., R.11 E, sec. 28 & 33	Obliterate & Decommission	2.0
6400 - 460	DOI - BLM	T.11 S., R.11 E, sec. 28 & 33	Obliterate & Decommission	0.50
1170-800 and 890	USDA Forest Service	T.12 S., R.10 E, sec. 1 T.12 S., R.11 E, sec. 5 & 6 T.11 S., R.11 E, sec. 31, 32 & 33	O&M of Closure	2.5/ 1.25
1170-960	USDA Forest Service	T.12 S., R.11 E, sec. 8	Gate	1.3
TOTAL				**11.55**

- Monitor and maintain the road closures (permanent and seasonal closures and decommissioned roads) listed above for federal lands throughout the term of the New License.*

7.9 Public Access

The Public Access Strategy shall address the use of Project habitat lands for recreational purposes. The strategy will identify which forms of recreation are consistent with the primary goals of protecting, improving, and maintaining plant communities and wildlife habitats on Project habitat lands and describe how those uses will be managed. The Licensees shall develop the strategy in consultation with the TRWG. Recreational use may not be a viable option in all cases if it places plant and animal communities at risk, or cultural resources may be impacted. The Licensees will implement recreational management measures on Project habitat lands within one year of issuance of the New License. At a minimum, the Public Access Strategy shall include the following:

- A description of the types and appropriate levels of recreational use and public access that will be allowed on the Trout Creek Ranch property during the next license. To prevent harm or damage to resource values associated with the Ranch, and to prevent trespass onto neighboring private lands, public access for recreational purposes will be offered on a managed and/or controlled basis. The primary objective of protecting and enhancing fish and wildlife habitat on the Ranch has priority over all other uses. Public access will be tailored to ensure that this objective is met. The concept of managed and/or controlled access will encourage a variety of uses, including programs designed for educational, scientific, and/or interpretive purposes, and opportunities for hunting, bird watching, and hiking. Unfettered public access to the Ranch will not be allowed. The Licensees, in consultation with the TRWG, will work with interested parties such as OMSI, ODFW, and CTWS to design programs for controlled public access and recreational use of the Ranch that can be easily and efficiently managed.

- A description of the types and appropriate levels of public use that will be allowed on Licensees-owned 'winter range' habitat lands (i.e., Burnt Ridge, Geneva, Lower Desert, Wheeler Ranch, Fly Lake, Fly Creek, and Campbell Creek tracts) during the next license. Public access and recreation will be managed to prevent harm or damage to resource values associated with these lands. The primary objective of protecting and enhancing fish and wildlife habitat on 'winter range' Project habitat lands has priority over all other uses. The Licensees, in consultation with the TRWG, will work with interested parties such as ODFW, USFS, BLM, and CTWS to design programs for public access and recreation that can be easily and efficiently managed.

- A list of Project lands where public access is limited or restricted altogether due to safety and/or security reasons.

7.10 Pelton Fish Ladder Wildlife Protection*

Within one year following the issuance of the New License, the Licensees shall install 5 new small animal crossings over the Pelton Fish Ladder, remove the shotgun style outlets from 6 culverts that pass under the fish ladder and install a wildlife diversion device in the dirt canal section of the fish ladder to improve crossing opportunities for small mammals, reptiles and amphibians. Design and construction locations of the small animal crossings and the canal diversion device shall be determined in consultation with and approval by the TRWG. The Licensees shall maintain the existing wildlife crossing for the life of the license.

The Licensees shall monitor animal entrapment and mortality in the fish ladder throughout the life of the license. Monitoring results will be used to determine if additional protection measures are necessary in the future. Within two years following the issuance of the New License, the Licensees shall conduct effectiveness monitoring (animal track counts) at the 5 overhead small animal crossings and 6 underground culvert crossings for a period of two years. The Licensees shall consult with the TRWG to determine the methodology and appropriate level of sampling effort for effectiveness monitoring. If monitoring results indicate that additional small animal crossings would be beneficial, they may be added in the future. The TRWG, in consultation with the Licensees, shall determine whether additional small animal crossing should be installed.

7.11 Wildlife Monitoring

The Wildlife Monitoring Strategy covers specific wildlife population monitoring activities and special studies that the Licensees have agreed to conduct or participate in during the term of the New License, including the following:

- *Bald eagle annual productivity* – The Licensees shall conduct bald eagle nesting surveys annually to monitor trends in nesting productivity and success, and the status of bald eagle nesting pairs that use the Project reservoirs. Surveys shall be conducted at appropriate times during the nesting season to determine the occupancy rate and subsequent nesting success of all nest sites (currently 8 sites) in the survey area. The occupancy rate shall be determined by surveying each nest site at least once in March/April. A nest site shall be recorded as occupied if at least one adult bald eagle is present at or near the site. Occupancy surveys shall be conducted from the ground using spotting scopes and/or field binoculars. Observation points shall be located a safe distance from the nest to avoid disturbing the eagles. Nesting success shall be determined from nest site surveys conducted in late May/June. Each site will be surveyed from a helicopter or the ground to determine whether young are present. The number of young and their plumage stage (using standard USFWS protocol) shall be recorded. Nest sites shall be re-visited as necessary to confirm nesting success and the number of young. The target timeframe for conducting these surveys shall be June 10 to June 20. Nest status shall be reported using protocols outlined in the annual report of *Bald Eagle Nest Locations and History of Use in Oregon and the Washington Portion of the Columbia River Recovery Zone 1971 through 2003* (Issacs and Anthony 2003). Overall nesting success shall be reported as the ratio of successful nests to occupied nests.

Results of the nesting productivity surveys shall be reported to the TRWG, and statewide nesting survey coordinator (currently Oregon Cooperative Fish and Wildlife Research Unit, Oregon State University) within 30 days of completing the surveys. The results shall also be included in the annual progress report for terrestrial resources.

- *Bald eagle Project reservoirs winter use* – The Licensees shall monitor winter use of the Project reservoirs by bald eagles throughout the life of the license. Monthly surveys will be conducted in mid January, mid February, and mid March to document the winter abundance and distribution of bald eagles associated with the Project reservoirs. The January survey shall be timed to coincide with the statewide Oregon mid-winter bald eagle count; the February and March surveys shall be scheduled to coincide with the winter communal roost site surveys. All three Project reservoirs shall be surveyed on the same day to obtain as accurate a count as possible. An outboard motor boat will be used to observe and count eagles at Lake Billy Chinook. At Lake Simtustus, eagles will be counted at several viewpoints overlooking the reservoir, as well as from a boat. Eagles will be observed at the Reregulating Reservoir by patrolling the shoreline with a pickup truck.

  Results of the winter use surveys will be reported in the annual progress report for terrestrial resources. The January count that coincides with the statewide mid-winter bald eagle count will be reported to the state mid-winter eagle count coordinator (currently Oregon Cooperative Fish and Wildlife Research Unit, Oregon State University) within 30 days of completing the survey.

- *Bald eagle fall and winter communal roost sites* – The Licensees shall conduct fall and winter communal roost surveys annually at known communal roost sites associated with the Project reservoirs. There is currently one fall communal roost site and two winter communal roost sites. The communal roost surveys shall also include any new sites established in the future.

  Winter roost sites shall be surveyed monthly from February to March, generally near the midpoint of each month. The winter surveys shall include an evening count of bald eagles flying into the roosts, followed by a morning count of eagles leaving the roosts. The observer(s) shall be located a safe distance from the roost sites to avoid disturbing the eagles, and use field binoculars or a spotting scope to observe the eagles. The observer(s) shall arrive at the observation viewpoint(s) at least 2 hours before sunset and 1 hour before sunrise. Both evening and morning counts shall be conducted during the same 24-hour period.

  Fall communal roost sites shall be surveyed at least once between October 15 and 31, and at least one other time during November. The fall surveys shall be conducted in the same manner as the winter roost surveys.

  Results of the fall and winter communal roost site surveys shall be reported in the annual progress report for terrestrial resources.

- *Bald eagle potential nesting habitat* – Every three years, the Licensees shall conduct aerial and/or ground surveys of suitable bald eagle nesting habitat to identify any new nest sites that

may occur in the future. A definition of suitable bald eagle nesting habitat is found in the *Pacific Bald Eagle Recovery Plan* (USFWS 1986*)*. The surveys shall cover the tributary canyons of the Metolius River Arm of Lake Billy Chinook, and the tributary canyons of the Metolius River between Lake Billy Chinook and Bean Creek.

The location and site characteristics of any new nest site shall be mapped and recorded. New nest sites shall be reported to the appropriate land management agency (i.e., USFS, BLM), ODFW, ODOF, USFWS, BIA, CTWS-BNR, and statewide nesting survey coordinator (currently Oregon Cooperative Fish and Wildlife Research Unit, Oregon State University) within 30 days of completing the survey. Results of the nesting habitat surveys shall also be reported in the annual progress report for terrestrial resources.

- *Golden eagle annual productivity* – The Licensees shall conduct golden eagle nesting surveys to monitor trends in nesting productivity and success, and the status of golden eagle nesting pairs associated with the Project reservoirs. Surveys shall be conducted at appropriate times during the nesting season to determine the occupancy rate and subsequent nesting success of all nesting territories (currently 7 territories) in the survey area. The occupancy rate shall be determined by surveying each nesting territory at least once in March/April. A nesting territory shall be recorded as occupied if at least one adult bald eagle is present at or near the site. Occupancy surveys shall be conducted from the ground using spotting scopes and/or field binoculars. Observation points shall be located a safe distance from the nest site to avoid disturbing the eagles. Nesting success shall be determined from nest site surveys conducted in late May/June. Each site will be surveyed from a helicopter or the ground to determine whether young are present. The number of young and their plumage stage (using generally accepted protocol) shall be recorded. Nest sites shall be re-visited as necessary to confirm nesting success and the number of young. The target timeframe for conducting these surveys shall be June 10 to June 20. Nest status shall be reported using the same protocols designed for bald eagle nesting surveys outlined in the annual report of *Bald Eagle Nest Locations and History of Use in Oregon and the Washington portion of the Columbia River Recovery Zone 1971 through 2003* (Issacs and Anthony 2003). Overall nesting success shall be reported as the ratio of successful nesting territories to occupied territories.

  Results of the nesting productivity surveys shall be reported to the TRWG within 30 days of completing the surveys. The results shall also be included in the annual progress report for terrestrial resources.

- *Site-specific monitoring* – see 7.4, Comprehensive Bald Eagle Management, *Nest Site Management Plans* and 7.5, Raptor Protection, *Golden Eagles*.

- *Prairie falcon annual productivity* – The Licensees shall monitor the nesting productivity of prairie falcons encountered incidentally during the golden eagle nesting surveys. Currently, there are two known prairie falcon eyries in the Project vicinity. The eyries will be surveyed during the golden eagle occupancy and nesting success surveys. New eyries will be added to the survey in the future, should they occur.

Results of the nesting productivity surveys shall be reported to the TRWG within 30 days of completing the surveys. The results shall also be included in the annual progress report for terrestrial resources.

- *Osprey nesting productivity* – The Licensees shall monitor every other year, the nesting productivity of ospreys that nest in the Project vicinity. The survey area shall include the Project reservoirs, the Metolius River corridor between Lake Billy Chinook and "El Rancho" (RM 16.6), and the Deschutes River corridor between the Reregulating Dam and the State Highway 26 bridge at Warm Springs (RM 97). The Licensees, at their discretion, may choose to expand the surveys to additional upstream and downstream reaches of the Metolius and Deschutes rivers, respectively. The surveys shall be conducted in July each year, with the target timeframe being July 5 to 20. Whenever possible, the surveys shall be conducted from the air using a helicopter. New nest sites encountered during the nesting surveys shall be recorded and mapped. Nesting productivity shall be reported in terms of the number of active nest sites and the number of young observed.

  Results of the nesting productivity surveys shall be reported to the TRWG within 30 days of completing the surveys. The results shall also be included in the annual progress report for terrestrial resources.

- *Waterfowl annual productivity* – The Licensees shall monitor the annual nesting productivity of waterfowl that nest in association with the Project reservoirs. Two surveys shall be conducted: (1) one survey between May 15 and 30 to document the total number of goose broods and young produced; and (2) a second survey between June 20 and July 10 to document the total number of duck broods and young produced. Lake Billy Chinook and Lake Simtustus shall be surveyed in their entirety from a boat. The Reregulating Reservoir shall be surveyed from shore using a pickup truck. Observers will use field binoculars and/or spotting scopes to ensure accuracy. The species and number of young in each brood observed will be recorded. Each brood will be classified according to its current stage of development (e.g., Class I – downy, Class II – downy/feather mix, and Class III- fully feathered).

  Results of the surveys shall be reported to ODFW within 15 days of completing the surveys. The results shall also be reported in the annual progress report for terrestrial resources.

- *Waterfowl nest sites* – To develop an index of the value of wetlands and riparian habitat for waterfowl nesting, the Licensees shall conduct waterfowl nest site surveys every 5 years. The surveys shall be conducted on foot along pre-determined routes established near the shorelines of Chinook Island (Lake Billy Chinook) and the Reregulating Reservoir (including the Pelton Waterfowl Pond). Two sets of surveys shall be conducted: (1) one set of surveys between March 1 and 15 for early nesting species (i.e., geese); and (2) a second set of surveys between April 25 and May 10 for later nesting species (i.e., ducks). Observers will record the number and status (i.e., active, incubating, predated) of waterfowl nests encountered along the survey routes.

  Results of the surveys shall be reported in the annual progress report for terrestrial resources.

- *Waterfowl winter use* – Each year in January, the Licensees shall conduct a survey of the Project reservoirs to document winter use by waterfowl. The surveys shall be conducted by boat at Lake Billy Chinook and Lake Simtustus. Waterfowl will be counted from the shore at the Reregulating Reservoir. All three reservoirs will be surveyed in their entirety. The species and numbers observed for each species will be recorded. Observers will use field binoculars and spotting scopes to ensure the accuracy of the counts.

  Survey results will be reported to ODFW within 15 days of completing the survey. The results will also be reported in the annual progress report for terrestrial resources.

- *Breeding birds* – The Licensees, in consultation with the TRWG, shall develop, fund, and implement breeding bird surveys for landbirds residing in the Project vicinity and on Project habitat lands in the Metolius Mule Deer Winter Range and Trout Creek watershed within 2 years of license issuance. The surveys shall be conducted throughout the life of the license. Though the Licensees in consultation with the TRWG will define the exact purpose of the surveys and methodology that will be used, it is suggested that the methods follow those used in the seasonal wildlife surveys conducted by EDAW, Inc. for PGE in 1996-1997 (McShane et al. 1999). The surveys shall be designed to cover a variety of plant communities to document habitat use by breeding birds. The Licensees, in consultation with the TRWG, shall also develop a schedule for the surveys (e.g., annually, every other year, or other appropriate timeframe).

- *Mule deer trend counts and sightability estimates* – The Licensees shall contribute a total of $5,700 annually, throughout the life of the license, toward the cost of conducting mule deer trend counts and sightability surveys on Reservation lands, the Metolius Mule Deer Winter Range, and Trout Creek watershed. The Licensees shall consult with CTWS-BNR and ODFW to determine what portion of the total dollar amount will be allocated to each agency on an annual basis for the counts and surveys.

- *Cooperative mule deer radio telemetry* – The Licensees will participate in a cooperative mule deer telemetry study with ODFW. Other possible cooperators include USFS, BLM, USFWS, U.S. Geological Survey, CTWS, conservation interests, and private landowners. The Licensees shall contribute a total of $50,000 toward the overall cost of the study. In addition, the Licensees shall provide a limited amount of in-kind biological support for the study. The Licensees' $50,000 contribution and in-kind support shall be directed at the mule deer resource directly or in-directly related to the Project.

- *Eagle protection study* – see 7.5, Raptor Protection, *Eagle Protection Study*.

8.0 MONITORING AND ADAPTIVE MANAGEMENT

Adaptive management is crucial in achieving terrestrial resource goals and objectives, and as such, is a key element of the *TRMP*. The Licensees, in consultation with the TRWG, shall identify an adaptive management process that will apply to all aspects of the *TRMP* throughout

the life of the New License. The objective of adaptive management shall be to monitor the implementation (compliance) and effectiveness of specific mitigation, enhancement, and protection measures, and to modify those actions as needed to meet resource-specific goals and objectives. The data generated from monitoring will be analyzed and used to evaluate changes in condition and progress toward meeting resource management objectives. Monitoring shall provide the necessary information to track and assess the effects of specific management actions on terrestrial resources, and to change if necessary, future management actions or resource objectives.

Adaptive management shall be based on periodic monitoring cycles tailored to each resource objective and the temporal expectation for change related to a specific mitigation or management action. The Licensees shall report the results of the previous year's monitoring activities in the annual progress report. The Licensees and TRWG shall review and evaluate the monitoring results at the annual TRWG meeting to be held each March-April. The primary purpose of the evaluation process shall be to determine whether management practices are achieving resource objectives, or should be changed. The Licensees and TRWG may request outside peer review of the monitoring results to assist in developing and evaluating adaptive management actions. Subsequent to the annual evaluation process and/or peer review, the Licensees, in consultation with the TRWG, shall develop and implement specific monitoring proposals for the current year. Monitoring activities will be incorporated into an annual work plan for terrestrial resources.

The goal of monitoring should be to develop a scientifically defensible estimation of the status and trends in the terrestrial resources being monitored, and to determine whether management practices are supporting those resources or should be changed (Gibbs et al. 1999). To ensure success, monitoring must be linked to well-defined objectives. In some instances, monitoring may involve testing specific hypotheses related to resource objectives or their components. The Licensees, in consultation with the TRWG, shall define site-specific resource objectives that are both realistic and measurable. These objectives should articulate the following (Elzinga et al. 1998): (1) what will be monitored, (2) the geographic scope of the monitoring, (3) the specific metric of the indicator that will be measured, (4) the anticipated response to the management action, (5) the magnitude of change anticipated, and (6) the anticipated time frame over which the response should occur. Prior to initiating site-specific monitoring actions, the Licensees, in consultation with the TRWG, shall establish baseline biological conditions for the resources that will be monitored. This will be accomplished using existing data and information, and/or new data collected through appropriately designed field surveys.

The Licensees, in consultation with the TRWG, shall establish monitoring protocols and schedules. Monitoring parameters, or indicators, that best display the current condition and dynamics of the system being managed should be selected for monitoring (Gibbs et al. 1999). Preference shall be given to indicators that not only demonstrate the existence of change, but which can also be linked to the cause of change. Monitoring intensities shall reflect the need to obtain sufficient enough data to have a reasonable chance of detecting change. With respect to the action items contained in this *TRMP*, a majority of the indicators selected for monitoring purposes will most likely be associated with selected plant communities and wildlife populations. The results of several of the wildlife monitoring activities identified in the Wildlife Monitoring Strategy (7.11) could potentially be used for adaptive management purposes.

9.0 REFERENCES

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GLOSSARY

(to be developed)

Appendix A: Implementation Schedule
Appendix B: Pelton Waterfowl Pond Standard Operating Procedure (SOP)
Appendix C: Integrated Weed Management Plan
Appendix D: Bald Eagle Nest Site Management Plans
Appendix E: Bald Eagle Communal Roost site Management Plans

Pelton Round Butte Project
Settlement Agreement

E X H I B I T F

Description of
TROUT CREEK HABITAT IMPROVEMENT PROJECT

Pelton Round Butte Project – FERC No. 2030

July 2004

EXHIBIT F

Description of Trout Creek Habitat Improvement Project

The Licensees will fund a channel enhancement and berm removal project on the mainstem of Trout Creek in the lower Deschutes River Basin to benefit the production of anadromous salmonids. This project was identified in cooperation with the Confederated Tribes of Warm Springs Branch of Natural Resources, the Oregon Department of Fish and Wildlife (ODFW) The Dalles District and Trout Creek Project Offices, the USDA Forest Service (USFS) and USDI Bureau of Land Management (BLM). Within one year of license issuance, the Licensees shall file with the Commission a plan to implement the Trout Creek channel enhancement and berm removal project. The plan shall be prepared in consultation with the Fish Committee and with approval by the appropriate Fish Agencies pursuant to their respective statutory authorities. Planning, National Environmental Policy Act (NEPA) compliance and permitting, and Endangered Species Act (ESA) consultation for this project will be contracted with the land-management or fisheries management agency involved. Upon Commission approval, the Licensees shall implement the plan.

The mainstem Trout Creek channel enhancement and berm removal project would enhance the channel on mainstem Trout Creek in the Willowdale Valley and downstream. This work would be done with landowner cooperation on the R2 Ranch and the Trout Creek Ranch. Currently, Trout Creek in this reach is degraded as a result of past events and activities, including the erosion of the active channel during the major flood of 1964, and subsequent artificial straightening and channelization. This project will involve regrading, reshaping, and realignment of the stream channel to make the channel more hydraulically stable; and revegetation of the riparian zone.

Comparable work has been planned by ODFW and the Jefferson County Soil and Water Conservation District (JCSWCD) and funded by the Bonneville Power Administration (BPA) on the Priday property at the upstream end of the Willowdale Valley and on the Nye Property above Ashwood; implementation of these projects began in early 2004. The planning work that has been accomplished by ODFW and the JCSWCD for these projects will be invaluable for the planning, permitting, and ESA consultation for the Licensee-funded project continuing downstream. A detailed description of the work planned for the Priday and Nye properties, taken from the Biological Assessment written for the ESA consultation with the National Marine Fisheries Service (NOAA Fisheries) for these projects, follows as a representative description of the work that will be conducted for the adjacent Licensees-funded project.

Purpose and Need

The purpose of the proposed projects is to restore instream habitat, improve the currently existing channel form and function characteristics, and increase the density and vigor of riparian vegetation, thereby improving habitat for Middle Columbia steelhead listed as "threatened" pursuant to the ESA. Improvement of habitat should lead, in the long term, to increased

production and increased numbers of steelhead (*Oncorhynchus mykiss*) in the Trout Creek Watershed and in the Deschutes River sub-basin.

The biological and ecological need for the proposed work stems from anthropogenic processes that have transformed the stream and its corridor into a poorly functioning condition and consequently poor quality habitat for Middle Columbia steelhead. The Trout Creek Watershed Assessment identified the following as habitat limiting factors in the Trout Creek watershed: overgrazing, deforestation, road construction, low flows, poor channel and floodplain conditions, lack of instream habitat diversity, blocked passage, high summer temperatures, and the absence of adequate riparian vegetation. These are all factors that limit the production of Middle Columbia steelhead in the Trout Creek watershed.

The proposed project will improve channel and floodplain conditions, instream habitat diversity, flow, water temperature and riparian vegetation. The proposed project will compliment the actions being taken by the Trout Creek Habitat Improvement projects funded by BPA to improve upland habitat conditions.

Land use practices, floodplain/stream channel modifications, overgrazing, and deforestation of the upper watershed have all led to destabilization of stream channels within the Trout Creek Basin. Destabilization of the uplands, floodplains and stream channels affect fish habitat and land use activities. Although much has been learned about natural river mechanics, geomorphology, hydraulics, and sedimentation, the practices that have been most often used to address channel destabilization has been traditional engineering approaches (channelization, rip-rap, dikes, etc.).

Since there have been a number of examples of the traditional engineering approaches failing in Trout Creek and in the nation, the actions that are proposed for this multi-year project are based instead, on replicating, to the extent practicable, natural channel design principles. This approach benefits both fish habitat and land use activities by providing sustainable long-term solutions to watershed problems.

This project will use alternative approaches to stream restoration other than traditional engineering or passive restoration approaches. The use of natural channel design principles to develop an acceptable solution to the loss of stream and floodplain function, form, and character is a reasonable alternative to the hard engineering approach used after the 1964 flood and to the lack of acceptance by landowners or utility of a passive approach to restoring these functions, forms and characteristics.

A passive restoration approach is appropriate in situations where the deviation between the natural channel and the impacted channel is small. However, it is not appropriate where the deviation between the natural channel and the impacted channel is of the magnitude of this project area. Within the Trout Creek watershed in areas where extensive channel modification has occurred passive restoration techniques have failed to reverse the trend of continued habitat degradation.

Background Information

Salmonid species in the Trout Creek watershed include summer steelhead and rainbow trout. Summer steelhead is classified as "wild" and is managed for natural production. Trout Creek summer steelhead are part of the Middle Columbia Evolutionary Significant Unit (ESU) that are presently listed as threatened under the ESA. Efforts to protect and enhance salmonid populations throughout the Deschutes River Basin, and particularly in the eastside tributaries, have been ongoing for the past several decades.

This is a multi-year stream restoration/channel enhancement project that will restore natural stream and floodplain functions including proper channel dimension, pattern, and profile for two sections of Trout Creek. This is consistent with the primary objective of the all work funded by BPA and the Farm Service Agency (FSA) in Trout Creek. The goal of all agencies involved with this project (including NOAA Fisheries) is to restore and protect critical habitat that will lead to the recovery of summer steelhead and to improve habitat conditions for other fish and wildlife resources in the watershed. Over time this project is expected to contribute to an improvement in critical summer steelhead spawning and rearing habitat, resulting in elevated natural spawning populations and substantial increases in juvenile out-migrants. Project objectives include:

- Restore natural stream functions: i.e. floodplain connectivity, sinuosity, meander geometry, slope, width/depth ratio, riffle-pool-run-glide sequence, natural bank stabilization, instream habitat diversity, etc. Instead of installing large check dams, rip-rap and other traditional structural treatments on the bed and banks of the impacted reach, the project will replicate the dimensions, patterns and profile of a stable self-sustaining channel.

- Improve water quality/quantity*:* Reduce stream bank erosion and sediment input by restoring natural stability processes. Exclude livestock by fencing the perimeter of the established meander belt/buffer. Restore native riparian vegetation by establishing communities of native trees (willows, cottonwood, alder, choke cherry, etc.) shrubs, and grasses within the stream meander belt/buffer (this action will be funded by FSA). New channel construction will also be at an elevation higher than the current channel elevation. This will allow for greater storage of water in the adjacent degraded meadow complexes. The slow summer release of water from these reestablished meadow complexes will help to reduce the low water bottleneck that rearing summer steelhead fry must endure.

- Maintain or improve the current land use(s) outside the meander belt/buffer to the greatest extent possible. Encourage local landowners, by this work, to develop better land use plans for the adjacent uplands.

- Induce improvements in the soil conditions of the floodplain by encouraging increased deposition of fines in these areas due to re-configured floodplain cross-sections

- Create optimal habitat conditions for salmonids and a multitude of other species by increasing the function and quality of the stream and riparian area.

Channel Conditions & Dynamics

Width/ Depth Ratio: The flood proofing activities of the Army Corps of Engineers in 1965 converted a channel that historically supported a type B or C channel into D, or F channel types. Type D and F channel types are very unstable, highly erosive, have wide, shallow channels and provide poor habitat for fish. According to the ODFW Physical Habitat Survey, Trout Creek Basin 1998, the width to depth ratio for the reaches that were surveyed averaged significantly higher than 12.

Stream bank Condition: According to the ODFW Physical Habitat Survey, Trout Creek Basin 1998, 19% of the total area surveyed on Trout Creek had actively eroding banks.

Floodplain Connectivity: Trout Creek has been highly modified to accommodate agriculture needs and to control flooding. Accordingly, there has been a reduction in the connectivity of the streams to their floodplains through channelization, berm construction, down cutting, and irrigation diversions.

Flow/Hydrology

Peak/Base Flows: Trout Creek watershed has experienced natural & man caused disturbances from fire, juniper invasion, over grazing, channelization, and irrigation diversions. These factors have increased the rates of runoff and have altered the timing and frequency of peak and base flows. Irrigation diversion has significantly altered the base flow conditions.

Project Description

The proposed project involves restoration of natural channel function, to the extent possible, using natural fluvial processes and native materials. If optimal habitat benefits are to be derived for fish and wildlife both sites require extensive channel and floodplain work in order to undo the traditional engineering techniques applied in previous decades and the effects of agricultural use. Where necessary, adjustments to the existing channel (dimension, pattern, and profile) must be made. Where utilizing the existing channel is not practicable, new channel segments will be constructed with proper dimension pattern and profile with connection to a floodplain capable of containing and reducing the erosive energy associated with 100-year flood events. Overall, by recreating the proper dimensions of the stable channel form, there will be a net increase of at least one mile (13-15%) of stream channel.

Both projects restore quality salmonid habitat, reduce unnatural bank erosion, restore natural stream functions, and improve aquatic/riparian biological processes in the mainstem of Trout Creek. This approach will re-create the stable channel dimension(s), pattern, and profile as emulated from a stable reference reach identified for this restoration. Specific principles that will be utilized are summarized as follows:

1. Develop designs that take advantage of the natural hydrologic and sediment moving characteristics of the Trout Creek drainage.

2. Develop designs that enhance and ultimately capitalize on the stabilizing effect of healthy native riparian vegetation.
3. Re-establish natural channel geometry and balance energy and sediment transport to the point that natural channel adjustments are gradual and more typical of the stable stream form for these reaches of Trout Creek.
4. Use natural materials such as large rock for channel and bank stabilization in high-energy areas.

A brief description of each of the project elements proposed to be used in this project is described below:

J-hook Vanes

J-hook vanes with chute cutoffs are a multipurpose structure that helps to maintain streambed grade control, relieve back eddy erosion on the streambank, minimize near bank shear stress, and maintain desirable fish habitat and passage via a scour pool that is formed and maintained by the hook of the J. At specific locations, (partial channel spanning) j-hooks will be constructed at 20º-30º angles from the outside bank at a 3º-7º slope beginning at bankfull elevation and diminishing to streambed grade at the center of the channel thalweg (approximately 10-15% of bankfull depth measured at the top of the boulder located in the center of the hook).

These structures are constructed from boulders that are approximately 2'x3'x3' in size that are strategically placed with an excavator. These boulders are keyed into the streambed at the specified location/elevation and spaced appropriately to prevent channel scouring/undercutting and do not interfere with fish passage (all age classes) whatsoever as there are gaps maintained between header stones in the "J" portion of structure that leave gaps 1/3 to ½ diameter in size of the rocks used in construction. These gaps are in the top course of the structure only.

To construct a J-hook, an excavator sets up from/on a point bar and begins simultaneously excavating and placing boulders. This process minimizes the impact to stream disturbance and maximizes the efficiency of the construction. Boulders are first keyed up to the bankfull elevation. Working in this fashion out to the middle of the J (channel thalweg) and then completing by keying into the opposite gravel bar. As the boulders are placed, bedload material excavated by the construction is mixed in with the placed boulders to fill voids (except for the top course of header stones as noted above).

Cross Vanes

Rock cross vanes are a V-shaped structure whose legs (limbs) start at a bankfull elevation and extend upstream at an angle of between 20º to 30º from both banks and slope 3-7% typical (10% max). The structure spans the entire width of the stream, and has a straight nose (sill) that is approximately 1/3 of the bankfull width that is perpendicular to flow and replaces the apex of the V. They are constructed of boulders placed to form a modified upstream "V." This is best described as an upstream "V" minus the apex that is replaced with a straight sill situated perpendicular to the thalweg. The legs (limbs of this modified "V") are keyed into the bank to prevent end cutting. Footer rocks are also buried to prevent undercutting. The configuration of

the structure acts to direct the entire range of stream flows away from the bank and reduce near-bank erosion zones and velocities. The reduced velocity zones become depositional areas for finer bedload and suspended sediments, creating suitable conditions for natural vegetative recovery/establishment.

Dimensions and rock size are similar to the J-hook structures (stones that are approximately 2'x3'x3'). The cross vane provides grade control and directs the flow towards the center of the channel. This structure stabilizes the channel by dissipating energy, controlling gradient, and maintaining sediment transport. The structure benefits fishery habitat by scouring and maintaining a large, high quality pool in the zone where overflow converges, providing channel diversity, cover, and a stable area at the shoreline for riparian vegetation to grow. The height of the structure above the channel bed determines the depth and size of the pool it creates. A more defined thalweg also results in lower width/depth ratio, which helps to reduce stream temperatures during the dry part of the year. By design, rock cross vanes are non-impediments to fish migration (all life stages) in the same manner as the J-hook vanes described above.

To construct a cross vane, an excavator sets up from/on a point bar and/or streambank and begins simultaneously excavating and placing boulders. This process minimizes the impact to stream disturbance and maximizes the efficiency of the construction. Boulders are first keyed up to the bankfull elevation on the streambank. Working in this fashion out to the middle of the vane (channel thalweg) and then completing by keying up to the bankfull elevation of the opposite streambank. As the boulders are placed, bedload material excavated by the construction is mixed in with the placed boulders to fill voids.

Bank Layback

Bank layback and/or upper bank slope treatment above a bankfull bench are areas that contain near vertical banks that are from 5 to 15 feet in height as measured from the toe of the slope to the top of bank at the first terrace. In order to create proper channel/floodplain dimensions the banks must be sloped to increase flood capacity and provide a medium to grow riparian vegetation for streambank stability and water quality enhancing purposes. Work will be conducted from the top and landward side of the streambank with an excavator using a 2 cy + bucket. Excavated material will be piled behind the work area for later transport and or loaded immediately into dump trucks or belly dumps to transport to floodplain reconstruction areas on the project calling for the fill material. Because no channel or in water excavation is required for this activity, no impacts to fish are anticipated.

The slopes for this work will vary depending upon the channel section required to provide adequate flood prone area. Slopes may vary from nearly flat to 1 vertical on 2 horizontal. These areas will be aggressively planted and reseeded with native plant materials (trees, shrubs, and grasses) to reduce flood erosion. Laying back the banks is necessary to reduce erosive energy during high flows and prevent further excessive sediment inputs from bank failure. The intent from a hydraulic perspective is to create a larger channel cross section, at flows above the bankfull, that will reduce erosive pressure on the bank by making allowance for out of bank flow when bankfull flow is exceeded during flood events. Sloping the banks improves fish habitat by

reducing sediment loading and promoting riparian vegetation that will provide shade, large wood recruitment, and in-stream cover (*e.g.*, undercuts and overhanging vegetation).

New Channel Excavation

New channel (channel realignment) will be excavated in some areas outside of the existing channel prism. The section and profile are based upon sediment analyses, hydraulic modeling and data from a reference reach located near the project and on stable portions of the existing stream observed within the project.

The new alignment will provide better hydraulic and habitat characteristics. New channel construction consists of forming the new meanders that align with the existing channel to create a more natural and stable geometry. For fish (salmonids) this is probably the biggest benefit of all the proposed work, as the overall stream length will be increased by about one mile (13 % increase) over the entire project compared to current site conditions. This is a net gain in fish habitat.

By design, the location of the new channel meander minimizes impact on existing vegetation. Where tree and brush removal is required, all of this material will be transplanted and utilized in the construction of the new project to help facilitate the re-vegetation process. To construct the new channel, all segments of the "new" channel will be performed above the ordinary high water mark in the dry, The new dimensions and instream structures will be placed prior to the time the stream is redirected into the new channel to minimize potential impacts to fish.

Existing Channel Reshaping

Existing channel reshaping consists of reshaping the thalweg and banks in portions of the stream where the new alignment is closely associated with the alignment of the existing channel. The designed section and profile are based on typical restoration calculations based on data from a reference reach located near the project and on stable portions of the existing stream observed within the project. Existing channel reshaping includes construction of pools on the outside edge of bends and shaping point bars to form the bankfull channel and flood prone area. Additionally, this will shape the dimension, pattern, and profile of the pool, glide, riffle, and run reaches. The benefits for fish and the aquatic habitat from this work will result in a more hydraulically stable channel.

Reshaping the Floodplain

The berms and material from excavated channels will be moved by a dozer, front-end loader and dump truck where needed. This material will typically be placed in the abandoned channels and low areas within the flood prone area. This work is necessary to create the proper dimensions and elevations for the flood prone and channel meander belt areas. The width of the floodplain will be determined by the width of the flood prone area of each cross-section.

Re-vegetation

Re-vegetation will be incorporated into most of the project area. The buffer areas will be enrolled into the Conservation Reserve Enhancement Program (CREP). This will involve reseeding of disturbed areas with a mix of native grasses, and extensive re-vegetation with native woody vegetation. Fencing will be incorporated to protect new plantings, streambanks, and structures from livestock. All of these actions will follow guidance under the Biological Opinion on the Oregon Conservation Reserve Enhancement Program (NMFS Log #6112, USFWS Log #1-7-99-F-117).

Native woody plant species will be used as plant material for this project. Plant species include willow (*Salix spp*.), red osier dogwood (*Cornus stolonifera*), cottonwood (*Populus spp.*), and alder (*Alnus spp*.). The exact composition of the trees used in the project will be dependent upon the availability of these species. Actual vegetative planting will be done in the fall or early spring of the construction year (*i.e.,* when these plants are dormant). Follow-up measures, such as watering during the first summer, will be taken to optimize survival of newly planted vegetation. Much of the planting will be done mechanically with heavy equipment.

Planting techniques for these projects include trenching, seeding, stinging, and transplanting rooted stock.

Trenching: Trenching entails digging a trench with an excavator at an angular/perpendicular angle to stream flow at a sufficient depth to tap the low flow period water table and placing live cuttings (vertically) into the trench. Trenches are dug landward from the top of the stream bank, reaching out to the toe of slope at waters edge of the bank full elevation and excavating at the appropriate depth.

Overall length of the trench varies with the objective being to plant outward onto the terrace above bank full elevation to re-vegetate the width of the out-of-bank flood prone area. Width of the trench is generally 2' minimum up to 3' maximum. Cuttings are placed vertically into the trench after the trench is started and buried/backfilled with native soil in a layering (soil-plant-soil-plant) process, placing the cuttings in rows across the width of the trench and layering soil 8" minimum depth in-between the next row of cuttings to be placed.

Stinging: An excavator and associated stinger attachment will be used to punch holes into the soil/substrate in both the riparian and upland areas to plant additional native vegetation. A stinger is a round 4" to 6" diameter X 8' to 10' long steel bar (pointed) excavator attachment that is used to poke holes in the ground using the excavator's hydraulic system to achieve the task. This planting method ensures that vegetation reaches down into the low flow summer water table to increase plant survival rate. A portion of the planting on both of the project sites will be done with a stinger to minimize bank/floodplain disturbance; however, trenching vegetation (as describe above) will be done where it is the more effective treatment. Native cuttings used in these projects, will be harvested from nearby areas to ensure genetic adaptability to the project site.

Seeding: Areas disturbed as a result of construction and/or previously not vegetated will be inoculated with a seed mix containing native grasses to provide ground cover and erosion control. All seeding will be done by hand with a broadcast spreader.

Transplanted stock: A considered attempt will be made to protect and transplant every tree and shrub growing in the project area that would be impacted by the project. Front-end loaders will be used to excavate the shrubs and trees from one area and transport and plant them at another.

Rooted stock: Rooted stock will be comprised of both riparian and upland plant species to be used throughout the wide buffer area. Planting of rooted stock will be done primarily with hand tools and some limited mechanical devices.

Pelton Round Butte Project
Settlement Agreement

E X H I B I T G

List of Measures to be Included in the RECREATION RESOURCES IMPLEMENTATION PLAN for the PELTON ROUND BUTTE PROJECT

Pelton Round Butte Project – FERC No. 2030

July 2004

EXHIBIT G

List of Measures to be Included in the Recreation Resources Implementation Plan

(i) Within five years of license issuance, and subject to coordination by the US Forest Service ("USFS") with the existing campground concessionaire, the Licensees shall implement the measures listed below. This implementation will follow the schedule outlined in the Recreation Resources Implementation Plan ("RRIP"), which may be periodically updated in consultation with the Recreation Resources Working Group.

(1) Replace the existing concrete ties at the Perry South boat ramp

(2) Retrofit the existing Perry South boat launch to be accessible in compliance with the requirements of the Americans with Disabilities Act ("ADA").

(3) Replace or modify the 25-year old boat dock system at Perry South using current Oregon State Marine Board dock standards to minimize ongoing maintenance.

(4) Install one vault for a two-unit prefabricated concrete toilet at Perry South.

(5) Provide 20 additional overnight boat moorages parallel to the east bank of the cove at Perry South.

(6) Resurface, at an estimated cost of approximately $30,000, existing roads and parking areas with asphalt where needed at Perry South, particularly near the boat ramp.

(7) Fund National Environmental Policy Act ("NEPA") compliance for Perry South Campground and Street Creek upgrades.

(ii) Within ten years of license issuance, the Licensees shall implement the measures listed below. This implementation will follow the schedule outlined in the RRIP, which may be periodically updated in consultation with the Recreation Resources Working Group.

(1) Lake Billy Chinook

(i) Develop criteria to evaluate whether navigational hazards on Lake Billy Chinook should be marked or removed, including public safety concerns and the effect of removal on natural or cultural resource values, including fisheries, habitat, and visual quality.

(ii) Develop procedures to avoid or minimize impacts to natural or cultural resource values, fisheries, habitat, and visual quality, when marking or removing navigational hazards.

(iii) Mark or remove navigational hazards on Lake Billy Chinook.

(iv) Fund a study designed to evaluate the technical feasibility of an off-shore boat moorage program. If determined to be feasible, the Licensees shall fund the installation of up to 50 moorages in Lake Billy Chinook, if the respective land managing agencies agree to develop, implement and enforce regulations

regarding the use of the moorages and enforce the closure of other areas where boats tie-up to the shore. Potentially suitable coves to be considered include areas east of Perry South Campground, Big Canyon, Juniper Canyon, and near The Island on the Crooked and Deschutes River Arms.

(2) Chinook Island

(i) Construct short-term boat moorage for 16 boats on the northern shoreline plus a nearby swimming area and beach.

(ii) Provide an interpretive trail with signs and a kiosk.

(3) Indian Park

(i) Install a concrete boat ramp with short-term and overnight moorage.

(ii) Upgrade individual campsites including ADA compliance, and construct a group day-use area and designated swimming area.

(iii) Establish an RV camp host site.

(iv) Improve road access into the park and redesign and upgrade interior access road and trail system. Redesign and better delineate park roads and campsite spurs to help keep vehicles in designated areas and thus minimize ongoing vehicle related erosion and dust.

(4) USFS and Bureau of Land Management ("BLM") Sites

(i) After sites have been validated by other resource specialists for potential impacts, fund improvements and annual maintenance at four shoreline dispersed campsites on the shoreline of Lake Billy Chinook. These sites include:

1. land east of the Three Rivers Recreation Area (BLM Beach);
2. cove area downstream from the Cove Marina;
3. west shore area of the Crooked River Arm downstream from the bridge;
4. west shore area of the Deschutes River Arm downstream from the bridge.

At each site, damaged areas will be rehabilitated and level tent pads, cooking areas, and boat tie-ups will be provided. Nearby floating restrooms or a "pack it in/out" policy will be used for sanitation. These sites will be closed to open fires during periods of high fire danger.

(ii) Provide funding to the appropriate land managing agencies for the closure and rehabilitation of all other dispersed campsites if the respective land managing agency formally commits to officially closing the site(s) and to supporting enforcement of the closure.

(5) Monty Campground

(i) Remove the abandoned water system at Monty and replace with a new well and a hand-pump system. Remove old stand pipes.

(ii) Contribute 30% of the funding for NEPA compliance for Monty Campground upgrades.

(iii) Redesign vehicle circulation and relocate portions of the interior road at Monty Campground. Surface interior road with gravel

(iv) Provide two ADA accessible vault toilets and up to seven ADA accessible campsites at Monty Campground.

(6) Perry South Campground

(i) Upgrade or replace toilet facilities to provide accessibility, convert of up to ten appropriate campsites for ADA accessibility, and modifications to the day-use/picnic area, boat launch, and dock facilities to improve accessibility.

(ii) Develop raptor interpretive signing at Perry South. Use USFS two-panel design for a bulletin board.

(iii) Provide RV space for host at Perry South, including an asphalt pad and septic system.

(iv) Formalize the shoreline trail at Perry South from the boat launch to the rope swing and revegetate disturbed areas along the trail route.

(v) Rehabilitate and protect the Spring Creek riparian zone throughout the campground. Rehabilitation and protection measures include, but are not limited to constructing split rail fencing, and/or boulder placement along the stream banks, designating trail crossings, and planting native riparian vegetation where stream banks are impacted.

(7) Street Creek Boat Launch

(i) Provide boat launch gravel parking at Street Creek for ten vehicles with trailers.

(ii) Provide one permanent ADA accessible vault toilet at Street Creek.

(iii) Provide a temporary courtesy loading dock at the Street Creek ramp

(8) Licensees' Recreation Facilities

(i) Reduce the amount of chain-link fencing, or use less visually obtrusive material within and adjacent to Pelton Park, to improve the visitor experience and area aesthetics.

(ii) Reconfigure, buffer, and level several campsites, eliminating six sites in the process.

(iii) Modify ten of the existing campsites for RVs by lengthening and leveling spurs and providing water and electrical hookups.

(iv) Relocate eight water hydrants to improve accessibility and reduce visitor impacts.

(v) Modify restrooms/toilets/showers to be fully ADA accessible

(vi) Provide additional grassy areas in Pelton Park campground and day-use areas.

(vii) Continue to improve the swimming beach at Pelton Park by regrading and providing additional sand for the beach.

(viii) Improve the southern day-use area with ADA accessible picnic tables, cooking grills, and additional grassy area (if feasible).

(ix) Provide a new toilet in the new group camp area and provide another flush toilet in under-served areas of the campground

(x) Provide an ADA accessible fishing pier.

(xi) Expand on the existing campground trail system.

(xii) At Pelton Wildlife Overlook (PWO), partially bury existing boulders surrounding the parking area to make them blend in more with the surrounding native vegetation and revegetate disturbed areas.

(xiii) Provide additional interpretive information, brochures and/or signs, on species likely to be observed at PWO.

(xiv) Provide a permanent ADA accessible vault toilet at PWO to replace the temporary portable toilet.

(xv) Retrofit the two existing viewing platforms at PWO to provide improved downward visibility for disabled persons.

(xvi) Firm up the pathways and a portion of the parking surface with smaller sized compacted crushed rock to provide improved ADA accessibility

(xvii) Provide additional trail connection at the "V" to provide a loop trail system.

(xviii) Provide improved ADA accessibility to campsites, picnic tables, cooking grills, restrooms, and primary access routes per draft proposed ADA accessibility guidelines.

(9) Round Butte Overlook Park

(i) Upgrade interpretive media and displays and coordinate improvements and themes with other new interpretation and education program elements.

(ii) Provide improved ADA accessibility to picnic tables, cooking grills, drinking fountains, restrooms, and walkways per the draft proposed ADAAG guidelines.

(iii) Continue to improve parking and circulation with informational signs and better define parking spaces and edging.

(10) Cove Palisades State Park

(i) Provide new boat delineators / floating booms at the swimming areas at the Upper and Lower Deschutes Day-Use Areas, similar to the one at Crooked River Day-Use Area.

(ii) Repair or replace approximately 30 existing dock sections in the day-use areas.

(iii) Replace eight existing gangways at docks.

(iv) Replace existing dock anchors with new pilings where feasible.

(v) Repave the existing approaches to boat launches at the Crooked River Day-Use Area.

(vi) Add two new launch docks at the Crooked River Day-Use Area and one launch dock at the Upper Deschutes River Day-Use Area to delineate launch lanes and to provide additional launch moorage.

(vii) Repair and apply shotcrete to all boat launch gabions.

(viii) Better define existing launch lanes with new launch lane delineators and signs at all boat launches.

(ix) Provide improved ADA accessible parking near the boat launch at the Upper Deschutes Day-Use Area.

(x) Improve Crooked River Day-Use Area to the north along the ski beach area, including developing new lawn areas, providing additional parking (to replace lost roadside parking), and adding new restrooms.

(xi) Slightly expand the Crooked River Day-Use Area to the south with minor expansion only for additional parking (to replace lost roadside parking).

(xii) Provide additional ADA-accessible picnic tables at all three day-use areas, particularly Crooked River Day-Use Area.

(xiii) Expand the Upper Deschutes Day-Use Area along the south shoreline into areas already impacted by existing use including developing new lawn areas, providing new restrooms, providing short-term boat moorage, stabilizing existing bank erosion, and potentially providing additional parking to replace lost roadside parking.

(xiv) Develop a 15-site boat-in fee camping area in an area already used by visitors known as Streaker's Cove located between Upper and Lower Deschutes River Day-Use Areas, including picnic tables, water service, vault toilet, and boat dock moorage.

(xv) Develop new trails within the State Park and surrounding Project area, some segments of which are ADA accessible, including one or more of the following trail routes over a phased timeframe (to be used in an integrated approach with staged implementation):

1. From the Crooked River Day-Use Area to the Cove Marina;
2. in partnership with others, along the east canyon rim linking the Crooked River Campground, east rim viewpoints, Round Butte Overlook Park, and Willow Creek;
3. from the Deschutes River Campground to the Lower Deschutes River Day-Use Area;
4. from the Madras area along Willow Creek (maintain existing trail route) to Pelton Dam Road then connecting to the Lower Deschutes River Trail at Mecca Flat; or
5. extension of the Tam-a-láu Trail.

(xvi) Fund seasonal operation and maintenance costs for two new self-contained floating restrooms for use by boaters on the Crooked River Arm and the Deschutes River Arm of the reservoir.

(xvii) Provide increased funding for limiting vehicles to designated parking lots only and other costs associated with increasing management presence.

(xviii) Assist in funding the removal of floating debris from the reservoir and provide continued debris removal services.

(xix) Provide funding on a 50/50 cost-share basis with Oregon Parks and Recreation Department to provide protection and interpretive improvements for the Crooked River petroglyph.

Pelton Round Butte Project
Settlement Agreement

E X H I B I T H

PELTON ROUND BUTTE FUND IMPLEMENTATION PLAN

Pelton Round Butte Project – FERC No. 2030

July 2004

EXHIBIT H

The Pelton Round Butte Fund Implementation Plan

I. Establishment of PRB Fund

The Licensees for the Pelton Round Butte Project ("Project"), Portland General Electric ("PGE") and the Confederated Tribes of the Warm Springs Reservation ("CTWS"), shall establish the Pelton Round Butte Fund (the " PRB Fund") to support resource protection measures for Project-related impacts not otherwise covered by specific license conditions, including projects that enhance and improve wetlands, riparian and riverine habitats, and riparian, aquatic and terrestrial species connectivity that may be affected by the continued operation of the Project. The PRB Fund shall consist of two parts: a General Fund and a Water Rights Fund, whose separate purposes are described below in Sections II and III, respectively.

A. Within six months after issuance of the New License, the Licensees shall establish the PRB Fund. The Fund shall be a tracking account maintained by the Licensees with all accrued interest being credited to the Fund. The total amount, excluding interest, to be credited to the Fund shall be $21.5 million, stated in 2003 dollars, which amount will be credited to the Fund as described in Section I.B. below.

B. The Licensees shall credit the Fund with the amounts shown below at the times shown. The amount of each transfer has been determined using an assumed Gross Domestic Product ("GDP") deflator of 2.5% for the first four payments and 4.0% for the fifth payment, and is not subject to further adjustment for escalation, except as provided in Section I.E.

Year	Amount (2003$)	Amount Deposited
2005	$3,500,000	$3,677,000
2007	$3,000,000	3,311,000
2011	$5,000,000	6,092,000
2013	$7,000,000	8,961,000
2020	$3,000,000	5,844,000
Total	$21,500,000	$27,885,000

C. Funds shall be allocated to the Water Rights Fund and the General Fund as follows:

Year	Water Fund		General Fund	
	Amount (2003$)	Amount Deposited	Amount (2003$)	Amount Deposited
2005	$ 3,000,000	$3,152,000	$ 500,000	$525,000
2007	--		$3,000,000	$3,311,000
2011	$5,000,000	6,092,000	--	
2013	$2,000,000	$2,560,000	$5,000,000	$6,401,000
2020	--		$3,000,000	5,844,000
Totals	$10,000,000	$11,804,000	$11,500,000	$16,081,000

D. Licensees will seek a water acquisition project to undertake in 2004 worth approximately $1 million. If this project cannot be completed in 2004, the Licensees shall complete an equivalent project in 2005 or as soon thereafter as practicable. If such a project cannot be substantially completed by the date of the first deposit to the Water Rights Fund, the Licensees may, instead of completing such project, increase the first payment to the Water Rights Fund by $1,000,000. This payment shall be disregarded in the calculations performed pursuant to Section I.E.

E. After the Licensees complete the credit to the Fund in 2020, they shall determine the total amount that would have been credited to the PRB Fund if each payment had been adjusted to reflect the actual inflation during the period from license issuance to the date of that payment. The actual inflation rate shall be determined based on the Gross Domestic Product Implicit Price Deflator inflation index as reported by the Bureau of Economic Analysis, U.S. Department of Commerce, or any successor agency, over the time period from license issuance to the New License anniversary date in 2020.

1. If the total amount that would have been credited to the PRB Fund is *less than* $27,885,000, then the Licensees shall credit no further amounts to the PRB Fund.

2. If the total amount that would have been credited to the PRB Fund is *more than* $27,885,000, then the Licensees shall, in 2025, credit the General Fund with an amount equal to the difference between $27,885,000 and that amount that would have been so credited to the PRB Fund if each payment had been adjusted to the actual inflation rate. However, the amount of this payment shall not exceed $2,460,000, which is the difference between the amount credited to the Fund and the amount ($30,345,000) that would have been credited to the Fund if each payment had been adjusted using an assumed GDP deflator of 4.0%. The amount of this credit shall be escalated according to the formula in Section I.J below from 2020 to 2025.

F. The Licensees shall credit the PRB Fund's tracking account with the amounts shown above on the anniversary of the issuance date of the New License. If the New License is not issued in 2004, the years shown above shall be adjusted accordingly.

G. Funds credited to the tracking account but not yet spent on projects shall accrue interest, which shall be credited to the appropriate fund to be used for purposes described herein. The accrued interest rate shall be the yield in percent per year, compounded daily, on U.S. Treasury securities at a constant maturity of one year, as reported in the Federal Reserve Statistical Release H-15 (Daily Update on Selected Interest Rates for January 1), or the most recent reporting date prior to January 1 of any given year.

H. If at the end of the license term, including any annual licenses, contributions and accrued interest remain unallocated or uncommitted to a specific project, they shall be returned to the Licensees.

I. Section IV(B)(3)(d)(8) of the Fish Passage Plan specifies the measures the Licensees will undertake at their own expense regarding the upgrade and reactivation of existing fish passage facilities in Lake Simtustus. Any request for additional measures regarding these facilities in Lake Simtustus shall consider data from the Fish Passage Plan's program of Test and Verification studies, including but not limited to data on disease, predation, and outmigrant movement during both Temporary and Permanent Downstream Passage, and data from the Fish Passage Plan's Permanent Downstream Passage recruits per spawner evaluation and other pertinent information. In the event that any Party requires or requests another agency to require the Licensees to take, without the Licensees' agreement, additional measures regarding these facilities, beyond those specified in Section IV(B)(3)(d)(8) *Upgrade and Reactivation of Existing Fish Passage Facilities in Lake Simtustus*, including to evaluate or improve passage efficiency at the Pelton skimmer; to construct or retrofit fish protection, guidance or collection facilities at Pelton Dam during the term of the new license; or to evaluate or improve the Round Butte Dam Upstream Fish Trap before volitional passage is established, the costs for such measures or evaluations that the Licensees are required to undertake or implement shall be deducted from the amount remaining unallocated or uncommitted to specific projects or yet to be contributed to the General Fund; *provided that* if the total amount remaining unallocated or uncommitted in the General Fund and yet to be contributed to the General Fund is not sufficient to undertake the required measures or evaluations, the remaining cost shall be deducted from the Water Rights Fund; and *provided further that* if the total amount remaining unallocated or uncommitted in the PRB Fund and yet to be contributed to the PRB Fund is not sufficient to undertake the required measures or evaluations, the remaining cost shall be an obligation of the Licensees.

J. The amount, if any, to be credited to the PRB Fund in 2025 pursuant to Section I.E above, shall escalate according to the following formula:

$$AD = D \times \left(\frac{NGDP}{IGDP}\right)$$

WHERE:

AD = Adjusted dollar amount as of anniversary of the issuance of the license in the year in which the adjustment is made.

D = Dollar amount as calculated pursuant to Section I.B prior to adjustment.

IGDP = GDP-IPD for the quarter of the year before the date of the transfer in 2020.

NGDP = GDP-IPD for the quarter of the year before the date of the transfer in 2025.

"GDP-IPD" is the value of the Gross Domestic Product Implicit Price Deflator inflation index published by the Bureau of Economic Analysis of the U. S. Department of Commerce, or any successor agency, in the third month following the end of the applicable quarter. If that index ceases to be published, any reasonably equivalent index published by the Bureau of Economic Analysis, or any successor agency, may be substituted by the agreement of the Governing Board and the Licensees. If the base year for GDP-IPD is changed or if publication of the index is discontinued, the Licensees shall promptly make adjustments or, if

necessary, select an appropriate alternative index acceptable to the Governing Board to achieve the same economic effect.

K. Except as provided in Section I.I, funds deposited to the Water Rights Fund shall not be used for any other purpose, unless such funds are transferred between the Water Rights Fund and the General Fund as provided in Section III.F, below.

II. Purpose, Use, and Administration of the General Fund

A. The General Fund shall be used to provide for habitat mitigation and enhancements ("Resource Projects") related to increasing the success of anadromous fish reintroduction at the Project and the sustainable and harvestable fishery in the Deschutes River, not otherwise covered by specific resource protection, mitigation, and enhancement ("PME") measures identified in the new license or elsewhere in the Settlement Agreement, and not otherwise funded by the Water Rights Fund pursuant to Section III, below. Resource Projects may be associated with identified PME measures carried out pursuant to the terms of the new license or the Settlement Agreement.

B. Resource Projects funded will be located in the Deschutes Basin, including the Middle and Lower Deschutes River, the Crooked River, the Metolius River, and any tributaries to those river segments. Necessary studies designed to evaluate or monitor the potential benefits or environmental effects of the projects may comprise a part of the below-described potential projects. Resource Projects funded by the General Fund are limited to:

1. Land acquisition or lease of riparian, wetlands, and uplands. Funds may be used for locating appropriate parcels, purchase costs, purchase and title expenses, surveying, and ongoing restoration, monitoring, and management for the life of the new license.

2. Water rights acquisition or lease. Funds may be used for locating appropriate rights, purchase/lease costs, purchase and title expenses, and ongoing monitoring, to the extent such rights are not otherwise obtained through the Water Rights Fund.

3. Water conservation. Funds may be used for conservation projects pursuant to the Conserved Water Act, ORS 537.455 et. seq., which yield legally protected instream water rights. The percentage of conserved water protected instream via a Conserved Water Act project must, at a minimum, equal the percentage of General Fund monies used to finance the conservation measures.

4. Conservation easements. Funds may be used for locating appropriate parcels, establishment of easements, surveying, and ongoing restoration, monitoring and enforcement.

5. Construction of fish passage facilities and removal of fish passage barriers. Funds may be used for private, non-federal dam and diversion removal, construction or improvement of fish passage facilities and screens, including planning, design, and

effectiveness monitoring, *provided*, however, that no General Fund monies may be used for improvement or removal of barriers at other Federal Energy Regulatory Commission ("FERC")-licensed projects.

6. Instream habitat improvements. Funds may be used for projects that improve or enhance fish habitat such as cover, pool and riffle structure, spawning beds, and water quality, including planning, design, and effectiveness monitoring.

7. Riparian and wetland protection and enhancement. Funds may be used to protect riparian corridors and wetlands from grazing, provide for native species plantings, non-native plant species management, and erosion control, including planning, design, and effectiveness monitoring.

8. Off-Project recreation impacts. Funds may be used to protect and restore riparian corridors, wetlands, and spawning and rearing habitats that are adversely impacted by off-Project recreation use. Such projects may include planning, design and effectiveness monitoring.

C. Projects not described in the eight categories above may be funded only if (1) the Licensees include them in their proposed project recommendations to the Governing Board as described below, and (2) the proposed projects receive unanimous support from the Governing Board.

D. Criteria and Factors for Resource Project Approval and General Fund Expenditures

1. Proposed Resource Projects must be consistent with Federal, State and Tribal laws and policies in effect at the time the project is proposed. Resource Projects will be identified, approved, and funded in accordance with the criteria and factors described below.

2. Within six months after issuance of the New License, the Licensees will develop a system to evaluate potential Resource Projects. The evaluation system must be unanimously approved by the Governing Board. Without otherwise limiting the incorporation of additional criteria, the evaluation system will use the criteria set forth in Section II.B. above and the following criteria, listed in order of priority:

   (a) Activities upstream of the Project that will support the anadromous reintroduction program by helping to achieve a self-sustaining chinook salmon population and a sustainable salmon harvest.

   (b) Activities in the lower Deschutes River mainstem and tributaries that increase the likelihood of adult and juvenile salmonid survival as the fish pass through the Pelton Round Butte Project to and from the upper basin.

   (c) Activities that enhance existing or reintroduced populations of resident and anadromous fish and terrestrial wildlife above and below the Pelton Round Butte Project.

3. In determining whether a Resource Project meets these criteria, the Governing Board will consider any relevant information gathered during the test and verification studies provided for under the Fish Passage Plan.

4. If passage is determined to be infeasible and is to be replaced by alternative mitigation, the Licensees shall revise the above criteria and evaluation system as necessary to be consistent with the then- applicable objectives expressed in the Fish Passage Plan and the License, and submit them to the Governing Board for approval. The revised criteria and evaluation system shall become effective upon unanimous approval by the Governing Board.

5. In determining whether to fund a Resource Project, the Governing Board shall give preference to Resource Projects that do not contemplate or require the inclusion of additional lands or property rights within the Project boundary .

6. The evaluation system must also include consideration of the following factors to reflect the feasibility of proposed Resource Projects and to give priority to projects that are more practical to implement:

   (a) Whether the activity may be planned and initiated within one year.

   (b) Whether the activity will provide benefits for at least the life of the license, or in the case of water right leases, for at least the length of the lease.

   (c) Whether the activity will provide a measurable positive cost-benefit as compared to similar activities (e.g., a project that improves two miles of riparian corridor for the same cost as another project that improves only one mile of similar corridor for the same cost).

   (d) Whether the activity will be cost-shared with other funding sources.

   (e) The likelihood of project success and level of community support.

E. Use of Funds

1. Decisions on the use of the General Fund, including any accrued interest, will be made by a Governing Board made up of the entities described in Section II.F.

2. The following approach will be used for Resource Project proposal, review and selection:

   - Step 1: Any person or private or governmental entity, including the Licensees, may propose a Resource Project to the Licensees. In addition, the Licensees may solicit Resource Project proposals from any person or private or governmental entity.

- Step 2: The Licensees will review all Resource Project proposals in consultation with any appropriate Implementation Committee established pursuant to the Settlement Agreement, applying the criteria and factors set forth in Section II.D in accordance with the approved evaluation system. Not later than October 31 of each year, the Licensees will provide a report describing proposed Resource Project recommendations to the Governing Board for review and approval. The report will include a description of all proposed Resource Projects, an evaluation of each Resource Project, and the basis for why each Resource Project is or is not being recommended for funding. The report shall describe any determination reached by the Implementation Committee consulted, but the approval of an Implementation Committee is not required before the Licensees can propose a Resource Project to the Governing Board. The cost of any Implementation Committee review shall not be assessed against the General Fund.

- Step 3: The Governing Board will confirm that the Licensees applied the criteria correctly, propose any modifications as needed, and use the decision-making process set forth in Section II.G below to approve Resource Projects and funding.

F. Membership on the Governing Board

The Governing Board shall be comprised of eleven signatories of the Settlement Agreement, including one representative or designee from the following agencies or organizations:

1. Licensees (one representative collectively)
2. CTWS Branch of Natural Resources ("CTWS BNR")
3. CTWS Water Control Board ("CTWS WCB")
4. US Fish and Wildlife Service ("USFWS")
5. National Marine Fisheries Service ("NOAA Fisheries")
6. Bureau of Indian Affairs ("BIA")
7. US Forest Service ("USFS")/Bureau of Land Management ("BLM")(one representative collectively)
8. Non-Governmental Organizations (American Rivers, Oregon Trout, Trout Unlimited, Native Fish Society, WaterWatch of Oregon [one representative collectively])
9. Oregon Department of Fish and Wildlife ("ODFW")
10. Oregon Department of Environmental Quality
11. Oregon Water Resources Department

G. Decision-Making Process

1. Voting. Each member shall have one vote on all matters to be decided by the Governing Board.

2. Meetings. The Licensees shall convene a meeting of the Governing Board on an annual basis, or whenever requested by two or more members of the Governing Board.

3. Quorum. No action may be taken at a meeting of the Governing Board unless a quorum consisting of at least one representative of each of the following blocs of Governing Board members is present: the Licensees; CTWS (BNR or WCB); the federal agencies (USFWS, NOAA, USFS/BLM or BIA); and ODFW. However, any of these representatives may choose not to attend and notify the members of the Governing Board in writing that the Governing Board is authorized to act in the absence of the representatives providing such notice.

4. Conduct of Meetings. Meetings will be chaired by a member of the Governing Board elected annually by the members.

5. Resource Project and Funding Decisions. A negative vote, as opposed to abstention, by two or more Governing Board members is required to deny a Resource Project and funding proposal. In the event of a negative vote by two or more members, or any other dispute regarding the General Fund, any member of the Governing Board may seek dispute resolution as provided in the Settlement Agreement.

H. Resource Project Implementation

Upon approval of a Resource Project and General Fund expenditure by the Governing Board, the Licensees shall implement the Resource Project, or fund implementation of the Resource Project by another entity, in accordance with the approved terms and schedule. If a Resource Project approved by the Governing Board includes a commitment of funds for future mitigation, monitoring, or maintenance measures, such funds shall be considered to be committed as of the date of the approval by the Governing Board, but shall continue to accrue interest (which interest shall not be considered to be allocated to the Resource Project so approved) as provided in Section I.G, until actually spent in accordance with the approved terms and schedule.

I. Milestones and Reporting

The activities carried out under the General Fund shall be reviewed annually. The Licensees shall submit to the Governing Board for review and comment a written draft annual report that describes the amount of payments credited to and disbursed from the General Fund. Upon completion of review and comment by the Governing Board, the Licensees shall submit the annual report to FERC in accordance with Proposed License Article [61]. The

annual report shall include any monitoring information collected regarding any Resource Projects implemented through the General Fund.

J. National Environmental Policy Act ("NEPA") Compliance

For any ground or habitat-disturbing activities on National Forest or BLM lands required to implement a Resource Project, the Licensees shall, unless such analysis has been conducted by the party recommending the activities, conduct an environmental analysis, using General Fund monies. The analysis shall include such procedures and analyses as are required to comply with USFS or BLM regulations in existence at the time the process is initiated. The Licensees may refer to or rely on any previous NEPA analysis for the activity to the extent that such analysis is not out of date, as determined by the appropriate land management agency. Any contractors selected by the Licensees to conduct the NEPA process shall be approved by the land management agency in advance of any work. Following scoping, the Licensees shall submit the scope of work for the environmental analysis, including, but not limited to, the range of alternatives that shall be addressed, to the appropriate land management agency.

The Licensees shall make reasonable efforts to initiate and complete the NEPA process sufficiently in advance of Resource Project implementation dates to accommodate time lines for preparation and publication of a NEPA decision by the responsible land management agency, and any administrative appeals of the NEPA decision.

K. Habitat Monitoring

Funding for any riparian habitat improvements undertaken as part of a Resource Project below the Project, will include funds to monitor condition of the riparian habitat being restored and managed and to gauge the effectiveness of such Resource Project. Monitoring programs will be determined in consultation with the Fish Committee and the Terrestrial Resources Work Group, and will be consistent with the strategies detailed in the Terrestrial Resources Management Plan. Monitoring of riparian condition may include the following parameters: vegetation species composition; bank stability, herbaceous cover; tree/juniper/shrub cover; height and diameter of trees; canopy cover; growth and physical condition of vegetation; and distribution of vegetation. Regardless of the outcome of such monitoring, the Licensees will have no ongoing obligation to maintain projects once they have been completed.

L. Compliance with Laws

Notwithstanding the affirmative vote of an agency that is a Governing Board member, all Resource Projects implemented through the General Fund must comply with applicable laws and are subject to the approval of any agency with permitting authority and/or jurisdiction over the site of the Resource Project. Such compliance will be a condition for implementing any Resource Project.

III. Purpose, Use, and Administration of Water Rights Fund

A. The Water Rights Fund shall be used to acquire or lease instream water rights, or participate in water conservation projects, each of which result in instream flows that benefit aquatic habitat ("Water Projects"). The Licensees may partner with one or more established conservation entities in the development, funding, or implementation of a proposed Water Project. The Licensees shall actively pursue opportunities for increasing instream flows and document their efforts in the annual Water Rights Fund report as provided in Section III.F.1.

B. Water Projects will be located in the Deschutes Basin, including the Middle and Lower Deschutes River, the Crooked River, the Metolius River, and any tributaries to those river segments.

C. In determining whether a proposed Water Project satisfies the criteria and factors listed below, the Licensees will consult with appropriate resource agencies. However, expenditures of funds from the Water Rights Fund shall not be subject to review or approval by the Governing Board, except as provided in Section III.F.3 below.

D. Criteria and Factors for Approval of Water Projects and Fund Expenditures

1. Proposed Water Projects must be consistent with Federal, State and Tribal laws and policies in effect at the time the project is proposed. Licensees shall obtain all permits and regulatory approvals required by law for the implementation of any proposed Water Project. Water Projects will be identified, approved, and funded in accordance with the criteria and factors described below.

2. Funds may be used for locating appropriate rights, purchase/lease costs, title expenses, and ongoing monitoring and for conservation projects pursuant to the Conserved Water Act, ORS 537.455 et. seq., which yield legally protected instream water rights. The percentage of conserved water protected instream via a Conserved Water Act project must, at a minimum, equal the percentage of Water Rights Fund monies used to finance the conservation measures.

3. Funds may not be used to acquire water rights that serve as mitigation for the impacts of groundwater development in the Deschutes River Basin, or as credit for a mitigation obligation of any person or entity other than an obligation of the Licensees associated with the PRB Project.

4. Water rights acquisitions must go instream at times and locations that improve aquatic habitat values beyond existing conditions.

5. Any Water Project must result in net benefit to aquatic resources. In determining whether a proposed acquisition will result in net benefit to aquatic resources, the Licensees shall evaluate whether a project's beneficial impacts will be greater than its detrimental impacts. Such evaluations shall consider the effects of the project in

conjunction with the effects of any previously completed water rights acquisition projects in the basin.

6. Acquisition of permanent water rights shall be accorded a higher priority than acquisition of temporary water rights.

7. In evaluating any potential Water Project, the Licensees shall undertake an analysis of and consider the price of comparable transactions.

E. Decision-Making Process

Decisions on the use of the Water Rights Fund shall be made by the Licensees and documented in an annual report. Prior to funding a Water Project, the Licensees may consult with any appropriate Implementation Committee to determine whether the proposed project satisfies the criteria and factors set forth in Section III.D. The cost of such consultation shall not be assessed against the Water Rights Fund. In no event shall approval of a resource agency or Implementation Committee be a prerequisite to a decision by the Licensees to undertake a Water Project.

F. Milestones and Reporting

The activities carried out under the Water Rights Fund shall be reviewed periodically as provided in this Section and in Proposed License Article [61] of the New License. Upon periodic review, the Licensees shall demonstrate progress towards achieving increased instream flows in the Deschutes and Crooked River basins.

1. Annual Report to Governing Board. The Licensees shall submit to the Governing Board for review and comment an annual report that describes the amount of payments credited to and disbursed from the Water Rights Fund. The annual report will describe: (i) progress toward water rights acquisitions; (ii) consultation efforts with resource agencies or Implementation Committees; (iii) a comparison of the prices paid for completed Water Projects with other similar projects in the Deschutes River Basin; and (iv) consistency of Water Projects with the criteria and factors described in Section III.D above. If appropriate, the annual report shall include any monitoring information collected regarding any Water Projects implemented through the Water Rights Fund.

2. Annual Report to FERC. Licensees will file an annual report to FERC describing activities of the Water Rights Fund. This report will be prepared in consultation with the Governing Board and will consist of the annual report to the Governing Board and comments by the Governing Board members, as well as any response by the Licensees to those comments.

3. Periodic Review. In 2010 and 2018, and every five years after 2018 for as long as funds in the Water Rights Fund remain unspent, the Governing Board may determine that some or all of the funds then credited to the Water Rights Fund but not yet

committed or allocated to Water Projects may be made available for Resource Projects funded by the General Fund. The Governing Board's determination shall be in accordance with the decision-making process described in Section II.G above, and shall be based on: (i) a report prepared by Licensees pursuant to this paragraph; or (ii) an independent review conducted under Section IV.A.2. The report prepared by the Licensees shall describe the Licensees' progress to date in implementing Water Projects, including a summary of acquisitions made to date with fund dollars, acquisitions made by others in the Deschutes Basin, and potential upcoming projects. If the New License is not issued in 2004, the years shown above shall be adjusted accordingly.

G. Compliance with Laws

Notwithstanding the fact that the Governing Board shall have no authority to approve Water Projects undertaken through the Water Rights Fund, all Water Projects implemented through the Water Rights Fund must comply with applicable laws and are subject to the approval of any agency with permitting authority and/or jurisdiction over the Water Project.

IV. General Provisions

A. Administrative and Technical Support

1. The Licensees shall provide administrative support for meeting minutes, record keeping, and other PRB Fund management duties. The Licensees shall bear the cost of all reasonable administrative, legal, and overhead costs associated with the management of the PRB Fund and shall not assess any such costs against the PRB Fund.

2. The Governing Board may choose to conduct an independent review of PRB Fund activities at any time. The cost of an independent review shall be borne by the General Fund.

B. Information and Education

The Licensees and the Governing Board will collaborate with the Parties to provide public information communicating the benefits of Resource Projects and Water Projects undertaken under the auspices of the PRB Fund. The cost of providing such information to the public shall not be borne by the PRB Fund.

Pelton Round Butte Project
Settlement Agreement

E X H I B I T I

LOWER RIVER GRAVEL STUDY DESIGN

Pelton Round Butte Project – FERC No. 2030

July 2004

EXHIBIT I

Lower River Gravel Study Design

The Parties to the Agreement have agreed to a study of gravel in the lower Deschutes River in accordance with the tasks and methods described in this Exhibit and consistent with Article 58 of Exhibit A to the Agreement. The Lower River Gravel Study will evaluate gravel mobility, supply, and use by spawning salmonids in the lower Deschutes River. The study area extends from the Reregulating Dam (RM 100.5) to the Trout Creek confluence (RM 87.3). The study comprises two primary components, a geomorphic aspect and a biological aspect. These two evaluations are described in detail below.

Geomorphic Evaluation

The geomorphic aspect of the Lower River Gravel Study consists of two main components: (1) a field-based sediment transport monitoring program, and (2) an experimental gravel augmentation between the Reregulating Dam and Shitike Creek. The objective of the monitoring and augmentation study is to assess the impacts of the Pelton-Round Butte Hydroelectric Project ("Project") on downstream gravel availability and channel morphology. These studies will provide a more rigorous understanding of sediment transport thresholds and sediment dynamics in the Deschutes River, which will provide a better basis for evaluating the extent to which the Project has reduced downstream gravel availability for spawning salmonids. The objective of the experimental gravel augmentation program is to test the dynamics of augmented gravels and, in combination with the biological monitoring program described below, monitor their quality through time.

Sediment Transport Monitoring

The field-based sediment transport monitoring program presented here is based upon the State and Tribal Clean Water Act ("CWA") Section 401 water quality certificates, the sediment transport program developed by Emmett (1999), the Response to AIR submitted by the Joint Applicants to FERC in July 2002, and modifications recommended during the September 16, 2003 meeting. Four of the components described below would occur concurrently once the new license is issued, and a fifth study would occur if the monitoring studies require it. A detailed study plan of the following components will be submitted to the Pelton Round Butte Fish Committee for approval prior to implementation.

- Place radio-tagged and colored tracer rocks (or rocks with exotic lithologies) at six to seven cross sections downstream of the Reregulating Dam. Upstream of Shitike Creek, tracer gravels will be placed at three cross sections, where we expect that sediment is most likely to be transported. Fassnacht (1997) previously set up three study locations upstream of Shitike Creek in 1995. These sites should be used if they appear to have similar sediment dynamics (and expected sediment transport thresholds) to the rest of the reach and to sites used by spawning salmonids. The advantage of using these sites would be the information on potential channel change since 1996 gained from re-occupying the Oregon State University

cross sections. The precise location of the cross sections will be determined in the field in conjunction with members of the Fish Committee. Downstream of Shitike Creek, sediment supply is increased because of sediment supplied by Shitike Creek and other tributaries. We propose to put three to four cross sections downstream of the confluence with Shitike Creek. One cross section should be placed immediately downstream of Shitike Creek to facilitate comparison with the reach just downstream of the dam, where sediment inputs are supplied solely by local erosion of the bed and banks. A second site could be placed between Shitike Creek and Trout Creek, where access is available. Another cross section should be located upstream of Trout Creek (RM 87.3) at a site where disturbance by anglers would be limited. If it is deemed necessary by the Fish Committee, a fourth site can be located near confluence with the Warm Springs River. The specific sites will be selected in consultation with the Fish Committee. Radio-tagged tracer rocks would be located following flow events exceeding 6,500 cfs (a 1.2-year flow), and colored tracer rocks would be resurveyed during summer after high flows have receded.

- Concurrent with the marked rock studies, establish survey cross sections at the tracer gravel sites. These cross sections would be examined each year to see if tracer particles had been displaced by that year's flow, and would be resurveyed in any event following flows greater than 6,500 cfs. In order to determine the lowest flow required to initiate bedload movement, after five years, the Fish Committee can recommend a different tracer rock examination and cross-section resurvey interval based on observations of bed mobility to date.

- Concurrent with the above studies, bedload transport will be measured at the Warm Springs Bridge (U.S. Highway 26) on rising and falling limbs of flows exceeding 5,500 cfs. If no sediment transport is observed at three peaks of 5,500, the threshold will be increased in consultation with the Fish Committee. The exact location of the sampling, e.g. from the bridge itself or from a cataraft upstream, will be made in consultation with the Fish Committee, based on inspection of site conditions, local hydraulics, and safety considerations.

- When the marked rocks and cross sections are established, columns of painted rocks (or scour chains if scour cores are difficult to place) will be placed at each cross section in the study reach to determine depth of scour and any subsequent filling. The exact number and location will be determined in consultation with the Fish Committee.

- If annual monitoring, data, and assessments show that sediment transport is occurring, bed material size will be re-sampled at the sample sites of McClure (1998). Any re-sampling shall be conducted in consultation with the Fish Committee. Re-sampling shall include surficial pebble counts at all 12 sites and bulk sampling at six of these sites. Due to the large spatial variability in natural bed material size, any re-sampling of these sites may help inform a conclusion that bed material size is not changing, but such a conclusion must be supported by other bed mobility information. Information developed pursuant to any re-sampling shall be distributed in that year’s annual report.

Experimental Gravel Augmentation Program

The second main component of this geomorphic evaluation constitutes a set of gravel augmentation experiments to monitor the mobility of the placed spawning gravels, both for the light this will shed on overall bed mobility and sediment transport in the reach, and to inform possible future gravel augmentation efforts. In conjunction with the gravel augmentation experiments, the quality of the augmented gravels for salmonid spawning and their use by spawning fish will be monitored through the biological monitoring program described below.

Approach

The test program would involve adding a total of 300 cubic yards of gravel distributed among at least three sites between the Reregulating Dam and Shitike Creek. Sites would be chosen in consultation with the Fish Committee to minimize potential adverse effects of the augmented gravel, including disturbance to existing spawning habitat. This program will start with the addition of gravel in 2007, and monitoring beginning in 2008, immediately following initiation of selective water withdrawal ("SWW") at Round Butte Dam.

Tracer rocks (either painted rocks or rocks with an exotic lithology) will be used to track the movement of the imported gravels. The topography of each site will be surveyed upon placement of the gravels. In years without flows exceeding 6500 cfs, the tracer gravels will be inspected to determine whether they have moved, and if not, the site will not be resurveyed. If the tracer gravels moved, or in any event if flows exceeded 6500 cfs, the site will be resurveyed in detail by total station, and changes since the previous survey will be documented and computed. Throughout the course of the experiment, bank stability and any affects on instream pools will be monitored as a part of the topographic resurveys of the augmented gravel sites, and downstream at the first two "response" reaches. If the tracer gravels moved, or if flows exceed 6500 cfs during a given year, the sites and the first two downstream response reaches will be resurveyed in detail by total station, and changes since the previous survey will be documented and computed.

All necessary review and approval requirements, including National Environmental Policy Act ("NEPA") and Wild and Scenic Rivers Act ("WSRA") Section 7 Consistency determinations, CWA Section 404 (dredge/fill) permit, and others as appropriate, will be obtained prior to any test gravel placement.

All necessary tribal, federal and state permits or approvals, including NEPA and WSRA Section 7 Consistency determinations, CWA Section 404 (dredge/fill) permit and others appropriate, will be obtained prior to any gravel augmentation beyond the planned testing phase.

Assessment of Results

The Licensees will submit annual results of the monitoring study presented above to a three-member expert review panel to determine whether gravel augmentation is appropriate. The expert review panel will consist of experts in geomorphology and fisheries and will be selected by the Licensees, subject to approval by the Fish Committee. After five years of study the expert

review panel will submit a report detailing their recommendation regarding the need for a gravel augmentation program.

If, following five years of study and review, the expert review panel determines that 1) the Project is causing impacts that could be mitigated by gravel augmentation, including examination of whether the Project may be having deleterious effects on channel bedforms and spawning gravel quantity and quality, 2) that the augmentation test did not adversely affect downstream bank stability or cause downstream pool filling, and 3) that augmentation would be beneficial to fish habitat and fish populations (as indicated by the results of the biological monitoring program described below), the expert review panel will make a recommendation to the Fish Committee regarding the implementation of a long term gravel augmentation program.

Based on the recommendation of the expert review panel, and any other relevant information, the Fish Committee will determine whether a long-term gravel augmentation action plan should be implemented, or whether the current study program needs to be extended. If a long-term gravel augmentation is required by the Fish Committee, the Licensees shall develop and implement the action plan in coordination with the Fish Committee. Any such plan will include appropriate monitoring components. If the study program needs to be extended, the Licensees shall, after consultation with the Fish Committee, develop a plan to implement such program. After approval, the Licensees will implement the continued study program, with a five-year review of this study program scheduled.

As part of its review process, the expert review panel will consider the results of studies described in detail above and below, along with previous studies of channel morphology and sediment transport in the Deschutes River (e.g., Fassnacht et al. 2003, O'Connor et al. 2003 a, O'Connor et al. 2003b, Kondolf and Williams 2003). Components of the geomorphic study include:

1. The marked rocks study to examine sediment transport thresholds
2. The tracer rocks study to examine sediment transport thresholds and sediment transport rates.
3. Cross section surveys to examine changes in channel morphology through time.
4. The scour core/scour chain study to examine the amounts of scour and redeposition during high flows.
5. Bedload sampling used to measure sediment transport rates and develop a bedload rating curve.
6. Gravel augmentation test to examine the fate of augmented gravel and potential impacts to bank stability and pool habitat downstream.

Biological Monitoring for Gravel Augmentation

In conjunction with the gravel augmentation experiments, the quality of the augmented gravels for salmonid spawning and their use by spawning fish will be monitored. The goal of the biological monitoring program described below is to monitor salmonid spawning use, spawning habitat area, and salmonid spawning habitat quality in the Deschutes River downstream of the Reregulating Dam to determine if/when the addition of new gravel between the Reregulating

Dam (RM 100.5) and the mouth of Shitike Creek (RM 97) would be necessary and beneficial to salmonid populations. This program will provide continuing information to the Fish Committee and managing agencies concerning salmonid spawning habitat quality and use of spawning areas in the Deschutes River below the Reregulating Dam, which will provide decision-makers with the information they need to determine if or when a gravel augmentation program should be established. These monitoring results would be viewed in total, with no specific single or combination of parameters automatically triggering a transition to gravel augmentation. These biological-monitoring results will be analyzed in combination with the results of the geomorphic evaluation described above.

General Description of Program

- Determine relative use of spawning sites above and below Shitike Creek. This would involve annual enumeration of redds for both fall chinook salmon and rainbow/steelhead to determine if relative spawner use is shifting downstream as spawning habitat quality and quantity decreases upstream.

- Measure steelhead/rainbow spawning habitat area above and below Shitike Creek. This criterion would monitor and compare the relative change in actual area of spawning at three sites upstream of Shitike Creek with three sites downstream of Shitike Creek.

- Spawner use of experimental gravel augmentation sites. This criterion would measure the use of experimental patches compared to use of other spawning areas upstream of Shitike Creek.

- Spawning gravel quality parameters would be measured separately above and below Shitike Creek at sites identified in the Deschutes River Gravel Study (Huntington 1985) and at the experimental augmentation sites. These parameters would include permeability, and inter gravel dissolved oxygen ("IGDO").

- Rainbow Embryo Survival. The survival of rainbow trout embryos within redds at the three study sites above Shitike Creek will be compared to survival of embryos both in the three experimental gravel augmentation patches and the three study sites below Shitike Creek. The most efficient methods will be used to sample redd sites in mid-summer after the conclusion of steelhead emergence. This sampling will be conducted in years 2 and 4 post SWW and results compared to permeability and IGDO measurements at these sites.

- Invertebrate populations would be compared at the gravel augmentation sites to non-augmented nearby control sites. Invertebrate sampling of augmentation sites would be conducted concurrent with invertebrate studies, which will be conducted to determine the effect of SWW on invertebrate populations in the lower Deschutes River. In the future, if it is determined to transition to a full program of gravel augmentation, a more intensive pilot study of the positive and negative impacts to invertebrates will be conducted.

More Detailed Description of the Program

Spawner Use Above and Below Shitike Creek

To help determine if spawning habitat quality below the Reregulating Dam is declining due to lack of gravel, spawning by both *Oncorhychus mykiss* (rainbow-steelhead in combination) and *O. tshawytscha* (fall chinook salmon) will be monitored. The objective is to compare spawning by these two species over time, above and within a short distance below the mouth of Shitike Creek. If a full program of gravel augmentation is implemented, monitoring of chinook spawning will continue, but monitoring of rainbow/steelhead spawning will not continue.

For rainbow/steelhead, spawning at the study sites used by Zimmerman and Reeves (2000) between the Reregulating Dam and Trout Creek will be monitored annually, unless a permanent gravel augmentation program is implemented, at which point monitoring will cease. Counts will be made three times at each site over a six-week interval that encompasses the peak spawning period. For fall chinook salmon, the eleven one-mile reaches counted annually upstream of the Warm Springs River will be utilized. This includes three reaches upstream of Shitike Creek, and eight reaches downstream.

For each species the relative percentage of the spawning within this reach that occurs upstream of Shitike Creek will be calculated each year, and added to the data set. For chinook, these data extend back to 1972 (Figure 1). For rainbow-steelhead, three years of data were collected by Zimmerman and Reeves (1999; 2000) and survey information will be added annually. Regression analysis will be developed for each species (Figure 1-example). This monitoring will assist in determining if there is a decrease in the use of spawning areas upstream of Shitike Creek as compared to areas downstream from Shitike Creek. A negative change will be indicated by a statistically significant decreasing trend in the percentage of redds occurring upstream vs. immediately downstream of Shitike Creek.

Steelhead/Rainbow Spawning Habitat Area Above and Below Shitike Creek

Huntington (1985) mapped spawning areas in the entire lower 100 miles of the lower Deschutes River in 1983 and 1984 as part of the Deschutes River Gravel Study. This was difficult for fall Chinook as many areas were in deep water, and were only located when chinook were spawning, and the fish and redds observed from a helicopter. It is known that many of these chinook spawning areas above Sherars Falls were used at a reduced level or not at all when populations were low during the early 1990s. In recent years, fish have again been observed on many of these bars. Trout/steelhead spawning areas in the upper river are consistently used from year to year. Thus, monitoring of spawning habitat area will be conducted for rainbow spawning study sites, but not for fall chinook.

This monitoring objective is to continue to map the area of the trout/steelhead spawning in the study sites (Zimmerman and Reeves 1999; 2000) between the Reregulating Dam and Trout Creek. The perimeter of these sites will be mapped and the total area calculated each year. The relative change in total area for the sites upstream of Shitike Creek will be compared to the same parameter for the sites downstream of Shitike Creek. This information will be reported to the Fish Committee annually. A persistent relative reduction of spawning area in the sites upstream

of Shitike Creek as compared to the sites downstream will be interpreted as evidence of a reduction in spawning habitat immediately downstream of the Reregulating Dam. Mapping of spawning areas will not continue if a permanent gravel augmentation program is implemented.

Spawning Use of Experimental Augmentation Sites

The three augmented sites where gravel will be placed on bars above Shitike Creek will be monitored for spawning use both by fall chinook and steelhead/rainbow. Use at these sites will be compared to use of the total reach by spawning fall chinook, and by rainbow/steelhead at the three sites above Shitike Creek identified by Zimmerman and Reeves 1999; 2000). This monitoring will continue under the same time schedule as the physical monitoring of these placed gravel patches.

Spawning Habitat Quality and the Gravel Environment

Permeability

Permeability of gravels is one indication of spawning habitat quality. The more permeable the gravel, the higher the quality. Permeability was measured in 1963 (Aney et al. 1967), 1983 (Huntington 1985), and again in 2002 (Scott Lewis, PGE unpublished) at three sites above and three sites below Shitike Creek. To continue to monitor spawning habitat quality, permeability will be monitored above and below Shitike Creek in 2008. These permeability measurements will be repeated in year 4 following implementation of SWW and every 5 years thereafter, if necessary. The exception to this is that permeability will be measured at the three augmented sites above Shitike Creek each time the physical monitoring of these placed gravel patches is conducted. Measurement of permeability will not continue if a permanent gravel augmentation program is implemented.

Inter Gravel Dissolved Oxygen

IGDO is an important parameter reflecting spawning and incubation habitat quality. Low IGDO is an indicator of too many fines and potentially low survival of eggs and fry. During the next license period, IGDO will be monitored continually during the first three years following implementation of SWW immediately below the Reregulating Dam to determine compliance with the CWA Section 401 water quality certificates. IGDO will also be monitored during fall at the same sites as gravel permeability , above and below Shitike Creek, in year 4 following implementation of SWW and every five years thereafter, if necessary. The exception to this is that IGDO will be measured at the three augmented sites above Shitike Creek each time the physical monitoring of these placed gravel patches is conducted. Except to the extent required by the WQMMP and the CWA Section 401 water quality certificates, IDGO measurement will not continue if a permanent gravel augmentation program is implemented.

Rainbow Embryo Survival

The survival of rainbow trout embryos within redds at the three study sites above Shitike Creek will be compared to survival of embryos both in the three experimental gravel augmentation patches and the three study sites below Shitike Creek. The most efficient methods will be used

to sample redd sites in mid-summer after the conclusion of steelhead emergence. This sampling will be conducted in years 2 and 4 post-SWW and results compared to permeability and IGDO measurements at these sites.

Invertebrate Monitoring

Invertebrate sampling of experimentally placed gravel patches would not be done initially. However, when scheduled invertebrate studies are conducted to determine the effect of the SWW on invertebrate populations, samples will be taken from augmented patches to determine if differences are observed. If, in the future, a general gravel augmentation program is implemented, pilot studies will be conducted to determine the positive or negative impact of gravel augmentation on invertebrate populations before full augmentation is implemented.

References

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Table 1. Proposed geomorphic and biological monitoring in relation to river bed material in the Lower Deschutes River downstream of the Reregulating Dam.

Monitoring type	Above Shitike Creek		Below Shitike Creek
	Augmentation Test Site Scale	**Reach Scale**	**Reach Scale**
Geomorphic	tracer rocks	tracer rocks	tracer rocks
		cross sections	cross sections
		bedload transport measurements	
		columns of painted rocks, scour chains	columns of painted rocks, scour chains
	Particle size	Particle size	Particle size
	Depth (intergravel head?), velocity		
	Armoring (embeddedness), percent fines,		
	Bank stability, bank erosion		
	Pool filling		
Biological	Intergravel DO, permeability	Intergravel DO, permeability	Intergravel DO, permeability
		Relative spawner use (redd counts) by fall chinook, steelhead/redband trout	Relative spawner use (redd counts) by fall chinook, steelhead/redband trout
		Relative spawning habitat area for steelhead/redband trout	Relative spawning habitat area for steelhead/redband trout
	Spawner use of augmented sites by chinook and steelhead/redband trout		
	Rainbow embryo survival at 3 test gravel patches Year 2 and 4	Rainbow embryo survival at 3 test Sites	Rainbow embryo survival at 3 test sites
	Invertebrate monitoring	Invertebrate monitoring	Invertebrate monitoring

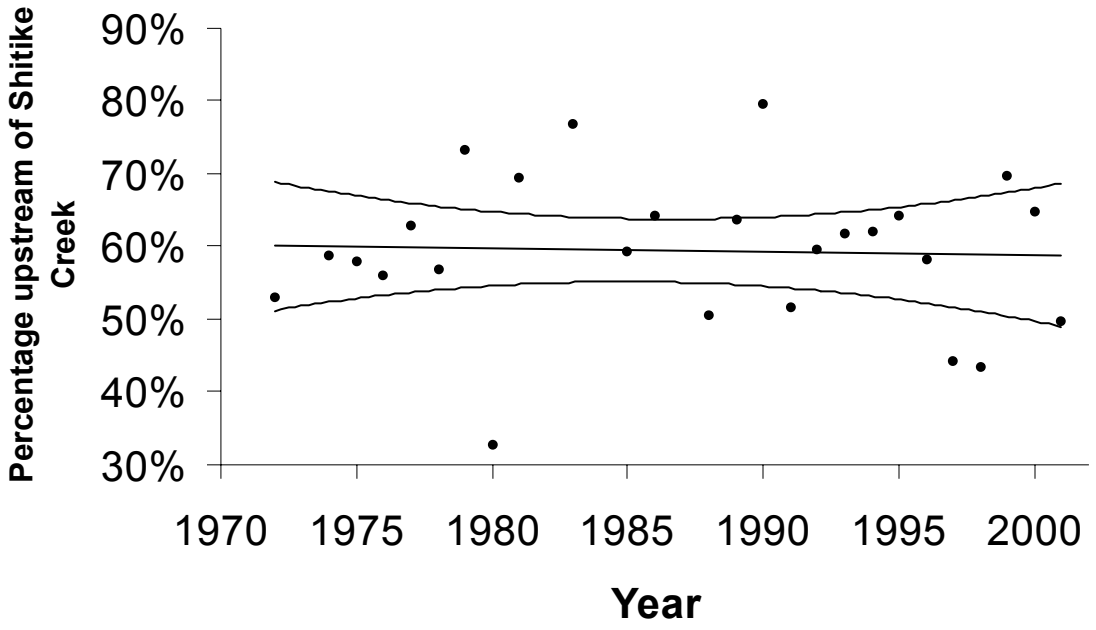

Figure 1. The percentage of the total fall Chinook redds counted annually in eleven index areas in the Lower Deschutes River between the mounth of the Warm Springs River (RM 80) and the Reregulating Dam (RM 100) that were counted upstream of Shitike Creek (RM 97).

Pelton Round Butte Project
Settlement Agreement

E X H I B I T J

PELTON ROUND BUTTE PROJECT
CULTURAL RESOURCES MANAGEMENT PLAN

Pelton Round Butte Project – FERC No. 2030

July 2004

Pelton Round Butte Hydroelectric Project
FERC Project No. 2030
Madras, Oregon

CULTURAL RESOURCES MANAGEMENT PLAN

Final

Portland General Electric Company
Portland, Oregon

The Confederated Tribes of the Warm Springs Reservation of Oregon
Warm Springs, Oregon

July 2003

CONTENTS

TABLES

ACRONYMS

ACHP	Advisory Council on Historic Preservation
APE	Area of Potential Effect
ARPA	Archaeological Resources Protection Act
ATV	all terrain vehicle
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BPA	Bonneville Power Association
CFR	Code of Federal Regulations
COHG	Central Oregon Heritage Group
CPSP	Cove Palisades State Park
CRMPC	Cultural Resources Management Plan Coordinator
CRS	Cultural Resource Specialist
CRMP	Cultural Resources Management Plan
CSD	Community Services Department
CTWS	Confederated Tribes of the Warm Springs Reservation of Oregon
DOE	Determination of Eligibility
ECPA	Electric Consumers Protection Act
FLPMA	Federal Land Policy and Management Act
FERC	Federal Energy Regulatory Commission
FPA	Federal Power Act
FTR	Final Technical Report
GIS	geographic information system
HLC	Hydro Licensing and Compliance
I&E	Interpretation and Education
LBC	Lake Billy Chinook
MOA	Memorandum of Agreement
NAGPRA	Native American Graves Protection and Repatriation Act
NF	National Forest
NFMA	National Forest Management Act
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
ODOT	Oregon Department of Transportation
OPRD	Oregon Parks and Recreation Department
ORS	Oregon Revised Statutes
OSMA	Oregon State Museum of Anthropology
PA	Programmatic Agreement
PGE	Portland General Electric
PIT	Passports in Time
ROW	Right-of-Way
ROWMP	Right-of-Way Management Plan
RRIP	Recreation Resources Implementation Plan

ACRONYMS (continued)

RV	Recreational Vehicle
SHPO	State Historic Preservation Officer
SMP	Shoreline Management Plan
TCP	traditional cultural property
THPO	Tribal Historic Preservation Officer
TRMP	Terrestrial Resources Management Plan
USDI	United States Department of the Interior
USFS	United States Forest Service
USGS	U.S. Geological Survey
WSPE	Warm Springs Power Enterprises

1.0 INTRODUCTION

1.1 Purpose and Definitions

The Pelton Round Butte Hydroelectric Project (Project), Federal Energy Regulatory Commission (FERC) Project No. 2030, will be owned and operated by Portland General Electric (PGE) and the Confederated Tribes of the Warm Springs Reservation of Oregon (Tribes) under a new license. PGE and the Tribes (Licensees) have jointly prepared this Cultural Resources Management Plan (CRMP) to guide the protection and treatment of cultural resources associated with the Project. The CRMP is a management tool to facilitate responsible stewardship of cultural resources in the Project area, particularly historic properties – those eligible for listing in the National Register of Historic Places (NRHP) and protected under Section 106 of the National Historic Preservation Act (NHPA) and other Federal and Tribal regulations. The CRMP also incorporates the *Guidelines for the Development of Historic Resource Management Plans for FERC Hydroelectric Projects, jointly issued by FERC and the Advisory Council on Historic Preservation, and effective January 11, 2001.*

The primary objectives of the management program detailed here are:

(1) To satisfy both the letter and the spirit of FERC requirements (18 CFR §109) for the identification, evaluation, and treatment of cultural resources potentially affected by the Project;

(2) To facilitate and ensure compliance with all legal requirements (including Tribal, Federal, State, and municipal) pertaining to cultural resources;

(3) To ensure proper and efficient inter-agency coordination of activities affecting cultural resources in the area of potential effect (APE) of the Project; and

(4) To optimize the benefits of cultural resources to the general public and to Tribal members.

The overall purpose of the CRMP is: to serve as a procedural guide for the Licensees' staff to follow in the management of cultural resources and the conduct of consultation in compliance with Section 106 of the NHPA; and to define a program for mitigating potential effects to historic properties of the Pelton Round Butte Project.

The Licensees intend to follow the management direction of the CRMP for the protection and mitigation of cultural resources when the new license is accepted. The CRMP will be adopted through a Programmatic Agreement (PA) in consultation with the appropriate Federal agencies, the State Historic Preservation Officer (SHPO), the Warm Springs Tribal Historic Preservation Officer (THPO), the Tribal Cultural Resources Program Manager, the Advisory Council on Historic Preservation (ACHP), and the FERC.

The objective of this CRMP is to ensure that eligible or potentially eligible historic properties are protected from the adverse effects of any Project undertaking in the area of potential effects. The Area of Potential Effect (APE) includes lands within the Project boundary and lands outside the Project boundary that were considered to be subject to effects from Project actions (see Section

2.2). Under the authority granted by the Federal Power Act and its Federal operating license, the Licensees will be directly responsible for managing Project-related effects on historic properties within the Project boundaries. The Licensees will coordinate with the Tribes and appropriate Federal agencies for the management of Project effects on historic properties outside the Project boundaries.

The term "historic property" refers to "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion on, the National Register of Historic Places, including artifacts, records, and material remains related to such a property or resource" [16 U.S.C. 470w(5)] [36 CFR §800.2(e)]. Those sites that do not qualify as historic properties or as potentially eligible historic properties will be managed in accordance with BLM Manual 8100 (e.g., sites managed for their scientific values, conservation values, management values, sociocultural values, public values, and those discharged from any further management concerns) as well as Forest Service Regulations 2360. Historic properties may be grouped into archaeological resources, historic resources, and traditional cultural properties (TCPs), as defined below.

- Archaeological Resources. Archaeological resources are any material remains of human life or activities (i.e., sites, features, or objects) that can provide understanding of past human behavior (as defined by the Archaeological Resources Protection Act [ARPA]). Examples of prehistoric archaeological resources in the study area include Native American tools, flakes, rockshelters, and other objects and artifacts. Examples of historic archaeological resources include trash scatters, building foundations, and other artifacts.
- Historic Resources. Historic resources are districts, sites, buildings, structures, or other objects that are associated with or convey some aspect of American history, architecture, engineering, and/or culture (USDI 1977). Examples of historic resources in the study area may include homestead sites, stone walls, or other physical evidence of recent human habitation, including the Project facilities themselves. Within this document, historic archaeological resources are generally described in conjunction with prehistoric archaeological resources. Buildings, structures, and linear resources are described separately.
- TCPs. TCPs are districts, sites, buildings, structures, or objects that embody traditional cultural values and are historically and traditionally associated with those values (ACHP 1991). TCPs are properties or locations that have associations "with cultural practices or beliefs of a living community and (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community" (USDI 1992).

1.2 Legal and Regulatory Context

Cultural resource studies have been pursued in connection with relicensing applications for the Project and in compliance with numerous Federal laws and regulations. These laws and regulations in general define the research, evaluation, and reporting procedures to be followed for projects under Federal jurisdiction.

The Federal Power Act (FPA), as amended by the Electric Consumers Protection Act (ECPA), gives FERC the responsibility to issue licenses for non-federal hydroelectric power plants.

The FERC provides guidelines to relicensing applicants, as detailed in the Hydroelectric Project Relicensing Handbook (FERC 1990), defining a set of steps designed to provide the FERC and responsible agencies with the information needed to fulfill their responsibilities.

The FERC recommends that two stages of cultural resources investigation be conducted in the Project area. Stage I is a preliminary reconnaissance designed to assess the areas potentially affected by Project operations and assist in planning for more detailed studies, and includes background research as well as field visits. Stage II research encompasses the more detailed inventory and evaluation work needed to determine which resources require management attention by the licensee. Normally, Stage II research includes systematic pedestrian surveys, interviews with persons knowledgeable about traditional cultural practices, and subsurface testing of archaeological sites to evaluate their information potential and to gather data pertinent to management planning.

The FERC further requires that the information gathered during the Stage I and Stage II studies be documented in a technical report filed with the application for the hydroelectric license. For the Pelton Round Butte Project, this requirement has been met by the Final Technical Report (Pettigrew 1998c), issued jointly by the Tribes and PGE in December 1998. Details about the background, conduct, and results of the relicensing studies that are not available in this CRMP may be found in the Final Technical Report.

Because the licensing of non-federal hydroelectric projects is under Federal jurisdiction, the relicensing is considered a Federal "undertaking" (35 CFR §800.16[y]), falling under all pertinent requirements of Federal historic preservation and environmental laws and regulations. Among the most important of these laws and regulations are the National Historic Preservation Act of 1966 (NHPA); associated ACHP regulations, Protection of Historic Properties (36 CFR §800); the National Environmental Policy Act of 1969 (NEPA); the American Indian Religious Freedom Act of 1978 (AIRFA); the Archaeological Resources Protection Act of 1979 (ARPA); and the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA), and the Federal Land Policy and Management Act (FLPMA). These laws, pertinent presidential executive orders (EO), and memoranda are described below.

1.2.1 Federal Legislation

1.2.1.1 National Historic Preservation Act of 1966

Section 106 of the NHPA requires Federal agencies to consider the effects of any actions or programs on historic properties and provide the ACHP with an opportunity to comment on any adverse effects. As the Federal agency responsible for relicensing the Pelton Round Butte Project, the FERC must comply with Section 106 of the NHPA.

The NHPA and its amendments established the National Register of Historic Places (National Register or NRHP), identified responsible agencies, and promulgated regulations that form the backbone of Federal government action in the areas of historic preservation and cultural resource management, as explained below.

(1) National Register of Historic Places. The NRHP is the official roster of resources determined to be of national, state, or local significance. The U.S. Department of the

Interior (USDI), through the National Park Service, maintains the NRHP and establishes the criteria for identifying historic and cultural resources to be listed on the NRHP. With some specific exceptions, the USDI has established three main standards that a resource must meet to qualify for listing on the NRHP: age, integrity, and significance. To meet the age criteria, a resource generally must be at least 50 years old. To meet the integrity criteria, a resource must possess integrity of location, design, setting, materials, workmanship, feeling, and association (36 CFR §60.4). Finally, a resource must be significant according to one or more of the following criteria (ACHP 1991):

- Possess association with important events (Criterion A);
- Have an association with important persons (Criterion B);
- Display distinctive characteristics, such as unique architecture, craftsmanship, or design (Criterion C); or
- Have the capacity to provide important information about the past (Criterion D).

(2) Responsible Agencies and Entities. The NHPA identifies the roles of entities responsible for reviewing properties for NRHP eligibility and for reviewing actions affecting eligible properties:

- State Historic Preservation Officer. Each state must designate a SHPO who coordinates preservation activities within that state. In Oregon, the SHPO is the Director of the Oregon Parks and Recreation Department (OPRD). The Oregon SHPO is responsible for making official Determinations of Eligibility (DOE) for the NRHP of cultural resources within Oregon. The Oregon SHPO is also a participant in consultation regarding the effects of an undertaking on cultural resources.
- Tribal Historic Preservation Officer (THPO). Section 101(d)(2) of the NHPA permits recognized Tribes to establish a Tribal Historic Preservation Officer. The THPO has responsibilities equivalent to the SHPO for cultural resources located on Tribal lands. The Confederated Tribes of the Warm Springs Reservation of Oregon have established a THPO responsible for Tribal lands.
- Advisory Council on Historic Preservation (ACHP). ACHP is responsible for reviewing and commenting on Federal actions affecting historic properties.
- U.S. Bureau of Indian Affairs (BIA). The BIA is entrusted with the responsibility of ensuring that rights of Native American Tribes are protected in the actions taken by state and Federal agencies. This responsibility includes ensuring that the NHPA requirements are properly addressed for activities that affect Tribal lands.
- Federal Land Management Agencies. The Bureau of Land Management and the U.S. Forest Service each manage lands within the Project's Area of Potential Effect. These agencies are responsible for recommendation of sites for National Register eligibility and for actions that may affect cultural resources within their jurisdiction. Specific planning documents and regulations related to these agencies are presented in Table 1-1 in the following section.

(3) Regulations, Standards, and Guidelines. The NHPA authorizes the ACHP and the USDI to establish a variety of regulations, standards, and guidelines (ACHP 1991). The ACHP has issued Protection of Historic Properties (36 CFR §800), which sets out the regulations, guidelines, and procedures that Federal agencies must follow to comply with Section 106. The five basic steps of the Section 106 review process include: (1) identifying and evaluating historic properties; (2) assessing the effects of the undertaking on eligible properties; (3) consultation with SHPO and THPO to resolve adverse effects, if any; (4) allowing for ACHP comment; and (5) proceeding with the undertaking.

1.2.1.2 Antiquities Act of 1906

This act authorizes the President to designate as National Monuments historic and natural resources of national significance located on Federally owned or controlled lands as National Monuments.

1.2.1.3 National Environmental Policy Act of 1969 (NEPA)

NEPA requires Federal agencies to consider the effects of their actions on the environment as a whole, including its cultural elements. NEPA provides a decision-making process that provides for the systematic consideration of alternatives and examination of the direct, indirect, and cumulative environmental impacts associated with implementation of a proposed action.

The applicability of NEPA and the level of documentation necessary will be determined by considering several factors including:

- The type of action;
- Whether the action is covered by pre-existing NEPA analysis or a published categorical exclusion;
- The type and level of impacts of expected, if any; and
- The sensitivity of the resources involved.

NEPA compliance does not satisfy other applicable requirements, nor does compliance with other applicable requirements necessarily satisfy NEPA's mandates.

1.2.1.4 Federal Land Policy and Management Act (FLPMA)

The U.S. Federal Land Policy and Management Act (FLPMA) of 1976. Establishes public land policy and guidelines for the administration, management, protection, development, and enhancement of public lands. FLPMA deals with four areas: the U.S. Bureau of Land Management's (BLM) authority, and its grazing, mining, and preservation policies. Under FLPMA, BLM lands remain classified as public, requiring BLM to produce land-use plans and resource inventories. FLPMA permits the sale of these public lands, but only under certain regulations. It also authorizes the BLM to enforce the law on its public lands in compliance with local law enforcers whenever possible. BLM land management authority under FLPMA includes authority to capture, remove, or relocate wild horses and burros from public land, and to grant permission for electrical cables and pipeline rights-of-way. Hydroelectric projects that existed

prior to the enactment of FLPMA, such as the Pelton Round Butte Project, are not governed by many of its provisions.

1.2.1.5 American Indian Religious Freedom Act of 1978 (AIRFA)

AIRFA states that the policy of the United States is to protect and preserve for American Indians their inherent rights of freedom to believe, express, and exercise the traditional religions of the American Indian, Eskimo, Aleut, and Native Hawaiians. These rights include, but are not limited to, access to sites, use and possession of sacred objects, and the freedom to worship through ceremony and traditional rites.

1.2.1.6 Archaeological Resources Protection Act (ARPA) of 1979

The ARPA (as amended) protects archaeological resources that are at least 100 years old on public Federal and Native American lands. The ARPA establishes a permit system for excavation and other research at archaeological sites on these lands. An ARPA permit can only be issued to a person qualified under the legislation to conduct archaeological investigations. The recovered archaeological resources and associated records must be preserved (curated) by an approved institution. Excavations and other work at protected sites without an ARPA permit are illegal and are punishable by criminal and/or civil penalties set forth in the ARPA. Within the Project APE, archaeological sites on Federally administered land or on lands owned by the Tribes are protected by ARPA, and an ARPA permit is necessary to conduct archaeological evaluations or other research at these sites. Similar Oregon laws (ORS 390.235 to 390.240) apply to portions of the Project on non-Federal lands.

1.2.1.7 Native American Graves Protection and Repatriation Act of 1990 (NAGPRA)

NAGPRA establishes regulations regarding the treatment of any Native American graves, human remains, and/or funerary objects, sacred objects, or objects of cultural patrimony on Federal, Tribal and trust lands. Objects of cultural patrimony are objects of central importance to a group as a whole, which cannot be owned or controlled by an individual. Knowingly disturbing or removing gravesite remains or these objects is a felony under Federal law and can result in criminal prosecution. This legislation applies to Federal and Tribal lands. Similar Oregon laws (ORS 97.740 to 97.990) apply to portions of the Project on non-Federal lands.

1.2.2 Presidential Executive Orders (EO) and Memoranda

Four Executive Orders or memoranda have been issued since the NHPA was amended in 1992. In general, these have been incorporated into changes in the revised regulations, effective January 11, 2001.

1.2.2.1 Memorandum for Heads of Executive Departments and Agencies dated April 29, 1994: Government-to-Government Relations with Native American Tribal Governments

This memorandum directs Federal agencies to conduct their relationship with federally recognized Indian tribes on a government-to-government basis. This memorandum is applicable wherever there is interaction between Federal agencies and Federally recognized tribes. Also included are

detailed instructions on how the installation commander should proceed to set up a consultation relationship with a tribal entity.

1.2.2.2 EO 11593 – Protection and Enhancement of the Cultural Environment

This EO, effective May 13, 1971 directs Federal agencies to locate inventory and nominate to the NRHP properties under their control; initiate measures to preserve, restore, and maintain significant sites through their policies, plans, and programs; and assure that Federal plans and programs contribute to the preservation of non-Federally owned sites, structures, and objects of significance. This EO has since been incorporated into the NHPA.

1.2.2.3 EO 13007 – Indian Sacred Sites

This EO, effective 24 May 1996, provides direction to Federal agencies on managing Indian sacred sites. "Sacred site" is defined as any specific, discrete, narrowly delineated location on Federal land that is identified by an Indian tribe as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion, provided that tribe or appropriate authorized representative of an Indian religion has informed the agency of the existence of such a site. When needed, each installation must develop procedures to meet site access and protection requirements as discussed. The procedures must also provide reasonable notice to Indian tribes of actions that may impact the integrity of sacred sites.

1.2.2.4 EO 13175 – Consultation and Coordination with Indian Tribal Governments

This recent EO, effective November 6, 2000, provides a process to establish regular and meaningful consultation and collaboration with tribal officials in the development of Federal policies with tribal implications, to strengthen the United States government-to-government relationships with Indian tribes, and to reduce the imposition of unfunded mandates upon Indian tribes.

1.3 Existing Management Plans

Many agencies administer lands within the Project APE. Most land managing agencies, the Tribes, and the Oregon SHPO have instituted management plans that establish procedures to be followed in the treatment and care of historic properties on the administered areas. This CRMP is not designed to supersede or establish exceptions to existing agency and Tribal management plans, but is intended to establish procedures that are compatible with those plans.

Table 1-1 summarizes existing agency management plans pertinent to the Project APE. Most of these were prepared in compliance with the provisions of Sections 106 and 110 of the NHPA. Additionally, both the BLM and the USFS have established programmatic agreements for streamlined Section 106 reviews (with more limited SHPO involvement) for cultural resources under their care.

Table 1-1. Existing planning documents for land managing agencies relating to cultural resources.

Agency	Document	Summary
Bureau of Land Management (BLM)	National Programmatic Agreement (PA) with Advisory Council and National Conference of State Historic Preservation Officers (1997)	Calls for revision of BLM cultural resource management procedures, and BLM compliance with Section 106 through PA provisions rather than through 36 CFR §800.
	Protocol for Managing Cultural Resources on Lands Administered by the Bureau of Land Management in Oregon (1998)	Specifies SHPO review of BLM undertakings only in certain cases. Lists undertakings exempt from survey and protection requirements.
	BLM Manual: 8100 – Identifying Cultural Resources (1998)	Detailed specifications of procedures for inventory, evaluation, management use categorization, documentation, data maintenance, personnel qualifications and administrative requirements, and external review.
	BLM Manual: 8270 – Paleontological Resource Management (1998) and H.8270-1 General Procedural Guide for Paleontological Resource Management (1998)	Provides a comprehensive approach to the management of paleontological resources, including identification, evaluation, protection, and use.
BLM, Prineville District	Two Rivers Resource Management Plan (1986)	Stipulates inventory, evaluation, and consideration of effects for surface-disturbing projects in accordance with Federal standards.
	Middle Deschutes/Lower Crooked Wild and Scenic Rivers' Management Plan (1992) (with Ochoco National Forest and Oregon State Parks and Recreation Department)	Stipulates management in accordance with Federal standards. Requires maintenance of databases, a monitoring program, a public information program, comprehensive inventory, protection from public recreation use, and inter-agency coordination.
BLM, Prineville District continued	Lower Deschutes River Management Plan Record of Decision (1993)	Stipulates management in accordance with Federal standards. Emphasizes inventory and evaluation, protection, stabilization, database maintenance, Tribal consultation, law enforcement, avoidance of impacts, and public interpretation.

Table 1-1. Existing planning documents for land managing agencies relating to cultural resources.

Agency	Document	Summary
	Central Oregon Heritage Group (COHG) Charter (1998)	Officially establishes the COHG as a self-directed work team composed of cultural resource specialists from the BLM Prineville District, Deschutes NF, and Ochoco NF. The COHG is to reduce program inefficiencies and duplication and increase inter-agency cooperation and sharing of expertise.
BLM, Salem District	Salem District Record of Decision and Resource Management Plan (1995)	Includes general goals for inventory, evaluation, conservation, protection, and management of cultural resources. Promotes paleoenvironmental investigation, educational and interpretive programs, and Tribal consultation.
	Little North Santiam Watershed Analysis (1997)	Lists known sites in North Santiam River watershed, but includes no management discussion.
Confederated Tribes of the Warm Springs Reservation of Oregon	Ordinance #68: Protection and Management of Archaeological, Historical, and Cultural Resources (1987)	Directs increased efforts to inventory and evaluate sites. Establishes legal protection of sites. Establishes Tribal policy for exercise of treaty rights on off-Reservation ceded lands. Provides non-exhaustive list of protected cultural materials. Defines procedures for excavation of human remains.
	Integrated Resources Management Plan for the Forested Area (1992)	Specifies goals, objectives, and desired future conditions. Calls for development of a cultural resource program and research design. Specifies means to protect sites. Emphasizes enhancement and interpretation of sites.
	Memorandum of Understanding with Ochoco NF (1993)	Coordinates goals and procedures of Tribes and the Ochoco NF. Requires consultation as part of Forest planning.
	Integrated Resource Management Plan II for the Non-forested and Rural Areas (1997)	Specifies goals, objectives, and desired future conditions for cultural resources. Adopts Section 106 procedures. Covers all proposed developments. Calls for inventory of 10% of Reservation within 10 years.

Table 1-1. Existing planning documents for land managing agencies relating to cultural resources.

Agency	Document	Summary
USFS	National Forest Management Act (NFMA)	National Forest Management Act (NFMA) Planning for and management of the National Forest System is guided by the Forest and Rangeland Renewable Resources Planning Act (RPA) of 1974, as amended by the National Forest Management Act (NFMA) of 1976. Together, these laws encourage foresight in the use of the Nation's forest resources, and establish a long-range planning process for the management of the National Forest System. NFMA directs the Forest Service to prepare comprehensive land and resources management plans that are coordinated with the national RPA planning process for all national forests.
Deschutes National Forest	Lithic Scatter PMOA (agreement among Forest Service Pacific Northwest Region, SHPO and Advisory Council) (1984)	Defines lithics-dominated archaeological sites as significant and calls for a regional management strategy for such sites.
	A Regional Management Strategy for Identification and Treatment of Lithic Scatters Archaeological Sites on the Deschutes, Fremont, Malheur, Ochoco, Umatilla, Wallowa-Whitman, and Winema National Forests (1986)	Management strategy called for by the Lithic Scatter PMOA. Defines lithic scatter sites, lists pertinent research questions, and specifies methods and techniques to be used in management and research. Defines avoidance as the primary management option. Lists project design options for protecting sites.
	Deschutes NF Land and Resource Management Plan (1990)	Defines a series of standards and guidelines calling for inventory, evaluation, thematic NRHP nominations, and CRMPs. Requires coordination with Indian Tribes and Includes provisions for the treatment of human burials.
	USFS Manual 2360	Chapter 2360 of Title 2300 (Recreation, Wilderness, and Related Resource Management) addresses procedures for areas with scenic, historical, geological, botanical, zoological, paleontological, or other special characteristics. (USFS Website, Accessed 4/30/1).

Table 1-1. Existing planning documents for land managing agencies relating to cultural resources.

Agency	Document	Summary
	Metolius Wild and Scenic River Management Plan Draft Environmental Impact Statement (1995)	Recognizes both the cultural and scientific values of heritage resources. Calls for development of a heritage resource management plan to protect sites and perform data recovery where damage is unavoidable. Requires inventory of potential project areas and monitoring of high probability sites every 3 years.
	Metolius Watershed Analysis (1996)	Calls for prioritization of heritage resource sites as an aid in developing Heritage Resource Management Plans, and evaluation of prehistoric sites in developed locations.
	Central Oregon Heritage Group (COHG) Charter (1998)	See summary for BLM Prineville District, above.
Jefferson County	Comprehensive Plan (1981)	Lists the petroglyph boulder in The Cove Palisades State Park as an officially designated historic site, subject to protection by zoning ordinances.
Mt. Hood National Forest	Lithic Scatter PMOA (agreement among Forest Service Pacific Northwest Region, SHPO and Advisory Council) (1984)	See summary for Deschutes National Forest, above.
	A Regional Management Strategy for Identification and Treatment of Lithic Scatters Archaeological Sites on the Deschutes, Fremont, Malheur, Ochoco, Umatilla, Wallowa-Whitman, and Winema National Forests (1986)	See summary for Deschutes National Forest, above.
	Mt. Hood NF Land and Resource Management Plan (1990)	Establishes as goals a complete inventory and preservation and scholarly research of cultural resources. Mandates a Forest CRMP, including a monitoring plan. Stipulates adherence to Federal standards.
Ochoco National Forest	Lithic Scatter PMOA (agreement among Forest Service Pacific Northwest Region, SHPO and Advisory Council) (1984)	See summary for Deschutes National Forest, above.

Table 1-1. Existing planning documents for land managing agencies relating to cultural resources.

Agency	Document	Summary
	A Regional Management Strategy for Identification and Treatment of Lithic Scatters Archaeological Sites on the Deschutes, Fremont, Malheur, Ochoco, Umatilla, Wallowa-Whitman, and Winema National Forests (1986)	See summary for Deschutes National Forest, above.
	Land and Resource Management Plan (1989)	States general goals to locate, evaluate, protect, and mitigate significant sites; and enhance and interpret selected sites; and promote research and Native American traditional practices. Specifies objectives in terms of numbers of sites documented, enhanced and interpreted, and nominated to the NRHP per decade for the next 50 years.
	Middle Deschutes/Lower Crooked Wild and Scenic Rivers' Management Plan (1992) (with BLM Prineville District, and Oregon State Parks and Recreation Department)	See summary for BLM Prineville District, above.
	Cultural Resource Inventory Design (1992)	Specifies that archaeological surveys will be done according to a stratified sampling scheme: 100% of high probability zone and 20% of low probability zone. Details information to be provided in inventory reports. Lists research topics. Specifies monitoring all sites at least every 5 years.
	Memorandum of Understanding with the Confederated Tribes of the Warm Springs Reservation of Oregon (1993)	Coordinates goals and procedures of Tribes and the Ochoco NF. Requires consultation as part of Forest planning.
	Central Oregon Heritage Group (COHG) Charter (1998)	See summary for BLM Prineville District, above.
Oregon State Historic Preservation Office	1996 Oregon Historic Preservation Plan (1995)	Describes 16 goals for historic preservation in Oregon, and defines initial management steps to reach these goals.
The Cove Palisades State Park (Oregon State Parks and Recreation Dept.)	The Cove Palisades State Park Master Plan (1999)	Defines areas within the Park in terms of levels of protection from development. Includes cultural resources with other resources to be protected, but makes no specific management provisions for cultural resources.

Table 1-1. Existing planning documents for land managing agencies relating to cultural resources.

Agency	Document	Summary
	Middle Deschutes/Lower Crooked Wild and Scenic Rivers' Management Plan (1992) (with Ochoco National Forest and BLM Prineville District)	See summary for BLM Prineville District, above.
Willamette National Forest	Cultural Resource Inventory Plan (1988)	Describes procedures to be followed in designing, implementing, and reporting cultural resource surveys.
	Land and Resource Management Plan Chapter IV: Forest Management Direction (1990)	Requires that cultural resource inventory and evaluation follow established Federal standards, including stratified sampling surveys and updates of overview documents.
USDA Forest Service, Pacific Northwest Region (Region 6)	Programmatic Agreement with Advisory Council and Oregon SHPO (1995)	Establishes a streamlined Section 106 compliance review process in which some undertakings are exempt from case-by-case review.

Note: As these plans are listed in full in this table, they are not included in Section 8.0 (Literature Cited) unless referenced elsewhere in this CRMP.

1.4 Licensees' Responsibilities

The ultimate responsibility for cultural resource management lies at the Federal level with the lead Federal agency's requirements to implement the NHPA. For Pelton Round Butte Project undertakings, this responsibility rests with the FERC as the licensing agency for lands within the Project boundary, in coordination with appropriate agencies responsible for Federal lands outside the Project boundary but within the APE. Because the responsibility for cultural resources is shared, and because the Licensees as well as the various agencies and Tribes conduct activities potentially affecting cultural resources, close coordination among all parties is essential to effective management.

The Licensees are responsible for compliance with the license for the Project. While the license will be issued jointly to PGE and the Tribes, day-to-day operations will be managed by a Project operator, which will be PGE for the first period of the new license under the terms of the Long-Term Global Settlement and Compensation Agreement (Global Settlement). The Project operator will also be responsible for overseeing the management of the resources in the Project boundary to ensure that proper procedures are followed to meet FERC's legal obligations and the Licensees' stewardship goals. PGE's Hydro Licensing and Compliance (HLC) staff will advise and assist in fulfilling these responsibilities for cultural resources, with assistance from the Tribes' Cultural Resources staff and/or professional contractors as needed.

The CRMP will be implemented in conjunction with other documents, policies, and guidelines for the Pelton Round Butte Project. The most relevant documents are the Pelton Round Butte Comprehensive Management Plan (March 1999), the draft Terrestrial Resources Management Plan (TRMP), the draft Recreation Resources Implementation Plan (RRIP), and the draft Shoreline Management Plan (SMP). Annotated outlines for these management plans (except for the

Comprehensive Plan) are included as attachments to the Joint Application Amendment (Joint Amendment). This CRMP is also intended to serve without conflict with the management plans of other agencies, including BLM Manual 8100 and FS Manual 2360. Federal agencies and Tribes have ongoing cultural resource management programs and broad responsibilities for cultural resources that cannot and are not altered by this CRMP. Even within the Project boundary, the CRMP pertains only to Project-related actions and activities and has no bearing on the potential effects of non-Project undertakings.

1.5 Process of CRMP Development

Although PGE and the Tribes were previously competitors in the relicensing process, both acknowledged that greater efficiencies could be gained by working together during the cultural resources field survey and data evaluation portion of the process. When they agreed to joint studies, PGE and the Tribes consolidated information that each had prepared to that date. These reports document the previous studies conducted within the Project area and provide research orientations and context. The Tribes and PGE then jointly shared the work to complete an inventory of cultural resources and evaluation to determine NRHP eligibility. The process of evaluating the field data for significance and Project effects was also completed jointly, and the results were presented in a Final Technical Report issued by both PGE and the Tribes.

Subsequent to the release of the Final Technical Report, PGE and the Tribes each prepared separate draft CRMPs. As a whole, there were broad levels of agreement between the two CRMPs in the need to protect cultural resources and the types of programs that would be effective in providing that protection. Additionally, each of the two CRMPs focused on different, but equally important, issues.

The two plans differed in their approaches to accomplishing the programs and the level of emphasis placed on mitigating individual sites versus managing operations and resources over the long term. Agreement between the Tribes and PGE was achieved through a series of consultation meetings involving key technical, legal, and operational representatives of each side.

As a result of consultation with Federal, tribal, and State agencies, and negotiations between the Tribes and PGE, the two separate draft CRMPs have been consolidated into this CRMP that provides the basis of the Licensees' proposals. This CRMP was developed with input from the responsible land managing and reviewing agencies, including four USFS national forests — the Ochoco, Deschutes (Sisters Ranger District), Mount Hood (Clackamas River Ranger District), and the Willamette (Detroit Ranger District) — as well as the Crooked River National Grassland. Other agencies involved were the Bureau of Land Management (Prineville District), the BIA, and the Oregon Parks and Recreation Department (The Cove Palisades State Park).

2.0 BACKGROUND

2.1 Description of Project

The Pelton Round Butte Project (Project) consists of the existing Round Butte, Pelton and Reregulating developments located on the Deschutes River in Jefferson County, Oregon. The three developments are located in sequence on the Deschutes River, near the confluence of the Deschutes with the Crooked and Metolius rivers. Water released from the Round Butte Development flows directly into the Pelton Development and then into the Reregulating Development. The Project is operated as a modified run-of-the-river system. The Project is licensed by the FERC as Project No. 2030. The current license will expire on December 31, 2001.

The 300-MW Round Butte Development is the largest of the three Project developments, in terms of both generation capacity and reservoir storage capacity. The Round Butte Dam is a rock-filled structure rising 440 feet above the riverbed to create Lake Billy Chinook, a popular and important regional recreational resource. The 108-MW Pelton Development is located downstream of the Round Butte Development. The Pelton Dam is a variable-radius concrete arch structure 204 feet high that creates Lake Simtustus. The 19-MW Reregulating Development was originally constructed without power generating facilities as part of the Pelton Development. The Reregulating Dam is a combined concrete gravity and rock-filled structure with a maximum height of 88 feet. In 1982, the Tribes constructed a powerhouse adjacent to the Reregulating Dam spillway. The power facilities are owned by the Tribes and operated by PGE under an agreement with the Tribes.

Land abutting the Project includes property owned by PGE, the United States government, the State of Oregon, the Tribes, and private citizens. Approximately 15,400 acres of property lies within the Project boundaries or within 1/4 mi. of the boundary, with nearly half of this managed by the U.S. government, including the Deschutes National Forest (4%), the Crooked River National Grassland (14%), and the BLM Prineville District (28%). The Tribes own nearly a third of the property, and their Reservation is located to the north of the Metolius River and to the west of the Deschutes River. The State of Oregon manages 6 percent of the property within 1/4 mi. of the Project boundary. Jointly owned lands (lands owned by the Licensees) comprise approximately 6 percent of the land, with flowage easements on another 13 percent that is in private ownership.

2.2 Definition of Area of Potential Effect

The ACHP defines the Area of Potential Effect (APE) as "the geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist" (36 CFR §800.16[d]). The APE is a flexible concept that may vary with the nature of the historic properties and the type of effects. The APE for this Project has been defined (Pettigrew 1998a) most specifically for archaeological sites (including both prehistoric and historical sites), buildings, and hydroelectric facilities where ground disturbance or other forms of degradation or loss may occur as a result of Project-related activities. These areas encompass the reservoir shorelines, recreation areas associated with the reservoirs,

areas used in Project operation (including dams, powerhouses, and other Project facilities), and power transmission and access road corridors. Table 2-1 lists specific definitions of areas included in the archaeological APE for this Project. Maps, located in the Final Technical Report, Volume I, Appendix D, show their locations. [Note that the Bethel-Round Butte transmission line corridor and associated access roads were included in the APE and in the field studies. These areas subsequently were removed from the license based on a FERC order issued on August 28, 2002, and are no longer within the Project boundary.]

The Project APE for traditional cultural properties was drawn broadly enough to encompass likely direct and indirect effects, yet narrowly enough to make practical its application (Ellis et al. 1998). Defined in consultation with the officials and agencies of the Tribes (e.g., THPO, Culture and Heritage Committee, Fish and Wildlife Committees, and Cultural Resources Program Manager) and other appropriate parties and agencies, the APE extends laterally from the reservoirs and river channels for a distance of 3 to 5 miles and includes transmission line rights-of-way.

Table 2-1. Area of Potential Effect for archaeological sites.

Survey Area	Estimated Acres/Miles[2]	Notes
Reservoir shoreline areas[1]		
Lake Simtustus shoreline	18.7 mi. of shoreline	
Reregulating Reservoir shoreline	5.3 mi. of shoreline	
Lake Billy Chinook	59.4 shoreline mi.	Includes all of Chinook Island.
Recreation areas including 250 m buffer zone in most cases		
The Cove Palisades State Park	4,130 acres	No buffer zone included because Park boundaries generally extend beyond heavily used areas
Pelton Park	89 acres	
Lake Simtustus Indian Park	156 acres	
Lake Simtustus RV Park	89 acres	
Monty Campground	15 acres	
Round Butte Overlook Park	81 acres	
Perry South Campground	238 acres	
Designated overlooks Pelton Wildlife Overlook	 100 acres	
Wildlife Viewing Area	10 acres	
Three Rivers Marina	117 acres	
Total recreation areas	5,025 acres	
Areas associated with Project operation (including buffers)[2]		
Buffer zone	Total 101 acres	500x500 m around each of the three dams
WSPE complex	44 acres	Includes 250 m buffer zone
Quarry and borrow pits	270 acres	Includes 250 m buffer zone for unfenced pits
Round Butte Switchyard	90 acres	Includes 250 m buffer zone
Pelton fish ladder and holding pond	2.7 mi. long, 12 acres	
Total Project operation areas	517 acres	Not counting linear features
Electrical transmission lines		
Bethel-Round Butte 230-kV line		4 mi. 325 ft. wide, 61 mi. 125 ft. wide, 34 mi. 200 ft. wide
Cove Substation-Pelton Reregulating Dam 69/115-kV line and 12.5-kV line	10.5 mi. 100 ft. wide	
Pelton Dam-Round Butte Substation	7.9 mi. 100 ft. wide	

Table 2-1. Area of Potential Effect for archaeological sites.

Survey Area	Estimated Acres/Miles[2]	Notes
230-kV line (parallels Cove-Pelton 69-kV line except for last 3.5 mi.)		
Pelton Rereg. Dam-Warm Springs Substation 69-kV line	3.2 mi.	100 ft. wide.
Stub lines from 12.5-kV line to Project facilities	1.2 mi.	
Total T-line corridors	120.6 mi. from 100 to 325 ft. wide	Not counting stubs
Road Corridors[3]		
Main Round Butte Dam access road	2.8 mi.	To junction with Belmont Lane
Road to Round Butte Observatory	0.4 mi.	
Willow Creek Bridge	2 acres	Includes 50 m wide buffer zone
Road to misc. dam facilities, including quarries, housing area, and viewpoints	0.2 mi.	
Connecting road southward from Pelton Dam to cattle guard on Elk Drive	4.1 mi.	
Main access road from Hwy. 26 to the right abutment of Pelton Dam	3.1 mi.	
Dizney Lane from the main Pelton Dam access Road to the Rereg. Dam	1.0 mi.	
Power house access road from Jackson Trail Road to WSPE and the Rereg. Dam	0.6 mi.	
Road accessing west side of Round Butte Dam alongside Lake Billy Chinook	1.0 mi.	
Transmission line access roads	16.7 mi.	Roads built or used primarily to access transmission lines
Road leading to Lake Simtustus Indian Park	2.9 mi.	
Access road to Perry South Campground from Fly Lake Road	5.5 mi.	
Connecting road from Perry South Campground to south shore of Lake Billy Chinook	2.0 mi.	
Connecting road from Perry South Campground to Monty Campground:	4.2 mi.	
Total road mileage	44.5 mi.	

[1)] Survey area for transmission lines is the right-of-way plus roads primarily used for access.
[2)] Shoreline APE includes a 50-m wide zone at the upper reservoir margin, as well as rockshelters, caves, and possibly cultural features that are outside the 50-m zone but are readily accessible from the shoreline.
[3)] Road corridor APE includes a 15-m zone on each side of the road.

2.3 Context of Resources

A detailed cultural overview of the Project vicinity is available in Volume I, Section 3, of the Final Technical Report and is summarized below. American Indian peoples have inhabited the region for at least the past 13,000 years. Euro-American migrants, mostly from eastern North America, began arriving in the early 1800s and by the late 1800s represented the majority of the population. American Indian groups were allocated reservations between the 1850s and the 1870s. By the

1920s the cities, towns, and transportation and communication routes familiar today had been firmly established. Homesteaders attempted dry farming south of the Metolius River and east of the Deschutes River in the 1910s and 1920s, only to abandon their farms in the 1930s when the climate proved too dry to support that strategy. The Project's hydroelectric facilities were constructed in the 1950s and 1960s. Current patterns of recreational use of the reservoir vicinities were established in the 1970s.

2.4 Investigation History

Human use of the Project vicinity throughout prehistory and history has left a diverse cultural heritage that has been the subject of research from the 1960s through the 1990s. Pettigrew (1998a) summarizes archaeological research in the Project vicinity prior to studies conducted for this license (including lists of sites documented prior to 1997). Bowyer and Schalk (1998) detail the conduct of archaeological studies that took place in 1997 and 1998 as part of this relicensing. The prior research and the studies conducted for the relicensing are described below.

2.4.1 Research Prior to 1997

Archaeological field research conducted prior to the relicensing effort is contained in 84 reports. No cultural resources studies were conducted in the 1950s in connection with the construction of Pelton Dam and the Reregulating Dam. The earliest project on record was the 1961–1963 Round Butte Dam Archaeological Program (Cressman 1963; Roscoe 1967; Ross 1963), which inventoried and sampled prehistoric sites threatened by the construction of Round Butte Dam. The largest group of projects is that comprising timber sale surveys undertaken by the Willamette National Forest, Detroit Ranger District, near the Bethel-Round Butte 230-kV transmission line. Between 1979 and 1992, Willamette National Forest archaeologists performed at least 38 surveys in this vicinity. Smaller numbers of timber sale surveys have been completed along the same transmission line by personnel of the Mt. Hood National Forest, Clackamas River Ranger District, and the BLM Salem District. Other archaeological surveys have covered highway rights-of-way, transmission lines, housing developments, and other project areas.

In addition to those already mentioned, two other pre-1997 projects recorded many sites within the Project APE in the Deschutes River vicinity. The Cove Land Exchange Project (Glover 1983) recorded sites within The Cove Palisades State Park (CPSP). The survey of the Cove-Pelton Reregulating Dam 69/115-kV transmission line (Jenkins and Darby 1992; Oetting 1993) documented sites within the principal corridor linking Project dams.

Archaeological inventory activities within the study area prior to the relicensing fieldwork located 68 prehistoric sites and 14 prehistoric isolates. A total of 31 sites was reported by Cressman (1963) and Ross (1963) for the Round Butte Dam Archaeological Program, which yielded the only

documentation for sites now inaccessible below the waters of Lake Billy Chinook. Of the 31 officially recorded sites, only four[1] may remain above the high water elevations of Lake Simtustus and Lake Billy Chinook, while the remaining 27 are either inundated by or at the margins of Lake Billy Chinook or destroyed by other activities.

All of the sites recorded by the Round Butte Dam Archaeological Program are along the Deschutes and Crooked Rivers; none were documented on the Metolius River. Review of the field notes for the survey indicates that relatively little time was spent searching for sites on the Metolius River, which was much less accessible at the time than today. Regardless of the areas covered, however, most of the site locations are uncertain because they are documented only on a single small map provided in the Cressman (1963) and Ross (1963) reports.

During a CPSP land exchange survey, a substantial group of sites was documented by Glover (1983). This survey yielded 11 prehistoric sites within the study area, all of them on the tablelands and benches well above Lake Billy Chinook. Of the remaining field studies recorded in the Project APE, only one (Swift and DeKlyen 1990) recorded a prehistoric site (35JE295) that may extend to the margin of a Project area reservoir (in this case the Metolius Arm of Lake Billy Chinook).

Two concentrations of prehistoric sites are notable on the west side of the Cascade Range along the Bethel-Round Butte 230-kV transmission line. One is in the vicinity of Breitenbush Hot Springs, and the other is north of Sardine Mountain.

Prior to 1997, only one prehistoric site in the Project APE had been formally evaluated for NRHP eligibility. The Lundsford Saddle Site (35MA119), on the Willamette National Forest, Detroit Ranger District, within the Bethel-Round Butte 230-kV transmission line corridor, was test-excavated and assessed as eligible by Draper et al. (1993).

Relatively few cultural resources from the historical period were recorded near or within the Project area prior to 1997. During the 1961–1962 Round Butte Dam Archaeological Program (Cressman 1963; Ross 1963), historical resources were not recorded. Based on historic maps, many historical resources should have been recorded during this 1960s survey, including the Clark Rodgers homestead known as The Cove, a stone house, and several cabins, along with a small hydroelectric facility, all now inundated by Lake Billy Chinook.

Situated at the southern end of the Crooked River Arm of Lake Billy Chinook are the Opal Springs facilities. This complex is owned by the Deschutes Valley Water District, but administered by the BLM Prineville District. This property was surveyed in 1981 (Simmons 1981), and a house, debris scatter, and hydro-related structures were noted. The scatter and the structures were not fully documented.

During a land exchange survey for the Ochoco National Forest, Glover (1983) recorded four historical resources. The four sites include an agricultural landscape feature, a secondary refuse disposal area, a fence line and debris scatter, and a debris scatter associated with the historic location of a house.

1 (35JE17, -19, -20, and -21 clearly are not submerged, 35JE28 and –29 are believed to be destroyed by quarry actives as is the location of 35JE18. Site 35JE22 is inundated and site –23 is still unknown but probably under water).

In 1992, two historical resources were recorded during a transmission line survey for PacifiCorp (Jenkins and Darby 1992). One of the sites (OR-JE-8) contains railroad and domestic debris from a railroad construction camp associated with the Oregon Trunk Line. The site was assessed as eligible in the survey report, and the eligibility was confirmed during a reassessment of the property (Minor 1993). Based on historic maps, the rail line route in this area is now a road. The other site identified in the PacifiCorp survey (Pelton-4) is a secondary refuse scatter probably dating from the 1920s. In addition, an irrigation canal lies adjacent to a lithic scatter (Pelton-1), but no other information on the canal was provided in the survey report.

No buildings or structures within one-half mile of the Project are listed on Oregon's Statewide Inventory of Historic Buildings. Of the 40 Jefferson County properties listed, most are associated with agriculture, including the Hay Creek Ranch complex (n=20). During the 1981 survey at Opal Springs (Simmons 1981), a 1920s bungalow house was recorded. The report provides a brief description of the house and notes that hydro-related facilities were constructed at Opal Springs between 1905 and 1958 (Simmons 1981). The 1985 USGS Steelhead Falls quadrangle notes a pumphouse, diversion dam, and cable at this location. The building was considered not eligible for nomination to the NRHP (Simmons 1981). The report does not provide an evaluation of the Opal Springs hydro-related facilities, which are outside the Project APE.

2.4.2 Archaeological Survey in 1997 and 1998

As detailed in Table 2-2, the APE for archaeological sites is divided into several areas: reservoir shoreline, recreation areas, areas associated with Project operations, and road corridors. Sites are defined as locations with cultural features of ten or more artifacts that are more than 50 years old and located within a bounded landscape (or the same landform). Locations with fewer than ten artifacts are considered isolates and documented on a COHG Isolate Record form. Independent of an archaeological complex, isolated linear resources such as roads, trails, railways, and ditches were recorded separately. As detailed by Bowyer and Schalk (1998), these areas were surveyed, mostly in 1997.

Before the field survey began in 1997, Project specialists conducted background research at the University of Oregon Map Library in Eugene, the Oregon SHPO in Salem, the BLM office in Portland, the CPSP office, and the Warm Springs Tribal Historic Preservation Office. Records for sites within 1/2 mi. of the Project APE were compiled. Over the course of the research, other institutions and agencies were contacted, including the Jefferson County Historical Museum; Jefferson County Public Works; the BLM Salem and Prineville Districts; the Deschutes, Mt. Hood, Ochoco, and Willamette National Forests; and the Crooked River National Grassland.

The areas surveyed in 1997 comprised three separate efforts: the Lake Billy Chinook (LBC) Reservoir low pool, the CPSP, and all other areas (Table 2-2). The LBC Reservoir was surveyed during the drawdown in January and February. Access to most of this area was by boat. Some of the LBC shoreline was visually inspected from the boat, as were portions of the Lake Simtustus shoreline. Survey of the CPSP was conducted between May and July. Remaining survey areas were covered in five phases from 19 May to 24 August. A boat afforded quick access to the Lake Simtustus shoreline, some areas were accessed on foot, and four-wheel drive vehicles allowed access to the majority of the other portions of the Project area.

During the course of the 1997 survey, the APE was modified several times by the addition of survey areas, including transmission lines and a wildlife viewing area. Minor portions of the APE were not surveyed due to steep terrain in the canyons and restricted access to private property, such as within the Three Rivers Marina complex. For the CPSP, areas not surveyed included steep slopes of the main river canyons, rimrock exposures on these slopes, boulder fields along the shoreline, and some small areas inadvertently omitted. Most Warm Springs Reservation portions of the APE were surveyed except for some steep-walled canyons. In the western Cascade Range, the terrain was steep, rocky, and at times blocked with impenetrable vegetation. Most of the Willamette Valley section was surveyed, except for areas with dense blackberry and Scot's broom and small areas considered unsafe. In one case, a landowner denied access onto the property. Many of the access roads identified on PGE field maps were inaccessible, even on foot, or were not located.

Table 2-2. Survey coverage for the Pelton Round Butte Project[1].

Survey Area	Estimated Acres/Miles[2]	Surveyed Acres/Miles[2]	Comments; Days Surveyed (1997 unless specified)
Reservoir Shoreline			
Lake Billy Chinook shoreline	59.4 mi., 25 ac	17.4 mi., 25 ac	1/22–1/25, 2/1–2/5, 2/20–2/21
Lake Simtustus shoreline	18.7 mi.	6.0 mi.	5/20-5/22
Reregulating Reservoir shoreline	5.3 mi.	2.8 mi.	5/26, 5/28, 6/3
Recreation Areas			
The Cove Palisades State Park	4130 ac	~3700 ac	May–July
Tam-a-láu Trail Rock Art Area	14 ac	20 ac	5/19/98
Pelton Park	89 ac	30 ac	5/21, 5/26
Round Butte Observatory	81 ac	81 ac	5/25–5/26
Lake Simtustus Indian Park	156 ac	160 ac	6/4
Lake Simtustus RV Park	89 ac	80 ac	5/22
Perry South Campground	238 ac*	180 ac	*Survey includes 20 ac of LBC survey; 5/27, 6/2
Monty Campground	15 ac	Previously surveyed	5/20/98
Rereg. Reservoir overlook	100 ac	75 ac	5/21–5/23
Three Rivers Marina	117 ac	10 ac	Private property; limited access; 6/10
Rereg. Reservoir Wildlife Viewing Area	10 ac	4 ac	6/10; remainder recently surveyed by others

Table 2-2. Survey coverage for the Pelton Round Butte Project[1].

Survey Area	Estimated Acres/Miles[2]	Surveyed Acres/Miles[2]	Comments; Days Surveyed (1997 unless specified)
Project Operations			
Buffer around the three dams	186 ac	101 ac	5/19, 5/21, 5/23-5/26, 6/5
WSPE complex	44 ac	44 ac	5/26
Quarry and borrow pits	300 ac	270 ac	5/24–5/25
Round Butte Switchyard	100 ac	90 ac	5/25–5/26
Pelton Fish Passage, holding pond Bethel-Round Butte T-line	2.7 mi., 15 ac 99.0 mi.	2.7 mi., 12 ac 91.0 mi.	5/29; 5/19-5/20, 6/3 6/5–6/9, 7/7–7/15, 7/29–7/31, 8/21–8/24
Pelton Round Butte T-line	3.5 mi.*	2.4 mi.	* Portion not recently surveyed by Jenkins and Darby (1992); 8/20
Cove-Pelton Rereg. Dam 69/115 kV & 12.5 kV	10.5 mi.	0 mi.	All recently surveyed by Jenkins and Darby (1992)
Reregulating-Warm Springs T-line	3.2 mi.	3.2 mi.	6/5
Misc. T-stub lines from Round Butte Dam	3.5 mi.	1.2 mi.	8/20–8/21; most areas previously surveyed or steep terrain
Road Corridors			
Main Round Butte Dam access road, Belmont Lane	2.8 mi.	2.8 mi.	5/24
Road to Round Butte Dam Observatory	0.4 mi.	0.4 mi.	5/25
Willow Creek Bridge	2 ac	2 ac	6/3
Road to misc. dam facilities, including quarries, etc.	0.2 mi.	0.2 mi.	5/23–5/25
Connecting road S from Pelton Dam to cattle guard on Elk Drive	4.1 mi.	4.1 mi.	5/21
Main access road from Hwy. 26 to the right abutment of Pelton Dam	3.0 mi.	3.1 mi.	5/19
Dizney Lane from the main Pelton Dam Road to the Reregulating Dam	1.0 mi.	1.0 mi.	5/19
Road from Jackson Trail Road to WSPE and the Reregulating Dam	0.6 mi.	0.6 mi.	5/26
Road accessing W side of Round Butte Dam alongside Lake Billy Chinook	1.0 mi.	1.0 mi.	5/25

Table 2-2. Survey coverage for the Pelton Round Butte Project[1].

Survey Area	Estimated Acres/Miles[2]	Surveyed Acres/Miles[2]	Comments; Days Surveyed (1997 unless specified)
Transmission line access roads: originally assumed 0.5 mi. for each corridor mi.	Est. 56.4 mi.	16.7 mi.	6/2–6/11, 7/7–7/15, 7/29–7/31
Road leading to Lake Simtustus Indian Park	2.9 mi.	2.9 mi.	6/4
Access road to Perry South Campground from Fly Lake Road	4.0 mi.	5.5 mi.	5/27
Connecting road from Perry South Campground to S shore of LBC	2.0 mi.	2.0 mi.	5/27, 6/2
Connecting road from Perry South Campground to Monty Campground	4.1 mi.	4.1 mi.	5/30/98
Survey Totals		171.1 mi., 4864 ac	

[1] See Final Technical Report, Volume I, Appendix D, for maps of APE and survey areas.

[2] Linear corridor surveys (including reservoir margins) are measured in miles, non-linear survey areas in acres. Transect width varied in linear corridor surveys.

Although the acreage and corridor width of portions of the APE varied (see Table 2-2), survey parameters remained constant. Transect interval spacing for block acreages were no more than 30 meters, with transects usually oriented in a cardinal direction. For irregular-shaped parcels and the canyon slopes, surveyors paralleled the parcel boundary or the slope contours, respectively, and also inspected the base of the rimrock. For roads and the fish passage facilities, individuals walked both sides, approximately 7.5 meters from the edge. Pedestrian surveys in those areas walkable along the reservoir shoreline were 50 meters wide from the normal shoreline upward, with transect spacing at 25 meters, plus the area exposed during the drawdown. During the drawdown of Lake Billy Chinook in January and February 1997, at the upper end of the Metolius Arm on a large open terrace, the survey encompassed a 150-meter wide strip of shoreline along a .5 mile-long stretch. The APE for the transmission line corridor varied from 30 to 99 meters in width, and surveyors were spaced at intervals no greater than 30 meters. Closer transect spacing was employed when vegetation was dense, terrain was steep, or the APE was narrow. In those areas with little ground visibility, the surveyors scrutinized uprooted trees, rodent burrows, and road and stream cuts. Approximately 4,844 acres of non-linear area and 167 miles of linear corridor were surveyed in 1997.

Inventory work in 1998 involved two special cases: (1) the discovery of rock art alongside the Tam-a-láu Trail within the CPSP, and (2) the addition of Monty Campground to the Project APE. A group of elders from the Warm Springs Reservation noticed a possible red pictograph on a boulder in early 1998 during a tour organized by Park staff. In a follow-up reconnaissance, Park staff members located a possible petroglyph on a nearby boulder. In response to this discovery, an intensive survey in May 1998 focused on the boulder-strewn bench on which the pictograph had been identified. This survey effort resulted in the formal documentation of three prehistoric localities: (1) a single red pictograph with two closely associated debitage surface artifacts

(together identified as site 35JE511); (2) an isolated debitage artifact (PRE-IF-1-98); and (3) a small, low density lithic scatter of seven debitage artifacts (PRE-IF-2-98).

In response to a request by Don Zettel and William Anthony of the Deschutes National Forests' Sisters Ranger District, Monty Campground, located upstream from the mouth of the Metolius River, was added to the Project APE in early 1998. As a result, the access road to Monty Campground from Perry South Campground (4.1 miles in length) was also included in the APE. Because the Monty Campground had been surveyed as recently as 1992 (Oetting et al. 1992), it was decided that further survey there would be limited to an update of the site record for site 35JE341, within the campground. This site was added to the Project inventory of cultural resources (Table 2-2). The Project field team rerecorded that site and surveyed the campground access road in May 1998. The access road survey yielded no additional cultural resources.

Another site, 35JE510, was added to the Project inventory in 1998 by the field team conducting test excavations at site 35JE153 within the CPSP. The site, characterized by lithic debitage and tools, was found and documented in April 1998 as the field team was attempting to find the westward extent of 35JE153.

Completed site records utilize the form developed by COHG. During the survey for the CPSP, sites and isolates were given the temporary designation of CP-Pxx (prehistoric) and CP-Hxx (historical). Other sites were designated as PRB-PRE-xx for prehistoric sites, PRB-HIS-xx for historical sites, and PRB-IF-(PRE or HIS)-xx for isolates. Previously recorded sites retained their temporary number or Smithsonian trinomial as they were updated on COHG forms.

Using tapes and pacing, maps were drawn and sketch drawings were completed for most of the features. Site locations were pinpointed on 7.5-minute U.S. Geological Survey (USGS) Quadrangle maps, and a global positioning station recorded horizontal and vertical position for some of the sites and isolates. Photographs of each site documented the general landform, the site complex, and, as appropriate, features and artifacts. A video camera was also used to document several sites. Illustrations were completed for all lithic tools and for some historical items. In addition to descriptions for site access, site overview, and environmental setting, detailed artifact descriptions were written. For historical sites, an artifact summary form details the quantity and variability of the material culture, along with trademarks, brand names, and datable attributes. This artifact summary form is included with the COHG site record. A COHG Lithics Inventory Summary Form was completed at each site and these data are included as part of the site record. Isolates generally were left *in situ*. However, during the CPSP survey, 22 temporally diagnostic projectile points were collected. Similarly, seven lithic artifacts were collected from the surface at 35JE510, including three projectile points, two other biface fragments, and two unifaces. These have been curated at the Oregon Museum of Anthropology.

Three prehistoric archaeological sites (35MA132, 35MA133, and 35MA171) in the Detroit Ranger District, Willamette National Forest, had been recorded prior to 1997. While these sites were recorded in proximity to the Bethel-Round Butte 230-kV transmission line, the Project field survey team found no physical evidence of these sites in the APE during their 1997 inspection of the area. To determine whether subsurface cultural deposits at the sites extended into the APE, and at the request of the Detroit Ranger District, a Project field team revisited the area in September 1998 to perform limited small-scale testing (Oetting 1998). The results of this work show that subsurface

cultural deposits at all three sites extend into the Project APE. Consequently, all three sites are included in the Project inventory. While these sites were recorded as part of the inventory, they are no longer within the Project boundary and are not addressed by this CRMP. The Licensees' role in managing these sites will be coordinated with the USFS through the Special Use Permit process.

2.4.3 Resource Evaluations

Research efforts in 1998 related largely to evaluation of the inventoried resources for NRHP eligibility and assessments of Project effects for archaeological sites through test excavations. A strategy was implemented to prioritize for testing sites thought likely to be eligible, as well as those sites with uncertain eligibility, that are most likely to be subject to Project effects (Pettigrew and Bowyer 1998). Linear resources were evaluated on the basis of their possession of distinct, character-defining features, while other aboveground structures were evaluated according to National Park Service and Oregon SHPO guidelines.

Archaeological field teams in 1998 investigated 20 prehistoric sites (2 of which, 35JE20 and 35JE21, are now combined as 35JE20), 8 historical sites, and 2 prehistoric isolates (1 of which was reclassified as a site); rerecorded 1 prehistoric site; and added to the Project inventory 2 prehistoric sites and 2 prehistoric isolates. Altogether, 1998 fieldwork generated data to address the eligibility and management circumstances of 20 prehistoric and 8 historical sites. Study of the hydroelectric facilities themselves (the three dams and associated engineering features) in 1996 and1997 took the form of background research designed to consider the potential historic significance of these facilities. The literature review yielded a preliminary assessment that the facilities do not meet significance criteria at present.

The aims of the TCP study included the identification of traditional American Indian uses and values associated with the Project vicinity, specific locations within the APE that may be defined as traditional cultural properties potentially NRHP-eligible, Project effects on such properties, and the exploration of appropriate steps to prevent or mitigate those effects. Interviews with knowledgeable persons in 1997 and 1998 were a principal means of gathering information on traditionally important resources and locations. Consultation with Tribal committees was an important part of the planning for and performance of the study. Based on this research and interview process, the TCP study identified ten potential TCPs in the study area.

2.5 Descriptions of Cultural Resources and Significance

Studies conducted as part of the relicensing process focused on developing a detailed inventory and evaluation of archaeological resources, historic resources, and traditional cultural properties in the Project APE. Detailed results of the cultural resource studies are presented in the FTR (Pettigrew 1998c). This section summarizes the results of those studies, focusing on information with implications for the management and stewardship of those resources.

2.5.1 Prehistoric Archaeological Resources

Research conducted for the relicensing effort through 1998 in combination with prior research resulted in the creation of a very substantial inventory of cultural resources within the Project APE.

This inventory includes a total of 110 prehistoric sites (listed in Appendix A Table A-1), of which 17 are previously recorded sites that were revisited (one of these sites, 35JE20, encompasses previously recorded site 35JE21).

The total includes 71 open-air lithic scatter sites, three rock shelters/pictograph locations, and 36 rock feature sites. While most of these rock features are probably prehistoric in age, they typically cannot be dated with confidence and may include some historic rock features as well. Map locations and detailed descriptions of the prehistoric archaeological sites are provided in Volume I Appendix D, and Volume IV of the Final Technical Report.

Several lithic scatter sites contain stacked rock features as well. Aside from the stacked rock features, a single hearth feature was the only other type of feature noted. Domestic facilities such as housepit depressions were not seen on any recorded sites but in some cases may exist beneath the surface.

Site evaluation tests to determine NRHP eligibility were conducted in 1998 at sites considered to have the highest risk of direct impacts from Project activities (17 lithic scatters and two rock shelters). Prioritization of sites for this purpose took into account both the likelihood of the sites' eligibility to the NRHP and the degree and immediacy of Project effects (Pettigrew and Bowyer 1998). The NRHP eligibility status, anticipated Project effects, and eligibility recommendations are listed for all inventoried prehistoric sites in Appendix A, Table A-1. Field testing and formal evaluations were undertaken for 19 prehistoric sites (see Pettigrew 1998c:Volume II). One prehistoric site (35MA119) had already been tested and evaluated by others (Draper et al. 1993).

Based on the data from the tests, 14 sites are recommended as eligible for the NRHP (12 lithic scatters and the two rock shelters), while five lithic scatters are recommended as not eligible. Agency cultural resource staff has received this information and have concurred with the recommendations of eligibility. Two sites were previously recommended as eligible: one scatter site (35MA119) evaluated by the Willamette National Forest, and one other lithic scatter (35JE509) evaluated by the Deschutes National Forest. One pictograph site (35JE511) has not been formally evaluated, but it is likely to be considered an NRHP-eligible property. For the remaining 52 open-air lithic scatter sites and 36 rock feature sites, the data obtained to date are insufficient for determining NRHP eligibility.

NRHP evaluations for prehistoric sites are usually based on an assessment of NRHP Criterion D, the ability of the site to yield important prehistorical information. By this standard, the 14 sites recommended as eligible are considered by the field archaeologist to contain sufficient artifacts or other data to contribute to the knowledge of regional prehistory. The 14 prehistoric archaeological sites tested in 1998 and recommended eligible for the NRHP and the two sites previously recommended as eligible are listed in Table 2-3.

Table 2-3. Prehistoric archaeological sites recommended eligible for the NRHP.

Site Number	Type	General Location	Owner/Administrator
35JE19	Rockshelter	Cove Palisades State Park	Ochoco National Forest
35JE20/21	Lithic Scatter	Cove Palisades State Park	Bureau of Land Management (Prineville)
35JE58	Rockshelter	Metolius River Arm	Privately owned
35JE153	Lithic Scatter	Cove Palisades State Park	Ochoco National Forest/State of Oregon
35JE185	Lithic Scatter	Cove Palisades State Park	Ochoco National Forest
35JE295	Lithic Scatter	Metolius River Arm	Deschutes National Forest
35JE347	Lithic Scatter	East side of Reregulating Reservoir	Privately owned
35JE454	Lithic Scatter	Warm Springs Reservation side of Metolius River Arm	Tribes
35JE455	Lithic Scatter	Warm Springs Reservation side of Metolius River Arm	Tribes
35JE458	Lithic Scatter	Warm Springs Reservation side of Reregulating Reservoir	Tribes
35JE459	Lithic Scatter	Reregulating Reservoir	PGE
35JE461	Lithic Scatter	Reregulating Reservoir	PGE
35JE468	Lithic Scatter	North of Tenino Creek	Tribes
35JE470	Lithic Scatter	East rim of Lake Simtustus	Ochoco National Forest
35JE509	Lithic Scatter	South of Metolius River	Deschutes National Forest
35MA119	Lithic Scatter	Transmission Line Right-of-Way	Willamette National Forest

2.5.2 Historic Resources

Historic resources related to the Pelton Round Butte Project are described below in terms of historic archaeological resources, historic buildings or structures, and linear resources.

2.5.2.1 Historic Archaeological Resources

Historic resource studies for the Project relicensing effort were conducted from April 1996 through 1999 in conjunction with fieldwork conducted in 1997–1998 by field archaeologists in studies sponsored jointly by PGE and the Tribes. Thirty historic archaeological sites were documented in the Project APE. Map locations and detailed descriptions of these sites are provided in Volume I, Appendix D, and Volume V of the Final Technical Report.

Many of these sites are homesteads on the tableland above the canyons, located primarily east of the Crooked River and south of the Metolius River. Survey of the CPSP identified the remains of seven newly recorded and four previously recorded homestead complexes. Boundaries for ten of the homestead complexes are based on their historic claims of 120 ac or 160 ac and encompass foundations, collapsed buildings, pit features, fence lines, rock walls and enclosures, cleared fields, and debris scatters. Other debris scatters and features recorded during the CPSP survey are located within documented homestead boundaries.

The sites include 17 homestead locations, nine trash scatters, two railroad construction camps, one pit feature, and one collapsed stock ramp. Field testing and formal evaluations were undertaken for eight historical sites (see Pettigrew 1998c:Volume II). The NRHP eligibility status, anticipated Project effects, and evaluation priority are listed for all inventoried historical archaeological sites in Appendix A, Table A-2.

Based on these investigations, four sites were recommended as eligible for the NRHP and four sites were recommended as not eligible. In addition, one other historic site (OR-JE-8) had previously been evaluated as eligible (Minor 1993). The five eligible sites are briefly summarized in Table 2-4.

A review by cultural resources staff of the land managing Federal agencies in the Project area disagreed with the determination of eligibility for one of these sites (OR-JE-32). In addition, the Forest Service considers a number of sites to be ineligible that the Licensees' technical reports categorized as "insufficient data for a determination of eligibility." These sites include: OR-JE-12, OR-JE-22, OR-JE-26, OR-JE-28, OR-JE-29, OR-JE-30, OR-JE-31, OR-JE-33, and 5EO333. The Licensees will append this CRMP in accordance with the SHPO's determination.

Table 2-4. Historic archaeological sites recommended eligible for the NRHP.

Site Number	Type	General Location	Owner/Administrator
ORJE8	Railroad Camp	East side, Lake Simtustus	Bureau of Land Management (Prineville)
ORJE21	Homestead	Cove Palisades State Park	State of Oregon
ORJE24	Homestead	Cove Palisades State Park	State of Oregon
ORJE32*	Homestead	Cove Palisades State Park	Ochoco National Forest
ORJE34	Homestead	Cove Palisades State Park	State of Oregon/Ochoco National Forest

*The Forest Service disagrees with this determination of eligibility; see discussion above.

2.5.2.2 Historic Buildings or Structures

Five properties containing historic buildings or other structures were identified during archival research or archaeological field surveys. These include a ranch site, a house, a garage, rock enclosures, and earthen weirs for water storage (Table A-3, Appendix A).

Historical research indicates that the buildings are not NRHP-eligible, but that the weir (CP-H5) is a contributing element to the eligibility of a homestead site. The rock-walled structure (CP-H3) cannot be evaluated without further research.

2.5.2.3 Linear Resources

A total of 140 linear resources were identified in the Project APE, including 73 roads, 48 fences, 10 trails, four railroad lines, three ditches, one rock wall, and one flume. These resources were inventoried as they were encountered in the field, but only the portions of the resources that

occurred within the APE were recorded. Of these, 59 linear resources are located in the Project boundary and 81 are associated with the Bethel-Round Butte transmission line that is no longer within the Project boundary. The linear resources within the Project boundary include 15 roads, 33 fences, five trails, one railroad line, three ditches, one rock wall and one flume (Table A-4, Appendix A).

Evaluation of linear resources was based on an historic context that specifically focuses on this resource type (Final Technical Report, Volume I, Appendix C). This context addresses roads and trails, fences, and railways, encompassing 135 of the 140 resources. The context discusses and specifies character-defining features that may contribute to a resource's eligibility under NRHP Criterion C. Based on the framework in the context, 17 of the 135 linear resources are considered to have integrity and to have contributing elements that "embody the distinctive characteristics of a type, period, or method of construction" (the language of Criterion C). Thus, if any of these linear resources were determined to be NRHP-eligible in their entirety, these components would be contributing elements. This does not imply that the other 118 are ineligible or do not have contributing elements outside the Project boundaries. For example, two resources that probably are eligible under Criterion A are the Pacific Crest Trail (GB-39) and the Skyline Trail (GB-95), but these trails lack distinctive elements where they intersect the Bethel-Round Butte transmission line corridor. Also, whether or not a linear resource possesses such character-defining features within the Project APE, it still may be eligible under Criterion A or B.

The linear resources context does not cover the remaining five linear resources, including three ditches, a rock wall, and a flume. An historic context addressing irrigation features associated with the Umatilla Reclamation Project was applied to address the ditches (Bowyer 1996). Using this context, the three inventoried ditches (GB-32, EG-2, and RS-2) lack character-defining features that would make those portions within the APE contributing elements under Criterion C. This finding does not preclude the eligibility of the ditches under the other criteria or of those portions outside the Project boundaries, although it does remove these resources from future research plans in connection with this Project.

The final two linear resources are the flume and the rock wall. Linear resource GB-9 was identified as a flume and was assessed as ineligible because its integrity is impaired. The rock wall (RS-6) is of uncertain function, but resembles a fence line. If RS-6 represents a fence line, it would be eligible under Criterion C based on the historic context addressing fences. Both GB-9 and RS-6 are located within the Project boundary. The rock wall is on Tribal lands above the Reregulating Reservoir and may be associated with historical or prehistoric Indian activities; thus, it may be eligible under Criterion A or D or both. More field and background research would be required to ascertain this association and its eligibility.

The 17 linear resources with contributing elements are summarized in Table 2-5.

Table 2-5. Linear resources recommended as contributing elements*.

Site Number	Type	General Location	Within Project Boundary	Owner
CP-H6	Road	Round Butte Dam	X	Ochoco National Forest
EG-01	Road	Madras West	X	Private
EG-12	Trail	Olallie Butte		Mt. Hood National Forest
GB-3	Road	Madras West	X	BLM
GB-19	Road	Warm Springs	X	Tribes
GB-74	Railroad	Salem East		Southern Pacific Railroad
HIS-1	Trail	Steelhead Falls	X	Ochoco National Forest
HIS-2	Road	Round Butte Dam	X	BLM
HIS-6	Trail	Round Butte Dam	X	BLM
HIS-14	Railroad	Madras West	X	BLM and private
I-5H	Fence	Round Butte Dam	X	Ochoco National Forest
I-6H	Fence	Round Butte Dam	X	Ochoco National Forest
I-7H	Fence	Round Butte Dam	X	State of Oregon
I-10H	Fence	Round Butte Dam	X	BLM
I-11H	Fence	Round Butte Dam	X	Ochoco National Forest
JC-7	Trail	Olallie Butte		Mt. Hood National Forest
RS-1	Road	Madras West	X	Private

** At such time as any of the linear resources are evaluated in their entirety and determined to be eligible, these components would be considered contributing elements.*

2.5.2.4 Hydroelectric Facilities

The Project facilities were evaluated to determine their eligibility for listing in the NRHP based on the NRHP Criteria A, B, and D, as well as a determination of whether the facilities are of exceptional historical importance (as required for resources less than 50 years of age to be eligible for NRHP listing). The literature review did not support a conclusion that the Project facilities are eligible for the NRHP or of exceptional historical importance. However, a reconsideration of eligibility should take place in 2007, when the Project facilities reach the 50-year minimum age normally required for properties to be considered significant. Earlier reconsideration will be needed if any plans are developed for major modification of the facilities.

2.6 Traditional Cultural Properties

An ethnographic study (Ellis et al. 1998) was conducted in 1997 and 1998 to identify TCPs in the Project APE and determine their eligibility for listing in the NRHP. TCPs are sites, areas, or resources with continuing cultural significance for one or more contemporary people (in this context, Native American Tribes or communities). Such TCPs can include resource areas (for fishing, plant gathering, etc.); ritual sites; and areas of mythological, symbolic, or historic significance. In accordance with general principles governing NRHP eligibility, TCPs must show a continued relationship through time between a specific area and a community, group, or Tribe. At a minimum, eligible TCPs must show a documented time-depth of use or significance of at least 50 years and must meet other relevant NRHP criteria regarding integrity and significance.

Based on the analyses of interviews and written sources, the TCP study identified potential TCPs in the study area. The Final Technical Report identified four locations for which insufficient information was available concerning cultural significance: (1) the area around the confluence of the Deschutes, Metolius, and Crooked rivers; (2) the Grandview-Canadian Bench area; and the related sites of (3) Big Eddy and (4) *waqmap* near the Reregulating Dam. Since the completion of the Final Technical Report, further inquiry by Archaeological Investigations Northwest, Inc., has determined that these four locations do not satisfy criteria as potentially eligible traditional cultural properties (French et al. 2001; included on the technical reports CD accompanying the Final Joint Application Amendment). Consequently, these four places are no longer the subject of management attention. Using the standards of the National Park Service Bulletin 38 (USDI 1992), the remaining locations on the list were evaluated and three were recommended by AINW as eligible for listing onto the NRHP under Criterion A. However, one of these, located within the non-inundated portions of the lower Metolius River Canyon, was withdrawn from consideration by the Tribes. The two TCPs recommended as NRHP-eligible are described below.

- Southern Edge of the Metolius Bench. The Metolius Bench is a broad, flat to gently rolling plateau defined by the Metolius River on the south, an unnamed tributary of the Deschutes River on the north, and the Deschutes River approximately on the east. The southern bench of the Metolius River was used traditionally as a major resource area for the Seekseequa community. Resources gathered included numerous plant foods (a variety of lomatiums, bitterroot, wild onion, sunflower, and others), as well as elk, jackrabbits, yellow moss, and rocks for tools. Numerous camps, usually located near springs, are associated with the resource locations, where artifacts are sometimes found.
- Seekseequa Junction Area. The Seekseequa Junction area was the location of the major Paiute settlement on the Warm Springs Reservation after the Paiutes were relocated in the 1880s. Just up Seekseequa Creek from the modern road junction was a longhouse that was the location of an annual root feast and rodeo. There is a modern longhouse near the site of the old longhouse.

Both locations are considered to be of traditional cultural importance primarily to the Seekseequa community on the Warm Springs Reservation. The Seekseequa area constitutes the southern portion of the Reservation. While this area was the historical nucleus of settlement for the Paiutes who were placed on the Reservation in the 1880s, presently this community is comprised of other tribal entities as well.

Project effects on the Metolius Bench are associated with recreation by the general public on the reservoirs. No Project effects were identified in relation to Seekseequa Junction.

3.0 MANAGEMENT GOALS, PRINCIPLES, AND STANDARDS

The Licensees are committed to the stewardship of historic properties within the Project boundary. The Licensees' responsibility for such management derives from the authority granted by the Federal Power Act and its Federal operating license. Outside the Project boundary, this responsibility is shared with the appropriate agencies on Tribal, State, and Federal lands within the APE. The Licensees will protect and preserve the integrity of NRHP-eligible properties affected by the Project in the APE to the extent possible within the requirements of continuing Project operation and the need to balance stewardship of all sensitive resources in an integrated fashion. Effective management of NRHP-eligible properties will be founded on the goals, management principles, and standards discussed below, and conducted through ongoing management programs throughout the term of the operating license.

3.1 Goals

The Licensees' goals for protecting and managing NRHP-eligible and unevaluated properties include the following:

- Protect and maintain the integrity of historic properties within the Project boundary.
- Avoid or mitigate Project-related impacts on historic properties within the Project APE.
- Maintain confidentiality of the location of sensitive archaeological resources.
- Address agency issues and coordinate cultural management programs with the appropriate Federal and historic preservation agencies under the requirements of Section 106 of the NHPA.
- Ensure consistency with existing Federal regulations and Federal, Tribal, and State resource management plans.
- Maintain compatibility with the goals of water use and quality, aquatic resources, terrestrial resources, recreation, aesthetics, land management, and Project facilities and operations.
- Demonstrate good stewardship of cultural and paleontological resources by providing programs to identify undiscovered historic properties, reduce vandalism, support enhancement opportunities, and encourage public awareness and stewardship of cultural and paleontological resources.
- Provide cost-effective measures for historic properties that balance with other resources and meet or exceed existing environmental regulations.

3.2 Principles for Protection and Mitigation

To achieve the goals listed above, the Licensees will consult and coordinate with appropriate Federal or state agencies and the Tribes, as well as follow the standards regarding the treatment of archaeological resources developed by the ACHP, published in Treatment of Archaeological Properties: A Handbook (ACHP 1980). While regulations governing the Section 106 process have recently been revised, these principles for the treatment of archaeological resources remain relevant and appropriate.

3.2.1 Consult and Coordinate with Agencies and Tribes

Much of the Project APE and many of the NRHP-eligible properties are on lands managed by Federal or State agencies or by the Tribes. Effective management of these resources will require close cooperation and consultation among the Licensees and the land managing agency, the Tribes, THPO, and other interested parties. Consultations are needed to inform agencies and the Tribes of current or future Project-related actions that may affect historic properties on non-Project lands within the APE and to define mitigation for the adverse effects of these activities (if any). General consultation with all parties will be conducted on a regular basis to keep responsible parties informed of general Project operations and cultural resource management activities. In addition, specific Tribal and agency consultations will be undertaken for planned projects or other activities that may affect cultural resources, particularly NRHP-eligible sites.

3.2.2 Avoid Anticipated Project Effects

A basic principle in dealing with potential adverse effects is to avoid these effects by ensuring that proposed projects and ongoing operation and maintenance activities avoid NRHP-eligible and unevaluated sites. This is best done through good communication between the Licensees' cultural resources staff and Project operations and maintenance staff so that projects can be planned or redesigned early in the process to avoid sites. Existing Project operations that affect NRHP-eligible and unevaluated resources should be reviewed and, if possible, moved or modified to avoid these sites. Measures to avoid Project effects include:

- Design projects around cultural properties by locating them within protected open spaces.
- Restrict the types of vehicles that can be used or the kinds of operations that can be conducted on sites.
- Limit Project activities to dry seasons or periods when the ground is frozen to minimize ground-disturbing effects.

3.2.3 Preserve in Place Through Site Protection

In general, if Project effects to an NRHP-eligible property cannot be avoided, the preferred option is to preserve in place by protecting the site from adverse effects. Protecting a site in place conserves the significant cultural and scientific values of the site for the future, and may be more cost-effective than full data recovery mitigation measures. A variety of site protection treatments are available, including:

- Restrict public work crew access to site areas through closing roads, adding gates, or planting vegetation barriers.
- Use fencing, earthen berms, and other devices to protect properties from nearby Project activities.
- Route construction activities and other Project effects away from sites by careful design of access routes and drainage channels.
- Cover affected areas of the property with clean sterile fill, geotextile cloth, or other protective coverings, while limiting immediate and long-term disturbances caused by the

covering (soil disturbance and compaction, chemical changes, etc.). Provisions should be made to ensure future access to the covered areas. This alternative will likely require some level of data recovery to document resources present beneath the covering.

- Stabilize the erosion of cutbanks and slopes with protective covers (e.g., riprap), vegetation, and/or engineered modifications to slope angles. If the stabilization requires some ground disturbance or covering, some limited data recovery to obtain data from these areas will be necessary.
- Design structures over properties to minimize subsurface disturbance. This would also probably require some limited data recovery.

3.2.4 Mitigate Adverse Project Effects Through Data Recovery

If NRHP-eligible archaeological properties cannot be avoided or protected from ongoing or planned projects, the Licensees may mitigate adverse Project effects through data recovery excavations and investigations to recover a substantial sample of the scientific data contained in the site. Data recovery will be considered only if the preferred alternatives of site avoidance or protection cannot be fully implemented. This policy reflects the recent changes in Federal regulations for the Section 106 process and the intent of Warm Springs Tribal Ordinance #68, which encourages protection and nondisturbance over excavation and studies. Ordinance #68 applies only to Reservation lands and other lands owned by the Tribes or held by the United States in trust for the Tribes or its members. Where data recovery within the APE is proposed on lands managed by a Federal agency and outside the Project boundary, the managing Federal agency will determine whether data recovery is the most appropriate treatment. For lands within the Project boundary, the Licensees will determine the treatment plan in consultation with the appropriate parties.

Data recovery is considered an adverse impact upon archaeological resources. However, when other options cannot protect a site from adverse effects, data recovery investigations may be considered to obtain and preserve scientific information or in the interest of the public. Such excavations may be staged over a multi-year period to enable results of preceding years to be used in guiding subsequent investigations and to assess level of data redundancy. Any proposed data recovery plans will be developed in consultation with the appropriate Federal and State resource agencies, the SHPO, and the THPO.

A distinction can be made in the amount or level of data recovery needed to mitigate adverse Project effects. If only a portion of a site will be damaged or disturbed, then data recovery excavations may be limited to obtaining a representative sample of the cultural materials, contexts, and features in that portion of the site. Full data recovery involving large-scale excavation could be appropriate in those few instances where all or most of an NRHP-eligible archaeological property will be damaged or destroyed. Regardless of the extent of excavation, all data recovery activities should be carefully planned and executed.

A data recovery plan is a detailed research design that specifies research questions to be examined, sampling strategy, field methods, anticipated laboratory analyses, report preparation, curation, budget, and key personnel (ACHP 1980). A decision to undertake data recovery at a site will weigh the research value of the site against other public or cultural values. The work will be

conducted in the most efficient and cost-effective manner consistent with the desired research results. Public participation, through structured programs when appropriate to the specific site, will be encouraged. However, data recovery will be timed to discourage site exposure to general recreationists. If an unevaluated site cannot be avoided by a planned project, the Licensees will have the site evaluated to determine its eligibility for the NRHP, in consultation with the appropriate parties

3.3 Standards for Protection and Mitigation

This section presents standards for protecting and effectively managing NRHP-eligible properties in the Project APE. Technical studies and consultation with agencies and the Tribes have identified six primary sources of Project-related effects to cultural resources in the Project area: (1) Project operations; (2) transmission line maintenance; (3) road and trail maintenance; (4) activities to protect or enhance natural resources; (5) developed campground maintenance, use, and development; and (6) Project-related recreation impacts or vandalism.

It is important to note that some potential effects on cultural resources within the APE are not within the Licensees' authority or ability to control. For example, grazing activities and their effects are under the control of Federal land management agencies. Additionally, the effects of recreation or vandalism are not the Licensees' responsibility in locations where the use is not Project-related. Coordination with appropriate agencies is an important part of this CRMP in these types of specific instances.

Table 3-1 provides a summary of each effect, where it occurs, and the eligible sites affected. Grouping Project effects by these types allows managers to be consistent in treating similar effects at different sites, organizes site evaluation and management by groups rather than each individual sites, and provides a framework when new archaeological sites are found.

The sections below describe the effect and general protection and mitigation standards for each type of effect. Section 4.0 addresses all currently known NRHP-eligible sites within the Project APE and identifies site-specific protection and mitigation measures for those sites that are solely the Licensees' responsibility. As additional sites are identified in the future, this document will provide a framework for mitigation and protection measures, but specific measures will have to be determined based on the nature of the site and the type of Project effects and in consultation with the appropriate agencies and the Tribes.

Table 3-1. Summary of potential Project effects on NRHP-eligible properties within the Project boundary.

Issue	Location	Eligible Sites (Site Number[s])	Potential Project Effect
Project operations	Reservoir shoreline drawdown zones: Metolius River Arm of Lake Billy Chinook and the Reregulating Reservoir	35JE454, 35JE455, 35JE458, 35JE459, 35JE461	Continued erosion and silting of prehistoric cultural resources.
Road and trail maintenance	The Cove Palisades State Park, east rim, The Island, and canyon; east of the Reregulating Reservoir; east rim of Lake Simtustus; and south of the Metolius River Arm of Lake Billy Chinook	35JE20/21, 35JE347, 35JE470, 35JE509, ORJE21, ORJE34	Ground-disturbing activities on prehistoric cultural resources related to road and trail use, maintenance, and/or improvements.
Campground maintenance, use, and development	Cove Palisades State Park–Crooked River Campground; Deschutes National Forest–Perry South	35JE153, 35JE295	Ground-disturbing activities and erosion due to campground facility maintenance, use, and development.
Recreational impacts and vandalism	All areas open to public recreational use; Metolius Bench	35JE19, ORJE24, 35JE58[1] (private); Southern end of Metolius Bench (TCP site).	Disturbance and damage from recreational activities and vandalism.
Activities to protect or enhance natural resources	All areas within Project boundaries	35JE461	Ground-disturbing activities.

NOTE: This table does not include Effect of Transmission Line Maintenance for sites in the Bethel-Round Butte corridor, as this transmission line is no longer included within the Project boundary.

[1] Effects at this site are not Project-related, but due to the significance of this resource, the Licensees have agreed to implement the appropriate site recordation and protection efforts.

3.3.1 Project Operations

3.3.1.1 Project Effects

Erosion and siltation associated with reservoir fluctuations from Project operations have the potential to affect prehistoric archaeological resources within the shoreline drawdown area. Waves undercut and cause slumping of cutbanks and wash finer sediments downslope, often leaving larger objects behind and burying surfaces farther downslope under a sediment mantle. Where reservoir levels vary, particularly in Lake Billy Chinook (with an annual range typically 10 feet) and the Reregulating Reservoir (with a daily range typically 20 feet), the elevational interval in which these processes operate is amplified. Wind-driven wave action is the primary concern, but wave action is more pronounced where recreational boat traffic creates wakes, primarily on Lake Billy Chinook and to a lesser degree on Lake Simtustus. The erosional process can destroy the

vertical and horizontal structure of archaeological deposits and features as well as the potential to gather information about human activities documented by that structure.

Other Project-related maintenance activities include those connected with Project facilities or the Pelton fish ladder. Any direct or indirect ground disturbance caused by maintenance crews can result in Project effects on NRHP-eligible sites. For example, vehicular traffic can disturb soils and cause erosion, and vegetation clearing can increase erosion rates.

Beyond those Project effects already described, any ground-disturbing action proposed in connection with the Project may affect archaeological sites by limiting their potential to yield important information. These effects may vary with the nature of the proposed action, but the degree and extent of disturbance to cultural deposits, artifacts, and features should be the primary focus of concern.

Archaeologists examined shorelines in the drawdown zone of each reservoir to determine if archaeological artifacts had been exposed. In the course of field studies conducted for Project relicensing, archaeologists located five prehistoric archaeological sites determined NRHP eligible along the reservoir shoreline area within the Project APE (35JE454, -455, -458, -459, -461). One other prehistoric lithic scatter site (35JE462) was found in the reservoir fluctuation zone, and an historic site (OR-JE-15) was found in the Reregulating Reservoir, but these sites have not yet been evaluated for NRHP eligibility.

As proposed in the Joint Amendment, Project reservoirs would continue to fluctuate on a daily or seasonal basis. Since the NRHP-eligible sites located along the reservoir drawdown zone may continue to be obscured or impacted by shoreline erosion or silting due to reservoir fluctuation, programs to protect these sites or mitigate the impacts are needed and are described below.

3.3.1.2 Protection and Mitigation

All seven of these sites (five eligible sites and two sites not yet evaluated) and any sites located in the future that are similarly affected will be stabilized and protected and will be monitored on a regular basis to assess the ongoing effects of reservoir fluctuations.

Wave action and other reservoir fluctuations are currently the most active and obvious of the identified Project effects in the APE. The Licensees will work to identify and implement viable protection measures at sites affected by reservoir fluctuations. The forms of protection will be determined on a site-specific basis but will likely include protective covering that eliminates erosional effects. Limited data recovery excavations to provide data samples from areas to be covered will be conducted if previous research at the site has not fully defined and characterized the affected area.

In addition, these sites may also be affected by general recreational use, as well as vandalism directed at these archaeological sites (e.g., collection of artifacts from the ground surface or digging in the site to obtain artifacts); therefore, the overall condition of these sites will be monitored on a regular basis. The two untested sites will be included in the first priority group of the Resource Evaluation Program as described in detail in Section 5.1.2.

If protection measures are inadequate or cannot be reliably implemented, the Licensees will mitigate the potential damage to archaeological resources located in the Project drawdown zone through data recovery excavations and investigations. The purpose of these data recovery investigations is to recover a substantial sample of the scientific data still contained in each site. Data recovery efforts may focus primarily on the portions of sites in the drawdown zones and along active beach lines, but may incorporate the larger site area based on consultation with appropriate Tribes and agencies. These investigations may be staged over a multi-year period to enable results of preceding years to be used in guiding subsequent investigations (and to assess level of data redundancy).

It is anticipated that evaluation of the two currently unevaluated sites subject to reservoir fluctuations (35JE462 and OR-JE-15) will be completed prior to the acceptance of the license. If not, the Licensees will commit to this evaluation within one year of license acceptance. If recommended as NRHP-eligible, protection and mitigation recommendations will follow those outlined above, and site-specific measures will be presented in subsequent amendments to this CRMP.

3.3.2 Transmission Line Maintenance

3.3.2.1 Project Effects

The Project APE included the 100 mile-long Bethel-Round Butte transmission line, the 10.5 mile-long transmission line from the Cove Substation to Pelton Dam, the 7.9 mile-long transmission line from Pelton Dam to the Round Butte Switchyard, and the 3.2-mile transmission line from the Regulating Reservoir to the Warms Springs Substation. The right-of-way (ROW) for each transmission line averages 125 feet wide. Some of these transmission lines are located in ROWs owned by the Bonneville Power Administration (BPA) and PacifiCorp. Of these four lines, the 100 mile-long Bethel-Round Butte transmission line is no longer included in the Project boundary. Management for cultural resources in the ROW will be coordinated with the USFS through Special Use Permit process.

Archaeologists examined the accessible portions of all four transmission line ROWs to determine if archaeological sites were present, and to document the effects of transmission line maintenance and ROW vegetation management on these sites. The prehistoric archaeological sites located within the transmission line ROW may be affected by routine Project maintenance activities and vegetation management practices that involve ground-disturbing actions. Maintenance practices using vehicles or other heavy equipment, such as tree felling and removal, construction of temporary roads, or steel tower/wooden pole replacement (if necessary), can displace, compress, or erode surface or subsurface cultural deposits, adversely affecting their integrity. Impacts to these sites may also occur from general recreational use of these areas, as well as from vandalism directed at these archaeological sites.

3.3.2.2 Protection and Mitigation

There are six sites recommended as NRHP-eligible located within the transmission line ROWs of the Project APE; two are located in the PGE Bethel-Round Butte ROW (now not within Project boundary), two are located in the ROW of a PacifiCorp transmission line on the east side of Lake Simtustus, and two are located in a BPA transmission line ROW on the plateau east of Lake Billy Chinook. Several untested sites will be included in the second priority group in the ongoing Resource Evaluation Program described in Section 5.1.2.

BPA and PacifiCorp have transmission line corridors within the Project APE on the canyon sides and plateaus east of the Project reservoirs, which cross lands under Federal or State management. The transmission line that passes through sites 35JE185 and OR-JE-32 is operated by BPA. The Licensees, therefore, do not have responsibility for impacts from transmission line activities. However, the Licensees will notify BPA of these sites and BPA will be responsible for protection and mitigation measures associated with its transmission line maintenance. The Licensees have the responsibility for any Project-related ground-disturbing activities within transmission line ROWs within the Project boundary.

The preferred strategy for dealing with potential adverse Project effects related to the transmission line ROW is to avoid these effects by ensuring that ongoing or proposed projects, including routine maintenance, will avoid eligible sites. A key to avoiding eligible sites is to ensure that Project maintenance and planning personnel are trained to be aware of cultural resource sites and issues, and to follow procedures detailed in this CRMP for obtaining approval from the Licensees' Cultural Resources Management Plan Coordinator (CRMPC) for projects (as described in detail in Section 6.3). These sites may also be affected by general recreational use of the area, as well as vandalism directed at these archaeological sites. Archaeological sites in ROWs still within the Project boundary will be monitored regularly to assess current site conditions and provide information that may be useful in identifying appropriate avoidance or protection measures for planned projects.

Site protection measures will vary according to site structure, proposed impacts, and Project requirements. These must be determined on a site-specific basis, but may include restricting vehicle and pedestrian access to areas by closing service roads with gates, restricting service vehicles to existing roads, restricting road improvements or new road construction to non-site areas, allowing only rubber-tired vehicles on existing roads, conducting activities during dry periods to avoid rutting, covering affected site areas with temporary or permanent protective coverings, or restricting vegetation removal/control to measures that can minimize vegetation without disturbing the ground surface in archaeological sites.

If avoidance cannot be accomplished and protection measures are inadequate or infeasible, data recovery investigations will be implemented to mitigate adverse Project-related effects to sites in the transmission line ROW. Data recovery investigations will be developed in consultation with appropriate parties and will adhere to a detailed data recovery plan. The investigations will recover a substantial sample of the scientific data contained in the site that will otherwise be lost to the adverse Project effects. The focus of investigations will generally be on the portions of the site where adverse effects are likely but may include larger portions of the site, depending on the type of impacts and the structure of the site.

3.3.3 Road and Trail Maintenance

3.3.3.1 Project Effects

Archaeologists examined the roads and trails within the APE, including roadway shoulders and the general vicinity of each road or trail, to determine if archaeological sites were present. Archaeologists located three prehistoric lithic scatter sites recommended as eligible for listing in the NRHP located on or near Project roads or trails within the Project APE (35JE20/21, 35JE347, and 35JE470) and one prehistoric site previously recommended as NRHP eligible by the Deschutes National Forest (35JE509). Also, two historic archaeological sites (OR-JE-21 and OR-JE-34) were identified and are recommended as eligible. These sites may be affected by Project-related vehicular access or impacts associated with maintenance or recreational use.

Unimproved access roads are dirt roads without engineered roadbeds, where vehicle tires are in contact with the natural ground surface. Here, vehicle tires can cause direct disturbance to the soil and to artifacts and features that may lie on or just below the surface. Potentially more damaging, because it may cause deeper and more extensive disturbance, is erosion sometimes promoted by vegetation removal and tire ruts in the roadbed. Where access roads have been improved through construction of engineered roadbeds, tire ruts cause no further ground disturbance, but roadside drainage can cause serious erosion, and roadside disturbance by road maintenance (shoulder grading, vegetation clearing, vehicle turnouts, etc.) can directly disrupt associations within cultural deposits and affect them indirectly through the encouragement of erosion.

Maintenance or construction practices, such as widening the shoulders of existing roads, re-graveling of unpaved roads, or snowplowing in winter, may disturb surface or subsurface cultural deposits and compromise the site's integrity. In addition, artifacts on unpaved roads can be damaged or displaced when the soil is compacted by heavy equipment, making cultural analysis more difficult. Public use of roads and trails also provides opportunities for vandalism and contributes to soil compaction.

3.3.3.2 Protection and Mitigation

The Licensees will consult with the appropriate land managing agency on Project-related activities outside the Project boundary involving roads or maintenance activities. General recommendations for protection and/or mitigation at these sites are presented below, based on current observations. These archaeological sites will be monitored regularly to assess current site conditions and record information that may be useful in identifying appropriate avoidance or protection measures for planned projects. Regular monitoring of site condition will also help identify whether impacts from Project-related recreation or vandalism are affecting the sites. Several untested sites may be affected by roads or trails, and these should be included in the second priority group in the ongoing Resource Evaluation Program (described in Section 5.1.2).

The preferred strategy for dealing with potential adverse Project effects from road or trail maintenance, construction or use is to avoid these effects. Avoidance measures may include road closures to restrict access, road maintenance procedures that are limited to already disturbed areas, or re-routing traffic. A key to avoiding eligible sites is to ensure that Project maintenance and planning personnel are trained in cultural resource management issues and the procedures detailed

in this CRMP. Sites will be monitored regularly to assess current site conditions and provide information that may be useful in identifying appropriate avoidance or protection measures for planned projects. Site protection measures will vary according to site characteristics, anticipated impacts, and Project requirements.

If avoidance cannot be accomplished or protection measures are infeasible, data recovery investigations will be implemented to mitigate adverse Project-related effects. Data recovery investigations will be developed in consultation with appropriate parties and will adhere to a detailed data recovery plan. The investigations will recover a substantial sample of the scientific data contained in the site that will otherwise be lost to the adverse Project effects. The focus of investigations will generally be on the portions of the site where adverse effects are likely but may include larger portions of the site, depending on the type of impacts and the structure of the site. Coordination with appropriate road or trail managers, such as the OPRD, Oregon Department of Transportation (ODOT), USFS, and Marion or Jefferson Counties, will sometimes be necessary to determine who has primary responsibility for site-specific protection and mitigation measures.

3.3.4 Developed Campground Maintenance, Use, and Development

3.3.4.1 Project Effects

An important recreational asset in the Project area are public campgrounds, with developed facilities in The Cove Palisades State Park and on USFS and Reservation lands, as well as informal dispersed camping on lands managed by these agencies and the BLM. Campgrounds located on archaeological sites can adversely affect those sites through ground-disturbing construction and maintenance activities, erosion resulting from changes in drainage patterns and removal of vegetation, and general recreational uses that compact or otherwise disturb the ground. Cultural resources within established campground sites also may be affected by vandalism, such as artifact collection from the ground surface or digging in the site to obtain artifacts.

Archaeologists examined the established campground sites within the APE to determine if cultural materials were present. In the course of field studies conducted for relicensing, archaeologists located two prehistoric lithic scatter sites recommended as eligible for listing in the NRHP on or near established campgrounds within the Project APE (36JE153, and 35JE295). A third site (35JE341) was located at the USFS Monty Campground, but has not yet been evaluated for NRHP eligibility. This site is designed as a Priority 1 site for evaluation for NRHP eligibility, scheduled within the first year after the license is accepted.

Where cultural materials are located on or near campground sites owned or managed by the OPRD, USFS, or BLM, these agencies have the primary responsibility to protect these resources. Where camping is determined to be Project-induced, the Licensees have a shared responsibility to manage the effects of that activity on NRHP-eligible properties.

3.3.4.2 Protection and Mitigation

The presence of developed campgrounds makes the strategy of avoidance difficult to implement for these sites. However, careful planning for maintenance and future development can be organized to avoid remaining undisturbed site areas. Measures may include closing or rerouting traffic around specific areas, enclosing site areas within planned open spaces, and placing drainage

channels to control erosion. These sites will be monitored regularly to assess current site conditions and provide information that may be useful in identifying appropriate avoidance or protection measures for future campground projects, as well as reviewing overall site condition in relation to recreation and vandalism impacts.

A variety of measures may be employed to protect these sites or portions of these sites, if avoidance cannot be accomplished. Measures to protect the site may be implemented in conjunction with some level of data recovery investigations, or may be recommended in lieu of data recovery if previous work at the site is deemed sufficient. Site protection measures will vary according to site structure, proposed impacts, and Project requirements. These must be determined on a site-specific basis but may include restricting vehicle and pedestrian access to specific routes, limiting the types of activities allowed at campsites (e.g., prohibiting digging or limiting fires to constructed fireplaces), covering areas with vegetation or using plants as protective hedges, or covering affected site areas with temporary or permanent protective materials.

If avoidance and protection measures are inadequate or infeasible, data recovery investigations will be implemented to mitigate adverse effects to these campground sites. Data recovery investigations will be developed in consultation with appropriate parties and will adhere to a detailed data recovery plan. The investigations will recover a substantial sample of the scientific data contained in the site that would otherwise be lost to the adverse Project effects. The focus of investigations will generally be on the portions of the site where adverse effects are likely but may include larger portions of the site, depending on the type of impacts and the structure of the site. Programs that include public participation (e.g., the Passports in Time [PIT] Program) or involve public education (e.g., brochures explaining the work or tours of the operations) will be promoted as part of any data recovery investigations, given the public access these excavations will have in a campground.

3.3.5 Recreation Impacts and Vandalism

3.3.5.1 Project Effects on Archaeological Sites

Numerous recreational opportunities exist within the Project APE, especially within The Cove Palisades State Park. While recreation is considered a Project benefit, it also creates the potential for archaeological sites to be inadvertently impacted or intentionally vandalized because of their increased visibility and accessibility. Inadvertent effects from recreation may include soil compaction, disturbance, and erosion from walking through sites or operating vehicles on sites; digging trenches, garbage pits and latrines; or moving artifacts around. Potential vandalism may include artifact collection, unauthorized digging in sites to obtain artifacts, alteration or destruction of rock features, defacement of rock art elements, and the addition of modern graffiti to rock art panels. Any of the archaeological sites accessible to the public in the Project APE may be affected by recreation impacts and vandalism, but only those sites not subject to other Project effects categories are specifically discussed here. In addition, sites on the Warm Springs Reservation are excluded, since existing access restrictions make impacts due to recreation and vandalism less likely.

The likelihood of inadvertent recreational effects or vandalism is related in part to the visibility of a site. Some sites are highly visible due to the nature of their location or the type of cultural

feature, such as rockshelters and rock art, and thus are more likely to attract visitors. Sites with moderate visibility include prehistoric rock features and historic sites with structural remains or trash dumps that have features that stand out from the natural landscape. Most prehistoric lithic scatters are generally less obtrusive (low visibility), since the artifacts may occur in low densities and may not be noticeable against the natural ground surface. These three levels of visibility are useful in determining appropriate management strategies for these sites.

Archaeologists examined the public recreational areas within the APE, including the entire CPSP, to determine if historic or prehistoric sites were present. In the course of field studies conducted for relicensing, archaeologists located 92 sites: three high visibility rockshelter or rock art prehistoric sites, 53 moderate visibility sites (36 prehistoric rock feature sites and 17 historic sites), and 36 low visibility prehistoric lithic scatter sites. Two prehistoric archaeological sites, both high visibility rockshelter sites (35JE19 and 35JE58), have been tested and determined eligible for listing in the NRHP. These sites have the greatest potential for vandalism because of their high visibility within established recreational areas. One moderate visibility historic site (OR-JE-24) has also been tested and recommended as eligible for the NRHP. Of the remaining 109 prehistoric and historic archaeological sites that have not been evaluated, most are in this category and would be Priority 3 in the Resource Evaluation Program (described in detail in Section 5.1.2).

3.3.5.2 Protection and Mitigation for Archaeological Sites

Archaeological sites located on non-Reservation Project lands are on lands open to the public and may be affected by dispersed recreational activities, as well as by vandalism or looting. There is a potential for adverse effects from recreation and vandalism at all of the sites recommended as eligible to the NRHP, in addition to the other Project-related effects discussed above. Three eligible sites are subject primarily to recreation and vandalism effects, rather than the previously discussed Project effects. These include two high visibility rockshelter sites (35JE19 and 35JE58) and one moderate visibility historic site (OR-JE-24).

Of the three sites related solely to this category, one of the rockshelter sites (OR-JE-58) is located on private land. The private landowner of this site and the Tribes are already working to preserve and protect this site. Although not affected by the Project, because of the significance of this resource, the Licensees will implement the most appropriate site protection, recordation, and monitoring efforts.

The Licensees will coordinate with the land managing agencies to determine how to share responsibility to direct recreational activities away from the two remaining sites (and any others affected by recreational use) and to control potential looting and vandalism. These archaeological sites will be monitored regularly to assess current site conditions and record information that may be useful in identifying whether impacts from general recreation or acts of looting or vandalism are affecting the sites.

The preferred alternative for dealing with the effects of dispersed recreation effects is site avoidance and, if necessary, site protection measures. For example, the Federal or State agencies may be able to restrict all motorized vehicles (including motorcycles and all terrain vehicles [ATVs]) to existing roads in areas containing archaeological resources, especially high and moderate visibility sites. General access to roads will also be limited by installing gates or other

devices. Pedestrian and bicycle traffic can be directed into particular areas and routes by establishing trails and by signs restricting entry as needed. Overt protective devices such as fences or signs identifying areas as archaeological sites should be discouraged, since they may attract rather than divert attention to the sites. More discreet barriers such as vegetation cover or other landscaping practices may better protect site areas and divert recreation use. General land use policies such as controlling digging and firewood collection may also avoid damage to sites. Public education on the value of cultural resources and laws protecting resources may also limit unintentional damage to sites. Increased law enforcement and training of law enforcement officers to recognize signs of vandalism (see Section 5.3) will also help control these effects.

Another type of avoidance that may aid in controlling looting and vandalism is to control the availability of information about site locations and contents. The Licensees will keep these data confidential to eliminate this source of information to looters and vandals. In addition, the Licensees will educate Project staff regarding the serious implications of vandalism and will train appropriate staff to recognize and properly report vandalism. The appropriate procedures for the discovery of looting and vandalism are discussed in detail in Section 6.5.

3.3.5.3 Project Effects on TCP Sites

In the course of traditional cultural studies conducted for Project relicensing, two TCP sites were located within the Project APE and are considered eligible for listing in the NRHP. Only one of these sites is affected by Project-related activities: the southern edge of the Metolius Bench. The Project effects that relate to the continuance of the traditions associated with these locations are a sense of reduced security at these sites and alterations to the traditional setting from reservoir-surface recreation. These effects are consequences of recreational developments and public visitation encouraged by these developments.

The Project area, particularly Lake Billy Chinook, is heavily used in summer months for water surface-based recreation during July and August. The presence of large numbers of boaters during this period – particularly if visitors leave their boats and trespass onto Reservation lands – alters the character of the traditional use experience in the southern portion of the Metolius Bench. The presence of outsiders (individuals not known in the community) may be perceived as an intrusion or a possible security concern to individuals or small groups of women gathering plant resources in the Metolius Bench area in spring and early summer.

Recreational use may also affect these TCPs by altering the setting in terms of visual intrusions and increased noise. For Tribal elders familiar with the Project area, the recreational developments visible from the Reservation (e.g., Three Rivers Marina and Perry South and Monty campgrounds) are viewed as intrusive visual elements that compromise the cultural character of the southernmost portion of the Reservation. Prior to Project construction, the non-Indian presence along the Metolius River was limited to a few scattered ranches, generally occupied by families known to the people in the Seekseequa community. The marinas and boat launches are more conspicuous features and are used primarily by people who are strangers to Reservation residents. The visual intrusion is accentuated by the noise of motorboats and personal watercraft.

3.3.5.4 Protection and Mitigation for the TCP Sites

The Project's effects on the Metolius Bench TCP of reduced security and alterations to the traditional setting may be very difficult or impossible to prevent. Nevertheless, these effects can be managed or minimized in a number of ways. Improved law enforcement can limit trespass and public access to sensitive areas on Reservation Lands, thereby improving the security of those places for Tribal members. Public education can improve visitors' sensitivity to traditional uses and Tribal concerns. The traditional setting can be fostered through measures such as enhanced wildlife or traditional plant habitats and the restoration of fisheries. To mitigate the effects of recreation in this area, the Licensees propose three programs: (1) law enforcement training; (2) provision of on-site educational materials; and (3) enhancement of fish, wildlife, and traditional plant habitats important to the Tribes.

The Licensees will work with law enforcement personnel with responsibilities in this area to identify the legal and cultural issues associated with trespass onto Tribal lands. The Licensees' law enforcement program is further described in Section 5.3.

To increase visitor awareness of all Project-area natural resources and further reduce recreation-related trespass onto the southern end of the Metolius Bench, the Licensees will develop an Interpretation and Education (I&E) Plan in conjunction with the proposed Recreation Resource Implementation Plan (RRIP). Once the RRIP is in place, the Licensees will also provide an ongoing contribution to signage and/or educational materials at existing recreational facilities, such as The Cove Palisades State Park, Perry South and Monty campgrounds, Indian Park, Chinook Island, Pelton Park, and Round Butte Overlook Park. One of the goals of the I&E program would be to provide visitors with a basic understanding of both the legal and cultural issues concerning trespass onto Warm Springs Reservation lands. The materials would include signs and simple handouts, brochures, or pamphlets. These materials would outline the legal prohibition and provide the context for the prohibition in terms of cultural identity, sovereignty, and Treaty rights. The I&E program is further described in Section 5.4.

The Licensees are proposing a number of measures to enhance fish, wildlife, and plant habitat areas for the benefit of the resource and the various interests of the general public. Where these resources are also culturally important to the Tribes, they serve to supplement resource sites viewed as TCPs. The Licensees' program for habitat enhancement is detailed in the TRMP and Pelton Round Butte Fish Passage Plan (see Attachment III-2 to Exhibit E, Section III of the Joint Amendment)**.** Habitat enhancements related to culturally important species are described in Section 5.2.

3.3.6 Activities to Protect or Enhance Other Resources

3.3.6.1 Project Effects

The FERC relicensing of the Project has required the study of many other resource areas, similar to the studies undertaken for cultural resources, and has resulted in the development of protection and mitigation plans for many of these resources. Elements of these plans may have the potential to affect cultural resources, if NRHP-eligible sites are located within the boundaries of proposed ground disturbing projects. Vegetation control to remove non-native species, erosion control measures, road closures, and new recreation developments are all measures intended to enhance other resources that might involve ground disturbance that could affect cultural resources. Coordination and communication between the different resource leads within the Project are crucial to avoid situations where mitigation measures for one resource results in inadvertent damage to other resources. The management plans for these other resource areas will be developed in coordination with the Licensees' cultural resource staff and this CRMP.

3.3.6.2 Protection and Mitigation

A primary responsibility of the Cultural Resources Management Plan Coordinator (CRMPC) is to coordinate the review of Project operation, maintenance, and construction activities. Any proposed activity that may involve ground disturbance will be reviewed by the CRMPC and a Cultural Resources Specialist (CRS) as needed as a part of standard internal review procedures. Thus, projects developed by other resource areas that include ground disturbance will be reviewed by the Licensees and appropriate investigations or monitoring will be undertaken.

4.0 SITE-SPECIFIC MANAGEMENT AND MITIGATION MEASURES

This section describes site-specific treatment provisions developed on the basis of the foregoing discussion as well as through consultation with the appropriate land managing agencies. In most cases, monitoring, study, and consultation are needed prior to final decisions regarding preferred options. Where data recovery is involved in the chosen treatment for archaeological sites, the Licensees will prepare a data recovery plan detailing the key personnel, research questions to be addressed, sampling strategy, field methodology, anticipated analyses, schedule, cost estimate, and reporting and curation provisions for the research effort. The data recovery plan will be submitted to the appropriate property owners or land managing agencies and to the SHPO and the THPO for review. Where Project effects are considered to be adverse (by the definitions of 36 CFR §800.5), the Licensees will consult with the SHPO, THPO, and the ACHP (if the ACHP decides to join the consultation) to execute a Memorandum of Agreement (MOA) about how the effects will be taken into account, as specified by 36 CFR §800.6.

For many sites where impacts are not solely Project related, the responsibility for monitoring, protection, or mitigation should be shared with the appropriate Federal or state agencies or the Tribes. The licensee will coordinate with these entities to determine the roles and responsibilities of each. For sites along the Bethel-Round Butte transmission line, the management responsibility will be addressed through the Special Use Permit process.

Professional archaeologists under PGE's direction initiated a monitoring program in 1999. All of the recommended eligible sites will be visited annually. The unevaluated sites will be visited on a 5-year (Priority 2) and 10-year (Priority 3) cycle after the new license is accepted. This program is further described in Section 5.1.1.

4.1 Archaeological Sites

Table A-1 (Appendix A) lists the archaeological sites that have been formally evaluated for NRHP eligibility and Project effects. Treatment provisions for those sites assessed as eligible and subject to Project effects are discussed below*.

4.1.1 35JE19 (Powerline Cave)

Most of the cultural deposits at site 35JE19 (Powerline Cave) have been disturbed by looting activity, but valuable scientific information still may be obtained from disturbed sediments by treating the deposits as a single unit of analysis. In addition, some undisturbed deposits may remain beneath backfill and boulders outside the cave mouth and in the extreme rear of the cave. The disturbed nature of the deposits limits the extent of damage that can be inflicted on the site's significant qualities because: (1) the site is less attractive to looters because it has been already extensively looted; (2) access to artifacts potentially valuable to looters is physically obstructed by

* Although evaluated as eligible sites, 35JE468 and 35MA119 are not included in this section as they are located within the Bethel-Round Butte transmission line corridor and are no longer within the Project boundary. Appropriate treatment for these sites will be determined in coordination with the USFS as part of the Special Use Permit process. Site ORJE15 is not included in this section as major portions of the site are inundated and the evaluation tests were inconclusive.

boulders at the front of the cave; and (3) already destroyed stratigraphic relationships and features no longer can be affected by looters digging in the disturbed sediments. Although public visitation to the cave no doubt is increased because of its location within the CPSP, the limited threat of damage to its data potential means that restricting public access is expected to be sufficient to effectively protect the site's significant qualities. Access to the site should be limited by installing locked gates on roads in the site vicinity (these roads are also recommended for closure to avoid effects and protect sites 35JE20, 35JE185, and OR-JE-32). The OPRD placed a locked gate on the main access road in 1999. Regular site monitoring will be continued to determine if recreation or vandalism are adversely affecting the site. If so, additional protective measures may be needed.

4.1.2 35JE20 (Rimrock Falls Site)

The data potential and integrity of site 35JE20 (Rimrock Falls Site) are very high and have not been damaged by vandalism. However, the use of unimproved roads that cross the site is causing disturbance to cultural deposits and artifacts and thus is affecting the site's significant qualities. In the absence of any management action, the damage from road use will continue and vandalism (including the removal of surface artifacts as well as subsurface disturbance) could occur. Vandalism could affect any of the site's surface manifestations, but subsurface damage probably would be limited to key locations (such as the stacked rock ring, Feature 3, and other locations marked by high surface artifact density). Protection measures include placing locked gates on approach roads and limiting authorized use of the area to dry periods with rubber-tired vehicles only. The primary access road was closed by the OPRD with a locked gate in 1999. Site condition monitoring was begun in 1999 and will continue. If vandalism were observed, a prudent course of action would be to document the surface evidence in detail and obtain a sample of subsurface data in those key areas that are targeted by vandals. At that point, a data recovery plan could be developed that includes systematic surface collection and recordation and limited subsurface sampling in the vicinity of the stacked rock ring (Feature 3) and in areas of high artifact concentration. This extent of subsurface sampling should be sufficient to yield important chronological and functional information that might be lost through anticipated acts of vandalism, but is not intended to address all possible research questions, exhaust the site's data potential, or affect its integrity.

4.1.3 Site 35JE58

Site 35JE58, pictograph panels, are threatened by vandalism, as exemplified by some presence of modern graffiti on the panels and modern debris on the ground. Further threat to the panels arises from the site's location on a pedestrian trail and its proximity to the populated vicinity of the Three Rivers Marina. Because of the significance of this resource, the Licensees will implement the most appropriate site protection, recordation, and monitoring efforts. Documentation was accomplished in 1999 through non-destructive polarized light photography with digital image enhancement by James W. Henderson (Applied Photographic Research), who has pioneered this technique for rock art documentation in the Pacific Northwest and elsewhere. The Tribes, through their enterprise The Museum at Warm Springs, retained the services of Mr. Henderson to document rock art in the north-central Oregon area and included 35JE58 among the sites to be photodocumented. To further explore the significance of the site and the changing condition of the images, this new documentation should be supplemented by the creation of an archive of historic photographs gathered from private and agency sources as well as historic texts from the nineteenth

and twentieth centuries that refer to the site. In addition, a professional damage assessment of the pictographs should be conducted by a rock art specialist and any recommended restoration efforts should be implemented.

Protection of the site may be facilitated through the cooperation of the landowner, Mr. Herbert Anderson of Dayton, Oregon, who has pledged to work with the Tribes to do whatever is feasible to prevent vandalism. A local site stewardship program will be developed in cooperation with the Archaeological Society of Central Oregon and the Three Rivers community. A stewardship program, successfully used by the Archaeological Society elsewhere in the region, can provide regular monitoring of the site and will involve the local community in protecting the site.

4.1.4 35JE153

The data potential and integrity of site 35JE153 are potentially threatened by its location within the Crooked River Campground of the CPSP and the developments that have taken place and may be undertaken in the future. Although CPSP staff patrols the area, the potential for artifact collection and unauthorized excavation in the knoll vicinity remains and erosion of the channelized stream's banks may remove some undisturbed cultural deposits. To determine if vandalism is actually occurring, a monitoring plan was begun in 1999. If this monitoring identifies site disturbance, a data recovery plan should be developed and include: (1) systematic surface collection and recordation focusing on, but not strictly limited to, the knoll area; and (2) subsurface sampling in the knoll area and in the streamside vicinity adjacent to the RV disposal holding tank. The subsurface sampling should be sufficient to characterize the site's chronology, primary functions, and stratigraphy in the threatened areas but is not intended to exhaust the site's data potential or endanger its integrity, both of which can be protected through continued oversight by CPSP staff and careful planning of future developments. Such developments should be limited and designed to protect subsurface cultural deposits.

4.1.5 35JE185

This site is beneath a BPA transmission line and is primarily affected by vehicular traffic on the access road (Pettigrew 1998c). The 1998 investigations also concluded that pedestrian traffic on the site was minimal but that artifact collection "should be expected" (in Pettigrew 1998c). The Licensees will notify BPA of this site discovery and the BPA will be responsible to determine exact courses of action for this site.

The effects of general recreational use and of vandalism have not been well defined at present for this site, but road closures may reduce the probability of these impacts. Regular site monitoring was begun in 1999 and will be continued to determine if recreation or vandalism are adversely affecting the site despite the protective measures implemented. To the extent that effects are occurring, data recovery mitigation measures may be necessary.

4.1.6 35JE295 (Perry South Campground)

This complex and highly productive site is undergoing degradation of its data potential and integrity through erosion associated with the construction, maintenance, and use of campground developments. The site's significant qualities could be affected by maintenance and future construction activities as well as by artifact collecting and vandalism. A monitoring plan for this site was developed and implemented in 1999. Several protective measures should also be implemented. Campground staff will be trained to be aware of activities that might disturb the site and appropriate procedures to follow should evidence of disturbance or vandalism be found. Regular law enforcement patrols of the campground will include inspection of the site area. No activity (including routine maintenance tasks) that may disturb the ground surface will be undertaken until it has been reviewed for potential archaeological effects and approved (following protocols agreed to in consultation). The leveling of tent or RV pads and the development of new campsites will be halted until effects on archaeological resources can be evaluated and mitigated. However, because Project effects are not fully preventable in this situation, the treatment plan includes mitigation of those effects through data recovery of surface and subsurface cultural deposits in high density areas. Recovered samples should be sufficient to permit meaningful comparison of the periods of occupation and the activities represented by the separate cultural strata in areas 1, 2, and 3 as defined by the site testing report (Final Technical Report, Volume II, Section 8) and to characterize the prehistoric features, including possible house remains, that may be present at the site. Based on the analysis of recovered samples, this site may be appropriate for nomination to the NRHP. Archaeological excavation should be designed to permit and enhance public interpretation during and following the work to promote public education regarding the values represented by the archaeological traces. Engineered stabilization of road and stream banks is planned to control erosion of cultural deposits. Future developments will be designed and limited to prevent or minimize further disturbance to cultural remains.

4.1.7 35JE347 (Railroad Cut Lithic Scatter)

Project effects on the known areas of site 35JE347, the Railroad Cut Lithic Scatter, are modest, and planned actions in response to those effects are correspondingly limited. Artifacts apparently are mostly on the surface on the east side of the road, so the threat of disturbance to these artifacts is primarily from road maintenance. Because the area on the west side of the road does not contribute to the site's significance, no actions are proposed there. The site may continue southwest of the railroad cut, but this area is outside of the APE and no additional investigations are planned in this area. Site protection measures will be implemented to limit road maintenance on Pelton Dam Road or the adjoining driveways to previously disturbed areas (including the west side of Pelton Dam Road). None of these roads will be widened or otherwise modified in the site area. Vegetation removal along the roads in the site area will be limited to techniques that do not involve any ground disturbance.

4.1.8 35JE454

Ongoing Project effects noted in the Final Technical Report (Pettigrew 1998c) for this site include wave erosion in the drawdown zone that has created a denuded "beach" zone, and erosion of the cutbank on the upper margin of the drawdown zone beach. Intact buried cultural deposits are present below the beach surface and behind the cutbank face. Wave action from Lake Billy

Chinook has created this drawdown beach platform and the cutbank since the early 1960s, but the degree of ongoing active erosion of these surfaces is not known at present.

Data points have been established on the beach and along the cutbank, and regular monitoring is being conducted. If monitoring data show that erosion is continuing, protection for the beach surface and the cutbank (as needed) is recommended. In that event, the cutbank will be stabilized with a protective cover (riprap, geotextile cloth, or appropriate vegetation covering) or repositioned to be above the normal high pool level of the reservoir. A protective cover may be needed on the beach surface. Decisions regarding the type and extent of treatment will be made in consultation with the Tribes and appropriate specialists in site protection.

Limited data recovery will be conducted if protective covers are used, focusing specifically on the areas to be covered. These investigations will include limited subsurface sampling and systematic surface collections to provide a representative sample of the cultural deposits being protected.

4.1.9 35JE455

This site is adjacent to site 35JE454 and is subject to the same Project effects. Data points for monitoring changes to the beach and cutbank have been placed at this site as well, which will be monitored in a similar manner. The site protection measures discussed above and the associated limited data recovery, if necessary, are similar for both sites.

4.1.10 35JE458

The 1998 site evaluation tests demonstrated that most of this site is above the pool level of the Reregulating Reservoir (Pettigrew 1998c). However, wave action is actively eroding the cutbank on the eastern margin of the site, which is progressively cutting into the buried cultural deposits at the site. In addition, grazing by domestic livestock is affecting shoreline areas. The cutbank at site 35JE458 will be stabilized. Bank stabilization can probably be accomplished by covering the bank with some type of vegetative protective cover. Fencing is also proposed, to prevent impacts from domestic livestock grazing on shoreline areas. Site monitoring, including the placement of data points for measurements, will be conducted to help determine how large an area should be protected. Consultations with the Tribes, site protection specialists, and personnel operating the reservoir will determine the type and size of protective covering to be installed. Limited archaeological investigation will precede the installation and will be dependent on the degree of cutbank modification necessary for the protective cover. If portions of the slope must be cut back and removed, it is recommended that limited data recovery excavations be conducted to obtain a representative sample of the deposits to be removed. If, however, the cutbank is faced off without substantial modification, archaeological investigations will be limited to recording and collecting the visible artifacts and documenting the site stratigraphy revealed in the cutbank profile.

4.1.11 35JE459

This site contains intact buried cultural deposits within the drawdown zone of the Reregulating Reservoir. The 1998 investigations (Pettigrew 1998c) indicate that wave action is actively eroding site deposits in at least a portion of the drawdown zone area. It is recommended that limited data recovery investigations be conducted in this vicinity of the site and that a protective covering be placed over this area after the excavations are completed. The subsurface sampling is also expected to recover a sample of cultural debris sufficient, but not more than sufficient, to characterize the artifact assemblage and to determine the period of site occupation. Methods for accomplishing these excavations in coordination with reservoir operations will have to be developed. Ongoing site monitoring will aid in refining the focus of investigations, and subsequent monitoring will include observations to assess the effectiveness of any protective covering.

4.1.12 35JE461

This site contains intact buried cultural deposits within the drawdown zone of the Reregulating Reservoir. However, the 1998 evaluation tests (Pettigrew 1998c) suggest that much of the site is covered and protected by a silt cap deposited by the reservoir. Therefore, no data recovery or other subsurface investigations are recommended at this site at this time. Instead, the monitoring program will include procedures to specifically evaluate if and how well this silt cap is protecting the cultural deposit. These monitoring data will be evaluated to determine whether additional protective measures and/or data recovery investigations are needed.

This site may be adversely affected if the proposed habitat enhancements to the nearby wetlands area are implemented. If these plans are developed, provisions to avoid, protect, or mitigate the adverse effects to this site must be developed and implemented.

4.1.13 35JE470 (Quarry Road Lithic Scatter)

Project effects on site 35JE470 (Quarry Road Lithic Scatter) are limited primarily to potential disturbance from road maintenance activities. This site will be protected from such effects by the restriction of road maintenance activities in the site area.

4.1.14 OR-JE-8

Measures applied to site OR-JE-8 will depend upon a determination of feasibility for protection of the site through access restriction. Currently this site, with visible features and presumably shallow cultural deposits relating to use as a construction camp for the Oregon Trunk Railroad, is threatened by vandalism stemming from the site's proximity to Pelton Park. A transmission line shared by PGE and PacifiCorp borders the east side of the site, and an access road to this line passes through the site. Consultations with PacifiCorp and the BLM (the land managing agency) will be necessary to determine exact courses of action for this site.

The effects of general recreational use and of vandalism have not been well defined at present for this site, but road closures may reduce the probability of these impacts. Regular site monitoring was begun in 1999 and will be continued to determine if recreation or vandalism are adversely

affecting the site despite protective measures implemented. If so, data recovery mitigation measures may be necessary.

4.1.15 OR-JE-21 (Osborne Homestead)

Probably the most conspicuous and easily accessible of the historic homesteads in the Project inventory is site OR-JE-21 (Osborne Homestead). The site's architectural remains and near-surface cultural deposits are being damaged by intentional and inadvertent activities by visitors to the site. A monitoring plan has been developed and was begun in 1999. This monitoring has documented some vandalism at the site. Because effective protection of the site by public exclusion may not be feasible, data recovery will be undertaken within the house lot area to include surface and subsurface contexts, in concert with additional historical research and oral interviews to supplement existing background information. Because of its architectural features, the Osborne Homestead is the most suitable homestead site in the inventory for public interpretation. Thus, the Licensees' program includes the development and implementation of an interpretation plan in coordination with the CPSP and the Jefferson County Historical Museum. Also included will be stabilization of the architectural remains and restriction of vehicular access. Finally, site surveillance will be incorporated into regular law enforcement patrols and monitoring. A clear presence of State Park rangers or County patrol officers in the area may dissuade potential vandals. These patrols are expected to be daily or weekly, but will be established in consultation with the CPSP and other appropriate parties.

4.1.16 OR-JE-24 (D. Glover Homestead)

This site is located along a gravel road, but Project effects to the site stemming from recreational use and potential vandalism may have greater impact than use or maintenance of this road. Regular site monitoring was begun in 1999 to determine whether general recreation or vandalism is affecting the integrity of the site. Monitoring data will aid in determining viable site protection measures and, if necessary, data recovery mitigation measures. The neighboring road is currently closed during the winter. If monitoring reveals ongoing disturbance from recreational visitors, one option will be to close this road to the general public year round. Site surveillance should be incorporated into regular law enforcement patrols and monitoring. A clear presence of State Park rangers or County patrol officers in the area may discourage potential vandals. These patrols are anticipated to be daily or weekly, but will be established in consultation with the CPSP and other appropriate parties. If necessary, planned treatment measures may include data recovery excavation and systematic surface collection focusing on features visible near the road. Stabilization of the cistern and other features is included. Additional historic research and oral interviews will be done to enhance the site-specific historic context. In addition, the Licensees will develop and implement a public interpretation plan in coordination with the CPSP and the Jefferson County Historical Museum. If possible, vehicular access will be restricted.

4.1.17 OR-JE-32 (Larkin Homestead)

A BPA transmission line and an access road cross portions of this site. However, the primary Project effects appear to be related to recreational use and vandalism (Pettigrew 1998c). Consultations with BPA, and the Ochoco National Forest (the land managing agency) will be necessary to determine exact courses of action for this site. In general, it is recommended that the

site be protected by restricting vehicular access to the site area to authorized personnel (by locking gates on approach roads) and by limiting authorized use to dry periods with rubber-tired vehicles only. No modifications or improvements will be made to this road in the site area. The effects of general recreational use and of vandalism have not been well defined at present for this site, but road closures may reduce the probability of these impacts. Regular site monitoring was begun in 1999 and will be continued to determine if recreation or vandalism are adversely affecting the site despite the protective measures implemented. If so, data recovery mitigation measures may then be necessary.

4.1.18 OR-JE-34 (McBain Homestead)

Because of its proximity to heavily used parts of the CPSP, this site has experienced vandalism, which is likely to continue in the future. Because of the ease of public access, effective protection of the site may not be feasible. Regular site monitoring was begun in 1999 to determine whether general recreation or vandalism is affecting the integrity of the site. Monitoring data will aid in determining viable site protection measures and, if necessary, data recovery mitigation measures. Vandalism and collection activities tend to focus on features where artifacts can be found. For this reason, if needed, the treatment plan for this site may involve limited data recovery and surface collection at two features: Feature A (concentration of food containers and household items) and Feature C (house foundation), in combination with additional historical research and oral interviews to supplement the site-specific historic context.

4.2 Buildings, Structures, and Linear Resources

None of the three historic sites containing buildings (PRB-HIS-9 [IR-JE-9], PRB-HIS-17, PRB-HIS-17) listed in the Project inventory is considered eligible to the NRHP. Consequently, no action is planned.

Of the two structures identified in the inventory, one (CP-H5) is considered an element contributing to the significance of the Harley Bailey homestead (OR-JE-33) under Criterion A. Because there is no evidence of vandalism, no treatment activities are currently proposed, although the condition of the structure will be monitored. Structure CP-H3 will require additional background research to assess its eligibility; this work is planned as part of the continuing Resource Evaluation Program to be undertaken under the new license (see Section 5.1).

Of the linear resources, 17 are considered potentially contributing elements if a future evaluation determines the linear resource in its entirety is NRHP eligible; 14 of these linear resources are within the Project boundary. The 14 linear resources within the Project boundary will be included in the monitoring program.

4.3 Hydroelectric Facilities

Because they are less than 50 years old, the Project hydroelectric facilities, including all three dams, were not recommended as eligible to the NRHP. However, by the year 2007 they will reach this age threshold for standard eligibility assessment. In addition, by that time, more information will be available on the context for assessment. Accordingly, a formal eligibility assessment is expected to be undertaken and completed by the year 2007. Prior to 2007, if any major changes to these facilities were planned, an eligibility assessment would be undertaken at the time of those plans. In the event the facilities are assessed as eligible, the Licensees will coordinate with the appropriate regulatory and land managing agencies to protect or mitigate the significant elements should any planned changes or actions be proposed that may affect them.

4.4 Traditional Cultural Properties

Based on the ethnographic study done in 1997 and 1998, two TCPs are considered NRHP-eligible; only one is subject to Project effects. The two are the southern edge of the Metolius Bench and Seekseequa Junction (along with the associated community on Seekseequa Creek). This latter area was not considered subject to Project effects. The southern edge of the Metolius Bench is affected by water surface-based public recreation that reduces a sense of security for Tribal members engaged in traditional activities and alters the traditional setting.

No treatment measures could fully protect the TCP on the southern edge of the Metolius Bench from the recreation effects. However, some management suggestions offered by Ellis et al. (1998) in the Final Technical Report are adopted here. Planned treatment provisions were described in Section 3.3.5.4 above and are presented in Section 5.2.

5.0 ONGOING MANAGEMENT AND ENHANCEMENT PROGRAMS

The Licensees are committed to mitigating Project-related effects on NRHP-eligible sites, as presented in Section 4.0, and implementing ongoing programs that protect and enhance cultural resources. The programs included here are intended to: (1) establish ongoing management programs; (2) enhance culturally important natural resources; (3) provide for increased law enforcement; (4) interpret and educate the public regarding cultural resources; (5) provide protocols for discovery of sites or human remains; and (6) establish consultation practices.

5.1 Ongoing Management Programs

Long-term management of cultural resources in the Project APE will be achieved through the operation of several ongoing programs discussed below.

5.1.1 Monitoring Program

The Licensees will coordinate a monitoring program of NRHP-eligible cultural resource sites and unevaluated sites in the APE with appropriate State and Federal agencies and the Tribes on whose lands some of the sites are located. This program will be designed to: (1) identify specific sources of natural or human-caused effects on NRHP-eligible sites; and (2) observe the effectiveness of protection measures. The results of monitoring will be used to define protection and mitigation measures specifically tailored to address known effects.

This program was initiated in 1999 under the direction of PGE. Sites being monitored include those assessed as NRHP-eligible and those not yet formally assessed. Future monitoring will include historical sites, prehistoric sites, linear resources, and buildings and structures that are considered potentially subject to Project effects. To be revisited annually are those (approximately 10 percent of the inventory) subject to known Project effects. Those sites considered to be potentially affected (approximately 20 percent) would be revisited every 5 years (Priority 2). The remaining sites (70 percent) are expected to be revisited every 10 years (Priority 3). Based on these criteria, an estimated total of 27 sites would be monitored annually. Site-by-site priorities will be reviewed annually on the basis of the most recent information.

In their on-site inspections, monitoring teams will compare surface-visible traces with the existing site record and update that record to: (1) provide supplementary information not included in the prior record; (2) correct errors in the prior record; and (3) document changes in site patterns or conditions since the prior record. In the first monitoring visit, field teams would establish photo points that are fixed in relation to site data and are easily relocatable in subsequent years, and create a photographic baseline record. Later monitoring teams would duplicate this photographic record to permit direct comparison of the images and assessment of visual changes. Where feasible, each site monitoring episode should take place at the same time of year, and photos should be taken at about the same time of day, to optimize the comparability of the images. Where appropriate, site monitors should establish other fixed points of reference, such as stakes along eroding cutbanks, that will facilitate measurement of the degree of change between monitoring visits. Monitoring data are to be documented on a standard form designed for the purpose and

appended to the site record form. Copies of the monitoring form would be provided to the Oregon SHPO, the THPO, and the appropriate land managing agency or landowner.

Monitoring will be designed to create an accurate record of changing site conditions that permits good management decisions. Monitoring records are to be carefully compared against prior records to determine the trends in site changes, such as a shift in an eroding cutbank, damage to features or structures from vandalism, the integrity of a cultural deposit subject to unauthorized excavation, or the completeness of a surface artifact deposit subject to unauthorized collection activities. The degrees of change will be described by objective and standard measurements, such as the horizontal movement of a measured segment of cutbank, number of bullet holes in a structural wall, the volume of unauthorized excavation, or the numbers of artifacts removed from a surface deposit. Monitoring results and trend studies will be documented in the Annual Report on Cultural Resources (see Section 6.6).

Monitoring will minimally entail a field visit to the site and a completion of a monitoring form that includes a description of the site when visited, photographs of site condition and effect, and a summary assessment of surface artifacts and features. These records will be used to compare site conditions during future visits and can form basic documentation to assess effects of recreation, vandalism, and other activities that may affect the site. While a general framework is provided above, the actual program—including the frequency of site visits and the responsibility for conducting such visits—will be determined in consultation with affected agencies and the Tribes. The monitoring program will be administered through the CRMPC, with support from the CRS as needed.

5.1.2 Resource Evaluation Program

The high priority cultural resource sites in the Project APE that have not been evaluated for NRHP eligibility are discussed in Section 5.1.2.1 and listed on Table 5-1. These sites will be evaluated in the first six years of the new license. All evaluations of NRHP eligibility and Project effects will meet or exceed the standards promulgated by the Department of the Interior in Archaeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines. These evaluations will follow the regulations in 36 CFR §800 and official guidelines such as National Register Bulletin 15: Guidelines for Applying the National Register Criteria for Evaluation and other National Register bulletins. In addition, historic properties characterized by buildings and structures are expected to be evaluated in a manner consistent with SHPO guidelines for resources of this type.

When an archaeological site is formally evaluated as part of the program described in this CRMP, the Licensees will: (1) consult with the appropriate land managing agency to seek consensus on the evaluation, (2) update the site record form to include the new information gathered to make the assessment, and (3) provide copies of the record update to the SHPO, the THPO, and the appropriate land managing agency or landowner.

New data gathered during evaluation, monitoring, inventory, and other research efforts will be analyzed and compared against existing data in a continuing process of refining existing interpretations and models. On the basis of such analyses and comparisons, the Licensees, in cooperation with other land managing agencies, will update research orientations and contexts used for site evaluation.

Documents written to guide and facilitate significance evaluations were prepared as part of the research effort that generated the current inventory and assessments. These include research orientation statements for prehistoric and historical archaeological sites (Final Technical Report, Volume I, appendices A and B, respectively) and an historic context document for linear resources (Final Technical Report, Volume I, Appendix C). The research orientation documents specify the research themes, issues, questions, and data requirements pertinent to the evaluation of archaeological sites, whose significance depends on research value (Criterion D). The context statement outlines the various historic contexts and the related criteria for assessing the NRHP eligibility of most kinds of linear resources, whose significance depends primarily on features or attributes that define their distinctive qualities. The Licensees will utilize these documents in the evaluation of archaeological sites and linear resources, and continue to develop and refine them on the basis of new information and experience.

The Resource Evaluation Program is discussed below for each type of site.

5.1.2.1 Archaeological Sites

Archaeological sites in the Project inventory have been prioritized for management attention on the basis of their likelihood for both NRHP eligibility and Project effects. Most sites at the top of the priority list already have been investigated and formally evaluated; these are the sites for which site-specific treatment proposals have been presented. These sites are listed in Table A-1.

Evaluation activities would require subsurface testing to establish site structure, integrity, and eligibility for listing in the NRHP. The Licensees have divided unevaluated sites into three priority groups, based on the proximity of Project facilities and the likelihood of ground-disturbing activities in the site vicinity. The first priorities are those sites in areas of ongoing Project effects that have not yet been tested (primarily along the reservoir shoreline and at campground areas). The second priority will be sites in areas of probable effects from Project facilities (e.g., operational areas and roads) and high visibility sites (e.g., rockshelters, rock art, and structures). The third priority will be all remaining sites, subject primarily to potential effects from recreation and vandalism. Table 5-1 summarizes the Priority 1 and 2 sites to be analyzed. The Licensees will initiate a program that will test all first priority sites within 1 year after the license is accepted and second priority sites within 6 years, examining a set number of sites per year. The 7 recorded prehistoric and historic archaeological sites in the Priority 2 group includes 5 roads/trails sites, 1 campground site, and 1 high visibility site. (Five other sites located within the Bethel-Round Butte transmission line ROW will be addressed in coordination with the USFS through their Special Use Permit process). Priority 3 sites will be evaluated if specific projects that may adversely impact the site are proposed, or if site condition monitoring identifies ongoing adverse Project effects. Thus, Priority 3 sites will be evaluated if necessary, but will otherwise remain unevaluated and will be routinely protected by monitoring and avoiding any impacts to site areas. This ongoing Resource Evaluation Program will be conducted by qualified archaeologists and administered by the Licensees' cultural resources staff (see Section 6.0).

Table 5-1. Priority 1 and 2 sites (for resource evaluation program).

Priority	Site Number	Age	Potential Impacts
Priority 1	35JE341	Prehistoric	Impacted by campground activities.
	35JE462	Prehistoric	Impacted by reservoir shoreline.
	ORJE15	Historic	Impacted by reservoir shoreline.
Priority 2	35JE424, 35JE457	Prehistoric	Potentially impacted by road/trails.
	ORJE13, ORJE16, E0333	Historic	Potentially impacted by road/trails.
	35JE511	Prehistoric	Potentially impacted by recreation as a high visibility site.
	CP-H3, CP-H5	Historic structures	Potentially impacted by recreation as a high visibility site.

Note: 5 sites located within the Bethel-Round Butte transmission line right-of-way will be addressed through the Special Use process with the USFS. These include 35JE194, 35JE471, 35MA132, 35MA133, and 35MA171.

5.1.2.2 Buildings and Structures

Five cultural resources characterized by buildings and structures are listed in the Project inventory. Four of these already have been evaluated. The remaining unevaluated site is CP-H3, an historic stacked rock enclosure that was possibly a hunting blind. Currently assigned evaluation Priority 2, this site should be investigated and assessed.

5.1.2.3 Hydroelectric Facilities

Project facilities will be evaluated when they attain the 50-year age threshold in 2007 or in coordination with proposed modifications to the facilities, if these are proposed prior to 2007.

5.1.2.4 Linear Resources

Of the 140 linear resources listed in the Project inventory, 17 are assessed as NRHP-eligible (under Criterion C) and 1 is considered unassessed (see Table A-4). Of these 18 linear resources, Project effects are anticipated for 11. The 11 linear resources to be assessed for Project effects have been prioritized (Table A-4) in a manner similar to that for archaeological sites, from Priority 1 (possibly immediate and destructive effects) to Priority 4 (limited effects that may occur in the future). Field visits to assess Project effects on these linear resources are incorporated into the archaeological site monitoring program that will yield data on which to base formal assessments of Project effects. Priority for field visits is given to four linear resources (HIS-1, HIS-2/CP-H19, HIS-6/CP-H20, and HIS-14) currently subject to potentially destructive Project effects (shoreline erosion, reservoir inundation, road construction and maintenance, recreation activities, or vandalism), as indicated in Table A-4. All 11 linear resources are to be monitored within the first five years of the new license period. These assessments will be reported in the Annual Report on Cultural Resources (see Section 6.6). No assessments of linear resources are planned in connection with the simple visibility of Project facilities, such as transmission lines, because this condition is not considered a potential Project effect.

Linear resources, currently assessed under Criterion C only, will be evaluated as necessary under Criteria A and B through historical research in the event of planned actions that may affect their significant qualities.

5.1.2.5 Traditional Cultural Properties

All evaluation regarding TCPs has been completed. No further assessments are anticipated during the new license period.

5.1.3 Data Recovery Program

The Licensees will manage Project effects to NRHP-eligible prehistoric or historic archaeological sites to avoid effects from ongoing Project activities or projects planned during the license period. Where this is not feasible, the Licensees will identify protection measures or data recovery investigations to mitigate adverse effects, subject to the policies delineated above and in consultation with the appropriate Tribes, agencies, SHPO, THPO, and other interested parties. Planned site protection measures will vary according to site structure, proposed impacts, and Project requirements, and may also necessitate limited data recovery. Protection and mitigation programs, organized by type of Project effect, are presented in Section 3.3 of this CRMP. Data recovery investigations will obtain and preserve a substantial sample of the scientific information that would otherwise be lost because of adverse Project impacts. A detailed data recovery plan will be prepared for each investigation and address research questions developed from the research orientations presented in the Final Technical Report (Pettigrew 1998b). The level of investigation and focus will depend on the Project scope, location within the site, previous investigations conducted at the site (including site monitoring), and concerns raised in consultations. Data recovery efforts may be limited to the area of direct Project effects or incorporate the entire site area. Measures to protect site areas may be recommended without data recovery, if previous monitoring and testing at the site are deemed sufficient to define and characterize areas to be protected. Data recovery plans and excavations will be developed and conducted by qualified archaeologists, administered by the Licensees' cultural resources staff (see Section 6.0). Specific protection and mitigation measures for identified NRHP-eligible sites are discussed in Section 4.0.

The Licensees will curate collections resulting from archaeological fieldwork at existing approved facilities. Specifically, collections from prehistoric sites will be curated at the Oregon State Museum of Anthropology (OSMA) at the University of Oregon, and collections from historical sites will be curated at the Department of Anthropology, Oregon State University.

The Licensees will generate reports of cultural resource activities in two general categories: site-specific reports, such as those concerning mitigation and discoveries, and an Annual Report on Cultural Resources. For all reports, the Licensees will follow established guidelines such as Archaeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines, the SHPO's State of Oregon Archaeological Survey and Reporting Standards, and COHG reporting standards.

5.1.4 Future Inventory Program

As part of the overall management of cultural resources, the Licensees will conduct additional surveys at appropriate locations: (1) pedestrian surveys of a sample portion of the APE to incorporate advances in survey methodology; (2) a survey of Project facilities in 2007; (3) a survey of other acquired lands that may be affected by the Project (i.e., the Metolius Mule Deer Winter Range) prior to ground-disturbing activities; and (4) areas not included in the previous survey now made accessible through ground-clearing fires or exceptionally low reservoir drawdowns. General programs for conducting these surveys are described below, and specific procedures further detailed in Section 6.4.

5.1.4.1 Sample Surveys

Within five years after obtaining the license and every 10 years thereafter, the Licensees will conduct a sample survey to update and verify the archaeological resource survey of the APE. The following process will be followed to organize and complete these surveys:

- Discuss the scope of the sample survey with the CRS, THPO, Federal or state agencies and the Oregon SHPO in the early stages of the planning process. Obtain all necessary permits.
- Provide staff or consultants that meet or exceed the Secretary of Interior Standards and Guidelines.
- Include an update of the literature search as part of the scope of the sample survey.
- Follow established confidentiality procedures for all information regarding archaeological resources.
- Submit the findings and recommendations of the completed sample survey to the appropriate Federal or state agencies, the THPO, and the Oregon SHPO. The agencies and the SHPO and the THPO, in consultation with the Licensees, will determine the best methods of proceeding on the recommendations of the survey.
- Update the cultural resources site maps and tables and the geographic information system (GIS) database to reflect the findings of the survey.
- If the sample survey identifies additional archaeological sites, the CRMPC will work with the CRS and company staff to determine if any activities had been planned for that area. If so, boundary determinations and determinations of eligibility will be completed as soon as possible. Upon completion, the CRMPC will consult with the appropriate Federal or state agency to determine if any effects may be caused to the newly identified site by planned activities. If no activities are planned in the area of that site, boundary determinations and determinations of eligibility for that site may be scheduled in conjunction with future archaeological work.
- Provide any non-confidential material resulting from the sample survey to the public for educational and interpretive purposes.
- If the sample survey identifies results inconsistent with the previous archaeological survey, consult with the agencies, SHPO, and THPO to determine if the results warrant a complete resurvey.

5.1.4.2 Project Facilities Survey

By 2007, the oldest of the Project hydroelectric facilities (Pelton Dam and the Reregulating Dam) will have reached the 50-year age threshold for eligibility for listing in the NRHP. At that time, the Licensees will complete an historic resources survey to evaluate these Project facilities for their eligibility for listing in the NRHP. The survey will incorporate information gathered from the historic resource studies completed for relicensing purposes (Pettigrew 1998c) and will include a reassessment of resources that have attained sufficient age to meet the criteria for the NRHP or relate to newly developed historic contexts. The following process will be followed in the organization and completion of this survey:

- Discuss the scope of the planned survey with the Oregon SHPO in the early stages of the planning process.
- Provide staff or consultants that meet or exceed the minimum professional qualifications for historic resource surveys as established by the Secretary of the Interior.
- Include an update of the literature search as part of the scope of the survey.
- Upon completion of the survey, submit the findings and recommendations to the Oregon SHPO. The SHPO, in consultation with the Licensees, will determine the best methods of proceeding on the recommendations of the survey.
- Amend the CRMP to reflect any necessary additions to the inventory of historic resources in the area.
- Provide material from the survey to the public for educational and interpretive purposes. This can be accomplished by placing copies of the material in local libraries and museums and using the information in interpretive material such as brochures, tours, guidebooks, etc.
- Update the cultural resource maps to reflect the findings of the survey.

5.1.4.3 Acquired Lands Surveys

The Licensees have acquired lands that may be included in the new license's Project boundary and, thus, would eventually be included in the APE. The 7,700-acre Metolius Mule Deer Winter Range is an example of land that was not surveyed for archaeological resources as part of this study at this time. Because actions are now proposed to close roads and complete other resource enhancement activities, the affected areas will be surveyed upon inclusion of these lands into the Project boundary. The survey procedures provided in Section 6.4 will be followed in conducting this survey.

5.1.4.4 Completion of Inventory

Although the existing inventory was completed thoroughly, some small portions of the APE were inaccessible because property owners refused access or because of safety considerations, dense vegetation, or reservoir inundation. Although exhaustive recordation of cultural resources in the APE is an unrealistic goal, this CRMP proposes to complete the survey coverage of all safely accessible areas. For example, areas made inaccessible by heavy vegetation cover, or where vegetation rendered surface visibility very poor, should be surveyed following ground-clearing

fires. Also, areas newly exposed by unusually low reservoir drawdowns would be examined if possible. However, future surveys for these areas is contingent on meeting three conditions: (1) the site is within the APE; (2) dense vegetation conditions are sufficiently reduced (e.g., ground-clearing fire); and (3) it is determined that there is potential for significant resource value from the survey. The survey procedures provided in Section 6.4 will be followed in conducting this survey.

5.1.5 Programs to Minimize Vandalism

A difficult problem facing cultural resource management is looting and vandalism. Looting is the illegal, unscientific removal of archaeological resources, and vandalism is the intentional or unintentional defacement (damage or destruction) of a resource. Cultural resources may be vandalized as deliberate acts, such as shooting at rock art panels, or as a result of carelessness causing a loss of the historic value of the resource. Collectors encourage looting of archaeological sites by paying large sums for Native American artifacts. Campers, hikers, and others in the area may commit looting or vandalism by disturbing sites and taking home artifacts they find, often unaware of the effects their actions have on cultural resources.

The Licensees will work to prevent looting and vandalism through several programs and will coordinate and cooperate with other agencies in their anti-vandalism programs. The Licensees' programs include: confidentiality, restricted access, site monitoring, education, and law enforcement.

- **Confidentiality** - Information concerning the location and contents of Project area archaeological resources will be kept confidential and will be released in accordance with established agency and Tribal guidelines.
- **Restricted Access** - The Licensees may restrict access to known archaeological resources, to the extent that restricted access is compatible with other resource and recreation plans and is within the Licensees' control. Such access restrictions will be done in consultation with the Tribes, agencies, and other interested parties, and will be reviewed on a regular basis.
- **Site Monitoring** - Site monitoring will be regularly conducted to assess conditions, and anti-vandalism measures (access restriction, fencing, landscaping, or other means that protect a resource without altering its historic character) may be recommended based on these observations.
- **Education** - The Licensees will educate staff regarding the serious implications of vandalism and will train appropriate staff to recognize evidence of vandalism and the correct procedures to follow upon discovery of vandalism. The appropriate procedures for the discovery of looting and vandalism or of Native American gravesites are discussed in Section 6.5.
- **Law Enforcement** -The Licensees will support additional law enforcement (see Section 5.3), will pursue appropriate legal remedies, and will cooperate with all law enforcement agencies.

5.2 Programs to Enhance Culturally Important Resources

5.2.1 Provide Access to Traditional Use Locations

Some locations in the Project area that were traditionally used in the past have declined in use due to diminished access or lack of access. Enhancement of culturally important resources and access to resource areas are important issues to the Tribes.

Jointly owned lands in the Metolius Mule Deer Winter Range lands may provide an opportunity to continue some traditional practices. The Licensees will assist the Tribes in determining whether traditional practices could occur on these lands and where culturally sensitive plant species may be located. The Licensees will arrange for Tribal access to these lands for traditional practices where such practices are consistent with established resource goals for native plant communities and wildlife habitat (see Terrestrial Resources, Exhibit E, Section IV).

An excellent opportunity may exist at the Wheeler Ranch portion of the Metolius Mule Deer Winter Range for re-establishing traditional use of the area for gathering of plant resources. Although this area (the Canadian Bench-Grandview locale) is not an eligible TCP, there is evidence that some Warm Springs Tribal elders make occasional forays to the area to assess both quantity and quality of plant foods that occur in the area. Currently, food plants in this area are considered too scattered for harvest. Enhancement of plant habitat through elimination or control of livestock grazing (especially by sheep) would likely improve both quantity and quality of some food plants, which could promote the re-establishment of traditional uses of this area.

Another opportunity exists at the Pelton Waterfowl Pond, where tule *(*Typha *Latifolia)* is found. Tule is identified as a priority species by Tribal Ordinance (490.510) and is used for basket weaving and other traditional uses. While tule can be found at a number of locations along the Project reservoirs, the Pelton Waterfowl Pond is one of the most accessible for Tribal elders to harvest tule. Normal maintenance of the pond includes periodic harvesting of the tule to manage its growth. In those years when harvesting is required, the Licensees will cooperate with Tribal members to allow pre-scheduled access and traditional tule harvest activities within the Waterfowl Pond area in accord with pre-set constraints determined by the Licensees' biologist and Project operator. The Licensees will coordinate the preparation of the Terrestrial Resource Management Plan (TRMP) with this CRMP to assure that these multi-disciplinary programs are coordinated.

5.2.2 Enhance Fish, Wildlife, and Plant Habitat Areas

The Licensees will work with the Tribes, the other land managing agencies, and landowners to enhance habitat for fish and native animals and plants. The Licensees are proposing to reintroduce anadromous fish to portions of their historic range above the Project. Programs to enhance fish habitat and improve fish populations—especially salmonids and lamprey—would benefit the general public and would also have important cultural benefits for Tribal people. There are opportunities in the Metolius Mule Deer Winter Range and with other resource enhancement programs to improve both on-site and off-site riparian habitat for enhancing both quantity and quality of plants and animals of cultural importance. Plans for such enhancements would be integrated with the Terrestrial Resources Management Plan (TRMP) and coordinated with Tribal

heritage programs. These programs are intended to benefit the resource and many interests of the general public as well as the Tribes.

5.3 Programs to Enhance Law Enforcement

The Licensees will provide funding to support one full-time and two seasonal County Sheriff's deputies to provide for public safety, enforce existing laws, reduce trespass onto Tribal lands, and limit vandalism and recreation-related impacts on cultural resources. In addition, the Licensees will support improved radio communication and will encourage more effective penalties for violations occurring on Project lands. The pressure of public recreation felt by Tribal members along the southern margin of the Metolius Bench are related primarily to the public use of Lake Billy Chinook and can be limited in part by law enforcement. The Licensees will sponsor periodic workshops for existing law enforcement personnel (Tribal, Jefferson County, State of Oregon, and Federal agencies) to enhance knowledge and understanding of laws and regulations governing the use of Tribal lands by persons who are not Tribal members as well as the understanding of problems created by public encroachment on Tribal property. The workshop also will include an emphasis on the protection of archaeological sites and other historic properties.

In addition, the Tribes facilitated an interagency planning effort that resulted in the Pelton-Round Butte Comprehensive Management Plan, signed in 1999 by representatives of the Tribes, the BIA, the Deschutes and Ochoco national forests, OPRD, and Jefferson County. This plan will improve the effectiveness of law enforcement in the Lake Billy Chinook area.

5.4 Programs for Interpretation and Education

Interpretation and education (I&E) programs can inform the public and increase public awareness and appreciation of cultural resources. Within one year of license issuance, the Licensees will work with the local community, agencies, and Tribes to develop an integrated, interdisciplinary I&E program for the Project area. The Licensees will jointly fund the initial development of the I&E Program, which will consider themes related to Project area natural and cultural resources, as well as hydropower development. This I&E Program will prioritize and jointly fund annual implementation and maintenance of the program thereafter through the Recreation, Fish, Terrestrial, and Cultural Resource Programs (combined total of at least $20,000 annually). Of this annual allocation, 25% shall be applied toward themes or projects related to cultural resources.

These materials and programs will be designed to improve public understanding of and appreciation for historical and archaeological resources as well as Tribal cultural resources and history. Specific activities may include:

- A protective structure and rock wall at the petroglyph rock located adjacent to the Deschutes Campground at the CPSP, with signs interpreting the significance of the rock in the context of the area's Native American presence.
- A brochure describing the area's cultural history (both Indian and non-Indian) and other attributes as well as management regulations, designed to inform and educate visitors and

to reconnect the user with the land; these will be made available at no cost to the visitor at the CPSP and other recreational centers.

- Signs along a short trail on Chinook Island with information on Tribal culture, treaty rights, or use of reservation lands.
- Interpretive displays at Round Butte Overlook Park and Pelton Wildlife Overlook that include could information on Tribal culture, traditional uses, local history, and the importance of protecting cultural resources.

The I&E plan would include concepts for on-site interpretive signage at key recreational facilities. Signage at these locations would provide information on cultural resources in the Project area. The content of all signage on traditional cultural beliefs, practices, and associations would be approved by appropriate Tribal entities to protect culturally sensitive or confidential information. Signage or displays at most facilities would be modest in scale. More extensive developments may be undertaken at The Cove Palisades State Park (possibly in association with the petroglyph in the park). Interpretive signage addressing Tribal history and traditional use will be coordinated with interpretive signage planned for archaeological, historical, and terrestrial resources.

In addition to interpretive signage, the Licensees will work with the Tribes and other agencies involved in the development and execution of this CRMP to develop regular and special interpretive and educational materials directed toward recreational users and other visitors in the Project area. These may include developing, tour routes to specific resource sites, brochures available at visitor centers or recreation areas, museum/visitor center displays, and public talks. Opportunities to accommodate public participation in cultural resources fieldwork through public archaeology programs such as the USFS Passport in Time (PIT) Program will also be incorporated where possible.

Development of the content of programming involving traditional cultural beliefs, practices, and associations would involve consultation with agency cultural resource specialists and Tribal members to assure that the protection of archaeological resources as well as culturally sensitive or confidential Tribal information is addressed. Interpretive messages addressing Tribal history and traditional use would be coordinated with messages planned for archaeological, historical, fish, and terrestrial resources.

6.0 IMPLEMENTATION AND ADMINISTRATION PROCEDURES

Cultural resource management requires incorporating regulatory requirements, the needs of the hydroelectric facilities, budgetary constraints, and agency coordination. The procedures defined in this section provide an efficient and cost-effective means of managing cultural resources in a manner consistent with the Licensees' goals in terms of the following:

- Staffing and training.
- Implementing protection and mitigation measures.
- Reviewing operational, maintenance, and construction activities.
- Conducting future surveys.
- Discovering looting, vandalism, or gravesites.
- Conducting annual surveys and reports.
- Providing interpretation and education programs.

6.1 Staff Roles and Training Requirements

Effective cultural resource management requires that staff roles be clearly defined and that specific training be provided. Managing cultural resources at the Project requires teamwork among several different divisions and staff members of both Licensees. The roles and responsibilities for cultural resource management relative to various departments are shown below.

6.1.1 Staff Roles

To implement the programs defined in the CRMP and administer its provisions, the Licensees will designate a Cultural Resources Management Plan Coordinator (CRMPC) position. Other staff with cultural resource management responsibilities at or contracted through PGE (Project Operations) will include a Cultural Resources Specialist (CRS), who will meet the Secretary of Interior Standards, Hydro Licensing and Compliance (HLC), Power Supply Engineering and Services, and the Project Crews. The roles of these positions and departments are described below.

6.1.1.1 Cultural Resources Management Plan Coordinator (CRMPC)

The Licensees will designate one or more qualified persons from the Project operator's staff to serve as Cultural Resource Management Plan Coordinator (CRMPC). The CRMPC will serve as the primary point of contact for all programs described in this CRMP and for coordination of reviews of any Project activities potentially affecting cultural resources. The Licensees have also agreed to fund a new (up to) half-time Cultural Resources Specialist (CRS) through the Confederated Tribes of the Warm Springs. The CRS will meet the Secretary of Interior's Standards and will work closely and cooperatively with the Licensees. The CRMPC's responsibilities will include:

- Coordinating the review of activities that may affect cultural resources and assist with compliance.

- Administer the implementation of mitigation measures.
- Coordinate with individual managers for planned construction and maintenance activities.
- Notify appropriate Federal and state agencies about undertakings that may affect cultural resources in their jurisdiction.
- Participate in consultation with agencies and Tribes.
- Coordinate with the CRS to determine undertakings requiring inspections and monitoring.
- Schedule and organize training for staff.
- Coordinate with appropriate agencies in providing interpretive programs.
- Provide on-site support for the annual Resource Evaluation Program, to be conducted with the CRS.
- Arrange for the CRS and/or company staff, in coordination with agency land managers, to visit archaeological sites to ensure that measures are effective and to check for possible vandalism or looting.
- Prepare the Annual Report on Cultural Resources describing undertakings that required inspection, monitoring, or consultation from the previous year.
- Coordinate the planning of, and review completion of, scheduled mitigation measures.
- Manage the CRS contract with the Confederated Tribes of the Warm Springs.

6.1.1.2 PGE Hydro Licensing and Compliance (HLC)

This department is responsible for all actions needed to comply with the provisions of the license from FERC. The CRMPC would report to the director of this department. Specific responsibilities of the HLC department are listed below.

- Provide training to ensure that staff is adequately trained and knowledgeable in cultural resources.
- Offer technical expertise and support.
- Maintain confidential files and databases.
- Assist with coordination and consultation.
- Provide a staff person(s) to serve in the Cultural Resources Management Plan Coordinator role.

6.1.1.3 Project Operations

Project Operations will serve as an important communication link between the CRMPC and ongoing activities at the Project that may affect cultural resources. This department will:

- Control operations and seek to avoid effects on cultural resources.
- Plan maintenance activities.
- Inform the CRMPC of any activities with potential to affect cultural resources.

- Review the CRMPC's recommendations and provide direction where applicable.
- Ensure that crews and contractors are informed about and follow restrictions, and are aware of the legal consequences of disturbing archaeological sites.

6.1.1.4 Project Crews

These crews are responsible for the field activities to operate and maintain the Project. Project crews will:

- Conduct activities according to restrictions.
- Report vandalism or looting.
- Report unanticipated discoveries of cultural resources.

6.1.2 Training

- To ensure that the CRMP and its programs are properly implemented, the Licensees will provide qualified staff in key positions. The CRMPC will be a qualified cultural resources manager, historian, or archaeologist with experience in hydroelectric operations, and either cultural resources management or historic preservation.

The CRMPC and other HLC staff members will periodically attend seminars, workshops, conferences, and other educational opportunities to maintain current knowledge and understanding of cultural resource management regulations and procedures. These programs may include lectures and conferences regarding cultural resource management sponsored by the Oregon SHPO, the National Trust for Historic Preservation, the Northwest Hydropower Association, Edison Electric Institute, the Utility Roundtable on Cultural Resources, and others.

The CRMPC will work closely and cooperatively with Project operations, the CRS, company and tribal staff, and qualified consultants. Key Project staff, such as managers and maintenance superintendents, will receive the following training:

- A full-day workshop organized by the CRMPC and staff to review and explain the CRMP.
- Periodic full-day workshops on protecting cultural resources. These workshops will also be organized by the CRMPC and include instruction by the CRS and/or qualified archaeologists, ethnographers, and historians.

6.2 Procedures for Implementing Protection and Mitigation Measures

To complete the protection and mitigation measures described in the CRMP (Sections 4.0 and 5.0), the Licensees will utilize the following procedures:

1. Provide funding for contracting through the Confederated Tribes of the Warm Springs for (up to) a half-time Cultural Resources Specialist (CRS) who meets or exceeds the Secretary of Interior Standards and Guidelines.

2. Monitor Project-impacted NRHP-eligible sites and unevaluated sites following a regular schedule, recording and photographing site conditions, and noting any changes in conditions.
3. At individual sites where Project impacts will affect the existing NRHP-eligible sites and unevaluated sites, the CRMPC and staff will review site reports and monitoring reports to determine whether site areas can be avoided or protection measures can be implemented. Site visits may be necessary to make these evaluations. It is the responsibility of the CRMPC, in consultation with the Licensees and the Federal agencies, to protect against or mitigate effects in anticipation of scheduled maintenance activities or other planned projects.
4. Should mitigation through data recovery investigations be required, develop detailed data recovery plans to guide archaeological investigations at the individual sites chosen for mitigation. These plans will be developed in consultation with the SHPO, THPO, and responsible agencies.
5. If required, incorporate mitigation measures into a Memorandum of Agreement (MOA) among the Licensees, the appropriate Federal or state agencies, THPO, and the Oregon SHPO.
6. Follow terms of the recovery plans or MOA when completing the mitigation measures.
7. Acquire all permits required to conduct archaeological field investigations.
8. Conduct fieldwork.
9. Report the results of data recovery investigations to the appropriate agencies and entities (USFS, BLM, BIA, SHPO, THPO, and Tribal Cultural Resources Program Manager) within 1 year of the issuance of the required permits.
10. Record the completion of the mitigation measures for inclusion in the Annual Report (discussed in Section 6.6).

6.3 Procedures for Review of Operation, Maintenance, and Construction Activities

The ongoing operation of the Project entails numerous tasks and activities including general maintenance, scheduled maintenance and construction, urgent conditions, and implementation of programs for the enhancement of other resources. Any of these activities are called an "undertaking" under Section 106 of the NHPA and have the potential to affect cultural resources. Under the provisions of this CRMP, the CRMPC has the responsibility to coordinate the review of these undertakings for Project actions within the Project boundary.

This section discusses the review process that the CRMPC will follow and the procedures for conducting the review of particular actions. There are three categories of undertakings that will undergo varying levels of review depending on their nature. They are: (1) undertakings exempt from case-by-case review; (2) undertakings requiring case-by-case review; and (3) undertakings in response to urgent conditions.

These types of undertakings have been adapted from two relevant sources: (1) Protocols for Managing Cultural Resources on Lands Administered by the BLM in Oregon (BLM Undated); and

(2) Programmatic Agreement among the USFS (Region 6), the Oregon SHPO, and the ACHP (USFS 1995). As many of the cultural resources in the Project APE are located on lands administered by these agencies, many of their established cultural resource management protocols are directly applicable to the Project.

6.3.1 Undertakings Exempt From Interagency Case-by-Case Review

Undertakings exempt from case-by-case review are those activities that would have little or no potential to affect cultural resources. Many of these undertakings are routine operations, maintenance, or restoration activities that are not ground disturbing in nature. While these routine undertakings will be reviewed by the CRMPC and the CRS, there is no requirement for the CRMPC to consult with the SHPO, THPO, or other agencies on a case-by-case basis. However, the CRMPC will contact appropriate agencies to determine if recent discoveries have identified NRHP-eligible or unevaluated sites in the vicinity that could be affected by the activity. Upon review and approval by the CRMPC, Project Operations may proceed with the activities described below, organized by activity type.

If the proposed activity is not listed below, the CRMPC will follow the procedures shown in Section 6.3.2 or will contact the appropriate agency to clarify the status of that activity.

6.3.1.1 Roadway, Trail, and Fence Activities

- Routine road maintenance on improved roads (not including crushed rock applications and major road improvements).
- Road closures not involving ground-disturbing methods that restrict vehicular use to existing roads and trails.
- Installation of routine recreational, special designation, or informational signs or markers, visitor registers, and portable sanitation devices within or alongside existing roadways or developed recreation areas.
- Fence replacement using the same post holes and/or maintenance that does not require blading of the fence line.

6.3.1.2 Recreational Activities

- Campground and undeveloped recreation areas' operations and maintenance when no new ground disturbance occurs (e.g., repair of existing buried utilities, tables, and fire rings) and no alterations to identified cultural resources.

6.3.1.3 Transmission Line Activities

- Upgrading or adding new power lines (or telephone lines) to existing poles/towers when there is no change in pole/tower configuration or new ground disturbance.
- Transmission line ROW modifications where no ground disturbance or road construction is authorized.
- Transmission line pole replacement when the ground is dry or cold-hardened.

6.3.1.4 Environmental Restoration Activities

- Fishery habitat improvements and associated surface disturbing activities when confined to the stream channel.
- Watershed restoration activities, such as non-mechanized planting, seeding, mulching, and revegetation within erosion-prone and disturbed area.
- Installation of devices to protect human or animal life (e.g., raptor electrocution prevention devices, etc.).
- Removal of log jams and debris dams using hand labor or portable mechanical devices.
- Modification of existing fences to provide wildlife ingress and egress.
- Placement of environmental monitoring stations where no ground disturbance is involved (e.g., stream gages).

6.3.1.5 Miscellaneous Activities

- Routine or preventive operation and maintenance activities on Project facilities that do not disturb previously undisturbed ground or structures determined eligible for the NRHP or unevaluated properties (including Project facilities that may be determined historically significant following survey efforts once they reach the 50-year mark).
- Removal of non-eligible structures and materials, or site reclamation on Project lands. The sites from which these materials are removed may be reclaimed without additional consultation with the SHPO, THPO or agencies as long as the reclamation does not expand previous surface disturbance.
- Resource management actions that do not utilize motorized vehicles or create new surface disturbance.
- Inventory, data, and information collection (including sample collection), including land use and land cover, resource evaluation activities and/or geophysical surveys.

6.3.2 Undertakings Requiring Case-by-Case Review

Actions not exempt (listed in Section 6.3.1) would require case-by case review by the CRMPC and the CRS, as well as direct consultations with agencies and/or the SHPO, THPO, and Tribal Cultural Resources Program Manager. Where the proposed action will occur on Project lands, the CRMPC will take the lead in the consultation process. Where the action will occur on non-Project Federal lands, the CRMPC will contact the appropriate agency or the Tribes, who will then take the lead in the consultation process. Where the action will occur on non-Project lands under state control or private ownership, the CRMPC will contact the landowners to determine who should take the lead for consultation. These actions include all activities not listed in Section 6.3.1, as generally described below:

1. Undertakings directly and indirectly affecting National Historic Landmarks or NRHP-listed, eligible properties, or unevaluated properties. The NRHP sites that are currently known are listed on Tables 2-3 and 2-4. Additional sites may be identified through further evaluation tests over the license period.
2. Undertakings that will have an adverse effect on NRHP-listed or eligible properties or unevaluated properties when the CRMPC determines that the adverse effect cannot be satisfactorily avoided, minimized, or mitigated through treatment.
3. Highly controversial undertakings when review is requested by the SHPO, an Indian Tribe, or a local government.
4. Undertakings where TCPs or sites of religious or cultural significance may be affected.

For these undertakings, the CRMPC will initiate consultation with the appropriate agencies, the SHPO, THPO, Tribal Cultural Resources Program Manager, ACHP, and other reviewing and consulting agencies as required by 36 CFR §800 or any interagency agreement document (such as a PA) developed to facilitate the Section 106 review process.

Consultation includes determining if adverse effects will occur, evaluating methods to avoid adverse effects, and, when effects cannot be avoided, identifying and planning for the necessary mitigation measures. The CRMPC will conduct consultation according to the following jurisdictional guidelines:

- When the affected resource is within the Project boundary, the CRMPC will take the lead in consultation.
- When the affected resource is on Federal land outside the Project boundary, the CRMPC will contact the appropriate Federal agency that will then take the lead in consultation.
- When the affected resources is on non-Federal land outside the Project boundary, the CRMPC will coordinate with the landowner to determine who should take the lead on consultation.

1. Contact the SHPO, Warm Springs THPO, the appropriate Federal or state agency, Tribes and/or private landowner to initiate consultation. The CRMPC will provide all pertinent information including the affected resource, the nature of the activity, status of the activity, the nature of potential effects, and any suggestions regarding avoidance or mitigation. Photographs, maps, and drawings should be submitted as necessary.
2. Consult with the SHPO, THPO, or appropriate Federal agency to determine if the action will have an adverse effect. If an adverse effect is determined, identify measures to mitigate the effects and to develop an MOA defining the actions needed. If no adverse effect is identified, record the action for the Annual Report and proceed.
3. Complete activity according to the outcome of the consultation, incorporating the measures specified in the MOA. The CRMPC will monitor the completion of the activity to ensure that the stipulations of the MOA or other agreements are followed.

4. Record the activity and the results of consultation for reporting in the Annual Report on Cultural Resources, described further in Section 6.6. Maintain copies of any correspondence or other proceedings.

If projects planned during the license period cannot avoid NRHP-eligible prehistoric or historic sites, or unevaluated sites, the Licensees will implement data recovery investigations and/or protection measures to mitigate adverse effects in accordance with the MOA resulting from consultation, as described above. Data recovery investigations will obtain and preserve the scientific information that would be destroyed or adversely affected by a planned project. Data recovery efforts may be limited to the planned project area or incorporate the entire site area. The level of investigation and focus will depend on the project scope, location within the site, previous investigations conducted at the site, and consultation with appropriate agencies and the Tribes. Measures to protect the site may be recommended in lieu of data recovery, if previous work at the site is deemed sufficient to define areas to be protected and measures to be most effectively employed. Measures to protect the site may also be implemented in conjunction with data recovery investigations. Site protection measures will vary according to site structure, proposed impacts, and Project requirements. Possible protection measures could include burial of site areas with sterile fill, restricting the kinds of vehicles used on-site, or conducting Project activities during specified seasons.

6.3.3 Undertakings in Response to Urgent Conditions

Special procedures are necessary when safety, life, or property is at risk by an unpredictable action, such as fire, flood, weather conditions, or facility malfunctions. During these urgent conditions, Project staff may not be able to follow all cultural resource management restrictions described above to the fullest extent possible. When the urgent condition is resolved, the CRMPC will consult with the appropriate land management agency, SHPO or THPO to determine steps to mitigate any impacts from the actions necessary to resolve the urgent condition. Such steps may include data recovery or the installation of measures that would protect the resource from future accidents. The CRMPC is responsible for ensuring that regulatory requirements are met (36 CFR §800.12).

6.4 Procedures for Conducting Future Surveys

As part of the overall management of cultural resources, the Licensees will conduct additional surveys at appropriate locations, including: (1) periodic pedestrian surveys of sample portions of the APE to incorporate advances in survey methodology; (2) a survey of Project facilities in 2007; (3) a survey of other acquired lands that may be affected by the Project, i.e., the Metolius Mule Deer Winter Range; and (4) areas not included in the previous survey now made accessible through ground-clearing fires or exceptionally low reservoir drawdowns. These survey programs are described above in Section 5.1.4.

All archaeological surveys will be conducted in accordance with standards promulgated by the Department of the Interior. In addition, all surveys should satisfy the following requirements:

- Necessary permits will be obtained from the appropriate agencies or private landowners.
- Survey teams will be fully briefed on safety considerations and on the traces of cultural resources that might be expected. Crew briefing should also cover the geomorphic setting of the area, so that contextual data are properly recorded.
- Archaeological surveys will cover 100 percent of the APE at intervals no wider than 30 meters, excluding only areas that cannot safely be examined. Any exceptions will be fully documented in field notes.
- Surveys will be designed to discover and record all surface-visible and potentially significant cultural resources, both prehistoric and historical, within the covered areas. The record should reflect all prehistoric cultural items encountered, whether in defined sites or as isolates. Historical items shall be documented if 50 years of age or older, or if qualified as having exceptional significance.
- Survey teams are willing to use the site and isolate record forms and the codes, protocols, and attachment forms currently approved by the COHG for data recordation. The COHG format includes systematic recordation of debitage and other lithic data and historical artifacts. The Licensees are willing to consider the most efficient way they can assist with data input into the COHG Heritage Information Management System.
- All site record forms will include site location maps, site sketch maps, and site photographs.
- Site recording procedures will include written or photo documentation of all prehistoric and historical remains encountered within the Project APE.
- All historical sites more than 50 years old will be recorded using systematic survey and inventory procedures for historical resources. Buildings and structures will be recorded on the Oregon Statewide Inventory of Historic Buildings form. The survey will record associated landscape features and the potential for archaeological remains.
- Site documentation will include descriptions and assessment of ongoing impacts, to provide data needed for proper evaluation of Project effects and management needs.

In addition to formal archaeological surveys, as another way of supplementing the Project inventory, the Licensees will provide training for field crews in the recognition, reporting requirements, and laws protecting archaeological sites and other eligible historic properties they may encounter in the course of their work.

6.5 Procedures for Inadvertent Discovery

Over the license period, unexpected discoveries of sites, features, and artifacts are likely to occur. Such discoveries may be made by personnel of land managing agencies, law enforcement officers, company inspectors, Tribal members, private landowners, or members of the general public. The Licensees will work cooperatively with responsible agencies to ensure that: (1) those who make discoveries know how and where to report their finds; (2) information is shared in accordance with established agency and Tribal guidelines; (3) discovered sites, features, or artifacts are documented and protected in the same manner as other recorded cultural sites; and (4) Tribal concerns and legal

requirements relating to human remains, funerary objects, sacred objects, and objects of cultural patrimony are satisfied. The CRMPC is responsible for ensuring that regulatory requirements are met related to such discoveries (36 CFR §800.13). The Licensees may not resume activities at discovery sites until cleared by the CRMPC in accordance with Federal, State, and Tribal laws (in consultation with the SHPO pursuant to 43 CFR §10.4(d)(2) on Federal lands within the Project boundary; by the Federal agency staff on Federal lands outside the Project boundary; and in accord with 43 CFR §10.4(e)(2) on Tribal lands).

6.5.1 Inadvertent Discovery of Artifacts

Discoveries made by Project personnel or reported by the general public will be reported to the CRMPC (see Section 6.5), who will guide the process of notification and related procedures. The CRMPC will be responsible for notifying the CRS, the SHPO, the THPO, the ACHP, and the appropriate Federal or State agency within 48 hours of any discovery (see Sections 6.5.2 and 6.5.3 for specific notification procedures). To ensure that those in a position to make discoveries know how and where to report their finds, the Licensees will: (1) consult with land managing agencies, companies, private landowners, and other appropriate stakeholders to make sure discovery procedures are understood; (2) take steps to provide "how to report discoveries" information to the general public through signage and brochures available to recreational visitors; and (3) conduct an annual training workshop for law enforcement agencies, field crews, and other appropriate personnel to educate them on what to look for, how to report, and legal requirements regarding cultural resources that may be encountered in the field.

Information on discoveries will be shared with appropriate agencies, companies, and individuals and documented for the Project inventory in the same manner as other cultural resources. The CRS or other qualified professional meeting the Secretary's Standards will be dispatched to the site within 72 hours to document the discovery and report to the CRMPC on its location, nature, extent, and potential significance as well as the kind and degree of anticipated Project effects, if any. The CRMPC will consult with the property owner or appropriate state or Federal agency to determine if protective or mitigative actions are required and initiate agreed-upon actions. If no immediate mitigative action is needed, the discovered resource should be treated in the same manner as other comparable resources in the Project inventory.

6.5.2 Discovery of Looting or Vandalism

Evidence of looting or vandalism may be discovered by Project personnel during monitoring, surveys, or by chance encounters in the field. In these events, Project personnel will follow the procedures below.

- Project personnel will immediately contact the CRMPC.
- Project personnel will avoid damaging or disturbing any evidence that may be at or near the site.
- The CRMPC will immediately contact the cultural resources official of the appropriate Federal or state agency and/or Tribe with responsibility for the site, which will then notify appropriate law enforcement officials.
- The CRMPC will assist law enforcement officials as requested.
- Upon conclusion of the investigations, the CRMPC will coordinate with the SHPO and the appropriate Federal or state agency or Tribes to assess the effects of the looting or vandalism.
- After the assessment, Project personnel will repair or mitigate the looting or vandalism according to the recommendations of the SHPO in consultation with the appropriate Federal or state agency and/or Tribes and consultants.

6.5.3 Discovery of Human Graves or Remains

While rare, construction activities involving ground disturbance, erosion, or vandalism can result in the discovery of human graves or remains. If these are found to be Native American graves and remains, their protection is an especially sensitive issue. Legally, these sites are protected under NHPA, NAGPRA, and Oregon State laws. Below are procedures to follow to address these concerns.

- If human remains or gravesites are discovered, all work in and around the project area will immediately cease. Knowingly disturbing or removing Native American remains and associated artifacts may subject the Licensees to prosecution under Federal law. The remains should be promptly protected from continued exposure to the weather and from public view.
- Staff or crews who made the discovery will immediately contact the CRMPC.
- If the find is on non-trust Federal land, the CRMPC will immediately notify the State Police and the appropriate Federal agency. The CRMPC will notify the Oregon SHPO, the THPO, and work with appropriate Tribal representatives. The CRMPC and the Federal agency will be responsible for ensuring that the procedures defined in 43 CFR §10.4(b) and (c) are followed. The CRMPC will take the lead if the resource is located on land within the Project boundary. The Federal agency will take the lead, with CRMPC assistance if requested, if the resource is on Federal lands outside the Project boundary.
- If the find is on Tribal land, the CRMPC will immediately notify the CRS, the THPO, Tribal Cultural Resources Program Manager, and the BIA. The CRMPC and the THPO

will be responsible for ensuring that the procedures defined in 43 CFR §10.4(b) and (c) are followed.

- If the find is on State or private land, the CRMPC will notify the Oregon State Police, the SHPO, the THPO, the Tribal Cultural Resources Program Manager, and the Commission on Indian Services. The CRMPC will also notify the appropriate State agency or private landowner. The CRMPC will be responsible for ensuring compliance with the provisions of ORS 97.745.
- The discovery party will leave any remains as undisturbed as possible until the site has been released as a non-crime scene by the appropriate authorities.
- If the remains are in danger of destruction, steps may be taken to protect them. For example, if an accidental water release has uncovered a gravesite and the gravesite is in imminent danger of further disturbance before trained archaeologists can arrive, protective measures may be taken to avoid or divert further disturbance.
- For Federal lands outside the Project boundary, the Licensees will assist the land-management agency and the Tribes if requested and as appropriate. For State or private lands, the Licensees will work with the THPO and the Tribal Cultural Resources Program Manager to coordinate the process for the disposition of the remains in accordance with State law (ORS 97.745).
- The CRMPC will thoroughly document all actions taken in response to the discovery and disposition of human remains and associated artifacts and include these activities in the annual reporting.

6.6 Annual Report on Cultural Resources

Each year, the CRMPC will coordinate preparation of an Annual Report on Cultural Resources to summarize information regarding all activities that potentially impacted cultural resources and any avoidance or mitigation measures used over the past period. The Annual Report will also discuss planned activities for the upcoming period. Procedures for completing the summary are as follows:

- List the number and types of undertakings that were considered exempt from case-by-case review.
- Summarize undertakings during the past year that required consultation, avoidance, or mitigation measures.
- Report any specific resource or action of special concern to the appropriate Federal or State agency, the Oregon SHPO, or THPO.
- Report the discovery of looting or vandalism and any repair or mitigation that occurred as a result.
- Discuss any consultation that has occurred or is ongoing.
- Discuss planned activities for the coming year and determine if any will require further consultation.
- Include any recommendations regarding amendments to the CRMP.

Each year, the Licensees will invite all PA signatories and other key parties associated with management of cultural resources in the Project area to an Annual Meeting to discuss the Annual Report and activities of the previous year. The primary goals of this meeting would be to review the ongoing cultural resource program and maintain or improve procedures for the interactive management of the program. Decisions made to change specific aspects of the management program such as monitoring schedules, data recovery, treatment plans, evaluation priorities, the implementation plan, or survey requirements will not require agency head signature to change. If consensus is reached that formal amendment of the PA or the CRMP is desirable, then specific amendments may be proposed and then instituted through consultation in accordance with 36 CFR §800.14(b), as discussed in Section 7.2.

6.7 Procedures for Providing Interpretation and Educational Opportunities

The Licensees will support various interpretive and educational programs to foster an understanding and appreciation of the area's cultural resources. These activities will be administered through the CRMPC and conducted according to the following procedures:

- Follow protocols developed though the integrated Interpretive and Education Program (see Section 5.4).
- Seek input from, and coordinate with, the appropriate Federal and state agencies, the Oregon SHPO, the THPO, the Tribal Cultural Resources Program Manager, and the Culture and Heritage Committee of the Tribes when selecting the content, location, and design of the interpretive or educational materials. Other groups such as the National Trust for Historic Preservation, the National Park Service, other Tribal organizations, the Oregon State Museum of Anthropology, Association of Oregon Archaeologists, and local historical museums may also be of assistance in defining interpretive and educational materials and selecting consultants.
- Leverage other sources of funding when possible.
- Select interpretive activities that avoid damage to NRHP-eligible and unevaluated resources and do not encourage vandalism opportunities. For example, interpretive signage near a sensitive and confidential prehistoric archaeological site would not be appropriate unless the site was adequately protected from the public. A brochure or video describing the general quality and quantity of archaeological sites in the Project area may be more appropriate.

6.8 Consultation

The Licensees will consult on a regular basis with the land managing agencies with jurisdiction in the Project vicinity to ensure that all plans and activities regarding cultural resources are consistent with the cultural resource plans and procedures of agencies managing lands in and adjacent to the Project APE, as well as those of reviewing entities (such as the SHPO and the THPO), companies, and other stakeholders regularly engaged in activities that may affect the Project's cultural resources. Table 1-1 summarizes management plans and other documents pertaining to cultural resources to facilitate this coordination.

To formalize this coordination process and clarify the roles and responsibilities of the cooperating agencies, the FERC will prepare a Programmatic Agreement (PA). The draft PA will be circulated with this proposed final CRMP. Authorized signatures on the PA will formally adopt the provisions of the CRMP and the procedures to be followed by the parties in foreseeable circumstances, pertaining to management of the Project's cultural resources, effective upon license acceptance.

6.9 Confidentiality Procedures

Cultural resource information and locations are considered sensitive information and should not be readily available to the general public. Site record forms held in repositories such as the Oregon SHPO are conditionally exempt from public record requests (such as requests through the Freedom of Information Act) and can be withheld from individuals who do not have professional or legal reasons for needing these data. The Licensees will follow this same principle. Information on site locations and contents will be released only on a need-to-know basis.

6.10 Implementation Schedule

Cultural resource activities planned in this CRMP are expected to be undertaken according to the schedule in Table 6-1. A specific timeline for the period of the license beyond the fifth year will be developed cooperatively between the Licensees and the other managing agencies as part of the Annual Meeting. For details on the development of the Interpretation and Education (I&E) Program, see the proposed Recreation Resources Implementation Plan (RRIP).

For the site-specific measures, scheduling priority is given to reservoir margin sites experiencing active erosion (35JE454, 35JE455, 35JE458, 35JE459, and 35JE461). In all cases of data recovery mitigation, final reports of the work would be produced within two years of the initiation of fieldwork. Sites 35JE19, 35JE20/21, 35JE185, 35JE468, and OR-JE-32 require access barriers that would be installed in the first year of the license, if they have not already been installed. Sites 35JE470 and 35MA119 are not listed in Table 6-1 because they are to be protected by permit restrictions or inter-agency agreements. Part of the treatment for 35JE58, special photography of the rock art panels, has already been completed.

According to proposed schedule, annual training workshops, annual reports, annual stakeholders meetings, and site monitoring activities would occur each year throughout the license period. Eligibility assessments for high priority unassessed sites would take place within the first six years of the license period according to the priority system referred to above. Assessment of effects for linear resources is planned as part of the monitoring program and would be completed in the first four years of the new license. Eligibility evaluation of the hydroelectric facilities would be accomplished in the year 2007 (estimated to be year five of the new license). Formal reviews are scheduled every 10 years throughout the license period, beginning in the fifth year of the new license.

Not specifically scheduled are opportunistic surveys, such as coverage of areas newly exposed by wildfires or unusually low reservoir drawdowns or areas where previously landowner permission was not extended. These are considered an ongoing (although occasional) activity, to be scheduled as possible when the situations arise.

Table 6-1. Proposed Schedule of Cultural Resources Activities

Year*	Activity
1	Monitor 27 sites
	Evaluate three Priority 1 sites (35JE462, OR-JE-15, 35JE341)
	Bank/beach stabilization/protection–35JE454, 455, 458, 459, 461
	Road closure/access restrictions for 35JE19, 20/21, 185, 468, OR-JE-8
	Establish site steward program for 35JE58
	Limited data recovery mitigation, 35JE459
	Data recovery mitigation, 35JE295
	Annual report and stakeholders meeting
	Annual Training Workshop
2	Monitor 27 sites
	Evaluate three Priority 2 sites (35MA132, 35MA133, 35MA171)
	Survey any identified and accessible gaps in APE inventory
	Pictograph damage assessment/restoration at 35JE58
	Data recovery mitigation, OR-JE-21
	Annual report and stakeholders meeting
	Annual Training Workshop
3	Monitor 27 sites
	Evaluate two Priority 2 sites
	Annual report and stakeholders meeting
	Annual Training Workshop
4	Monitor 27 sites
	Evaluate two Priority 2 sites (this will complete evaluations described in CRMP)
	Annual report and stakeholders meeting
	Annual Training Workshop
5	Monitor 27 sites
	Resurvey sample area of APE (on a 10-year cycle thereafter)
	Evaluate eligibility of hydro facilities
	Review CRMP
	Annual report and stakeholders meeting
	Annual Training Workshop
6	Monitor 27 sites
	Annual report
	Annual Training Workshop
* Year of New License	

NOTE: This schedule starts with the license acceptance. However, some of the tasks in Year 1 may be completed BEFORE the license is accepted; e.g., road closures in the 35JE19, 20/21 areas have already occurred and some shoreline stabilization may happen.

Other unscheduled actions may include the recording and evaluations of additional sites located through planned or opportunistic surveys. Schedules for these actions will be determined by the CRMPC and discussed with Stakeholders at the Annual Meeting.

7.0 ADOPTIONS AND REVIEW OF THE CRMP

Cultural resource management is an ongoing process that will change as additional resources are identified, new issues arise, and cultural values evolve. This section describes adoption and amendment procedures that may be necessary to maintain and administer appropriate and effective cultural resource management strategies over the term of the new license.

7.1 Adoption of the CRMP and the Programmatic Agreement

The Licensees received a letter from FERC dated April 11, 2002 formally authorizing them to represent FERC in the Section 106 consultation process. This provides the authorization needed for the SHPO to formally enter into the process. The Licensees anticipate that the SHPO will review the technical studies; comments have been received on the determinations of eligibility for evaluated sites. FERC has indicated that they will circulate the proposed final CRMP and request review by the SHPO and the Federal agencies. The FERC will prepare a draft PA, which will be circulated for review and comment. Both documents will be reviewed by the appropriate Federal agencies (USFS Deschutes and Ochoco National Forests and BLM Prineville District), the Oregon SHPO, THPO, the Tribal Cultural Resources Program Manager, the BIA (NW Regional Office), FERC, the National Park Service (Pacific Northwest Regional Office), and the ACHP as consulting parties to the Section 106 consultation process. The PA will serve as the formal approval of the provisions of the CRMP. The signing of the PA fulfills the Section 106 requirements of the relicensing process, and is effective upon license acceptance.

7.2 Amendment Procedures

As cultural resource management needs may change with changing cultural values and uses of the Project area, this CRMP may require amendment. Changes in hydropower technology or methods, additional archaeological or historical research, or other factors may introduce unanticipated conditions with the potential to affect cultural resources. Amending the CRMP to account for such changes may be necessary. Any of the signatory parties may suggest an amendment and should submit the contents of the amendment in writing to all signatory parties. The amendment shall not become incorporated into this CRMP until all signatory parties have reached agreement on the contents of the amendment.

7.3 Review of this CRMP

The Licensees, in consultation with other stakeholders, will conduct a formal review of the cultural resource management program every 10 years, beginning in the fall of the fifth year of the new license. This review would reassess the program's goals and examine the program's components, their history of implementation, and their degree of success in furthering the program's goals. The review is expected to focus particularly on the degree of success in the protection of and mitigation for cultural resources, and include in its purview consideration of the public benefits that have resulted from the activities. The review process should include input from participants in the annual meeting. A formal report of the review, with acknowledgment of the program's successes

as well as recommendations for changes, is to be part of the subsequent Annual Report. If the review's recommendations include formal amendment of the PA or the CRMP, then the Licensees should propose specific amendments through consultation in accordance with 36 CFR §800.14(b). Neither a new CRMP, the renewal of this CRMP, or any changes to this CRMP shall occur without a PA among all parties.

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Appendix A

Inventory and NRHP Status of
Cultural Resource Sites in the
Pelton Round Butte Area of Potential Effect (APE)

Table A-1. Inventory and NRHP Status of Prehistoric Cultural Resource Sites in the Pelton Round Butte APE.

Site Number	General Location	Type	Evaluation Status	Potential Project Effect[1]	Owner	Comments	Rec. NRHP Eligibility
Evaluation Tests Completed (1998): Sites Recommended as Eligible							
35JE19 Powerline Cave	CPSP	Rockshelter	Tested	Recreation	ONF	Vandalized, no intact dep. Found	Eligible
35JE20/21 Rimrock Falls	CPSP	Large lithic scatter	Tested	Road/camp	BLM	Very large site	Eligible
35JE58	Metolius arm	Rockshelter & pictograph	Tested	Recreation	Priv.	No subsurface cultural material	Eligible
35JE153	CPSP	Large lithic scatter	Tested	Campground	ONF/OR		Eligible
35JE185	CPSP	Lithic scatter	Tested	T-line	ONF	Possibly Early/Middle Archaic	Eligible
35JE295 Perry South	NF, Metolius arm	Lithic scatter	Tested	Campground	DNF	Early Archaic, potential for features	Eligible
35JE347 Railroad Cut	E of Rereg. Res	Lithic scatter	Tested	Road/RR	Priv.	Parts disturbed; site may continue to south	Eligible
35JE454	WS, Metolius	Lithic scatter	Tested	Shoreline	CTWS	2 subsurface components	Eligible
35JE455 Reflector	WS, Metolius	Low density lithic scatter	Tested	Shoreline	CTWS	2 subsurface components	Eligible
35JE458	WS, Rereg. Res.	Lithic scatter	Tested	Shoreline	CTWS	Intact deposits in cutbank area above reservoir	Eligible
35JE459 Campbell Creek	Rereg. Res.	Small lithic scatter	Tested	Shoreline	PGE	Intact deposits in drawdown zone	Eligible
35JE461 Rereg. Dam/Bench Flats	Rereg. Res.	Lithic scatter	Tested	Shoreline	PGE	Intact deposits in drawdown zone	Eligible
35JE468* Pole 37	N of Tenino Ck	Large lithic scatter	Tested	T-line, road	CTWS	Much of area/deposit is disturbed	Eligible

* Located in Bethel-Round Butte transmission line corridor, no longer within Project boundary.

Table A-1. Inventory and NRHP Status of Prehistoric Cultural Resource Sites in the Pelton Round Butte APE.

Site Number	General Location	Type	Evaluation Status	Potential Project Effect[1]	Owner	Comments	Rec. NRHP Eligibility
35JE470 Quarry Road	Simtustus, E rim	Lithic scatter	Tested	Road, quarry	ONF	Little subsurface stratigraphic integrity; additional information minimal	Eligible
Evaluation Tests Completed (1998): Sites Recommended as Not Eligible							
35JE154	CPSP	Lithic scatter	Tested	Road	OR	Tested--no subsurface deposit	Not eligible
35JE437	CPSP	Small lithic scatter	Tested	Road	ONF	Tested--no subsurface deposit	Not eligible
35JE456	CPSP	Small lithic scatter	Tested	Shoreline	BLM	Modern flintknapping locale	Not eligible
35JE465 Sand Quarry	E of Rereg. Res.	Small lithic scatter	Tested	Quarry	PGE	Modern flintknapping locale	Not eligible
35JE512	S. of Metolius	Lithic scatter	Tested	Road	DNF	Tested as PRE-IF-15 no subsurface deposits	Not eligible
Evaluation Testing Done by Others: Sites Recommended as Eligible							
35MA119* Lundsford Saddle Site	Cascades Mtns.	Lithic scatter	Tested	T-line, road	WNF	Determined eligible by eligible WNF testing	Eligible
35JE509 Fly Lake Lookout	S. of Metolius	Lithic scatter	Uncertain	Road	DNF	Recommended as eligible by DNF on site form	Eligible
No Evaluation Testing Conducted in 1998: Sites with Insufficient Data for NRHP Evaluation[2]							
35JE17	CPSP	Small lithic scatter	Not tested	Recreation	ONF	Potentially eligible--surface data	Insuff. Data
35JE152	CPSP	Small lithic scatter	Not tested	Recreation	ONF	Potentially eligible--surface data	Insuff. Data
35JE180	CPSP	Small lithic scatter	Not tested	Recreation	ONF		Insuff. Data

* Located in Bethel-Round Butte transmission line corridor, no longer within Project boundary.

35JE183	CPSP	Lithic scatter	Not tested	Recreation	ONF		Insuff. Data

Table A-1. Inventory and NRHP Status of Prehistoric Cultural Resource Sites in the Pelton Round Butte APE.

Site Number	General Location	Type	Evaluation Status	Potential Project Effect[1]	Owner	Comments	Rec. NRHP Eligibility
35JE184	CPSP	Small lithic scatter	Not tested	Recreation	ONF		Insuff. Data
35JE194* Moaning Bull	Seekseequa Ck.	Lithic scatter	Not tested	T-line	CTWS	Small proj. pt. Recorded in 1984	Insuff. Data
35JE341 Monty Campground	Metolius R.	Lithic scatter	Not tested	Recreation	DNF		Insuff. Data
35JE421	CPSP	Small lithic scatter	Not tested	Near t-line	OR		Insuff. Data
35JE422	CPSP	Small lithic scatter	Not tested	Recreation	ONF		Insuff. Data
35JE423	CPSP	Small lithic scatter	Not tested	Recreation	ONF		Insuff. Data
35JE424	CPSP	Small lithic scatter	Not tested	Nature trail	OR		Insuff. Data
35JE425	CPSP	Small lithic scatter	Not tested	Recreation	BLM		Insuff. Data
35JE426	CPSP	Small lithic scatter	Not tested	Recreation	BLM		Insuff. Data
35JE427	CPSP	Small lithic scatter	Not tested	Recreation	BLM		Insuff. Data
35JE428	CPSP	Small lithic scatter	Not tested	Recreation	BLM		Insuff. Data
35JE429	CPSP	Small lithic scatter	Not tested	Recreation	ONF		Insuff. Data
35JE430	CPSP	Small lithic scatter	Not tested	Recreation	ONF		Insuff. Data

* Located in Bethel-Round Butte transmission line corridor, no longer within Project boundary.

35JE431	CPSP	Small lithic scatter	Not tested	Recreation	ONF		Insuff. Data

Table A-1. Inventory and NRHP Status of Prehistoric Cultural Resource Sites in the Pelton Round Butte APE.

Site Number	General Location	Type	Evaluation Status	Potential Project Effect[1]	Owner	Comments	Rec. NRHP Eligibility
35JE432	CPSP	Very small lithic scatter	Not tested	Recreation	BLM		Insuff. Data
35JE433	CPSP	Small lithic scatter	Not tested	Recreation	BLM		Insuff. Data
35JE434	CPSP	Small lithic scatter	Not tested	Recreation	ONF		Insuff. Data
35JE435	CPSP	Small lithic scatter	Not tested	Recreation	ONF		Insuff. Data
35JE436	CPSP	Small lithic scatter	Not tested	Recreation	ONF		Insuff. Data
35JE438	CPSP	Small lithic scatter	Not tested	Trail	BLM		Insuff. Data
35JE439	CPSP	Small lithic scatter	Not tested	Recreation	BLM		Insuff. Data
35JE440	CPSP	Small lithic scatter	Not tested	Recreation	BLM		Insuff. Data
35JE441	CPSP	Small lithic scatter	Not tested	Recreation	BLM		Insuff. Data
35JE442	CPSP	Small lithic scatter	Not tested	Recreation	BLM		Insuff. Data
35JE443	CPSP	Small lithic scatter	Not tested	Recreation	ONF	Potentially eligible—surface data	Insuff. Data
35JE444	CPSP	Small lithic scatter	Not tested	Recreation	ONF	Potentially eligible—surface data	Insuff. Data
35JE445	CPSP	Small lithic scatter	Not tested	Recreation	OR		Insuff. Data
35JE446	CPSP	Very small lithic scatter	Not tested	Recreation	OR		Insuff. Data
35JE447	CPSP	Very small lithic scatter	Not tested	Recreation	OR		Insuff. Data

Table A-1. Inventory and NRHP Status of Prehistoric Cultural Resource Sites in the Pelton Round Butte APE.

Site Number	General Location	Type	Evaluation Status	Potential Project Effect[1]	Owner	Comments	Rec. NRHP Eligibility
35JE448	CPSP	Very small lithic scatter	Not tested	Recreation	OR		Insuff. Data
35JE449	CPSP	Small lithic scatter	Not tested	Recreation	ONF		Insuff. Data
35JE450	CPSP	Very small lithic scatter	Not tested	Recreation	ONF		Insuff. Data
35JE451	CPSP	Small lithic scatter	Not tested	Recreation	OR		Insuff. Data
35JE452	CPSP	Very small lithic scatter	Not tested	Recreation	ONF		Insuff. Data
35JE453	CPSP	Small lithic scatter	Not tested	Recreation	ONF		Insuff. Data
35JE457 Round Butte Obdsidian Pile	Simtustus, E rim	Very small lithic scatter	Not tested	Road/storage	BLM	Form questions integrity/age of site	Insuff. Data
35JE460 Boulder Bench	WS	Small lithic scatter	Not tested	No effect*	CTWS	*Form cites grazing as impact	Insuff. Data
35JE462 Lagged Terrace	WS	Lithic/ gs scatter	Not tested	Shoreline	CTWS	Priority A, but could not be tested	Insuff. Data
35JE463 Dead Juniper Point	WS	Lithic	Not tested	No effect*	CTWS	*Form cites grazing/logging impacts	Insuff. Data
35JE464 Friendly Bug	WS	Small lithic scatter	Not tested	Near shore*	CTWS	*Form cites grazing as impact	Insuff. Data
35JE466 Fish Ladder	E of Simtustus	Lithic scatter	Not tested	Road	BLM	Potentially not eligible (road fill)	Insuff. Data
35JE467 Eyerly	WS, Metolius	Very small lithic scatter	Not tested	Recreation	CTWS	Form suggests flakes may be recent	Insuff. Data
35JE469 High Bench	WS, Simtustus	Low density lithic scatter	Not tested	Recreation	CTWS		Insuff. Data
35JE471*	N of Tenino Ck.	Very small lithic scatter	Not tested	T-line	CTWS	1st recorded as isolate; non-eligible	Insuff. Data

Table A-1. Inventory and NRHP Status of Prehistoric Cultural Resource Sites in the Pelton Round Butte APE.

Site Number	General Location	Type	Evaluation Status	Potential Project Effect[1]	Owner	Comments	Rec. NRHP Eligibility
35JE472	CPSP	2 rock cairns (15-20 rocks)	Not tested	Recreation	OR		Insuff. Data
35JE473	CPSP	Rock cairn (25-30 rocks)	Not tested	Recreation	OR		Insuff. Data
35JE474	CPSP	Rock cairn, 2 basalt flakes, 1 obsidian biface tip	Not tested	Recreation	ONF		Insuff. Data
35JE475	CPSP	Rock mound, 1 obsidian flake	Not tested	Recreation	ONF		Insuff. Data
35JE476	CPSP	Rock mound	Not tested	Recreation	ONF		Insuff. Data
35JE477	CPSP	Rock stack	Not tested	Recreation	ONF		Insuff. Data
35JE478	CPSP	5 rock stacks, 2 rock clusters	Not tested	Recreation	ONF		Insuff. Data
35JE479	CPSP	1 rock cairn, 1 rock cluster	Not tested	Recreation	BLM		Insuff. Data
35JE480	CPSP	2 rock cairns	Not tested	Recreation	BLM		Insuff. Data
35JE481	CPSP	Rock cairn	Not tested	Recreation	BLM		Insuff. Data

* Located in Bethel-Round Butte transmission line corridor, no longer within Project boundary.

35JE482	CPSP	1 rock cairn, 1 rock stack	Not tested	Recreation	BLM	2 possible cairns as well	Insuff. Data
35JE483	CPSP	Rock cairn	Not tested	Recreation	BLM		Insuff. Data
35JE484	CPSP	2 rock cairns	Not tested	Recreation	BLM		Insuff. Data

Table A-1. Inventory and NRHP Status of Prehistoric Cultural Resource Sites in the Pelton Round Butte APE.

Site Number	General Location	Type	Evaluation Status	Potential Project Effect[1]	Owner	Comments	Rec. NRHP Eligibility
35JE485	CPSP	Rock cairn	Not tested	Recreation	BLM		Insuff. Data
35JE486	CPSP	Rock cairn	Not tested	Recreation	BLM		Insuff. Data
35JE487	CPSP	Rock cairn	Not tested	Recreation	BLM		Insuff. Data
35JE488	CPSP	Rock cairn	Not tested	Recreation	OR		Insuff. Data
35JE489	CPSP	Rock cairn	Not tested	Recreation	OR		Insuff. Data
35JE490	CPSP	Rock cairn	Not tested	Recreation	BLM		Insuff. Data
35JE491	CPSP	2 rock stacks	Not tested	Recreation	BLM		Insuff. Data
35JE492	CPSP	2 rock cairns	Not tested	Recreation	BLM		Insuff. Data
35JE493	CPSP	2 rock cairns	Not tested	Recreation	BLM		Insuff. Data
35JE494	CPSP	1 rock stack	Not tested	Recreation	BLM		Insuff. Data
35JE495	CPSP	2 rock cairns	Not tested	Recreation	ONF		Insuff. Data
35JE496	CPSP	1 rock stack	Not tested	Recreation	ONF		Insuff. Data
35JE497	CPSP	5 rock stacks	Not tested	Recreation	ONF		Insuff. Data
35JE498	CPSP	4 rock stacks	Not tested	Recreation	OR		Insuff. Data
35JE499	CPSP	2 rock stacks	Not tested	Recreation	ONF		Insuff. Data

Table A-1. Inventory and NRHP Status of Prehistoric Cultural Resource Sites in the Pelton Round Butte APE.

Site Number	General Location	Type	Evaluation Status	Potential Project Effect[1]	Owner	Comments	Rec. NRHP Eligibility
35JE500	CPSP	1 rock cairn, 4 rock stacks	Not tested	Recreation	ONF		Insuff. Data
35JE501	CPSP	3-5 rock cairns, 1 rock stack	Not tested	Recreation	ONF		Insuff. Data
35JE502	CPSP	Rock stack	Not tested	Recreation	OR		Insuff. Data
35JE503	CPSP	2 rock cairns	Not tested	Recreation	BLM		Insuff. Data
35JE504	CPSP	3 rock cairns	Not tested	Recreation	ONF		Insuff. Data
35JE505	CPSP	Rock cairn, 5 rock stacks, 1 obsidian flake	Not tested	Recreation	ONF		Insuff. Data
35JE510 Eccentric Site	CPSP	Lithic scatter	Not tested	Recreation	ONF		Insuff. Data
35JE511 Tam-a-lau Site	CPSP, canyon	Pictograph with lithics	Not tested	Trail	OR?	Potentially eligible based on feature type	Insuff. Data
35MA132*	Cascade Mtns.	Lithic scatter	Not tested	Recreation	WNF		Insuff. Data
35MA133*	Cascade Mtns.	Lithic scatter	Not tested	Recreation	WNF		Insuff. Data

* Located in Bethel-Round Butte transmission line corridor, no longer within Project boundary.

35MA171*	Cascade Mtns.	Lithic scatter	Not tested	Recreation	WNF		Insuff. Data
RF-35	COSO	Rock stack	Not tested	Recreation	ONF	No site #	Insuff. Data
LBC-3	Metolius	Rock cairn	Not tested	Recreation	CTWS	Recent sign/fence cairn? On form.	Insuff. Data

Table A-1. Inventory and NRHP Status of Prehistoric Cultural Resource Sites in the Pelton Round Butte APE.

Site Number	General Location	Type	Evaluation Status	Potential Project Effect[1]	Owner	Comments	Rec. NRHP Eligibility

[1] impacts in addition to potential vandalism

[2] assessments of potential eligibility under "Comments" heading were made by Pettigrew 1998c

* Located in Bethel-Round Butte transmission line corridor, no longer within Project boundary.

Abbreviations: BLM = Bureau of Land Management (Prineville); CPSP = The Cove Palisades State Park; CTWS = Confederated Tribes of the Warm Springs Reservation of Oregon; DNF = Deschutes National Forest; GS = ground stone; ONF = Ochoco National Forest; OR = State of Oregon; Priv = Private property; WNF = Willamette National Forest; WS = Warm Springs Reservation

Table A-2. Inventory and NRHP Status of Historic Archaeological Sites in the Pelton Round Butte APE.

Site Number	General Location	Type	Evaluation Status	Potential Project Effect[1]	Owner	Comments	Rec. NRHP Eligibility
Evaluation Tests Completed (1998): Sites Recommended as Eligible							
OR-JE-21 Leland Osborne Homestead	CPSP	Homestead	Tested	Road/rec.	OR	Standing barn walls, several features	Eligible
OR-JE-24 Dempsey Glover Homestead	CPSP	Homestead	Tested	Recreation	OR	Foundations, fences, artifacts	Eligible
OR-JE-32 Roy Emerson Larkin Homestead	CPSP	Homestead	Tested	Recreation	ONF	Foundations, features, artifacts	Eligible
OR-JE-34 David V. B. McBain Homestead	CPSP	Homestead	Tested	Road/rec.	OR/ONF	Foundations, features, artifacts	Eligible
Evaluation Tests Completed (1998): Sites Recommended as Not Eligible							
OR-JE-18	CPSP	Trash scatter & rock piles	Tested	Recreation	OR	Large dump, but 1950s+	Not eligible
OR-JE-11 Eyerly Ranch Complex	Metolius arm	Homestead/ ranch	Tested	Recreation	CTWS	Badly disturbed homestead	Not eligible
OR-JE-27	CPSP	Trash scatter	Tested	Recreation	ONF	Small scatter, 1940s+	Not eligible
Evaluation Tests Conducted/Attempted in 1998: Eligibility Not Yet Assessed							
OR-JE-15 The Orchards	Rereg. Res.	Orchard/ homestead	Part. tested	Water ero.	PGE	Could not be tested due to pool elev.	Insuff. Data
Evaluation Tests Completed by Others: Sites Recommended as Eligible							
OR-JE-8 Oregon Trunk Line Construction Camp	Simtustus	RR camp	Not tested	T-line/road	BLM	Features/artifacts, Oregon Trunk RR	Eligible
No Evaluation Testing Conducted in 1998: Sites With Insufficient Data for NRHP Evaluation[2]							
OR-JE-12 Horseshoe Rim Debris Scatter	RB Dam,	Trash scatter	Not tested	Recreation	BLM	Potentially elig., domestic goods	Insuff. Data
OR-JE-13 Rock Pit Can Scatter	E of Rereg. Dam	Trash scatter	Not tested	Road	Priv.	Potentially not eligible for A, B	Insuff. Data-D

Table A-2. Inventory and NRHP Status of Historic Archaeological Sites in the Pelton Round Butte APE.

Site Number	General Location	Type	Evaluation Status	Potential Project Effect[1]	Owner	Comments	Rec. NRHP Eligibility
OR-JE-14 Campbell Falls Railroad Camp	Simtustus	RR camp	Not tested	Recreation	Priv.	Potentially elig., similar to OR-JE-8	Insuff. Data
OR-JE-16* Many Seeps Site	W of RB Dam	Trash scatter	Not tested	Road	CTWS	Potentially elig.	Insuff. Data
OR-JE-17 Rubber Knife Site	W of Simtustus	Trash scatter	Not tested	No effect	CTWS	Potentially not eligible for A, B	Insuff. Data-D
OR-JE-19	CPSP	Trash scatter	Not tested	No effect	BLM	Potentially not elig., small dump	Insuff. Data
OR-JE-20	CPSP	Trash scatter	Not tested	No effect	ONF	Potentially not elig., small dump	Insuff. Data
OR-JE-22 Russell B. Campbell Homestead	CPSP	Homestead	Not tested	Recreation	ONF	Potentially elig., stone fences, cans	Insuff. Data
OR-JE-23	CPSP	Homestead	Not tested	Recreation	ONF	Pot. Not elig. for A, B, collapsed cabin	Insuff. Data
OR-JE-25 Henry and Mary Glover Homestead	CPSP	Homestead	Not tested	Recreation	ONF	Potentially elig., foundations, artifacts	Insuff. Data
OR-JE-26 Robert Glover Homestead	CPSP	Homestead	Not tested	Recreation	ONF	Potentially elig., depressions, fences	Insuff. Data
OR-JE-28	CPSP	Pit	Not tested	Recreation	ONF	Potentially elig.	Insuff. Data
OR-JE-29 Sam Jackson Homestead (?)	CPSP	Homestead	Not tested	Recreation	ONF	Potentially elig., foundations, artifacts	Insuff. Data
OR-JE-30	CPSP	Trash scatter	Not tested	Recreation	ONF	Potentially elig., 50+ cans	Insuff. Data
OR-JE-31 Madil Homestead	CPSP	Homestead	Not tested	Recreation	ONF	Potentially elig., depressions, 4 dumps	Insuff. Data

* Located in Bethel-Round Butte transmission line corridor, no longer within Project boundary.

OR-JE-33 Harley Bailey Homestead	CPSP	Homestead	Not tested	Recreation	ONF	Potentially elig., fence/artifacts	Insuff. Data

Table A-2. Inventory and NRHP Status of Historic Archaeological Sites in the Pelton Round Butte APE.

Site Number	General Location	Type	Evaluation Status	Potential Project Effect[1]	Owner	Comments	Rec. NRHP Eligibility
5E0333 John Swanson Homestead	CPSP		Not tested	No effect	ONF	Potentially elig.	Insuff. Data
CP-H1	CPSP	Stock ramp	Not tested	Recreation	OR	Potentially not elig., collapsed ramp	Insuff. Data

[1] impacts in addition to vandalism potential

[2] assessments of potential eligibility under "Comments" heading were made by Pettigrew 1998c

Abbreviations: BLM = Bureau of Land Management (Prineville); CPSP = The Cove Palisades State Park; CTWS = Confederated Tribes of the Warm Springs Reservation of Oregon; ONF = Ochoco National Forest; OR = State of Oregon; Priv = Private property

Table A-3. Inventory and NRHP Status of Historic Buildings and Structures in the Pelton Round Butte APE.

Site Number	General Location	Type	Evaluation Status	Potential Project Effect[1]	Owner	Comments	Rec. NRHP Eligibility
OR-JE-11 Eyerly Ranch Complex, Adams Homestead	Metolius arm	Ranch	Not tested (arch. tested)	No effect	CTWS	Crit. A, C-not eligible, stated eligible on site form, arch. component tested	Insuff. Data-B
PRB-HIS-10 Bungalow	Deschutes R.	House		No effect	DVWD	1920s bungalow, altered in 80s, Crit. A, C-not eligible	Insuff. Data-B
PRB-HIS-17* Sheep Barn	Salem, t-line	Garage		No effect	Priv.	Crit. A, B, C-not eligible; small garage used as sheep barn	Not eligible
CP-H3 Hunting blind	CPSP	Rock enc.		Recreation	OR	Stacked walls w/ collapsed roof, metal sign-State Game Comm.	Insuff. Data-A, C
CP-H5 Earthen weirs	CPSP	Water		Recreation	ONF	Earthen weirs for water storage; Crit. C-not eligible, Crit. B-insuff. Data	Pot. Eligible-A

[1] impacts in addition to vandalism potential

* Located in Bethel-Round Butte transmission line corridor, no longer within Project boundary.

Abbreviations: CPSP = The Cove Palisades State Park; CTWS = Confederated Tribes of the Warm Springs Reservation of Oregon; DVWD = Deschutes Valley Water District; ONF = Ochoco National Forest; OR = State of Oregon; Priv = Private property

Table A-4. Inventory of Linear Resources in the Pelton Round Butte APE.

Resource Number	General Location	Type	Owner	Description	Rec. NRHP Eligibility
HIS-01 GS Trail	Steelhead Falls	Trail	ONF	Trail with rock embankments, from reservoir to rim	Not evaluated
HIS-02/ CP-H19 Jordan Road	Round Butte Dam	Road	BLM	Historic road to west rim—visible on canyon walls west of Crooked and Deschutes rivers	Not evaluated
HIS-03 Fly Creek Ranch Road	Fly Creek	Road	DMF	2-track gravel road	Not evaluated
HIS-04 Rocky road	Round Butte Dam	Road	CTWS	10 ft. road scar, possible rock alignments	Not evaluated
HIS-05 ICC Road	Round Butte Dam	Trail	BLM	10 ft., stacked rock outside APE	Not evaluated
HIS-06/ CP-H20 Canadian Bench Trail	Round Butte Dam	Trail	BLM	3-6 ft. path up Deschutes Canyon wall to rim, rock embankments	Not evaluated
HIS-07 BJ Trail	Round Butte Dam	Trail	ONF	8 ft., parallel paths	Not evaluated
HIS-08 Metolius River Road	Fly Creek	Road	CTWS/ Priv.	12 ft. dirt road cut into slope above Metolius River	Not evaluated
HIS-14 Oregon Trunk Line RR	Madras West	Railroad	BLM JC/Priv.	Railroad bed/grade/cuts--no ties or tracks, but collapsed trestle present	Not evaluated
GB-00	Fly Creek	Fence	Priv.	Split post, barbed wire	Not evaluated
GB-01	Madras West	Road	PGE?	8 ft. dirt road	Not evaluated
GB-02	Madras West	Fence	Priv.	4 juniper posts with rock supports	Not evaluated
GB-03	Madras West	Road	BLM	10 ft. dirt road, with rock embankment	Not evaluated
GB-04	Madras West	Fence	BLM	Split post, barbed wire	Not evaluated

Table A-4. Inventory of Linear Resources in the Pelton Round Butte APE.

Resource Number	General Location	Type	Owner	Description	Rec. NRHP Eligibility
GB-05 Hurber's Canyon Road	Madras West	Road	BLM Priv.	10 ft. dirt road, stacked rocks outside APE	Not evaluated
GB-06	Madras West	Fence	ONF/ Priv.	Dirt road with rock embankment	Not evaluated
GB-07	Madras West	Fence	Priv.	6-7 posts aligned not evaluated	Not evaluated
GB-08	Madras West	Road	Priv.	12 ft. dirt road with exposed bedrock/rock alignments	Not evaluated
GB-09 Flume	Round Butte Dam	Flume	PGE	2 sections of wood planks across canyon wall, above dam overflow tunnel	Not evaluated
GB-10	Madras West	Fence	Priv.	Split post, barbed wire	Not evaluated
GB-11	Madras West	Fence	BLM/Priv.	Split posts parallel Oregon Trunk Line RR	Not evaluated
GB-12	Seekseequa Junc	Fence	CTWS	Split post, barbed wire	Not evaluated
GB-13	Seekseequa Junc.	Fence	CTWS	Split post (replaced with metal), barbed wire	Not evaluated
GB-14	Seekseequa Junc.	Fence	CTWS	Split post, barbed wire	Not evaluated
GB-15	Seekseequa Junc	Fence	CTWS	Split post, barbed wire, post/wire gate	Not evaluated
GB-16	Seekseequa Junc	Fence	CTWS	Split post, barbed wire, power pole segments for gate	Not evaluated
GB-17	Warm Springs	Fence	CTWS	Split post, barbed wire	Not evaluated
GB-18	Warm Springs	Fence	CTWS	Split post, barbed wire	Not evaluated

Table A-4. Inventory of Linear Resources in the Pelton Round Butte APE.

Resource Number	General Location	Type	Owner	Description	Rec. NRHP Eligibility
GB-19	Warm Springs	Road	CTWS	15 ft. 2-track road, cut into slope, rock embankment	Not evaluated
GB-20* Jackson Trail Road	Seekseequa Junc.	Road	CTWS	22 ft. graveled/paved road, near WSPE	Not evaluated
GB-21* Mitzler	Seekseequa Junc.	Road	CTWS	10 ft. 2-track road, berm on both sides	Not evaluated
GB-22* Metolius Bench Road	Seekseequa Junc.	Road	CTWS	10 ft. 2-track road	Not evaluated
GB-23* Dry Hollow Road	Metolius Bench	Road	CTWS	10-15 ft. 2-track road with juncture	Not evaluated
GB-24*	Metolius Bench	Road	CTWS	10 ft. 2-track road	Not evaluated
GB-25*	Metolius Bench	Road	CTWS	10 ft. 2-track road	Not evaluated
GB-26*	Seekseequa Junc	Road	CTWS	15 ft. gravel road	Not evaluated
GB-27*	Seekseequa Junc.	Road	CTWS	10 ft. 2-track road	Not evaluated
GB-28*	Seekseequa Junc.	Fence	CTWS	Split post & RR ties, barbed wire	Not evaluated
GB-29*	Potters Pond	Road	CTWS	8-10 ft. 2-track road with basalt cobbles	Not evaluated
GB-30* Tenino Road	Metolius Bench	Road	CTWS	20 ft. paved road	Not evaluated
GB-31	Madras West	Road	PGE	10 ft. 2-track road, parallels Vanore Rd	Not evaluated
GB-32	Madras West	Ditch	PGE	Tapered ditch with berm, 10 ft. top, 2 ft. bottom, 2.5 ft. deep	Not evaluated

Table A-4. Inventory of Linear Resources in the Pelton Round Butte APE.

Resource Number	General Location	Type	Owner	Description	Rec. NRHP Eligibility
GB-33*	Breitenbush Hot Spr.	Road	WNF	14 ft. gravel road	Not evaluated

* Located in Bethel-Round Butte transmission line corridor, no longer within Project boundary.

GB-34*/ GB-36*	Breitenbush Hot Spr.	Road	WNF/ MHNF	24 ft. paved road, 3 crossings	Not evaluated
GB-35*	Breitenbush Hot Spr.	Road	WNF	18 ft. paved road	Not evaluated
GB-37*	Breitenbush Hot Spr.	Road	WNF	16 ft. gravel road, former Short Lake Trail	Not evaluated
GB-38* Badger Creek Trail	Boulder lake	Trail	CTWS	12 ft. path, used as 4WD road	Not evaluated
GB-39* Pacific Crest Trail	Olallie Butte	Trail	MHNF	2 ft. path with gravel, shouldered edges	Not evaluated
GB-40*	Battle Ax	Road	WNF	14 ft. gravel road, former trail	Not evaluated
GB-41* Gates Hill Road	Mill City North	Road	MC	22 ft. gravel road	Not evaluated
GB-42*	Mill City North	Road	PGE	15 ft. gravel road, former trail	Not evaluated
GB-43*	Mill City North	Road	Priv.	8 ft. 2-track road, 4WD	Not evaluated
GB-44*	Mill City North	Fence	Priv.	Split post (some metal also), barbed wire	Not evaluated
GB-45* 4 Street	Mill City North	Road	MC?	20 ft. gravel road	Not evaluated
GB-46* Huddle Road	Lyons	Road	MC?	12 ft. gravel road	Not evaluated

Table A-4. Inventory of Linear Resources in the Pelton Round Butte APE.

Resource Number	General Location	Type	Owner	Description	Rec. NRHP Eligibility
GB-47*	Lyons	Fence	Priv.	Split post, mesh & barbed wire	Not evaluated
GB-48* Taylor Road	Lyons	Road	Priv.	24 ft. gravel road	Not evaluated

* Located in Bethel-Round Butte transmission line corridor, no longer within Project boundary.

GB-49*	Lyons	Road	Priv.	10-12 ft. 2-track road, in trailer Park	Not evaluated
GB-50* Little North Fork Road	Lyons	Road	MC	22 ft. paved road	Not evaluated
GB-51*	Lyons	Fence	Priv.	RR tie gate, split post, mesh & barbed wire	Not evaluated
GB-52*	Lyons	Road	Priv.	8-10 ft. gravel road	Not evaluated
GB-53*	Lyons	Fence	Priv.	Split post, mesh & barbed wire	Not evaluated
GB-54*	Lyons	Road	Priv.	10 ft. gravel road	Not evaluated
GB-55*	Stout Mountain	Railroad	Priv.	12 ft. bed & grade, no ties or hardware	Not evaluated
GB-56* Siegmund Road	Stout Mountain	Road	MC	18 ft. gravel road	Not evaluated
GB-57*	Stout Mountain	Fence	Priv.	Split posts	Not evaluated
GB-58* Fern Ridge Road	Stout Mountain	Road	MC	24 ft. paved road	Not evaluated
GB-59* Basl Hill Road	Stout Mountain	Road	MC	24 ft. paved road	Not evaluated

Table A-4. Inventory of Linear Resources in the Pelton Round Butte APE.

Resource Number	General Location	Type	Owner	Description	Rec. NRHP Eligibility
GB-60* Coon Hollow Road	Stout Mountain	Road	MC	22 ft. paved road	Not evaluated
GB-61*	Stout Mountain	Fence	Priv.	Split post, barbed wire	Not evaluated
GB-62* Dennison Road	Stout Mountain	Road	MC	20 ft. gravel road	Not evaluated
* Located in Bethel-Round Butte transmission line corridor, no longer within Project boundary.					
GB-63* Triumph Road	Stout Mountain	Road	MC	20 ft. paved road	Not evaluated
GB-64*	Stout Mountain	Fence	Priv.	Split post, mesh & barbed wire	Not evaluated
GB-65*	Stayton	Fence	Priv.	Split post line, blackberry hedge	Not evaluated
GB-66*	Stayton	Road	Priv	12 ft. possible rutted road	Not evaluated
GB-67* Cascade Highway	Stayton	Road	OR	26 ft. paved road	Not evaluated
GB-68*	Stayton	Fence	Priv.	Split post, mesh & barbed wire	Not evaluated
GB-69* Anderson Road SE	Stayton	Road	MC	16 ft. gravel road	Not evaluated
GB-70* Silver Falls Highway	Stayton	Road	OR	30 ft. paved road	Not evaluated
GB-71*	Stayton	Fence	Priv.	Split post, mesh & barbed wire	Not evaluated
GB-72* Waldo Hills Drive	Stayton	Road	MC	22 ft. paved road	Not evaluated

Table A-4. Inventory of Linear Resources in the Pelton Round Butte APE.

Resource Number	General Location	Type	Owner	Description	Rec. NRHP Eligibility
GB-73* Howell Prairie Road SE	Salem East	Road	MC	18 ft. paved road	Not evaluated
GB-74* Southern Pacific Railroad	Salem East	Railroad	SPRR	Railroad bed/tracks--in active use	Not evaluated
GB-75* 74th Avenue SE	Salem East	Road	MC	22 ft. paved road	Not evaluated
GB-76* Macleary Road SE	Salem East	Road	MC	22 ft. paved road	Not evaluated

* Located in Bethel-Round Butte transmission line corridor, no longer within Project boundary.

GB-77* 70th Avenue	Salem East	Road	MC	18 ft. paved road	Not evaluated
GB-78*	Salem East	Fence	Priv.	Split posts (some metal), wire mesh	Not evaluated
GB-79*	Salem East	Road	Priv.	10 ft. gravel road	Not evaluated
GB-80* 62nd Avenue	Salem East	Road	MC	22 ft. paved road	Not evaluated
GB-81*	Salem East	Fence	Priv.	Split post, mesh & barbed wire	Not evaluated
GB-82* State Street	Salem East	Road	MC	28 ft. paved road	Not evaluated
GB-83* 82nd Avenue	Salem East	Road	MC	18 ft. paved road	Not evaluated
GB-84	Madras West	Fence	Priv.	Split post, barbed wire, gate with metal posts	Not evaluated
GB-85	Madras West	Fence	Priv.	Split post (metal in APE), barbed wire, rock aligned	Not evaluated

Table A-4. Inventory of Linear Resources in the Pelton Round Butte APE.

Resource Number	General Location	Type	Owner	Description	Rec. NRHP Eligibility
GB-86* Boulder Corral Peters Pasture Road	Potters Pond	Road	CTWS	18 ft. dirt road	Not evaluated
GB-87*	Potters Pond	Fence	CTWS	Split posts with rock supports, barbed wire	Not evaluated
GB-88*	Potters Pond	Road	CTWS	8-12 ft. dirt road	Not evaluated
GB-89*	Sawmill Butte	Road	CTWS	12 ft. dirt road, exposed cobbles in bed	Not evaluated

* Located in Bethel-Round Butte transmission line corridor, no longer within Project boundary.

GB-90*	Sawmill Butte	Road	CTWS	12 ft. dirt road, exposed cobbles in bed	Not evaluated
GB-91*	Sawmill Butte	Road	CTWS	18 ft. dirt road	Not evaluated
GB-92*	Sawmill Butte	Road	CTWS	20 ft. dirt road, exposed cobbles in bed	Not evaluated
GB-93*	Sawmill Butte	Road	CTWS	10 ft. dirt road, exposed bedrock	Not evaluated
GB-94*	Sawmill Butte	Road	CTWS	18 ft. dirt road	Not evaluated
GB-95* Skyline Trail, Skyline Miller Road	Olallie Butte	Road	MHNF	18 ft. gravel road, cut into slope	Not evaluated
EG-01	Madras West	Road	Priv.	12 ft. dirt roads (2), rock alignments	Not evaluated
EG-02/ RS-0	Madras West	Ditch	Priv.	Irrigation ditch 4 ft. wide, 3 ft. deep	Not evaluated
EG-03	Seekseequa Junc.	Road	ONF	9 ft. dirt road	Not evaluated

Table A-4. Inventory of Linear Resources in the Pelton Round Butte APE.

Resource Number	General Location	Type	Owner	Description	Rec. NRHP Eligibility
EG-04	Madras West	Fence	Priv.	Juniper posts, mesh & barbed wire	Not evaluated
EG-05	Seekseequa Junc.	Fence	PGE	Juniper posts, barbed wire	Not evaluated
EG-06	Seekseequa Junc.	Fence	PGE	1 post with rock supports, barbed wire	Not evaluated

* Located in Bethel-Round Butte transmission line corridor, no longer within Project boundary.

EG-07	Fly Creek	Fence	Priv.	Posts with stacked rocks, barbed wire	Not evaluated
EG-08	Seekseequa Junc.	Trail	CTWS	3 ft. trail with switchbacks (?)	Not evaluated
EG-09*	Round Butte Dam	Fence	CTWS	Posts with stacked rock supports, barbed wire	Not evaluated
EG-10*	Mother Lode Mtn	Road	WNF	10 ft. dirt road, cut into slope	Not evaluated
EG-11*	Battle Ax/Detroit	Railroad	WNF	Possible RR grade, no artifacts	Not evaluated
EG-12* Fish Lake Trail	Olallie Butte	Trail	MHNF	4 ft. trail, blazes on both sides of trees	Not evaluated
EG-13* Teeter Road	Lyons	Road	MC?	10 ft. dirt road	Not evaluated
EG-14* Wagner Road	Lyons	Road	WNF	20 ft. gravel road	Not evaluated
JC-01	Madras West	Fence	ONF/ Priv.	Slit post, barbed wire	Not evaluated
JC-02	Seekseequa Junc.	Fence	ONF	Split post, barbed wire	Not evaluated

Table A-4. Inventory of Linear Resources in the Pelton Round Butte APE.

Resource Number	General Location	Type	Owner	Description	Rec. NRHP Eligibility
JC-03	Seekseequa Junc.	Road	ONF	12 ft. dirt road, rocks cleared from bed	Not evaluated
JC-04	Round Butte Dam	Fence	ONF	Fence post rock cairns, 6 aligned	Not evaluated
JC-05	Fly Creek	Fence	WNF	Split post, barbed wire	Not evaluated
JC-06	Fly Creek	Fence	ONF/ Priv.	Split post, barbed wire	Not evaluated

* Located in Bethel-Round Butte transmission line corridor, no longer within Project boundary.

JC-07* Red Lake Trail	Olallie Butte	Trail	MHNF	2 ft. path, blazed trees on uphill slope	Not evaluated
JC-08* Triangle Lake Trail	Olallie Butte	Trail	MHNF	3 ft. path, rocky bed	Not evaluated
JC-09*	Lyons	Road	Priv.	10 ft. dirt road	Not evaluated
JC-10* Fern Ridge Road	Stout Mountain	Road	MC	20 ft. paved road	Not evaluated
RS-01	Madras West	Road	Priv.	8 ft. dirt road, rock embankment	Not evaluated
RS-03	Madras West	Ditch	Priv.	Earth ditch, 5 ft. wide, 6 inch deep	Not evaluated
RS-04	Madras West	Fence	Priv.	Split post, barbed wire	Not evaluated
RS-05	Seekseequa Junc	Fence	CTWS	Split juniper post with rock support, barbed wire	Not evaluated
RS-06 Rock wall	Seekseequa Junc.	Rock wall	CTWS	1.5 ft. high stacked rock wall	Not evaluated

Table A-4. Inventory of Linear Resources in the Pelton Round Butte APE.

Resource Number	General Location	Type	Owner	Description	Rec. NRHP Eligibility
CP-H6 Historic road segment	Round Butte Dam	Road	ONF	Abandoned dirt road with rock embankment	Not evaluated
I-5H	Round Butte Dam	Fence	ONF	Rock fence segment	Not evaluated
I-6H	Round Butte Dam	Fence	ONF	Split post with rock supports, rock fence segments	Not evaluated
I-7H	Round Butte Dam	Fence	OR	Alignment of fencepost rock cairns	Not evaluated

* Located in Bethel-Round Butte transmission line corridor, no longer within Project boundary.

I-9H	Round Butte Dam	Fence	BLM	2 fencepost rock cairns	Not evaluated
I-10H	Round Butte Dam	Fence	BLM	Low rock fence segment	Not evaluated
I-11H	Round Butte Dam	Fence	ONF	Rock fence segment, extension of barbed wire fence	Not evaluated

[1] 7.5' USGS quadrangle containing resource

Abbreviations: BLM = Bureau of Land Management (Prineville); CTWS = Confederated Tribes of the Warm Springs Reservation; DNF = Deschutes National Forest; JC = Jefferson County; MC = Marion County; MHNF = Mt. Hood National Forest; ONF = Ochoco National Forest; OR = State of Oregon; PGE = Portland General Electric Company; Priv. = Private property; SPRR = Southern Pacific Railroad; WNF = Willamette National Forest; WSPE = Warm Springs Power Enterprise

Pelton Round Butte Project
Settlement Agreement

E X H I B I T K

IMPLEMENTATION COMMITTEES

Pelton Round Butte Project – FERC No. 2030

July 2004

EXHIBIT K

Implementation Committees

Fish Committee

The Fish Committee shall consist of representatives from the following Parties:

- Licensees
- National Marine Fisheries Service
- U.S. Fish and Wildlife Service
- US Forest Service
- Bureau of Indian Affairs
- Bureau of Land Management
- Confederated Tribes of the Warm Springs Reservation, Branch of Natural Resources
- Confederated Tribes of the Warm Springs Reservation, Water Control Board
- Oregon Department of Fish and Wildlife
- Oregon Department of Environmental Quality
- NGO Parties (American Rivers, Trout Unlimited, Oregon Trout, Native Fish Society [one representative collectively]).

Terrestrial Resource Working Group

The Terrestrial Resources Working Group shall consist of representatives from the following Parties:

- Licensees
- U.S. Fish and Wildlife Service
- US Forest Service
- Bureau of Indian Affairs
- Bureau of Land Management
- Confederated Tribes of the Warm Springs Reservation, Branch of Natural Resources
- Oregon Department of Fish and Wildlife

Recreation Resources Working Group

The Recreation Resources Working Group shall consist of representatives from the following Parties:

- Licensees
- US Forest Service
- Bureau of Indian Affairs
- Bureau of Land Management
- Confederated Tribes of the Warm Springs Reservation, Branch of Natural Resources

- Oregon Department of Fish and Wildlife
- Oregon Parks and Recreation Department

Shoreline Management Working Group

The Shoreline Management Working Group shall consist of representatives of the following Parties:

- Licensees
- US Forest Service
- Bureau of Indian Affairs
- Bureau of Land Management
- Confederated Tribes of the Warm Springs Reservation, Branch of Natural Resources
- Oregon Department of Fish and Wildlife
- Oregon Parks and Recreation Department
- Jefferson County

Pelton Round Butte Project
Settlement Agreement

E X H I B I T L

AUTHORIZED REPRESENTATIVES OF THE PARTIES

Pelton Round Butte Project – FERC No. 2030

July 2004

EXHIBIT L

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