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2005 SEP 26 A 9 40  
FEDERAL ENERGY  
REGULATORY COMMISSION

September 23, 2005

Ms. Magalie Roman Salas, Secretary  
Federal Energy Regulatory Commission  
888 First Street, N.E.  
Washington, DC 20426

**Re: Six-Month Update for the Condit Hydroelectric Project  
FERC Project 2342-011**

Dear Ms. Salas:

This document provides the Commission a six-month status report describing PacifiCorp's and the settlement parties' progress with respect to the implementation of the Settlement Agreement. This letter provides an update on activities since our February 2005 status report.

### Amendment

In February 2005, the parties to the Settlement Agreement executed a Memorandum of Understanding amending the Settlement Agreement to extend operations for two years so that removal begins in October 2008 rather than the original date of October. In addition, the amendment increased PacifiCorp's obligation to fund permitting and mitigation costs by \$3.3 Million in 1999 dollars. The Amendment is on file with the Commission (see Attachment A).

### Permitting

The execution of the Amendment allows PacifiCorp to resume permitting activities that had been on hold while the Amendment was being developed and executed.

### SEPA/401

PacifiCorp has been providing input regarding project decommissioning to the Washington Department of Ecology (Ecology) in compliance with their SEPA process. In addition, Ecology has been using PacifiCorp's Project Description (see Attachment B) as supplemental information for their analysis. The Project Description was completed prior to the execution of the Amendment and does not reflect the extended operations. PacifiCorp understands that Ecology plans to issue the draft supplemental Environmental Impact Statement for public comment in the near future.



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### Corps of Engineers

PacifiCorp received a request for additional information regarding project decommissioning from the Portland District, U.S. Army Corps of Engineers (Corps) on February 4, 2005. The request was the result of public comments the Corps solicited and received regarding PacifiCorp's application for permits under Section 404 of the federal Clean Water Act and Section 10 of the Rivers and Harbors Act. PacifiCorp provided responses to those comments on May 9, 2005 (see Attachment C).

### Biological Opinions

PacifiCorp has been providing input to the US Fish & Wildlife Service in support of the Service's re-consultation on its existing biological opinion. PacifiCorp understands that significant progress has been made on this document and that it is nearly complete. NOAA Fisheries has yet to issue a biological opinion on the Condit removal project.

### County Permitting

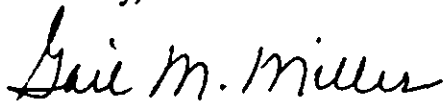
PacifiCorp has met with Klickitat and Skamania County Commissioners on various occasions during the previous months. PacifiCorp has also met with the Counties' planning departments regarding local permitting requirements that the Counties believe apply to the proposal to decommission and remove the project. PacifiCorp believes that all county-level permits are preempted by the Federal Power Act, and PacifiCorp intends to petition the Commission for a declaratory order to that effect in the near future. In an abundance of caution, and to avoid delay in the event the Commission or the courts disagree regarding preemption, PacifiCorp also intends to file draft permit applications with the counties in the near future.

### Parties to the Settlement Agreement

PacifiCorp conducted a Quarterly Meeting with the parties to the Settlement Agreement in April and July 2005 and plans an additional meeting in October. Numerous additional meetings between the parties also took place to discuss issues related to future filings.

Please call me at 503-813-5528 if you have any questions or concerns.

Sincerely,



Gail M. Miller  
Condit Project Manager

Attachment(s): 1) Settlement Agreement Amendment 2) Condit Project Description 3) Additional Information Response to Army Corps of Engineers

CC: One Original plus 8 copies on CD to Magalie Salas, Secretary, FERC  
FERC Service List (No Attachments)  
FERC Portland Regional Office (with Attachments)

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## CONDIT HYDROELECTRIC PROJECT SETTLEMENT AGREEMENT

THIS SETTLEMENT AGREEMENT (the "Agreement") is entered into by and between PacifiCorp, licensee and relicensing applicant for the Condit Hydroelectric Project, FERC No. 2342 (the "Project"), intervenors American Rivers, American Whitewater Affiliation, Columbia Gorge Audubon Society, Columbia Gorge Coalition, Columbia River United, Federation of Fly Fishers, Friends of the Columbia Gorge, Friends of the Earth, Friends of the White Salmon, The Mountaineers, Rivers Council of Washington, The Sierra Club, Trout Unlimited, Washington Trout, and the Washington Wilderness Coalition (hereinafter "American Rivers, et al."), the Columbia River Intertribal Fish Commission ("CRITFC"), the Yakama Indian Nation ("Nation"), the U.S. Forest Service ("USFS"), U.S. Department of the Interior ("Interior"), the National Marine Fisheries Service ("NMFS"), the Washington Department of Ecology ("Ecology"), and the Washington Department of Fish and Wildlife ("WDFW") (collectively the "Intervenors"), pursuant to Rule 602 of the Rules of Practice and Procedure of the Federal Energy Regulatory Commission (the "Commission"), 18 C.F.R. § 385.602 (1997). PacifiCorp and the Intervenors constitute the parties to this Agreement (the "Parties," any one of whom may be referred to as a "Party").

### Recitals

- A. PacifiCorp owns and operates the Project, which is located at approximately river mile 3.3 on the White Salmon River in Skamania and Klickitat counties, Washington.
- B. The Project, which was completed in 1913, blocks fish access to habitat above Condit Dam.
- C. In 1963, PacifiCorp's predecessor, Pacific Power & Light Company, applied to the predecessor of the Commission, the Federal Power Commission, for a license to operate the Project, and in 1968 the Commission issued a license containing an effective date of May 1, 1965 and a termination date of December 31, 1993.
- D. In December 1991, pursuant to Part I of the Federal Power Act of 1920, 16 U.S.C. 791a et seq. (the "FPA"), PacifiCorp filed an application with the Commission for a new license for continued operation of the Project (the "Relicensing Proceeding").
- E. PacifiCorp's initial FPA license to operate the Project expired on December 31, 1993. Since that time, PacifiCorp has been operating the Project pursuant to annual licenses issued pursuant to Section 15(a) of the FPA, 16 U.S.C. § 808(a), pending determination by the Commission of PacifiCorp's application for issuance of a new license for the Project.

F. In response to the Commission's request for comments, recommendations, and prescriptions regarding PacifiCorp's application for a new license, various Intervenor filed comments, recommendations, and prescriptions. After review of the comments, recommendations, and prescriptions from the Intervenor, the Commission staff issued a Final Environmental Impact Statement dated October 1996 and recommended a preferred alternative for a new Project license.

G. PacifiCorp has determined that Project operations would be uneconomic if a new Project license were issued by the Commission in accordance with recommendations of the Final Environmental Impact Statement.

H. In lieu of fish passage facilities and other measures recommended for a new Project license in the Final Environmental Impact Statement, the Nation, CRITFC and American Rivers, et al. requested that PacifiCorp remove the Project in order to restore anadromous fish and natural flow conditions in the White Salmon River. Intervenor Ecology, WDFW, Interior, USFS, and NMFS have supported investigation of dam removal.

I. On January 29, 1997, PacifiCorp requested a temporary abeyance of the Relicensing Proceeding in order to investigate the feasibility of various dam removal alternatives in collaboration with the Intervenor and other interested entities and individuals.

J. At the request of the Nation, CRITFC, and PacifiCorp, R.W. Beck, an independent, consulting engineer firm, prepared an initial engineering feasibility and cost study, dated March 1997, of Project removal alternatives.

K. On July 30, 1997, PacifiCorp filed a renewed motion with the Commission to hold the Relicensing Proceeding in abeyance in order to afford the Parties further time to collaborate. This motion was supported by American Rivers et al., Interior, NMFS, USFS, WDFW, Ecology, and the Nation.

M. On March 19, 1998, PacifiCorp filed a renewed motion with the Commission to hold the Relicensing Proceeding in abeyance to afford the Parties additional time to collaborate.

N. In May 1998, R.W. Beck, with assistance from a consulting engineer employed by American Rivers, prepared an additional, more detailed summary report of Project removal alternatives.

O. On August 31, 1998, PacifiCorp and the Intervenor filed a request with the Commission to hold the Relicensing Proceeding in abeyance to afford the Parties additional time to collaborate.

P. As a result of collaboration, the Parties have reached agreement on a dam removal plan for the Project, described as the "Selected Approach" in the Condit Hydroelectric Project Removal Summary Report dated May 1998 as supplemented by the removal costs worksheet attached thereto (collectively the "Removal Plan"), which is set forth in Exhibit A. The Parties believe the Removal Plan is technically, legally, biologically, and economically feasible.

## SECTION 1 PURPOSE AND EFFECT OF OFFER OF SETTLEMENT

**1.1 Purpose of Agreement.** The Parties have entered into this Agreement for the purpose of resolving all issues that were or could have been raised by the Parties in the Relicensing Proceeding, and for the purpose of obtaining a Commission order approving an extension and amendment of PacifiCorp's Project license in accord with Sections 3 and 4 below (the "Amended License"), an application for which will be submitted to the Commission pursuant to Sections 2 and 4 herein and 18 C.F.R. Part 6 (1997).

**1.2 Limitations.** This Agreement is the product of negotiation and cooperation among the Parties in an effort to investigate the economic, technical and environmental feasibility of dam removal as a preferred alternative in the Relicensing Proceeding. This Agreement reflects the Parties' agreement that Project removal, under the terms and conditions set forth in this Agreement, constitutes a fair, reasonable and just resolution to the issues in the Relicensing Proceeding. The Parties believe this Agreement also serves the public interest. By entering this Agreement, no party shall be deemed to have made any admission or waived any contention of fact or law which it did make or could have made in the Relicensing Proceeding. This Agreement shall not be offered in evidence or cited as precedent by any Party to this Agreement in any administrative or judicial litigation, arbitration, or other proceeding, except a proceeding to establish the existence of or to enforce or implement this Agreement. This Section 1.2 shall survive any termination of this Agreement. The Parties acknowledge that PacifiCorp disputes the Commission's authority to issue a decommissioning order as such in this or any further relicensing proceeding. However, PacifiCorp and the Parties agree that the Commission has authority under the FPA to issue an order consistent with this Agreement.

## SECTION 2 ACTIONS UPON EXECUTION OF THIS AGREEMENT

**2.1 Commission Filings.** Within thirty (30) days of the date on which this Agreement is signed by all of the Parties (the "Effective Date"), PacifiCorp shall file with the Commission: (a) a petition or application requesting the Commission to issue PacifiCorp an Amended License in accord with this Agreement ("Application"), and (b) a fully executed copy of this Agreement (including a copy of the Removal Plan).

**2.2 Permits.** In accordance with this Agreement, PacifiCorp shall apply for and use its best reasonable efforts to obtain in a timely manner and in final form all applicable federal, state, regional, and local permits, licenses, authorizations, certifications, determinations, and other governmental approvals, including but not limited to the Amended License, necessary to commence Project removal in accordance with the Removal Plan and this Agreement ("Permits"). The Parties shall in good faith and with due diligence cooperate during the permitting, environmental review, and implementation of this Agreement for the purpose of avoiding unreasonable delay in Project removal. The Intervenor who are permit issuing agencies will vigorously defend Permit Challenges to their respective permits. PacifiCorp will support any such litigation as a necessary party. Each Party shall bear its own costs of defense. The Parties agree that PacifiCorp shall not be required by this Agreement to cease generating power at the Project or to otherwise implement the Removal Plan or any Permit until any and all applicable Permits are obtained and any and all applicable, prescribed periods for a petition for administrative or judicial review or appeal or any similar proceeding relating to any Permit ("Proceeding") have expired without any such Proceeding having been commenced or, in the event any such Proceeding is commenced, until any such Proceeding is terminated on terms and conditions consistent with the Removal Plan and this Agreement. In the event any Proceeding is commenced, the Parties shall collaborate on the effect of such Proceeding on implementation of this Agreement.

**2.3 Representations Regarding Consistency and Compliance with Statutory Obligations.** By entering into this Agreement, Ecology, Interior, NMFS, USFS and WDFW represent that they believe their statutory and other legal obligations are, or can be, met consistent with this Agreement. Nothing in this Agreement shall be construed to limit any government agency, including Ecology, Interior, NMFS, USFS, and WDFW, with jurisdiction directly related to Project removal in accordance with the Removal Plan and this Agreement from complying with its obligations under applicable laws and regulation or from considering public comments received in any environmental review or regulatory process related to Project removal in accordance with the Removal Plan and this Agreement. This Agreement shall not be interpreted to predetermine the outcome of any National Environmental Policy Act ("NEPA") or State Environmental Policy Act ("SEPA") environmental review process or any Permit process.

**2.4 Environmental Review.** The Parties shall jointly request that the Commission promptly initiate NEPA compliance and coordination with other environmental review processes under federal, state, regional, and local laws which may be necessary for issuance of the Amended License and the issuance of Permits required to implement Project removal in accordance with the Removal Plan and this Agreement. The Parties shall make all reasonable efforts to expedite compliance with NEPA, SEPA, and environmental review required by other federal, state, regional, and local laws for issuance of the Amended License and the Permits to implement Project removal in accordance with the Selected Approach identified in the Removal Plan and this Agreement.

## **2.5 Communications with the Commission and other Government Agencies.**

Except as may be authorized for governmental agencies in Section 2.4 of this Agreement, no Party shall (a) propose, support, or otherwise communicate to the Commission or any other government agency any comments, proposals or recommendations relating to the Amended License or Permit terms and conditions or any environmental review process relating to the Project or Project removal (including but not limited to any comments, proposals or recommendations relating to mitigation or fishery enhancements), other than comments, proposals or recommendations which support and are consistent with the terms of this Agreement, or (b) oppose any Amended License or Permit term or condition that PacifiCorp is authorized or directed to carry out in accordance with the Agreement.

## **SECTION 3 EXTENSION OF COMMISSION LICENSE; ADDITIONAL CONDITIONS**

PacifiCorp shall apply to the Commission for an order amending PacifiCorp's original Project license, to extend the expiration date thereof to October 1, 2006, and add to the existing terms and conditions the following conditions: (a) that PacifiCorp shall comply with this Agreement, and (b) that PacifiCorp shall notify the Commission of PacifiCorp's decision to do one of the following: (1) cease generation of electricity at the Project and commence Project removal in accordance with the Removal Plan, the terms and conditions of this Agreement, and applicable Permits, or (2) not remove the Project because of the occurrence of one of the conditions set forth in Section 5 of this Agreement, whereupon PacifiCorp shall request the Commission to renew action on PacifiCorp's December 1991 application for a new license.

## **SECTION 4 PROJECT REMOVAL**

**4.1 Project Removal and PacifiCorp's Financial Commitment.** PacifiCorp shall implement and finance Project removal in accordance with the schedule set forth in the Removal Plan and in this Section 4 and in accordance with the terms and conditions of this Agreement, subject to the availability of and in accordance with all Permits necessary to implement the Removal Plan, unless otherwise agreed to by the Parties.

**4.1.1 Project Removal Costs and PacifiCorp's Financial Commitment.** Project removal costs include the sum of the following: (a) \$ 13,650,000 for planning, engineering, design, mobilization, demobilization, construction, and deconstruction costs associated with Project removal in accordance with this Agreement ("Construction Costs"), (b) \$2,000,000 collectively for technical, engineering and legal costs incurred by PacifiCorp in obtaining any Permits ("Permitting Costs") and technical, engineering, design, mobilization, demobilization, construction, deconstruction and legal costs associated with implementing and complying with permitting and mitigation measures required by any Permit ("Mitigation Costs"), (c) \$1,000,000 which PacifiCorp shall contribute to the Nation for the enhancement, supplementation, and conservation of

fishery resources in the White Salmon River Basin ("Fishery Enhancement Fund"), and (d) \$500,000 which PacifiCorp shall contribute for the enhancement, maintenance or other use of the Underwood In Lieu Site located near the confluence of the White Salmon and Columbia Rivers or other in lieu sites owned and managed by the United States for the use of the Nation, the Confederated Tribes of the Warm Springs Reservation, the Confederated Tribes of the Umatilla Reservation, and the Nez Perce Tribe and the members thereof (collectively the "Tribes") for fishing purposes ("In Lieu Site Enhancement Fund"). The In Lieu Site Enhancement Fund shall be administered by the Tribes for the purposes described in this Section 4.1.1.

Expenditures from the In Lieu Site Enhancement Fund and any actions taken concerning the Underwood or other in lieu sites shall be by the concurrence of the four Tribes and the Bureau of Indian Affairs. The items listed in (a) through (d) of this Section 4.1.1 are deemed "Project Removal Costs". Project Removal Costs shall be measured in lawful currency of the United States as of the Effective Date and adjusted using the methodology stated in Section 4.1.2. PacifiCorp's commitment to finance Project Removal Costs shall not exceed \$17,150,000 measured in lawful currency of the United States as of the Effective Date. Project Removal Costs shall begin accruing on the Effective Date of this Agreement. Any costs incurred by PacifiCorp prior to the Effective Date of this Agreement related to Project removal, including but not limited to costs of preparing the Removal Plan and other technical information shared with the Intervenor, shall not be included in nor credited to Project Removal Costs but shall be recognized nonetheless as contributions made by PacifiCorp to Project removal. So long as this Agreement is not terminated by October 1, 2004, PacifiCorp shall make its \$500,000 contribution to the In Lieu Site Enhancement Fund by October 1, 2004 or within thirty (30) days after receiving written notice from the Tribes of the location of the account to which such contribution shall be made, whichever is later.

- 4.1.2 Quarterly Adjustment of Project Removal Costs to 1999 Dollars.** Project Removal Costs paid in any given calendar quarter shall be stated in terms of lawful currency of the United States as of the Effective Date ("1999 Dollars"). Project Removal Costs paid in any given calendar quarter shall be converted to and stated in 1999 Dollars by adjusting for the percentage change in the Gross Domestic Product - Implicit Price Deflator Index published by the United States Department of Commerce, Bureau of Economic Analysis (being on the basis of 1992 = 100) ("GDP-IPD Index") from the Effective Date through the end of the calendar quarter in question. To determine the appropriate adjustment, the GDP-IPD Index values used shall be those published in the third month after the end of the calendar quarter in question, which values shall be compared with the GDP-IPD Index published in the third month after the Effective Date. If the GDP-IPD Index or any revision or equivalent of that index ceases to be published by a federal agency, the Parties shall replace it with a substantially equivalent index that, after any necessary adjustments, provides the most reasonable substitute for the GDP-IPD Index. A sample calculation is set forth in Exhibit B.

**4.2 Determination of Project Removal Costs and Schedule: Bids.** The total Project Removal Costs defined in Section 4.1.1 shall be determined in accordance with the procedure set forth in this Section 4.2. PacifiCorp shall initiate bid procurement procedures in a manner calculated to meet the schedule set forth in Section 4.4 at least ninety (90) days prior to the date construction on Project removal starts. At the time construction bids are received, PacifiCorp shall provide the Intervenor with an itemized estimate and supporting documentation of the total Project Removal Costs and a proposed schedule for Project removal in accordance with Section 4.4. Within twenty (20) days of receipt of PacifiCorp's estimate of Project Removal Costs and proposed schedule, the Parties shall meet for the purpose of reaching agreement on the Project Removal Costs and the final schedule for Project removal. Upon request by one or more of the Intervenor, PacifiCorp shall make available to the Intervenor any additional relevant technical and financial information used by PacifiCorp in arriving at its Project Removal Costs estimate. If the bids PacifiCorp receives indicate that Construction Costs will exceed \$13,650,000, the Intervenor shall have the opportunity to seek alternative funding sources and to make recommendations to PacifiCorp on opportunities for reducing Construction Costs to bring those costs within \$13,650,000. If the Intervenor are unable to obtain financing to make up the difference or to propose cost reductions acceptable to PacifiCorp, PacifiCorp shall have the option to withdraw from this Agreement in accordance with Section 5.1.6.

**4.3 Final Contract for Project Removal.** PacifiCorp shall provide the Intervenor with a copy of the final contract(s) for Project removal.

**4.4 Schedule for Project Removal.** PacifiCorp shall commence implementation of the construction schedule described in the Removal Plan not later than August 1, 2006, cease generating power at the Project not later than October 1, 2006, commence Project removal during October 2006, and finance Project Removal Costs in accordance with Section 4.1.1. The schedule attached hereto as Exhibit C illustrates activities that will be carried out under the schedule for Project removal. The Parties agree to consider commencement of removal in October 2005 or earlier if the Intervenor can identify additional funds which significantly reduce PacifiCorp's financial contribution to Project Removal Costs, provided that no change shall be made to the Project removal schedule described in this Section 4.4 except in writing approved by all Parties to this Agreement.

**4.5 Construction Costs Risk Allocation.** Once PacifiCorp awards one or more contracts to perform work within the scope of matters covered by Construction Costs, if actual Construction Costs exceed \$13,650,000, PacifiCorp may use unobligated funds available from Permitting Costs, Mitigation Costs, and Fishery Enhancement Fund, if any, in that order and to the extent necessary to satisfy Construction Costs which exceed \$13,650,000. PacifiCorp shall not so use the Fishery Enhancement Fund without consultation with and the approval by the Nation. If PacifiCorp reasonably anticipates that Construction Costs will exceed \$13,650,000 and that available unobligated funds from Permitting Costs, Mitigation Costs, In

Lieu Site Enhancement Fund, and the Fishery Enhancement Fund will not be sufficient to cover the difference between \$13,650,000 and actual Construction Costs, PacifiCorp shall give immediate notice to the Intervenor. Thereafter, if alternative funding is not provided by the Intervenor in a timely manner to cover Construction Costs in excess of \$13,650,000 or if Intervenor fails to identify cost reduction strategies acceptable to PacifiCorp, PacifiCorp may stop further work on Project removal and shall not be obligated to finance Project removal beyond the sum of Construction Costs, Permitting Costs, Mitigation Costs, In Lieu Site Enhancement Fund, and Fishery Enhancement Fund available in accordance with this Section 4.5. PacifiCorp shall be deemed, upon contribution of \$17,150,000 toward Project removal, to have fully satisfied its obligations to finance and implement Project removal the same as though Project removal had been completed in accordance with this Agreement.

**4.6 Project Removal Costs and Tax Savings Allocations.** If actual Project Removal Costs are less than \$17,150,000, PacifiCorp shall retain one-half the difference between the actual Project Removal Costs and \$17,150,000 and PacifiCorp shall contribute the remaining one-half of such savings to the In Lieu Site Enhancement Fund. PacifiCorp shall make such contribution to the In Lieu Site Enhancement Fund within thirty (30) days of completion of all mitigation and monitoring requirements of any governmental authority in connection with the removal of the Condit Dam. In addition, PacifiCorp shall contribute to the In Lieu Site Enhancement Fund one-half of any savings which the State of Washington forgoes if the Washington Department of Revenue determines that, due to an exemption, the Washington State Sales Tax on services, RCW 82.08, does not apply to services provided by contractors implementing removal of the Condit Dam in accordance with this Agreement. Any funds contributed by PacifiCorp to the In Lieu Site Enhancement Fund under this Section 4.6 shall be administered by the Tribes for mitigation and enhancement projects and activities benefitting resources of the White Salmon River Basin which are approved by the Intervenor.

## **SECTION 5 MODIFICATION OR WITHDRAWAL AND TERMINATION**

**5.1 Withdrawal.** A Party may withdraw from this Agreement in accordance with this Section 5.1 after complying with Section 5.2.

**5.1.1 Amended License Not Timely Issued by the Commission.** Any Party may withdraw from this Agreement if the Amended License is not issued by the Commission within three (3) years of the Effective Date of this Agreement.

**5.1.2 Amended License Inconsistent With This Agreement.** Any Party may withdraw from this Agreement if the Amended License issued by the Commission contains terms or conditions materially inconsistent with those set forth in this Agreement. In the event the Commission modifies, fails to require compliance with, or changes in the Amended License a term or condition that the Parties have agreed to in this Agreement, and this Agreement is not terminated in accordance with Section 5.3, the term or

condition as set forth in this Agreement shall remain a binding covenant among the non-withdrawing Parties, enforceable in accordance with the law of contracts (except to the extent the Amended License prohibits or precludes the performance of that term or condition). In the event a notice of intent to withdraw is filed, the provisions of Section 5.2 shall come into effect unless the Amended License is revised to conform to the Agreement. All Parties shall request the Commission to stay the rehearing proceeding pending the completion of the activities specified in Section 5.2.

- 5.1.3 **Permit Terms and Conditions Inconsistent with Agreement.** If any Permit includes a term or condition which is materially inconsistent with the terms and conditions of this Agreement, any Party affected by such inconsistency may withdraw from this Agreement.
- 5.1.4 **Inability to Obtain Required Permit.** PacifiCorp may withdraw from this Agreement if it is not able to obtain a Permit in final form on terms and conditions consistent with this Agreement which is necessary to implement the Removal Plan or the Amended License after exercising all good faith efforts and fully exhausting all avenues of appeal.
- 5.1.5 **Inability to Obtain Required Easement, Right-of-Way, Other Interest in Property, or Third-Party Consent.** PacifiCorp may withdraw from this Agreement if it is not able to obtain an easement, right-of-way, other interest in or to property, or the consent of any person or entity which is required by law to implement the Removal Plan or the Amended License after exercising all good faith efforts and fully exhausting all applicable avenues of appeal, if any.
- 5.1.6 **Inability to Obtain Contracts to Perform Removal and Implement Mitigation.** PacifiCorp may withdraw from this Agreement if it is not able after exercising all good faith efforts to obtain a contract with a qualified, responsive bidder to perform Project removal and to implement mitigation required by this Agreement or any Permit in accordance with the limitations on Project Removal Costs and other terms and conditions of this Agreement.
- 5.1.7 **Injunction Prohibiting Project Removal or Implementation of Any Permit or Mitigation.** PacifiCorp may withdraw from this Agreement if an injunction or similar order in any Proceeding prohibits PacifiCorp from implementing Project removal or any Permit or mitigation required by this Agreement after exercising all good faith efforts and fully exhausting all applicable avenues of appeal to have such injunction or other similar order vacated or modified to conform with this Agreement.
- 5.1.8 **Inability to Confirm In Lieu Site Enhancement Agreement.** PacifiCorp may withdraw from this Agreement if it is unable after due diligence to confirm an In Lieu

Site Enhancement Agreement with the Tribes within forty-five (45) days of the Effective Date of this Agreement.

**5.1.9 Inability to Obtain Release of Claims from the United States in Its Capacity as Trustee.** PacifiCorp may withdraw from this Agreement if the United States in its capacity as trustee on behalf of Indian tribes fails to provide, within forty-five (45) days of the Effective Date of this Agreement, a release and discharge to PacifiCorp's satisfaction of any and all claims for legal or equitable relief, causes of action, damages, or liabilities caused by, associated with, or in any way attributable to (a) PacifiCorp's ownership, use, operation or maintenance of the Project or (b) the removal of the Project with respect to Tribal interests in the fishery resources or fishery habitat of the White Salmon River and the Columbia River and in lieu sites, except for PacifiCorp's obligations under this Agreement.

**5.2 Notice of Intent to Withdraw; Duty to Negotiate; Modification of Agreement.** If a Party intends to withdraw from this Agreement, it shall first give the other Parties written notice of its intent to do so. The Parties shall meet within twenty (20) days of such mailing in a good faith attempt to negotiate changes to this Agreement that would resolve the cause of the proposed withdrawal. If the Parties are unable to reach agreement within ninety (90) days of the notice of intent, the objecting party may withdraw from this Agreement by notifying the other Parties in writing within one hundred (100) days of the date on which it gave notice of intent to withdraw to the other Parties. This Section 5.2 shall not preclude a Party from seeking rehearing on or otherwise appealing modification of the Amended License to which an objection is made within the prescribed time periods. The Party shall promptly withdraw the request for rehearing or appeal if the Parties subsequently agree to change this Agreement to reflect the Commission's modifications.

**5.3 Effect of Withdrawal.** If any party except PacifiCorp withdraws from this Agreement, this Agreement shall continue in effect, unless the other Parties affirmatively agree to terminate the Agreement. If PacifiCorp withdraws, this Agreement shall terminate.

**5.4 Effect of Termination.** Section 1.2 of this Agreement shall survive any termination of this Agreement. In the event of termination before the Amended License is issued, the Parties intend that the Relicensing Proceeding be restored to its status prior to the first motion to abey the proceedings, filed by PacifiCorp on January 29, 1997. If this Agreement is terminated after the Commission shall have issued an Amended License but before the Amended License is accepted by PacifiCorp, the Amended License shall be deemed rejected with the understanding that the existing relicensing proceeding will be resumed and that all Parties to this Agreement will be restored to the status quo in the relicensing proceeding prior to the Effective Date of this Agreement. If this Agreement is terminated after the Amended License is accepted by PacifiCorp, PacifiCorp shall promptly surrender the Amended License in accord with Commission rules with the understanding that the existing

relicensing proceeding will be resumed and that all Parties to this Agreement will be restored to the status quo in the relicensing proceeding prior to the Effective Date of this Agreement.

**5.5 Remedy for Unlawful Withdrawal or Termination of Agreement.** If any Party believes another Party has withdrawn from or terminated this Agreement in violation of the terms and conditions of this Agreement, the sole remedy for such alleged violation, after exhausting dispute resolution procedures under Section 10, shall be by a proceeding seeking specific performance of the obligations of the Party seeking to withdraw from or to terminate this Agreement.

## **SECTION 6 MITIGATION; POST-REMOVAL COVENANTS**

**6.1 Mitigation Provided by Project Removal.** The Parties agree that Project removal in accordance with Section 4 of this Agreement is the primary means of protection, mitigation, and enhancement of fish, wildlife, and other resources affected by the Project for the purposes of achieving a fair, reasonable and just resolution of issues in the Relicensing Proceeding and serving the public interest.

6.1.1 The Commission's draft and final environmental impact statements found that "dam removal would optimize anadromous fish access and use of upstream habitat because the river profile would rapidly change to the natural pre-dam slope conditions. A natural channel and slope without obstructions provides the best access and migration route for anadromous fish." In addition, the Secretaries of Commerce and Interior noted that dam removal would be the most fail-safe method to pass anadromous fish through the Project area.

6.1.2 The Commission's final environmental impact statement found additional benefits from dam removal, several of which are listed below:

"Project retirement and dam removal would end facility entrainment and passage of fish over the dam. Juvenile salmonids spawned and reared in the upstream habitat could safely out-migrate from the basin. Long-term anadromous fish restoration success with dam removal would result from a combination of increasing upstream passage effectiveness and eliminating downstream migrant mortality caused by project operations and spillway passage over the dam."

"Condit dam removal would restore natural bed load movement processes in the river . . . . Downstream of the powerhouse, aquatic resources, particularly salmonid productivity, would benefit from the elimination of short-term low flows . . . . An increased gravel supply combined with a stable . . . .flow regime would significantly increase salmonid production potential."

"Dam removal would also benefit water quality by passing cooler water to the downstream habitat during the summer and fall. Beneficial ecosystem processes would result from an increase in large organic debris (LOD) transported to the downstream habitat that was formerly retained behind the dam. Natural flow processes would also distribute the carcasses of post-spawn anadromous fish to the downstream habitat [supporting] an increase in the diversity and abundance of aquatic invertebrates . . . . Carcasses . . . would contribute valuable nutrients to the aquatic system and provide prey and nutrients to wildlife species."

"Dam removal would eliminate the adverse impacts associated with rapid and unrestricted flow fluctuations, including juvenile fish stranding and redd dewatering and reduced primary and secondary productivity."

"Dam removal would restore unobstructed river flows . . . and allow for continuous and unified management of the river."

"[T]he total recreational benefits and expenditures associated with whitewater boating and salmon fishing would exceed the benefits and expenditures generated by the current flatwater boating and fishing activities within the project area."

"[Dam removal] would provide significant traditional cultural resource benefits by restoring to the Yakama Indian Nation access to and fishing from anadromous fish-bearing areas . . . unblocked by Condit dam for the first time in 80 years. . . . The Yakama Indian Nation would once again have access to areas that they cite as important for traditional ceremonial, spiritual, and gathering uses by restoring to near natural conditions the area previously occupied by Condit dam and Northwestern Lake."

"[Dam removal] would allow for continued whitewater recreation, and the connection and enhancement of recreational opportunities between the scenic river area and the Columbia River Gorge. It would also provide long-term recreational opportunities from a natural free-flowing river. This alternative best addresses cumulative recreational impacts by eliminating the impoundment at Northwest Lake and restoring natural river conditions, allowing for full development to the inherent whitewater boating potential of the river reach from BZ Corners to a take-out point near the confluence with the Columbia River."

**6.2 Mitigation Provided To Implement the Removal Plan.** The Parties agree that the mitigation to implement the Removal Plan shall be in accordance with specific mitigation required by the Permits.

**6.3 Post-Removal Requirements.** So long as PacifiCorp implements the Amended License, the Removal Plan, and this Agreement, including mitigation required by any Permit,

(a) no Party shall claim that the Condit Dam constitutes an obstruction of the White Salmon River, (b) PacifiCorp shall not be required to take any further action with respect to the Project or enhancement or restoration of fish and wildlife resources or habitats in the White Salmon River Basin, and (c) the State of Washington shall not impose and no other Party to this Agreement shall request or seek to require the State of Washington to impose additional requirements on the Project or require additional mitigation or removal efforts under RCW 75.08.011, 75.08.012, 75.20.040, 75.20.060, 75.20.061, 75.20.090, 77.16.210, 77.16.220, 77.12.425 or otherwise on account of any matter arising from PacifiCorp's ownership, use, operation, maintenance, or removal of the Project.

**6.4 Contingent Mitigation Fund.** The Parties agree that fishery and other resource enhancements associated with Project removal outweigh mitigation opportunities that will be foregone between the Effective Date and the date of Project removal. The Parties also agree that it is appropriate to provide for a contingent mitigation fund to recapture foregone mitigation opportunities if Project removal does not occur because this Agreement is terminated in accordance with Section 5 above ("Contingent Mitigation Fund"). PacifiCorp shall contribute \$550,000 based upon appropriate mitigation measures to the Contingent Mitigation Fund within sixty (60) days after this Agreement is terminated in accordance with Sections 5.2 and 5.3 above, or fifteen (15) days after PacifiCorp receives written notice from the Intervenor designating with reasonable specificity the location and identification of the account into which PacifiCorp's contribution shall be made, whichever time is longer. The Contingent Mitigation Fund, if established, shall be used only to enhance fishery resources, fishery habitat, and other natural resources of the White Salmon River Basin.

## **SECTION 7 IMPLEMENTATION TEAM**

**7.1 Purpose and Function.** The Parties agree to cooperate in implementing the letter and spirit of this Agreement. To that end, this Agreement establishes an Implementation Team to facilitate such cooperative efforts. Without limiting the purpose and function of the Implementation Team, the Implementation Team shall meet as necessary to address issues relating to: implementation of this Agreement and the Removal Plan; determining Permits which are necessary to implement this Agreement and the Removal Plan; assisting PacifiCorp with processes for obtaining and complying with Permits; determination and coordination of mitigation requirements; and implementation and monitoring of mitigation. The Parties anticipate that there will be regular meetings of the Implementation Team to address these and other matters arising under this Agreement, as illustrated by the Schedule in Exhibit C.

**7.2 Meetings.** In addition to regularly scheduled meetings, the Implementation Team shall meet whenever requested by a Party. If a Party desires to convene such a meeting, it may do so by advance written notice to the other Parties of at least twenty (20) days, which notice shall also identify the matter or matters to be submitted to the Implementation Team for consideration. Each Party shall make good faith efforts to raise any issues of which that Party

is aware at regularly scheduled meetings or at a meeting convened by written notice given by any other Party in order to reduce the number of meetings. The Implementation Team will be used as the primary means of consultation and coordination among the Parties in connection with the implementation of this Agreement.

## **SECTION 8 CERTIFICATION OF PROJECT REMOVAL**

**8.1 Certification of Project Removal.** Not more than six (6) months nor less than one hundred (100) days prior to the date that PacifiCorp believes that Project removal will be completed in accordance with this Agreement, the Removal Plan, and Permits, PacifiCorp shall provide pre-certification notice to the Intervenor ("Pre-Certification Notice"). Within forty-five (45) days of the date of PacifiCorp's Pre-Certification Notice, the Parties shall meet to review those actions taken by PacifiCorp to remove the Project and those further actions proposed to be taken by PacifiCorp before the projected completion date ("Proposed Actions"). Upon the request of any Intervenor, PacifiCorp shall provide information in reasonable detail regarding Project removal. Any Intervenor who believes that Project removal will not be completed in accordance with this Agreement, the Removal Plan, and Permits by the date specified by PacifiCorp in its Pre-Certification Notice shall specify in reasonable detail its objection(s) in writing and provide a copy thereof to all other Parties within one hundred (100) days of the date of PacifiCorp's Pre-Certification Notice ("Objection"). No Party shall unreasonably object to PacifiCorp's Pre-Certification Notice. If no timely Objection is submitted by any Intervenor, PacifiCorp shall be deemed to have completed Project removal in accordance with this Agreement, the Removal Plan, and Permits as of the date PacifiCorp provides written certification to the Intervenor that Project removal has been completed in accordance with this Agreement, the Removal Plan, and Permits ("Certification"), so long as PacifiCorp complies with the Proposed Actions.

**8.2 Resolution of Objections to Pre-Certification Notice.** In the event any Intervenor provides a timely written Objection to the Pre-Certification Notice, the Parties shall meet within twenty (20) days of the date of such Objection for the purpose of resolving any dispute over completion of Project removal. If the Parties cannot resolve such dispute within thirty (30) days of the first such meeting date by means of a written acknowledgment of satisfaction, the dispute shall be submitted to informal, non-binding mediation in accordance with Section 10 of this Agreement. No Party shall unreasonably withhold such written acknowledgment of satisfaction. In the event a timely Objection is submitted in accordance with Section 8.1, PacifiCorp shall be deemed to have completed Project removal in accordance with this Agreement, the Removal Plan, and Permits upon receipt of a written acknowledgment of satisfaction from Intervenor that Project removal has been completed in accordance with this Agreement, the Removal Plan, and Permits. Such acknowledgment shall not unreasonably be withheld, conditioned or delayed.

## **SECTION 9 ENFORCEABILITY**

**9.1 Authority and Enforceability.** Each Party represents that it has full power and authority to execute this Agreement and perform its obligations under this Agreement. Each Party further represents that no further consent or approval is required to allow it to enter into and make this Agreement in accordance with its terms and conditions the valid, legal, binding, and enforceable obligation of such Party, subject to applicable law.

## **SECTION 10 DISPUTE RESOLUTION**

**10.1 Informal Dispute Resolution.** The Parties shall use their best reasonable efforts to resolve any dispute that may arise under this Agreement in accordance with this Section and without resort to administrative or judicial or other formal dispute resolution procedures. The purpose of this Section is to provide all Parties an opportunity to fully and candidly discuss and resolve disputes without the expense, risk and delay of formal dispute resolution. To these ends, if any dispute arises under or relating to this Agreement, any Party may provide to the other Parties a general statement of its claim(s) and position(s). If the Parties cannot resolve the dispute within thirty (30) days of receipt of any such written statement, any Party may within thirty-seven (37) days after delivery of such written statement commence non-binding mediation by giving written notice to all other Parties. The mediation shall be conducted and the mediator shall be selected in accordance with the then applicable American Arbitration Association Commercial Mediation Rules. The mediator's costs shall be shared equally among the Parties participating in the mediation. If the mediation resolves the dispute, the resolution shall be reduced to writing. Any Party may terminate its participation in the mediation without resolution of the dispute by giving written notice to the other Parties.

**10.2 Formal Dispute Resolution.** The Parties shall endeavor in good faith to resolve any disputes arising under this Agreement in accordance with Section 10.1 before resorting to other dispute resolution procedures. Each Party reserves all rights it may have to resort to administrative, judicial, or other formal dispute resolution procedures.

**10.3 Reliance on Agreement.** Any Party may rely upon and offer this Agreement as evidence in any administrative or judicial litigation, arbitration, mediation, or other proceeding to establish the existence of and to enforce or implement this Agreement. This Section 10.3 shall survive any termination of this Agreement.

## **SECTION 11 MUTUAL RELEASE OF CLAIMS BY PACIFICORP AND THE NATION**

**11.1 Nation's Release of Past Claims.** For the benefit of PacifiCorp and each of PacifiCorp's directors, officers, employees, and representatives, the Nation does hereby, for itself and any person, entity, agent, successor or assign claiming through or under the Nation, provide a full and complete release and discharge of any and all rights, matters, and interest

giving rise, directly or indirectly, to any kind or nature of claim, loss, harm, cost, damage, expense, or liability caused by, associated with, or otherwise in any way attributable to (a) PacifiCorp's ownership, use, operation or maintenance of the Project or (b) the removal of the Project (collectively, the "Nation's Claims"), including, but not limited to, any and all of the Nation's Claims heretofore alleged or asserted, or that could have been alleged or asserted, against PacifiCorp or the Project, and the Nation shall be deemed to have consented to and ratified PacifiCorp's ownership, use, operation, and maintenance of the Project (collectively, the "Nation's Release"). The Nation's Release is conditioned on and shall become effective on the date when PacifiCorp shall have both ceased generating power at the Project and commenced removal of the Project in accordance with the Removal Plan and this Agreement. Pending the effective date of the Nation's Release and for as long as this Agreement is in effect, the Nation shall not bring any action against PacifiCorp or its directors, officers, employees or representatives with respect to any of the Nation's Claims; *provided, however*, that the Nation may bring an action against PacifiCorp to the extent required to enforce this Agreement.

**11.2 PacifiCorp's Release of Past Claims.** For the benefit of the Nation and each of the Nation's directors, officers, employees, and representatives, PacifiCorp does hereby, for itself and any person, entity, agent, successor or assign claiming through or under the PacifiCorp, provide a full and complete release and discharge of any and all rights, matters, and interest giving rise, directly or indirectly, to any kind or nature of claim, loss, harm, cost, damage, expense, or liability caused by, associated with, or otherwise in any way attributable to the acts or omissions of the Nation affecting (a) PacifiCorp's ownership, operation or maintenance of the Project, or (b) removal of the Project in accordance with this Agreement (collectively "PacifiCorp's Claims"), including, but not limited to, any and all of PacifiCorp's Claims heretofore alleged or asserted by PacifiCorp against the Nation in connection with the Project (collectively, "PacifiCorp's Release"). PacifiCorp's Release is conditioned on and shall become effective on the date when PacifiCorp shall have both ceased generating power at the Project and commenced removal of the Project in accordance with the Removal Plan and this Agreement. Pending the effective date of PacifiCorp's Release and for as long as this Agreement is in effect, PacifiCorp shall not bring any action against the Nation or its officials, employees or representatives with respect to any of PacifiCorp's Claims; *provided, however*, that PacifiCorp may bring an action against the Nation to the extent required to enforce this Agreement.

**11.3 Release of Future Claims.** So long as either PacifiCorp or the Nation is in full compliance with its obligations under this Agreement, this Agreement shall be deemed to fully satisfy and release the complying party's obligations to the other as to any rights, matters, or interests that may give rise to the Nation's Claims or PacifiCorp's Claims (as applicable) arising after the Effective Date of Agreement. As to other rights, matters, or interests, PacifiCorp and the Nation reserve the same.

## SECTION 12 ECOLOGY AND WDFW'S RELEASE

For the benefit of PacifiCorp and each of PacifiCorp's directors, officers, employees and representatives, Ecology and WDFW ("State Agencies") do hereby provide a full and complete release and discharge of any past claims for natural resource or public nuisance damages caused by, associated with, or otherwise in any way attributable to the blockage of the White Salmon River caused by the Project or the absence of fish passage facilities at the Project. The State Agencies' Release is conditioned on and shall become effective on the date when PacifiCorp shall have both ceased generating power at the Project and commenced removal of the Project in accordance with the Removal Plan and this Agreement. Pending the effective date of the State Agencies' Release and for as long as this Agreement is in effect, the State Agencies shall not bring any action against PacifiCorp or its directors, officers, employees or representatives with respect to past claims for natural resource or public nuisance damages as particularly described above.

## SECTION 13 MISCELLANEOUS

**13.1 Support for Implementation.** The Parties shall support this Agreement in good faith and to take all reasonably actions to implement the Agreement without delay.

**13.2 Applicable Law.** This Agreement shall be construed in accordance with and governed by the internal laws of the State of Washington and the United States of America.

**13.3 No Partnership.** Nothing contained in this Agreement shall create or be construed as creating a partnership or joint venture relationship among the Parties.

**13.4 Waiver.** Waiver by any Party of the strict performance of any term or covenant of this Agreement, or of any right under this Agreement, shall not be a continuing waiver, and must be in writing.

**13.5 Notice.** All notices required under this Agreement must be in writing, and shall be addressed to each of the Parties as their respective addresses as set forth in this Section. All notices shall be effective and be deemed given if delivered (a) by personal delivery, on the date of delivery, (b) by certified or registered mail, return receipt requested, three (3) days after the date delivered to the United States Postal Service as shown on the receipt, and (c) by electronic communication on the date confirmation is delivered to the United States Postal Service as shown on the actual receipt. A party may change its address by notice to the other Parties. Notices under this Agreement shall be sent to the following persons:

Randy Landolt, Managing Director  
Hydro Resources Group  
PacifiCorp  
825 NE Multnomah, Suite 1500  
Portland, OR 97232

Katherine Ransel  
American Rivers  
150 Nickerson Street, Suite 311  
Seattle, WA 98109

John Gangemi  
American Whitewater Affiliation  
482 Electric Avenue  
Big Fork, Montana 59911

Dennis White  
Columbia Gorge Audubon Society  
367 Oakridge Road  
White Salmon, WA 98672

Chuck Williams  
Columbia Gorge Coalition  
P.O. Box 155  
White Salmon, WA 98672

Cindy Debruler  
Columbia River United  
P.O. Box 912  
Bingen, WA 98605

Pete Soverel  
Federation of Fly Fishers  
16430 - 72<sup>nd</sup> Avenue W.  
Edmonds, WA 98206

Gary Kahn  
Friends of the Columbia Gorge  
P.O. Box 86100  
Portland, OR 97286

Shawn Cantrell  
Friends of the Earth  
6512 - 23<sup>rd</sup> Avenue NW, Suite 320  
Seattle, WA 98117

Michael Fitzsimons  
Jaques Sharp and Sherrered  
205 Thirs Street  
Hood River, OR 97301

Scott Andrews  
Rivers Council of Washington  
509 - 10<sup>th</sup> Ave E., Suite 200  
Seattle, WA 9898102

Johan Helman  
The Mountaineers  
300 Third Avenue W.  
Seattle, WA 98119

Jeff Curtis  
Trout Unlimited  
231 SW Ash, Suite 208  
Portland, OR 97204

Kurt Beardslee  
Washington Trout  
P.O. Box 402  
Duvall, WA 98019

John Leary  
Washington Wilderness Coalition  
4649 Sunnyside Avenue N., #242  
Seattle, WA 98103

Executive Director  
Columbia River Intertribal Fish Commission  
729 NE Oregon Street, Suite 200  
Portland, OR 97232

Chairman  
Yakama Tribal Council  
P.O. Box 151  
Toppenish, WA 98948

Regional Forester  
Regional Office, R-6  
Forest Service  
U.S. Department of Agriculture  
P.O. Box 3623  
Portland, OR 97208-3623

Bill Arthur  
The Sierra Club  
180 Nickerson Street, Suite 103  
Seattle, WA 98109-1631

Northwest Regional Administrator  
National Marine Fisheries Service  
7600 Sand Point Way NE  
Seattle, WA 98115

Brian Faller  
Assistant Attorney General  
WA State Attorney General's Office  
Attorney for WA Department of Ecology  
P.O. Box 40117  
Olympia, WA 98504-0117

Neil L. Wise  
Assistant Attorney General  
Office of the Attorney General  
Fish & Wildlife Division  
P. O. Box 40100  
Olympia, WA 98504-0100

Tom Luster  
Department of Ecology  
P.O. Box 47600  
Olympia, WA 98504-7600

David Mudd  
Washington Department of Fish and Wildlife  
600 Capitol Way North  
Olympia, WA 98501-1091

Barbara Scott-Brier  
Attorney-Advisor  
Office of the Solicitor, Pacific Northwest  
Region  
U.S. Department of the Interior  
500 N.E. Multnomah Street, Suite 607  
Portland, OR 97232

Area Director  
Bureau of Indian Affairs  
911 N.E. 11<sup>th</sup> Street  
Portland, OR 97232

Regional Director  
U.S. Fish & Wildlife Service  
911 N.E. 11<sup>th</sup> Street  
Portland, OR 97732

**13.6 Modifications.** This Agreement may be modified only in a writing signed by all Parties.

**13.7 Captions.** All captions used in this Agreement are intended solely for convenience of reference and shall in no way limit any of the provisions of this Agreement.

**13.8 Counterparts.** This Agreement may be executed in counterparts, each of which taken together shall constitute a single agreement. A telecopied or facsimile signature shall have the same effect as an original.

**13.9 Implied Covenants.** The Parties agree that in construing this Agreement no covenants shall be implied between the Parties except the covenants of good faith and fair dealing.

**13.10 Force Majeure.** No Party shall be deemed to have defaulted in the performance of its obligations under this Agreement to the extent such performance is wholly or partially prevented or delayed by Force Majeure. Force Majeure means events or causes that are not reasonably within the control or contemplation of the Party whose ability to perform under this Agreement is delayed by the events or causes, including, without limitation and by way of example only: landslides, lightning, forest fires, storms, floods, freezing, drought, earthquakes, civil disturbances, strikes, or other disturbances associated with labor relations, acts of public enemy, war, public riots, breakage, explosion, accident to machinery or equipment (reasonably related to the delayed performance), government restraint, or other causes outside of the reasonable control or contemplation of a Party. Unless the Force Majeure prevents the performance of obligations under this Agreement, the Force Majeure event may not operate to excuse, but only to delay, the performance of obligations under this Agreement. In the event of such delay, the affected obligations hereunder shall be suspended for the duration of the Force Majeure event, the time for the performance of such obligations shall be extended for as long as is reasonable in light of the Force Majeure, and the schedule set forth in the Removal Plan shall be amended to account for such delay. The Party affected by Force Majeure shall use good faith efforts to attempt, in a commercially reasonable manner, to rectify the conditions brought about by the Force Majeure and to avoid or minimize delay. Upon learning of the existence of or potential for an event that qualifies as Force Majeure, the affected Party shall promptly notify the other Parties of such situation, describing in reasonable detail the nature of the event or events in question.

**13.11 Terms and Conditions Negotiated.** The provisions of this Agreement have been negotiated by the Parties in good faith and with the representation of legal counsel. Consequently, in construing this Agreement, no Party shall be entitled to a presumption against any other Party based on drafting.

**13.12 Third Party Beneficiaries.** The Parties do not intend to create, nor are there any, third party beneficiaries of this Agreement.

**13.13 Entire Agreement.** This Agreement, including attached Exhibits, is the entire and final understanding of the Parties and supersedes all prior agreements and understandings between the Parties related to the subject matter of this Agreement. Each provision of this Agreement is a necessary part of the Agreement, and this Agreement is not severable.

**13.14 Officials Not to Benefit.** No member of, Delegate to, or Resident Commissioner in, Congress shall be admitted to any share or part of this Agreement or to any benefit to arise therefrom, unless the share or part or benefit is for the general benefit of a corporation or company.

**13.15 Anti-Deficiency Act.** Nothing contained in this Agreement shall be construed as binding Interior, USFS or NMFS to expend in any one fiscal year any sum in excess of appropriations made by Congress, and available for purposes of this Agreement for that fiscal year, or as involving the United States in any contract or other obligation for the further expenditure of money in excess of such appropriations.

**13.16 Effective Date.** As defined in Section 2.1, the Effective Date is the date on which this Agreement is signed by all of the Parties.

**PACIFICORP**

By [Signature]  
Its Vice President  
Date: 22 September 1999

**AMERICAN RIVERS**

By [Signature]  
Its Northwest Director  
Date: Sept 17, 1999

**AMERICAN WHITEWATER  
AFFILIATION**

By [Signature]  
Its Attorney  
Date: Sept 17, 1999

**COLUMBIA GORGE AUDUBON  
SOCIETY**

By [Signature]  
Its Attorney  
Date: Sept 17, 1999

**COLUMBIA GORGE COALITION**

By [Signature]  
 Its Attorney  
 Date: Sept 17, 1999

**COLUMBIA RIVER UNITED**

By [Signature]  
 Its Attorney  
 Date: Sept 17, 1999

**FEDERATION OF FLY FISHERS**

By [Signature]  
 Its Attorney  
 Date: Sept 17, 1999

**FRIENDS OF THE COLUMBIA GORGE**

By [Signature]  
 Its Attorney  
 Date: Sept 17, 1999

**FRIENDS OF THE EARTH**

By [Signature]  
 Its Attorney  
 Date: Sept 17, 1999

**THE SIERRA CLUB**

By [Signature]  
 Its Attorney  
 Date: Sept 17, 1999

**RIVERS COUNCIL OF WASHINGTON**

By [Signature]  
 Its Attorney  
 Date: Sept 17, 1999

**THE MOUNTAINEERS**

By [Signature]  
 Its Attorney  
 Date: Sept 17, 1999

**TROUT UNLIMITED**

By [Signature]  
 Its Attorney  
 Date: Sept 17, 1999

**WASHINGTON TROUT**

By [Signature]  
 Its Attorney  
 Date: Sept 17, 1999

**WASHINGTON WILDERNESS  
 COALITION**

By [Signature]  
 Its Attorney  
 Date: Sept 17, 1999

**COLUMBIA RIVER INTERTRIBAL  
 FISH COMMISSION**

By \_\_\_\_\_  
 Its \_\_\_\_\_  
 Date: \_\_\_\_\_

**COLUMBIA GORGE COALITION**

By \_\_\_\_\_  
Its \_\_\_\_\_  
Date: \_\_\_\_\_

**COLUMBIA RIVER UNITED**

By \_\_\_\_\_  
Its \_\_\_\_\_  
Date: \_\_\_\_\_

**FEDERATION OF FLY FISHERS**

By \_\_\_\_\_  
Its \_\_\_\_\_  
Date: \_\_\_\_\_

**FRIENDS OF THE COLUMBIA GORGE**

By \_\_\_\_\_  
Its \_\_\_\_\_  
Date: \_\_\_\_\_

**FRIENDS OF THE EARTH**

By \_\_\_\_\_  
Its \_\_\_\_\_  
Date: \_\_\_\_\_

**THE SIERRA CLUB**

By \_\_\_\_\_  
Its \_\_\_\_\_  
Date: \_\_\_\_\_

**RIVERS COUNCIL OF WASHINGTON**

By \_\_\_\_\_  
Its \_\_\_\_\_  
Date: \_\_\_\_\_

**THE MOUNTAINEERS**

By \_\_\_\_\_  
Its \_\_\_\_\_  
Date: \_\_\_\_\_

**TROUT UNLIMITED**

By \_\_\_\_\_  
Its \_\_\_\_\_  
Date: \_\_\_\_\_

**WASHINGTON TROUT**

By \_\_\_\_\_  
Its \_\_\_\_\_  
Date: \_\_\_\_\_

**WASHINGTON WILDERNESS  
COALITION**

By \_\_\_\_\_  
Its \_\_\_\_\_  
Date: \_\_\_\_\_

**COLUMBIA RIVER INTERTRIBAL  
FISH COMMISSION**

By \_\_\_\_\_  
Its \_\_\_\_\_  
Date: \_\_\_\_\_

**FRIENDS OF THE EARTH**

By \_\_\_\_\_  
Its \_\_\_\_\_  
Date: \_\_\_\_\_

**THE SIERRA CLUB**

By \_\_\_\_\_  
Its \_\_\_\_\_  
Date: \_\_\_\_\_

**RIVERS COUNCIL OF WASHINGTON**

By \_\_\_\_\_  
Its \_\_\_\_\_  
Date: \_\_\_\_\_

**THE MOUNTAINEERS**

By \_\_\_\_\_  
Its \_\_\_\_\_  
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Its \_\_\_\_\_  
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**WASHINGTON TROUT**

By \_\_\_\_\_  
Its \_\_\_\_\_  
Date: \_\_\_\_\_

**WASHINGTON WILDERNESS  
COALITION**

By \_\_\_\_\_  
Its \_\_\_\_\_  
Date: \_\_\_\_\_

**COLUMBIA RIVER INTERTRIBAL  
FISH COMMISSION**

By \_\_\_\_\_  
Its \_\_\_\_\_  
Date: \_\_\_\_\_

**YAKAMA INDIAN NATION**

By William Yellow Dr.  
Its Chairman of Yakama Nation  
Date: Sept. 22, 1999

**U.S. FOREST SERVICE**

By \_\_\_\_\_  
Its \_\_\_\_\_  
Date: \_\_\_\_\_

**U.S. DEPARTMENT OF THE  
INTERIOR**

By \_\_\_\_\_  
Its \_\_\_\_\_  
Date: \_\_\_\_\_

**NATIONAL MARINE FISHERIES  
SERVICE**

By William Spiller  
Its National Marine Fisheries Service  
Date: Oct 9, 1999

09/15/99 WED 15:29 FAX 541 386 8771

JACQUES SHARP SHERRENO

002

**YAKAMA INDIAN NATION**

**U.S. FOREST SERVICE**

By \_\_\_\_\_  
Its \_\_\_\_\_  
Date: \_\_\_\_\_

By \_\_\_\_\_  
Its \_\_\_\_\_  
Date: \_\_\_\_\_

**U.S. DEPARTMENT OF THE  
INTERIOR**

**NATIONAL MARINE FISHERIES  
SERVICE**

By \_\_\_\_\_  
Its \_\_\_\_\_  
Date: \_\_\_\_\_

By \_\_\_\_\_  
Its \_\_\_\_\_  
Date: \_\_\_\_\_

**WASHINGTON DEPARTMENT OF  
ECOLOGY**

**WASHINGTON DEPARTMENT OF  
FISH AND WILDLIFE**

By \_\_\_\_\_  
Its \_\_\_\_\_  
Date: \_\_\_\_\_

By \_\_\_\_\_  
Its \_\_\_\_\_  
Date: \_\_\_\_\_

**FRIENDS OF THE WHITE SALMON River**

By Phyllis J. Clauver  
Its President  
Date: September 15, 1999

**YAKAMA INDIAN NATION**

By \_\_\_\_\_  
Its \_\_\_\_\_  
Date: \_\_\_\_\_

**U.S. FOREST SERVICE**

By *Angela D. Hoffman*  
Its *Deputy Regional Forester*  
Date: *9/10/99*

**U.S. DEPARTMENT OF THE  
INTERIOR**

By \_\_\_\_\_  
Its \_\_\_\_\_  
Date: \_\_\_\_\_

**NATIONAL MARINE FISHERIES  
SERVICE**

By \_\_\_\_\_  
Its \_\_\_\_\_  
Date: \_\_\_\_\_

**WASHINGTON DEPARTMENT OF  
ECOLOGY**

By \_\_\_\_\_  
Its \_\_\_\_\_  
Date: \_\_\_\_\_

**WASHINGTON DEPARTMENT OF  
FISH AND WILDLIFE**

By \_\_\_\_\_  
Its \_\_\_\_\_  
Date: \_\_\_\_\_

**FRIENDS OF THE WHITE SALMON**

By \_\_\_\_\_  
Its \_\_\_\_\_  
Date: \_\_\_\_\_

**WASHINGTON WILDERNESS  
COALITION**

By \_\_\_\_\_  
Its \_\_\_\_\_  
Date: \_\_\_\_\_

**COLUMBIA RIVER INTERTRIBAL  
FISH COMMISSION**

By \_\_\_\_\_  
Its \_\_\_\_\_  
Date: \_\_\_\_\_

**YAKAMA INDIAN NATION**

By \_\_\_\_\_  
Its \_\_\_\_\_  
Date: \_\_\_\_\_

**U.S. FOREST SERVICE**

By \_\_\_\_\_  
Its \_\_\_\_\_  
Date: \_\_\_\_\_

**U.S. DEPARTMENT OF THE  
INTERIOR**

By   
Its \_\_\_\_\_  
Date: 9/10/99

**NATIONAL MARINE FISHERIES  
SERVICE**

By \_\_\_\_\_  
Its \_\_\_\_\_  
Date: \_\_\_\_\_

**WASHINGTON DEPARTMENT OF  
ECOLOGY**

By \_\_\_\_\_  
Its \_\_\_\_\_  
Date: \_\_\_\_\_

**WASHINGTON DEPARTMENT OF  
FISH AND WILDLIFE**

By \_\_\_\_\_  
Its \_\_\_\_\_  
Date: \_\_\_\_\_

**FRIENDS OF THE WHITE SALMON**

By \_\_\_\_\_  
Its \_\_\_\_\_  
Date: \_\_\_\_\_

**WASHINGTON DEPARTMENT OF  
ECOLOGY**

By   
Its Director  
Date: 9-8-99

**WASHINGTON DEPARTMENT OF  
FISH AND WILDLIFE**

By \_\_\_\_\_  
Its \_\_\_\_\_  
Date: \_\_\_\_\_

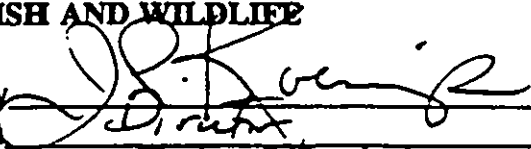
**FRIENDS OF THE WHITE SALMON**

By \_\_\_\_\_  
Its \_\_\_\_\_  
Date: \_\_\_\_\_

**WASHINGTON DEPARTMENT OF  
ECOLOGY**

By \_\_\_\_\_  
Its \_\_\_\_\_  
Date: \_\_\_\_\_

**WASHINGTON DEPARTMENT OF  
FISH AND WILDLIFE**

By   
Its *Director*  
Date: *Sept. 13<sup>th</sup>, 1999*

**FRIENDS OF THE WHITE SALMON**

By \_\_\_\_\_  
Its \_\_\_\_\_  
Date: \_\_\_\_\_

**EXHIBIT A**  
**REMOVAL PLAN**

## **CONDIT HYDROELECTRIC PROJECT**

**FERC NO. 2342**

# **REMOVAL PLAN SUMMARY**

## **INTRODUCTION**

Parties to the Condit Hydroelectric Project Settlement Agreement ("Settlement Agreement") reached agreement on a proposed removal plan for Condit Dam and demolition and removal of all Condit Hydroelectric Project ("Project") facilities with the exception of the Project's powerhouse. The proposed removal plan described as the "Selected Approach" in the Condit Hydroelectric Project Removal Summary Report (May 1998) submitted to the Commission in 1998 as supplemented by removal activities and cost modifications listed in the Cost Removal Worksheet, a copy of which is attached hereto, collectively are the "Removal Plan."

This document, the "Removal Plan Summary," describes the basic elements of the proposed Removal Plan and includes a schedule of the removal activities. The demolition and removal of Condit Dam and other Project facilities, except for the Project powerhouse, are estimated to take one (1) year. In accordance with the Settlement Agreement, PacifiCorp's contribution to planning, engineering, design, mobilization, demobilization, *construction and demolition costs for Project removal in accordance with the Removal Plan* shall not exceed \$13,650,000 (1999 dollars). In the event of any conflict between this Removal Plan Summary and the Settlement Agreement or the Removal Plan, the Settlement Agreement and the Removal Plan shall control.

The method for Project removal agreed upon in the Settlement Agreement was not reviewed in the Commission's October 1996 Final Environmental Impact Statement. The Settlement Agreement contemplates that before the Commission takes final action on PacifiCorp's application for the Amended License that the Commission needs to prepare a supplement to the October 1996 Final Environmental Impact Statement, engage in consultation as appropriate under Section 7 of the Endangered Species Act, and take other actions as appropriate.

### **REMOVAL PLAN ELEMENTS**

#### **Dam Removal.**

The removal of Condit Dam would be accomplished by excavating a drain tunnel through the concrete base of the dam to rapidly drain the reservoir and to allow the dam to be removed in quarried blocks of concrete using conventional construction techniques.

The drain tunnel is to be 12 feet high by 18 feet wide and would be excavated using drilling and explosives at the base of the dam, at elevation 174. The tunnel size is capable of passing 10,000 cfs. Concrete excavated from the tunnel would be transported to a spoil area adjacent to the dam by trucks that are loaded by a rough-terrain crane. An access road would be constructed to the existing spillway apron deck. The last 15 feet of the tunnel would be drilled and blasted, allowing the reservoir and impounded sediments to be sluiced through the tunnel, lowering the reservoir to stream level in about 6 hours.

Prior to this final tunnel blast, a barge mounted clamshell crane would be floated in front of the dam to excavate sediment and debris from the area in front of the projected tunnel hole-through. When the area has been sufficiently cleaned out, the crane and barge

would be removed from the reservoir and the final tunnel blast would be detonated to drain the reservoir. Should the tunnel plug with woody reservoir debris, measures will be taken to clear the jam.

To allow anadromous fish to pass the site during the dismantling of the dam, a series of protective fish pockets would be excavated in each of the walls of the tunnel to allow a place for fish to rest during their passage upstream.

Concrete excavation of the dam would proceed in the dry and start at the East End of the dam. Using drilling and explosives, concrete blocks with dimensions of 10 feet high by 4 feet deep by 6 feet wide would be removed with a highline yarder-type system to trucks for transport to the spoil area. The block size was selected to minimize the cost of excavation and hoist capacity, which would require average lifts of about 33,600 lbs.

Construction would proceed across the dam in a series of top slicing cuts at ten-foot vertical intervals. The very top cut and the front and back faces of the dam in each cut would be drilled and blasted into blocks and loaded into trucks with an excavator and hauled off the dam. As the top slice cuts progress downward and the dam widens, the center section would be drilled and blasted into rubble much like a highway rock cut excavation. The concrete rubble would be loaded into trucks with an excavator and hauled off the dam. This procedure would significantly decrease the cost of concrete demolition.

As the top slice cuts across the top of the dam progress downwards below elevation 225, the existing river channel gets narrow and steep. At this point a crane would be set up on the spillway slab to hoist concrete from this lower area. As the excavation reaches the level of the drain tunnel, the center portion of the area adjacent to the tunnel would be

excavated down to bedrock leaving sections of intact concrete along the edge of the tunnel and along the front and back faces of the dam to hold the water out. When the center section is completely excavated to bedrock, the edge sections are blasted into blocks and hoisted out of the river channel. This should put the river down to its original channel. Lastly, the area around the drain tunnel is excavated in a similar method. This work must be scheduled during low river flows in order to perform a good job of removing the concrete from the footprint of the dam in this lower section.

An earlier proposal for Project removal called for a gate to be fitted to the dam drain tunnel to control releases. Based on subsequent studies of sediment removal and with the concurrence of involved parties, it was decided as reflected in the Condit Hydroelectric Project Removal Summary Report that a more rapid removal of the sediments was preferred.

#### **Appurtenant Facilities Removal.**

In addition to removing the concrete gravity dam including its Obermeyer crest spillway gate and other spillway and intake gates, demolition of the Project facilities also would involve removal of the upstream cofferdams, wood stave pipeline, steel surge tank, and the wooden and steel penstocks.

Upstream Cofferdams: Photographs and drawings show that the cofferdams used to divert and control water during the original construction of the dam were flooded when the reservoir was allowed to fill, and would require removal to return the site to pre-construction conditions. To remove these structures, it is envisioned that a road would be constructed from the top of the excavated concrete dam and would ramp down to area of

the cofferdams. The cofferdams are expected to be at least partially exposed by the erosive flushing of the reservoir. Some blasting would probably be necessary to remove one of the cofferdams, since the photographs indicate that fill concrete was probably placed in one cofferdam in lieu of the puddled earthen materials shown on the original construction drawings. The concrete, stones and boulders, and timber members of the cofferdams would be excavated and trucked to the spoil area. The temporary construction road would also allow access to the upstream area where logs and other debris have sunk to the bottom of the reservoir. Some of these logs would be removed, as necessary, to promote reservoir sediment erosion.

Surge Tank: The steel surge tank and its concrete foundations would be removed to eliminate a future public safety hazard. To allow demolition of the concrete foundation of the tank, drilling and blasting techniques would be used. The foundation and tank materials would be loaded into trucks and transported to the spoil area for burial.

Wood Stave Pipeline and Steel & Wood Penstocks: The existing 13.5 foot diameter, 5100 foot long wood stave pipeline and the 650 foot long steel and wood penstocks, would be removed along with their concrete foundations. All of these materials would be transported to the spoil area and buried. At the time of construction it may be economically feasible to re-cycle some of these materials, and transport them to an off site recycling firm. For example, the scrap steel from the penstock, surge tank, and steel bands and fittings of the wood stave pipeline could have value at the time of removal.

### **Site Preparations.**

Because the dam is located in a steep area, room for construction-demolition adjacent to the dam is limited. It is proposed that a ten-acre area be purchased and used for a site setup and staging area, a borrow pit and a spoil area. Site setup facilities would include an office trailer, equipment parts vans, equipment fueling and maintenance station, an equipment parking area and an explosives magazine site.

It is estimated that two to three thousand cubic yards of fill material may be required for the construction of access roads to various areas of the project. This material could be removed from this spoil area and later back filled as the construction site is reclaimed.

A significant volume of waste materials would be generated from the demolition of the dam and associated facilities. Estimated quantities of some of these materials are listed as follows:

- Concrete - over 45,000 cubic yards (broken volume)
- Wood Pipe Staves- over 6,000 cubic yards stacked
- Steel - over 400 tons
- Woody Reservoir Debris - from drained reservoir area (unknown quantity)

Certainly, some of this material could be hauled off and recycled dependant on the market economics of recycling at the time of construction. A fairly large area would be required to store, sort and transport this material for recycling.

### **Access Road Construction.**

One of the first activities of the project would be construction of an access road to the spillway slab below the dam to permit excavation of the reservoir drain tunnel located at the base of the dam. Access roads into the drained reservoir area would be used during

removal of the cofferdams immediately upstream. Other access roads would be required for the removal of the 5100-foot long wood stave flowline.

### **REMOVAL PLAN SCHEDULE**

An aggressive schedule has been developed to complete the dam removal project within one year. The attached schedule, Figure 1, shows the sequence and timing of the major tasks. Certain criteria have been used to develop the schedule and includes the following:

- Work that affects water quality and quantity should be performed after October 1<sup>st</sup>. (US Fish & Wildlife Service, 21 January 1998 memo)
- The diversion dam used in the original construction of the dam should be removed prior to May 1<sup>st</sup> to allow fish passage. (US Fish & Wildlife Service, 21 January 1998 memo)
- Excavation of the 12X18 ft. drain tunnel at the base of the dam and the removal of low level concrete in the old river channel must be performed during low river flows (July through November)

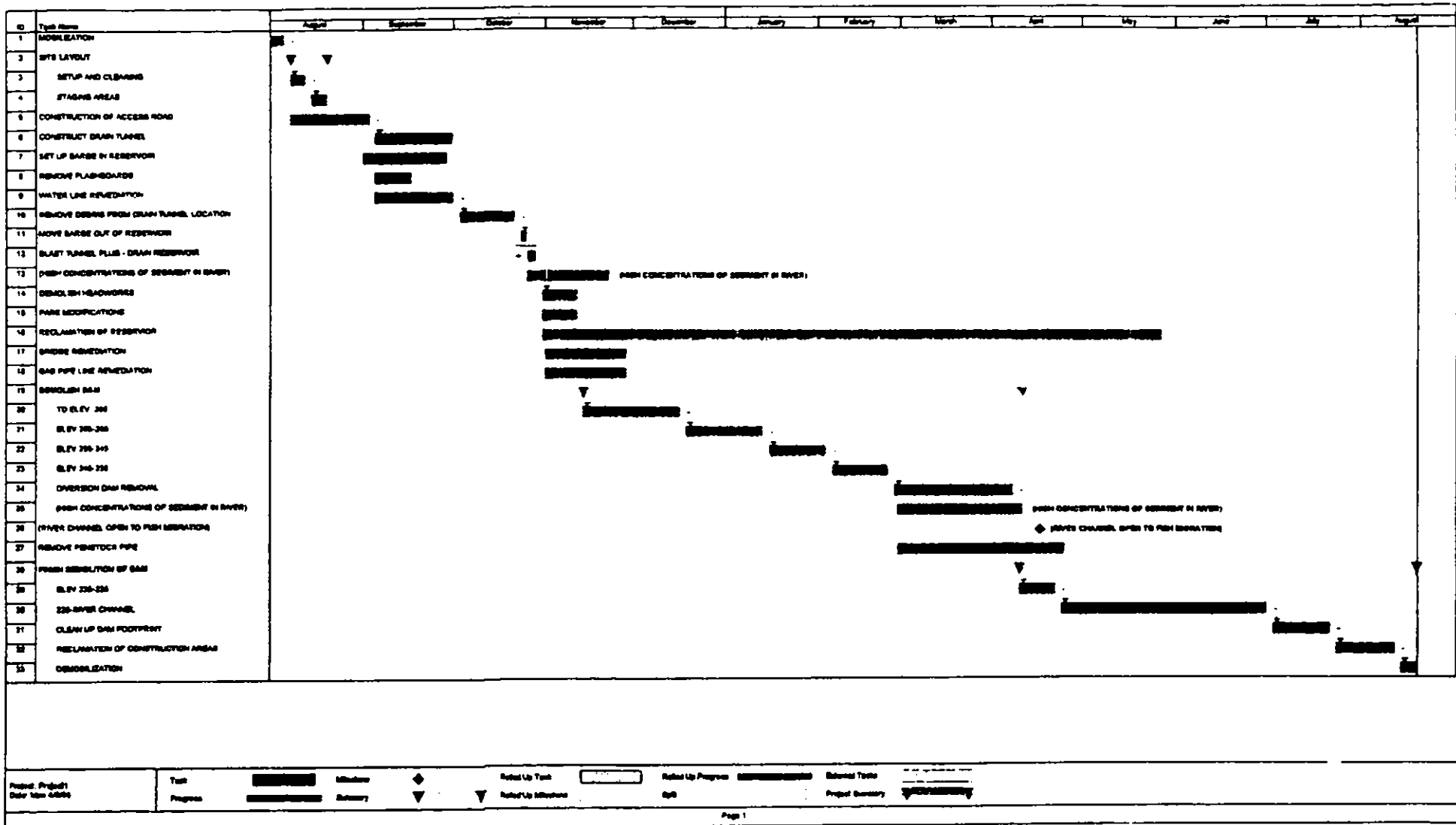
The success of this schedule is dependent upon many factors that are difficult to predict such as actual river flows and weather conditions that would be encountered and the impact of buried wood debris in the reservoir. If significant wood debris is encountered, the speed of sediment erosion could be reduced and additional time may be required to handle the debris and to keep the drain tunnel through the dam open.

### **REMOVAL PLAN CONSTRUCTION COSTS**

Although the structural removal work and the flushing of trapped sediments in the reservoir would consist primarily of demolition, rather than construction, the work has been referred to in the Settlement Agreement as "construction" because construction contractors would perform the work. The Condit Hydroelectric Project Removal Summary Report (May 1998) prepared by an independent consultant identified removal elements and

estimated construction costs of \$10,420,000 (1998 dollars) for the "Selected Approach," including allowances for overhead and contingencies (15%), legal, administration and engineering (10%), and minor building permits (3%). With the assistance of another independent consultant, parties to the Settlement Agreement reviewed and adjusted both removal elements and construction costs. Based on that review, the Removal Costs Worksheet identifies removal elements and construction costs of \$13,650,000 (1999 dollars) for the Selected Approach," including allowances for overhead (15%), legal, administration, and engineering (10%), and minor building permits (3%). The "Removal Cost Elements" total set forth in the Removal Cost Worksheet is the basis of "Construction Costs" set forth in Section 4.1.1 of the Settlement Agreement.

| <b>CONDIT HYDROELECTRIC PROJECT REMOVAL COSTS WORKSHEET</b> |                                                |                 |  |  |
|-------------------------------------------------------------|------------------------------------------------|-----------------|--|--|
| (Cost estimates are all expressed in 1999\$x1000)           |                                                |                 |  |  |
| <b>Removal Costs Elements</b>                               |                                                |                 |  |  |
| Bonding & Insurance (Mobilization)                          |                                                | 410             |  |  |
| Demobilization                                              |                                                | 38              |  |  |
| Site Set up                                                 |                                                | 177             |  |  |
| Construction of Tunnel                                      |                                                | 505             |  |  |
| Gate House & Pier removal                                   |                                                | 104             |  |  |
| Blast Tunnel Plug                                           |                                                | 57              |  |  |
| Pressure Grout Dam                                          |                                                | 100             |  |  |
| Blast & Drain Tunnel                                        |                                                | 57              |  |  |
| Dam Demolition - crest                                      |                                                | 2,006           |  |  |
| Dam Demolition - base                                       |                                                | 1,568           |  |  |
| Reclamation at dam                                          |                                                | 81              |  |  |
| Upstream Cofferdam Removal                                  |                                                | 350             |  |  |
| Tunnel Fish protection                                      |                                                | 12              |  |  |
| Spill gate removal                                          |                                                | 60              |  |  |
| Turbine removal dewatering                                  |                                                | 42              |  |  |
| Property Acquisition                                        |                                                | 400             |  |  |
| Sediment Management Activities:                             |                                                |                 |  |  |
| Canyon Debris Management                                    |                                                | 100             |  |  |
| Additional Contrib. to Sediment Mgmt.                       |                                                | 400             |  |  |
| Woody Debris Mgmt near Dam                                  |                                                | 400             |  |  |
| Accelerate (Blast) Sediment                                 |                                                |                 |  |  |
| From Reserv. Shoreline Slopes                               |                                                | 300             |  |  |
| Revegetation of Reservoir Area                              |                                                | 300             |  |  |
| Revegetation spoil area                                     |                                                | 75              |  |  |
| Log Boom Removal                                            |                                                | 10              |  |  |
| Concrete Disposal                                           |                                                | 240             |  |  |
| Penstock removal                                            |                                                | 398             |  |  |
| Switchyard removal                                          |                                                | 50              |  |  |
| Transmission Line removal                                   |                                                | 15              |  |  |
| Tailrace Infilling                                          |                                                | 28              |  |  |
| Powerhouse Preservation                                     |                                                | 50              |  |  |
| Purhse. Parking Lot Protection                              |                                                | 50              |  |  |
| Mt. Adams Water Supply                                      |                                                | 38              |  |  |
| White Salmon Water Supply                                   |                                                | 450             |  |  |
| Gas Line remediation                                        |                                                | 10              |  |  |
| Northwestern Lake Park                                      |                                                | 10              |  |  |
| Habitat Enhancement                                         |                                                | 25              |  |  |
| Noxious Weed Control                                        |                                                | 12              |  |  |
| Warning Signs                                               |                                                | 2               |  |  |
| Raceway Protections                                         |                                                | 5               |  |  |
| Northwestern Lake Bridge                                    |                                                | 630             |  |  |
| Community Dock Removal                                      |                                                | 6               |  |  |
| Lake Invest. Testing & Boring                               |                                                | 83              |  |  |
|                                                             |                                                |                 |  |  |
|                                                             | Subtotal 1) of Above Items =                   | 8,864           |  |  |
|                                                             | Overhead & Contingencies (25% of SubTotal 1)   | 2,416           |  |  |
|                                                             | Subtotal 2) Contr. Activities =                | 12,080          |  |  |
|                                                             | Legal, Admin & Engineering (10% of Subtotal 2) | 1,208           |  |  |
|                                                             | Minor Bldg. Permits (3% of Subtotal 2)         | 362             |  |  |
|                                                             | <b>Total of Removal Cost Elements =</b>        | <b>\$13,650</b> |  |  |
|                                                             |                                                |                 |  |  |
| Permitting & Mitigation:                                    |                                                | 2,000           |  |  |
| YIN Fishery Enhancement                                     |                                                | 1,000           |  |  |
| In Lieu Site Enhancement Fund                               |                                                | 500             |  |  |
| <b>Total Project Removal Costs</b>                          |                                                | <b>\$17,150</b> |  |  |
|                                                             |                                                |                 |  |  |
|                                                             |                                                |                 |  |  |



## EXHIBIT B

### GROSS DOMESTIC PRODUCT-IMPLICIT PRICE DEFLATOR INDEX SAMPLE CALCULATION

**Example 1:**

Assume that PacifiCorp has a contractual obligation to pay \$500,000 (1999 Dollars) on October 1, 2004. Assume that the Gross Domestic Product-Implicit Price Deflator Index ("GDP-IDP") on the Effective Date, which is assumed to be September 1, 1999, is 114.0. Finally, assume that the most current GDP-IDP index published as of October 1, 2004 is 119.0 which is the index for the 2nd quarter of 2004. The amount paid in 2004 dollars on October 1, 2004 would be:

$$\begin{aligned} &\text{Obligation Amount} * ((2004 \text{ GDP-IDP}) / (1999 \text{ GDP-IDP})) \\ &\$500,000 * (119.0 / 114.0) = \$521,930 \end{aligned}$$

**Example 2:**

Assume that PacifiCorp pays \$500,000 (2004\$) in Project Removal Costs on October 1, 2004. Assume the GDP-IDP on the Effective Date, which is assumed to be September 1, 1999, is 114.0. Finally, assume that the most current GDP-IDP index published as of October 1, 2004 is 120.0 for the last quarter of 2004. The amount credited (in 1999 Dollars) against PacifiCorp's contribution for Project Removal Costs would be:

$$\begin{aligned} &\text{Obligation Amount} * ((1999 \text{ GDP-IDP}) / (2004 \text{ GDP-IDP})) \\ &\$500,000 * (114 / 120) = \$475,000 \end{aligned}$$

**EXHIBIT C**

**SCHEDULE**



825 N.E. Multnomah, Suite 1500  
Portland, Oregon 97232  
(503) 813-5000

ORIGINAL

 **COPY**



May 9, 2005

Ms. Kathryn Harris  
Department of the Army (DA)  
Corps of Engineers, Portland District  
P.O. Box 2946  
Portland, OR 97208-2946

**Subject: PacifiCorp's Responses to DA Requests for Additional Information on  
Condit Hydroelectric Project: Corps No.: 200400523**

FILED  
OFFICE OF THE  
SECRETARY  
2005 SEP 26 A 9 41  
FEDERAL ENERGY  
REGULATORY COMMISSION

Dear Ms. Harris:

PacifiCorp is pleased to provide you the following information in response to your request for additional information regarding the Condit Hydroelectric Project. I apologize for taking more time than anticipated to provide our responses and appreciate your patience. We look forward to working with you on this project and addressing all pertinent issues.

Don't hesitate to contact me if you have questions regarding this information or have any additional questions.

Sincerely,

Gail M. Miller  
PacifiCorp Project Manager

Enclosure

CC: David Every, URS; Loree Randall, Ecology; Derek Sandison, Ecology;  
Settlement Agreement Parties  
Internal Distribution  
File

**U.S. Army Corps of Engineers Permit Application No. 200400523**

**PacifiCorp's Reply to Public Comments**

**Condit Hydroelectric Project**

**Prepared by PacifiCorp  
May 9, 2005**

# PacifiCorp's Reply to Public Comments U.S. Army Corps of Engineers Permit Application Condit Hydroelectric Project

Corps No. 200400523

May 9, 2005

In a letter dated February 4, 2005, the Corps asked PacifiCorp to address several issues raised during the public comment period on PacifiCorp's permit application for the Condit Hydroelectric Project (Project). These issues, as described by the Corps in its letter, are set forth below in bold italics. PacifiCorp's responses follow.

## 1. Temporary Impacts

***Question 1: Define the temporary access roads and temporary fill required during the construction activities. The locations of access roads provided in the original application were identified only on aerial photographs. The roads and temporary fill material should be shown on maps so they are easily discernible and can be identified by local landmarks.***

Response 1:

The table from the Project Description showing access roads, work areas and staging areas and their associated descriptions and purposes is included in this response as Attachment A. In addition, these areas are shown on the five aerial maps that are also included in the attachment. PacifiCorp also had a study performed to further define the requirements of the temporary haul roads, including estimates of cut and fill amounts along with a discussion of required earth moving equipment. This study is also provided in Attachment A.

## 2. Beneficial Uses

***Question 2: The Washington State Department of Ecology (DOE) designated several general beneficial use categories for the White Salmon and Columbia Rivers, including aquatic life; primary contact recreation; domestic, industrial, and agricultural water supply; stock watering; wildlife habitat; fish harvesting; commerce and navigation; and boating. Although Appendix 10 of the Project Description contained a table listing the extent of the effects to these uses from the sediment released upon removal of the Condit Dam, a narrative describing the effects on the various uses is required for the Corps to complete our analysis of the proposed project. Specific uses mentioned in the public comments include, but are not limited to, the Mt. Adams Orchard water withdrawal.***

**Response 2:**

The tables in Appendix 10 to the June 2004 Project Description were intended to summarize at a very general and categorical level the potential effects of the Project on beneficial uses designated by the Washington Department of Ecology (Ecology) under the federal Clean Water Act. These potential effects are described elsewhere in the Project Description, the Final Supplemental Final Environmental Impact Statement (FSFEIS) issued by FERC, and other documents. A narrative summary of the potential effects is set forth below.

**Summary**

The very purpose of removing the Project is to enhance beneficial uses by restoring the natural geological and ecological processes of the White Salmon River (WSR). Although Project removal may have short-term adverse effects on some beneficial uses in the WSR downstream of the Project, any such effects will be temporary and will be substantially outweighed by the permanent benefits that Project removal will provide to aquatic life, recreation, and other beneficial uses. Among the agencies supporting Project removal are Ecology, a signatory to the Agreement, is currently undertaking a rigorous evaluation of dam removal impacts as part of 401 certification, including consideration of beneficial uses. NOAA Fisheries and the U.S. Fish and Wildlife Service, which are responsible for protecting endangered and threatened species under the federal Endangered Species Act, also are signatories to the Agreement.

**Background: Summary of Sediment Behavior**

The Project Description includes an extensive analysis of sediment behavior during and following dam removal. The following summary of this analysis, which was based on conservative assumptions to ensure that potential sediment effects are not understated, provides context for the discussion of beneficial uses that follows.

When Condit Dam is removed, approximately 2.7 million cubic yards (mcy)<sup>1</sup> of sediment will have accumulated in Northwestern Lake since the dam was completed in 1913. Removing the dam will allow between 1.6 and 2.2 mcy<sup>2</sup> of this sediment to move downstream within the first year after the dam is breached.

<sup>1</sup> This figure includes an estimated 322,000 cubic yards of additional sediment that may have accumulated in the reservoir between 1997, when the volume of reservoir sediments was last surveyed, and 2008, when the dam is proposed to be removed. The estimate is based on average sediment accumulation for the 84 years between dam construction and the 1997 survey, which amounts to an average yearly accumulation of 29,000 cubic yards.

<sup>2</sup> The estimated range of sediment movement is based on the 1997 reservoir sediment survey. Although sediment that will have accumulated since 1997 may affect this estimated range, the effect will be small. Most, approximately 75 percent, of the additional 322,000 cubic yards will be material of small particle sizes that will naturally be located within the first mile upstream of the dam and would be eroded out of the reservoir within the first month after dam breach. The higher value of 2.2 mcy of eroded sediment is based on the assumption that the failure angle of repose for material composed of primarily small particles will be flatter than the angle of repose for the larger particles, while the lower value of 1.6 mcy assumes the same angle of repose for all material. The estimated range of eroded material based on assumed sediment volume in 2008 would be between 1.8 and 2.5 mcy. Because the difference in the estimated ranges is

Immediately after the dam is breached in October 2008, water will flow out of the reservoir at a rate of approximately 8,000 to 10,000 cubic feet per second (cfs), draining the reservoir in about 6 hours. Although this is a high flow rate, it is substantially less than the 45,000 cfs estimated during a 1996 flood. Moreover, once the reservoir has drained, the river flow will return to the rate of inflow into the former reservoir—in October, an average of 634 cfs, or less than 10 percent of the initial flow rate.

The rapid draining of the reservoir will create suspended sediment concentrations in the WSR below the dam that could briefly reach 250,000 parts per million (ppm) while the reservoir is draining and could average up to 150,000 ppm for the first day. These concentrations will fall rapidly in the following days and weeks, to an anticipated average daily concentration of about 3000 ppm after three months and 200 ppm after 6 months. After the first year, sustained suspended sediment concentrations will return to approximately background river concentrations, but briefly higher suspended sediment concentrations will occur with diminishing frequency for several years thereafter during progressively higher flood levels.

Immediately downstream of Condit Dam, the steep gradient and narrow canyon of the WSR will flush almost all the sediment downstream, although sediments may fill some pools in this reach. A large portion of the sediment, however, will likely settle in the lower 0.8 miles of the river, which is part of the unnatural pool formed in the Columbia River (CR) by Bonneville Dam. The Project Description predicts that, depending on the level of Bonneville Pool, more than 0.6 mcy of the 1.6 to 2.2 mcy of sediment eroded from the reservoir, including nearly all the gravel and other large sediment particles, will be deposited in this portion of the WSR (known as the “in-lieu” site).

The WSR will transport most of the finer sediment particles beyond the in-lieu site and into the Bonneville Pool. The remaining sand-sized and larger particles will settle on the Washington side of the Bonneville Pool within a few miles of the mouth of the WSR, and most of the remaining silt-sized particles will settle within the 20 miles of the pool between the WSR and Bonneville Dam. Most of the clay-sized particles, however, will remain in suspension downstream of the dam.

Because the flow in the WSR will be very high during the approximately six hours that the reservoir is draining, the WSR will initially comprise approximately 7 percent of the average flow of the CR. This, in turn, will cause suspended sediment concentrations in the CR to be relatively high during this period. After completely mixing with the CR a few miles downstream of the mouth of the WSR, the water from the reservoir may have suspended sediment concentrations of 2300 to 5800 ppm; at Bonneville Dam, the concentrations may range from 1100 to 2600 ppm; and in the lower CR, the concentrations may range from 900 to 2200 ppm. After the initial six hours, however, when the reservoir has drained, the WSR flow will return to normal and will make up

---

relatively small, and to ensure consistency with the Project Description and other documents, the remainder of this response continues to refer to the range calculated on the basis of the 1997 survey.

only approximately 0.6 percent of CR flow. This will dramatically reduce suspended sediment concentrations as they mix with the CR and settle downstream of the WSR. The anticipated concentrations will range from 200 to 1700 ppm after complete mixing with the CR a few miles downstream of the WSR mouth; from 100 to 750 ppm at Bonneville Dam; and from 80 to 625 ppm in the lower CR. After approximately the first week, sustained concentrations in the CR at these locations would be at essentially background levels, although brief spikes in concentrations may occur over the first month.

### **Potential Effects on Designated Beneficial Uses**

#### ***Aquatic Life***

##### ***Fish: WSR***

Fish species in Northwestern Lake include native rainbow and cutthroat trout, nonnative brook trout, and perhaps small numbers of threatened bull trout. Rainbow, cutthroat, and brook trout are also present in the approximately three miles of the WSR downstream of Condit Dam, as well as other native and nonnative resident fish, such as whitefish, largescale suckers, dace, sculpin, redbelly shiner, chiselmouth, northern pikeminnow, smallmouth bass, walleye, and catfish, and anadromous fish, such as chinook salmon, coho salmon, and steelhead trout. Based on habitat and surveys, few, if any, threatened bull trout are anticipated to be in the lower river.

Removing the dam will replace the reservoir habitat of Northwestern Lake with two miles of riverine habitat and reconnect the river downstream of the dam with the river upstream of the dam. When the dam is breached, some reservoir fish will be flushed downstream. Those that are not harmed will likely move downstream to reside in the Bonneville Pool of the CR.

In the WSR downstream of the dam, the sediment flowing out of the former reservoir may cause some level of adult fish mortality and the loss of any incubating eggs. Fall and spring chinook juvenile fish rearing in the river, however, will have migrated out of the river by October when the dam is proposed to be breached. The timing of dam removal was scheduled by tribal and agency fishery biologists for late October because adult fall chinook and steelhead runs headed to upriver spawning areas would be past the WSR by mid-October. In addition, PacifiCorp proposes to capture and transport to a hatchery the fall chinook adults returning to the WSR before the dam is breached in October. Lower Columbia Fall Chinook is the principal anadromous salmon stock that spawns in the lower WSR. Finally, PacifiCorp will take measures to protect the U.S. Fish and Wildlife Service's fish rearing facility at river mile 1.4 from high flows and reservoir sediments.

High suspended sediment concentrations will likely preclude fish from returning to the river within and downstream of the former reservoir for several months after the reservoir is drained, which will help minimize harm to fish. It is possible, however, that winter

steelhead and fall chinook may migrate up the WSR past the dam site to seek spawning areas during reduced periods of turbidity. Thereafter, periodic spikes in sediment concentrations associated with high flow events could have temporary adverse effects on fish in the WSR below the dam site. After approximately two years, however, sediment spikes will be increasingly infrequent and associated only with extreme floods that will have naturally high sediment levels. Substrate conditions in the river channel within and downstream of the former reservoir will also begin to stabilize, creating conditions that will allow spawning and juvenile rearing, although complete stabilization could take several years.

Ultimately, the removal of the dam and decommissioning of the Project will create approximately two miles of additional riverine habitat within the former reservoir area and will improve spawning and rearing habitat within the river downstream of Condit Dam in several ways. Removal of the dam will allow gravel and large woody debris to pass downstream from the upper watershed. Decommissioning the Project will eliminate the potential for fish stranding and redd dewatering during startup and shutdown, as well as any potential for the tailrace and tailrace flows to cause mortality in spawning anadromous fish. Moreover, the small increase in water temperature from the discharge of warmed reservoir surface water will be eliminated.

Fish habitat upstream of Northwestern Lake will not be adversely affected by the removal of the dam, and within several months after the dam is breached, suspended sediment concentrations in the lower river will be sufficiently low to allow safe upstream and downstream passage between the upper river and the CR. The removal of the dam will restore up to 19 miles of mainstem and tributary habitat for anadromous and resident fish that was blocked by the dam's construction in 1913. This includes the river and tributaries up to at least river mile 7.6 (Husum Falls), and possibly to river mile 12.4 for coho salmon and threatened chinook salmon. Threatened steelhead would likely be able to reach river mile 16.2 and may be able to pass falls located there, depending on river conditions. For threatened bull trout, the removal of the dam will allow access to potentially productive habitat in the upper watershed, as well as allow adults to move downstream to important foraging habitat in the CR. The carcasses of these additional fish in the upper watershed will also provide important nutrients to the watershed.

Anadromous fish, particularly steelhead trout, may provide additional competition for resident rainbow trout populations in the portions of the watershed upstream of Condit Dam. Rainbow trout studies in an Idaho river, however, showed that trout and steelhead coexistence contributed to greater production than when the stocks existed by themselves. There is no reason to expect that they will not do so in the WSR, where such competition was present before the construction of the dam. All other resident fish populations will benefit from the expanded habitat opportunities made available by the removal of the dam and the additional nutrients provided by anadromous fish carcasses.

### *Fish: CR*

Fish species in the WSR below Condit Dam are also present, either as residents or migrants, at the in-lieu site near the mouth of the river and in the adjacent CR. In addition, white sturgeon and juvenile American shad reside in the CR, and shad, sockeye salmon, and several populations of salmon and steelhead (some of which are listed as threatened or endangered) migrate in the CR past the mouth of the WSR as adults or smolts.

*Initial sediment plume caused by draining the reservoir.* When the dam is breached, the high flows and high suspended sediment concentrations in the WSR may harm or displace fish in the in-lieu site at the mouth of the river, as well as just beyond the mouth in the CR. For approximately six hours, 8,000 to 10,000 cfs of water (approximately 7 percent of the average October CR flow) will flow into and mix with the CR. The CR flow will rapidly reduce sediment concentrations below acutely harmful levels. Except for the immediate vicinity of the WSR mouth, CR fish are unlikely to be harmed by sediment entering the river, but they may be displaced from the most sediment-laden portions of the plume until it has completely mixed with the CR, approximately three miles downstream of the WSR mouth. Beyond this point, the plume will continue to dissipate through settling and further dilution by CR tributaries but may briefly interfere with foraging behavior and predator-prey relationships through the Bonneville Pool and downstream of Bonneville Dam.

*Effects after the reservoir drains.* After the reservoir has drained (i.e., after about six hours), the flow of the WSR into the CR will return to normal—an October average of 634 cfs, or about 0.5 percent of the October average of the CR. As noted above, suspended sediment concentrations entering in the WSR, although falling rapidly, will likely be at potentially harmful levels continuously for several weeks and intermittently for several months. Mixing with the much larger flow of the CR (as well as settling within the CR), however, will confine these potentially harmful concentrations in the CR to an area on the north side of the river downstream of the mouth of the WSR. This area will initially be about three miles long but will shrink over the next several weeks to the immediate vicinity of the mouth of the WSR. Note that, although sediment concentrations will be potentially harmful within this area, fish will be able to avoid the area, so that there should be little or no actual harm to fish. Downstream of this area, interference with foraging behavior and predator-prey relationships may persist for two to three days and intermittently for several weeks within the Bonneville Pool. Downstream of Bonneville Dam, however, no potentially adverse effects are anticipated after the initial sediment plume passes.

### *Fish: In-Lieu Site*

Within several weeks after the dam is breached, the in-lieu site may fill with sediment, depending on the flows following breaching, the elevation of Bonneville Pool, and other circumstances. For example, if Bonneville Pool is temporarily drawn down to minimum operating pool or lower, the backwater effect in the lower WSR will be reduced and more

sediment will be transported into the CR. In the worst case, however, a new, smaller channel approximately 100 feet wide and up to 17 feet deep will eventually form within the in-lieu site. High sediment concentrations in the WSR may exclude fish from the area for several months and may thereafter briefly—but with decreasing frequency—displace them from the area during progressively higher flood levels. A few migrant CR fish, which may currently use the in-lieu site as a cool water refuge in the summer, will find a smaller refuge after dam removal, but they will not be adversely affected by intermittently high sediment concentrations caused by high flow events because these events do not occur during the summer.

#### *Fish: Hatcheries*

None of the fish hatcheries on the CR downstream of the WSR draw their water from the CR. Therefore, they will not be adversely affected by high sediment concentrations from the removal of Condit Dam. In addition, sediment accumulation in the CR will not be sufficient to block smolts released from the hatcheries or adults returning to them. The closest hatchery to the mouth of the WSR is the Spring Creek Fish Hatchery on the north shore, about one mile downstream. The in-lieu site will capture all sediment larger than sand, and sand accumulations within the CR in the vicinity of the mouth are unlikely to be more than a few feet deep. Accumulations a mile downstream would be much less and would soon be transported further downstream.

#### *Other Aquatic Life*

*Upstream of Northwestern Lake.* Other aquatic life upstream of Northwestern Lake, including amphibians and invertebrates, will not be disturbed by the removal of Condit Dam. Removing the dam and reservoir, however, will likely benefit aquatic life upstream of the reservoir through increased riparian habitat connectivity and the additional nutrients provided by the carcasses of anadromous fish.

*Northwestern Lake.* The removal of Condit Dam will result in the loss of approximately 35 acres of shallow open-water habitat and 3.8 acres of lake-fringe wetlands. These areas are or were inhabited by herptiles (including formerly the Northwestern pond turtle, which is listed as endangered by Washington), invertebrates, and plants (including five plants that are listed as sensitive by Washington). The lake-fringe wetlands, however, will be replaced by natural or created riparian wetlands along the restored river or its tributaries within the former reservoir area. Moreover, the restored riparian habitat is likely to be more beneficial than the current lake-fringe habitat because it will provide more diverse habitat, a better wildlife corridor, more shade, and woody debris. Finally, although Northwestern pond turtles were observed in the reservoir in the early 1990s, no turtles have been observed since then, notwithstanding an extensive survey and trapping effort in the summer of 2004. Moreover, the reservoir is poor habitat for pond turtles because of its cold temperatures and lack of basking logs.

*WSR downstream of Condit Dam.* Aquatic life, including invertebrates, in the WSR downstream of Condit Dam will likely be harmed by high flows and sediment when

Condit Dam is breached. The continued transport of large volumes of sediment out of the reservoir area may preclude the recolonization of this reach of the river for several months, and increasingly infrequent and progressively higher floods could briefly transport large amounts of sediment into and through the reach for several years.

Eventually, as the river stabilizes, invertebrates and other aquatic life will recolonize the reach, and the one-half acre of riparian wetlands that may initially be lost when the dam is breached will naturally be replaced by riparian wetlands of at least comparable size and value. In addition, the removal of the dam and decommissioning of the Project will provide long-term benefits to aquatic life downstream. Although increased flows in the former bypass reach may transform pools and riffles into less productive run habitat, the increase in wetted area and the addition of gravel and woody debris from upstream will result in more productive habitat overall. Gravel and woody debris, as well as more stable flows, will also result in more productive habitat downstream of the former bypass reach.

*CR.* In the worst-case circumstance, the removal of the dam could deposit an average of up to five feet of sediment on the Washington side of the CR within a mile downstream of the mouth of the WSR. This, as well as high turbidity in this area for up to several months, could harm benthic invertebrates in the area. These organisms, however, will quickly recolonize the area. Downstream of the area, the potentially high turbidity within the Bonneville Pool for several days and downstream of Bonneville Dam for several hours will likely be too brief to have any substantial adverse effect on invertebrates or other aquatic life.

### ***Fish Harvesting***

The removal of Condit Dam will replace the 90-acre Northwestern Lake and flat-water recreational fishing on the lake with two miles of free-flowing river and will restore fish passage between the river upstream and downstream of the dam. The high sediment loads from the former reservoir area may also impair recreational fishing in the three miles of the WSR downstream of Condit Dam continuously for several months and intermittently for several years as fish populations recover and repopulate that portion of the river. In addition, tribal fishing access at the in-lieu site may be temporarily impaired by sediment filling the area, although the Settlement Agreement provides funds to the Tribes that they may use to protect the site or to reestablish access. Further, the tribes have had and will continue discussions with the Corps about the potential to temporarily lower the Bonneville Pool during the dam breaching event to facilitate sediment transport from the lower WSR to the Bonneville Pool. Within the CR, it is unlikely that fish harvesting will be impaired by high turbidity, even immediately after the dam is breached, because fish runs will have largely moved upstream of the WSR by that time of year. Because there is little fish harvesting during the winter months, any residual sediment movement into Bonneville Pool or downstream will not likely have any serious effects. Sediment at the mouth of the WSR may also modify access to the mouth of the WSR and the in-lieu site by recreational fishing boats, but the sediment will not preclude access.

Removal of the dam will provide immediate and long-term benefits to fish harvesting that substantially outweigh the elimination of flat-water fishing on Northwestern Lake, any partial filling of the lower WSR adjacent to the in-lieu site, and the temporary impairments to fish harvesting downstream. An anadromous fishery will be created on up to 19 miles of potential river habitat upstream of Condit Dam, and fish habitat will be improved in the WSR downstream of the dam. The additional and improved habitat will also strengthen the wild populations of chinook salmon, coho salmon, steelhead, Pacific lamprey, and bull trout, which should contribute to additional recreational, commercial, and tribal fishing opportunities within and outside the WSR Basin.

### ***Wildlife Habitat***

The elimination of Northwestern Lake will eliminate 35 acres of shallow open-water habitat for waterfowl, as well as approximately 3.8 acres of wetlands used by terrestrial wildlife. The high flows that result from rapidly draining the lake will also damage riparian areas in the WSR River downstream of the dam, including approximately one-half acre of riparian wetlands.

The lake-fringe and downstream riparian wetlands, however, will be replaced with natural or created riparian wetlands of equal or greater size and value. In addition, although the loss of shallow open-water habitat may reduce habitat for certain waterfowl, such as mallards, its replacement with two miles of river habitat will benefit other waterfowl, such as mergansers. The new riparian habitat will also have greater wildlife value than the lake-fringe habitat that it replaces, and fish-eating birds, such as bald eagles and osprey, will benefit from the improvements to salmon and trout populations.

### ***Primary Contact Recreation***

The elimination of Northwestern Lake will reduce opportunities for swimming and other primary contact recreation, but the small size of the reservoir and its cold water currently provide only limited swimming opportunities. The restoration of the river will restore the same opportunities for primary contact recreation as were available before Condit Dam was constructed. The high sediment loads in the months following the removal of Condit Dam should have little effect on primary contact recreation downstream because the dam will be removed at the beginning of winter, when little or no primary contact recreation occurs.

### ***Water Supply***

To PacifiCorp's knowledge, no public or private drinking water intakes are located on the WSR or CR downstream of Condit Dam. Accordingly, the temporary increases in sediment and turbidity caused by the removal of the dam will not have an adverse effect on private or public drinking water supplies. Similarly, any downstream agricultural water supplies would be unlikely to be affected because the high turbidity associated with

removing the dam will occur during the winter, when withdrawals for irrigation are unlikely.

Several industries withdraw water from the CR downstream of Bonneville Dam. Because the increase in turbidity downstream of the dam will be brief, any effect on these withdrawals would likely be insignificant and limited to the need to backwash filters more frequently for a period of a few hours or days. No industries withdraw water from the WSR downstream of Condit Dam, and, to PacifiCorp's knowledge, no industries withdraw water from the Bonneville Pool.

The elimination of Northwestern Lake would not have an adverse effect on groundwater quality. It could, however, indirectly affect up to four residential wells and one municipal well (City of White Salmon) by lowering the groundwater table and also require the relocation of an agricultural water intake (Mt. Adams Orchard) in the reservoir. With respect to the wells, PacifiCorp's water right for the Project has a priority date of 1913 and is senior to groundwater rights in the vicinity of the Project under Washington law. Moreover, PacifiCorp has contractual agreements with lessees of PacifiCorp cabins near the lake that hold PacifiCorp harmless for changes in reservoir levels. Mitigation cannot be required if the mitigation would be contrary to PacifiCorp's public and private legal rights. With respect to relocating the Mt. Adams Orchard water intake, the Settlement Agreement earmarks \$38,000 to share the costs of relocating the water intake from the reservoir to the new river channel.

### *Commerce and Navigation*

The removal of Condit Dam would result in sediment from Northwestern Lake and future upstream sediments filling the in-lieu site and depositing up to several feet of sand along the north side of the CR immediately downstream of the mouth of the WSR. Very little of this sand would accumulate in the CR shipping channel, and there would be no effect on navigation in the channel, which requires 17 feet of depth and is 45 feet deep in the vicinity of the WSR mouth.

### *Boating*

The loss of flat-water boating on Northwestern Lake will be counterbalanced by an increase in kayaking and rafting opportunities on an additional two miles of free-flowing river by removing the dam. In addition, Condit Dam will no longer be a barrier to kayaks and rafts, which will result in access to an additional three miles of river downstream of the dam. The increase in sediment following the removal of the dam, however, could limit kayaking and rafting downstream of the dam for several months, although this will be during the winter and early spring when there is little or no kayaking and rafting on this reach of the river.

### ***Aesthetic Values***

Washington's narrative water quality standard for the protection of aesthetic values prohibits effects that are "offensive" to human senses of perception, not merely effects that are perceptible to those senses. The draining of Northwestern Lake will expose the bare bed of the reservoir, which may be visually offensive in contrast with the surrounding forested slopes for a period of several years until the bed is sufficiently revegetated. In addition, the temporary increase in turbidity downstream of the reservoir may be visually offensive. The removal of the dam, however, will not result in any long-term impairment of aesthetic values, and the restoration of the natural rocky canyon within the former reservoir area could be viewed as more aesthetically pleasing and more harmonious with its natural surroundings than the current reservoir.

### **3. Construction Related Activities**

***Question 3: Numerous comments were received regarding the proposed project's impacts to increased levels of noise and air pollution. Although the Project Description discusses best management practices (BMPs) to mitigate for increased levels of noise and dust, neither the Description nor the Final Supplemental Environmental Impact State (FSEIS) discuss the effects to the local environment related to these items. Please provide a description of the expected effects related to increased levels of noise and air pollution, e.g. dust levels.***

**Response 3:**

In general, the expected effects of increased levels of noise and air pollution will be temporary and similar to those of similar large earthwork projects. Noise sources will include air drills, cranes, blasting, haul trucks, and dozers. Impacts to air pollution will be from equipment emissions and dust. Dust impacts will occur primarily during dry periods and the potential temporary effects are reduced visibility and dust adjacent to work areas, unpaved roads and staging areas. The BMPs described in the Project Description will address the potential temporary effects of noise and air pollution.

The Project Description includes a Blasting Plan that includes numerous best management practices to prevent or minimize potential adverse effects, such as inducing fish to move away from the immediate blasting area before the blast, using a method that is acceptable to the Washington Department of Fish and Wildlife. (See pages 59-61.)

The Project Description contains a Dust Control Plan that addresses the potential impacts of dust in the vicinity of the Project and the control methods that will be implemented to prevent or minimize such potential impacts. (See pages 63-66.)

The 1998 Summary Report, Engineering Considerations Report by R.W. Beck discussed the effects that blasting would have on birds and animals. The excerpt is shown below:

***"To economically remove the Condit dam in a timely fashion, the proposed maximum amount of explosive used per delay (delay time less than eight milliseconds between detonations) has been estimated to be twelve pounds. This is in keeping with good practice followed by the US Bureau of Mines to prevent vibration effects from becoming cumulative and to keep particle velocities (used as a measure to limit damage to structures) well below values that would cause damage to the dwelling near the dam from air or earth vibrations. In so doing, the drill hole depths in which explosive charges are placed will be limited to twelve feet and drill hole diameters to 2.5 to 3 inches.***

***"A review of a recently issued US Army Corps of Engineers blasting specification for another project was made and the criteria used in the specifications to mitigate their concerns of the effects of blasting on Peregrine Falcons. The Corps' studies found that if the maximum sound pressure level was limited to 90 dBL (decibels), there would be minor disruptions of the birds' activities. Using this same level as***

a basis for our assessments of the effects on birds and animals, we back-computed to determine the distance from the blast site and area of effect where levels would equal or exceed the recommended safe limits. We found that safe levels would occur beyond ¼ mile from the site of the blast, and that an area of about .2 square miles would be affected.

Birds and animals that may reside or visit the area shown by the Corps' criteria and studies to be affected during the demolition of the dam and other structures to be removed, could be disturbed during the construction activities, but considering the relatively small area affected, the proposed method of demolition and the safeguards recommended to be adopted are believed to be reasonable and prudent to protect wildlife.

In addition, a detailed evaluation of the expected effects related to increased levels of noise and air pollution will be included in the Supplemental Environmental Impact Statement that is currently being prepared by the Washington State Department of Ecology.

#### **4a. Sediment Quantity**

***Question 4a: The Counties have questioned the estimate of sediment that is trapped behind Condit Dam that will be transported downstream. The estimates used in the project proposal appear to be from the mid 1990s. What affect did the 1996 floods have on the amount of sediment behind Condit Dam? How much sediment can reasonably be expected to have accumulated since the previous sediment surveys were completed? Earlier estimates were as high as 2.9 million cubic yards (mcy) of sediment. In addition, G&G Associates prepared a "Response to Request for Additional Information Regarding PacifiCorp's Estimation of Erosion Rates Related to Proposed Dam Removal", August 2, 2001 (2001 Gathard Report). This report states on page 4 that the smallest river width values were used to determine the estimate volume of material that could be eroded from the former reservoir. What is the scientific justification for using the smallest width? The Corps believes that most defensible method should use the widest predicted river width to estimate e the amount of sediment that could be eroded from the reservoir bottom.***

**Response 4a:**

##### ***Summary***

The estimated volume of sediment in the reservoir is based on a bathymetric survey conducted in 1997, after the 1996 flashboard failure. The survey showed that the volume of sediment in the reservoir was approximately 2.4 mcy in 1997. An additional volume of approximately 205,000 cubic yards of sediment is estimated to have accumulated in the reservoir since the last survey.

With respect to the stream width used to estimate sediment erosion volumes, a narrow width was used to conservatively estimate the smallest volume of sediment that would

erode in the *first year* after dam removal. This is a conservative estimate because less sediment eroded in the first year means more sediment eroded in the following years, which could prolong potential adverse sediment effects. Using the narrow stream width, G&G Associates predicted that 1.6 mcy of sediment would erode in the first year after dam removal. However, because the pre-dam rock lined channel determines the final stream width and is narrower than the value used in the analysis for most of the length of the reservoir, using a wider stream width makes little difference in the predicted eroded sediment volume.

#### *Background*

This question involves three basic issues; 1) timing of bathymetric surveys used to calculate sediment volume, 2) the volume of sediment trapped in the reservoir since analysis of the sediment volume was conducted, and 3) details regarding the techniques for estimating the volume of sediment eroded.

#### *Increase in Sediment Volume Since the Last Survey, Including Potential Increases from the 1996 Flood*

The quantity of sediment trapped in the reservoir was based on a pre-dam survey conducted by the original designers and a bathymetric survey conducted in the autumn of 1997. A discussion of surveys conducted for the Project is contained in Appendix A of the May 1998 RW Beck report, *Condit Hydroelectric Project Removal* (Beck Report). Appendix A of this report is the DR Gathard & Associates report, *Condit Dam Removal Study Sediment Erosion Analysis* (Erosion Analysis Report). Section III.A.2 of that report discusses survey information used to generate sediment volume. The same survey information was used for all sediment volume estimates subsequent to the Beck Report, including the August 2, 2001 G&G Associates report discussing estimated eroded volume in response to the FERC Request for Additional Information.

As stated in the Erosion Analysis Report (Appendix A of the Beck Report), post-dam surveys used to estimate sediment volume trapped in Northwestern Lake were conducted in 1990 and 1997. Appendix 4 of Appendix A of the Beck Report contains documentation supporting the 1997 survey of Northwestern Lake. Page 2 of this document, item 4), describes the 1997 survey of Northwestern Lake. This survey was conducted after a 1996 flashboard failure lowered the water elevation of the lake. Analysis of sediment volume, then, included the effects of the 1996 flood and flashboard failure. The channel formed in the reservoir by the flashboard failure can be seen in the cross sections in Appendix 1 of Appendix A of the Beck Report. The legend on the cross section drawings indicates the 1997 sediment surface.

The volume of sediment in the reservoir in the autumn of 1997 was approximately 2.4 mcy. This sediment had accumulated over a period of 84 years. The average yearly sediment volume accumulation for this period is 29,300 cubic yards per year. Extrapolating the average accumulation rate for seven years to the beginning of 2005 indicates that approximately 205,000 cubic yards of additional sediment has accumulated since the 1998 Beck Report.

*Justification for Using the Smallest River Width*

On August 2, 2001, PacifiCorp submitted a response to a FERC Additional Information Request. The original request in October 1999 and an additional request for clarification in June 2001 requested information on the rate of sediment removal (erosion) from the reservoir. FERC asked PacifiCorp to provide more details illustrating the methodology used to predict the rate of sediment erosion in the first year after dam removal and to demonstrate that the majority of the sediment would erode the first year. The volume of eroded sediment will depend on the width of the eroded river cross section through the reservoir.

The response of August 2, 2001 was intended to show that, based on several different approaches, the majority of sediment in the reservoir would erode within the first year after dam removal. The smallest stream width anticipated to form after dam removal was chosen because this width would predict the smallest amount of sediment eroded in the first year. Using this smallest stream width and embankment slopes provided by the geotechnical report conducted for this analysis showed that, even with these most conservative assumptions, the majority of the sediment would erode during the first year. This approach provides the minimum sediment removal anticipated during the first year after dam removal and also provides the maximum anticipated sediment remaining in the reservoir after the first year that could possibly erode in subsequent years. However, much of the pre-dam river in the reservoir reach was formed in a rock channel. For approximately the first mile upstream of the dam, the river channel was constrained by rock embankments and was narrower than the 90-foot minimum width calculated for alluvial channels. In these reaches the smaller rock constrained width was used. A review of the analysis of the sediment volume removed indicates that using a wider value would have an insignificant effect due to constraints from rock embankments.

By calculating the minimum sediment eroded from the reservoir, G&G Associates was able to bracket the maximum future downstream impacts from reservoir sediments. Should a larger stream width or flatter slopes develop, more sediment would be eroded in the first year after dam removal. This would inherently reduce mid-term and long-term sediment downstream effects.

**4b. Sediment Quality**

***Question 4b: As stated in the December 15, 2004 letter from this office, additional sediment testing will be required. Please contact the Corps if you have additional questions regarding sediment testing requirements.***

**Response 4b:**

PacifiCorp contracted with Squier Kleinfelder to conduct a suitability evaluation of the *Northwestern Lake Sediment Characterization Study*, which was conducted in April 1994. The Suitability Evaluation is included in this document as Attachment B. The Suitability Evaluation concluded that the sediments in the upper portion of the reservoir, which the evaluation defines as the Upper

Reservoir Coarse-Grained Dredged Material Management Unit (DMMU), should be considered fully characterized and should not require additional sampling and analysis under the Corps' *Dredged Material Evaluation Framework* (DMEF) (1998). This conclusion was based on the predominance of sand or gravel or both (greater than 80 percent) in the samples and the low concentrations of organic materials and chemicals of concern (COCs). No apparent new source has been introduced into the upstream area that would provide new COCs.

The sediments in the lower portion of the reservoir, which the Suitability Evaluation defines as the Lower Basin Fine-Grained DMMU, does not pass the Tier I, Tier II, and Tier IIB evaluations on the basis of currently available information. This is because of the level of total DDT encountered in one sample collected near the north end of the DMMU. Additional testing may need to be undertaken in this portion of the reservoir. PacifiCorp proposes to perform a supplemental characterization study as described in the Squier Kleinfelder Report.

#### 4c. Sediment Angle of Repose

***Question 4c: The sediment studies use an angle of repose of 1.73H:1V. This angle is considered steep in all bank stabilization methods. How was this ratio determined? Was it based on laboratory tests performed on sediment samples taken from the reservoir?***

Response 4c:

##### *Summary*

The angle of repose used in the sediment analysis is based on laboratory tests of samples of sediment taken from the reservoir and field tests conducted in the reservoir by Squire Associates and presented in their November 1997 Report.

##### *Discussion*

The angle of repose used for the analysis of sediment stability is based on a geotechnical report conducted by Squire Associates in November 1997. This report is summarized in Appendix A and contained in its entirety in an appendix to Appendix A in the "Condit Hydroelectric Project Removal" report by R. W. Beck, May 1998. The geotechnical report was conducted specifically to address the anticipated angle of repose of the material remaining in the reservoir after dam removal. Results presented in the report were based on laboratory analysis and direct field observation of aged embankment slopes in reservoir material.

The opinion stated in the geotechnical report is that the angle of repose for the material in the reservoir will be between 30 and 34 degrees after reservoir drawdown. Natural eroded slopes in the reservoir area were observed to be between 29 and 32 degrees.

The issue of possibly flatter slopes immediately after dam removal was discussed with Squire Associates at the time of the analysis in 1997. Squire recognized that saturated

slopes in fine grained material can form flatter slopes. However, the amount of the smallest size fraction, clay-sized material, in the reservoir is relatively minor. Most of the suspendable sediment is either silt or fine sand, both of which drain more quickly than material with a high clay content that can cause embankment slopes to form closer to an angle of 10 horizontal to 1 vertical.

Most of the smaller sediment particles reside close to the dam. In the 2,000 feet immediately upstream of the dam, pre-dam embankments slopes were approximately 30 degrees. As a result, all sediment in this reach is predicted to erode with the exception of possibly a thin layer trapped on the original rock surface. As shown in Table 1 below, upstream of 2,000 feet from the dam the material is primarily sand and larger sized particles. The Squire Report concludes that this material will form embankments at approximately 30 degrees to the horizontal.

The geotechnical report included both field and laboratory studies of the angle of repose for sand. The report found that the long-term and short-term angle of repose was between 30 and 42 degrees. In other words, the geotechnical report predicts steeper slopes than used for the analysis of sediment removal since the sediment analysis uses the lower end of the range predicted. The sediment analysis used the flattest angle of repose in the range in the geotechnical report.

However, PacifiCorp considers the sediment removal analysis approach presented to be conservative with regard to the downstream effects. Should the angle of repose in fact be flatter than described in the geotechnical report, more material will erode from the reservoir in the initial flushing action. Changes in effects to the rivers from more sediment in the initial flushing would be indistinguishable from those effects described in PacifiCorp's previous numerous documents on the initial sediment release. However, since the reservoir contains a finite amount of sediment, flatter slope formation would leave less sediment to cause later erosion effects.

PacifiCorp chose to analyze the sediment release based on the most probable and conservative approach because flatter slope formation than that assumed would reduce the potential for adverse sediment effects. Nonetheless, the Sediment Behavior Report does state that sediment volume eroded from the reservoir will be between 1.6 and 2.2 mcy during the first year after dam removal. The upper value of 2.2 mcy is based on an analysis using flatter initial slopes.

Table 1 Distribution of Material Size Fractions in Northwestern Lake

| Distance Upstream of Dam | % Silt | % Clay | % Sand | % Gravel |
|--------------------------|--------|--------|--------|----------|
| 144                      | 61%    | 15%    | 24%    | 0%       |
| 584                      | 66%    | 12%    | 22%    | 0%       |
| 1,275                    | 57%    | 9%     | 34%    | 0%       |

| Distance Upstream of Dam | % Silt | % Clay | % Sand | % Gravel |
|--------------------------|--------|--------|--------|----------|
| 2,067                    | 39%    | 7%     | 54%    | 0%       |
| 2,708                    | 29%    | 6%     | 65%    | 0%       |
| 3,330                    | 28%    | 6%     | 66%    | 0%       |
| 4,048                    | 26%    | 6%     | 67%    | 0%       |
| 4,596                    | 26%    | 8%     | 65%    | 0%       |
| 5,161                    | 27%    | 10%    | 64%    | 0%       |
| 5,707                    | 27%    | 12%    | 62%    | 0%       |
| 6,227                    | 27%    | 13%    | 60%    | 0%       |
| 6,708                    | 23%    | 12%    | 65%    | 0%       |
| 7,226                    | 12%    | 6%     | 80%    | 1%       |
| 7,718                    | 2%     | 1%     | 95%    | 2%       |
| 8,262                    | 1%     | 0%     | 87%    | 12%      |
| 8,784                    | 1%     | 0%     | 82%    | 17%      |
| 9,301                    | 1%     | 0%     | 79%    | 21%      |

#### 4d. Sediment Erosion

***Question 4d: The Counties commented that the amount of sediment likely to erode from the bed of the former reservoir was underestimated. Specifically, the analysis assumed that adequate vegetation to stabilize exposed soils will have successfully established after 3 years. While newly established vegetation may stabilize soils on gradual slopes, it is unlikely that 3 year old vegetation will adequately stabilize soils on steeper embankments. Please justify your position that 3-year old vegetation will provide adequate erosion control.***

Response 4d:

##### ***Summary***

Vegetation was not used as a means to stabilize embankments in the analysis and is not considered to be a viable means of embankment stabilization. Vegetation growth on newly exposed surfaces was used to estimate surface erosion. Increased establishment of vegetation was used to estimate declining levels of surface erosion. However, surface erosion accounts for only 1% of the total eroded sediment volume.

This question addresses several separate issues. (1) Has PacifiCorp underestimated the amount of sediment eroded from the reservoir? (2) Is revegetating slopes intended to stabilize embankments and thereby reduce embankment failures? (3) Is 3-year old vegetation adequate to stop surface erosion?

##### ***Volume of Sediment That Will Erode from the Reservoir***

The total amount of sediment eroded from the reservoir is limited to the volume of sediment present in the reservoir at the time of the demolition of the dam. Based on

surveys taken in 1990 and 1997 and projections based on the average yearly sediment accumulation, the amount of sediment present in the reservoir in the year 2008 when the dam is anticipated to be removed will be approximately 2.7 mcy. This includes approximately 2.4 mcy in the reservoir in 1997 plus approximately 322,000 that may accumulate from 1997 to 2008. The 2.7 mcy of sediment is the maximum amount, under any circumstances, that could possibly be eroded from the reservoir regardless of the behavior of sediment under future conditions. However, as stated in the May 2004 Condit Dam Sediment Behavior Analysis Report, the volume of material that is anticipated to erode from the reservoir will be between 1.6 (67% of total sediment) and 2.2 (92% of total sediment) million cubic yards. Most of the additional 322,000 cubic yards accumulated between the 1997 survey and 2008 will be located near the dam and, therefore, be in an area that will be eroded in the first few hours after the dam is breached.

#### *Revegetation Plan Goals and Effects on Erosion*

PacifiCorp originally proposed in the Revegetation Plan (Section 2.1 of the Project Description) an aggressive program of dislodging unstable sediment on steep slopes immediately following reservoir draining in order to create an appropriate angle of repose for a stable and accelerated revegetation process. However, the agencies parties to the Settlement Agreement recommended a more natural process of accomplishing stable slopes, which assumes that episodic slope failure events will occur. It is not PacifiCorp's intent to use vegetation as a means of stabilizing steep embankments against structural slope failure because these slopes will ultimately fail, regardless of vegetation. Vegetation is intended to address only surface erosion on flatter slopes, and a monitoring period of approximately 3 years is proposed in order to document performance standards for vegetation cover on these slopes. Monitoring will continue, however, until performance standards are met (see Project Description, Revegetation Plan, pages 11-18 for details). As discussed in the geotechnical report included as Appendix 1 of Appendix A of the Beck Report, we anticipate that embankments will stabilize at an angle of repose of around 30 degrees to the horizontal. As discussed in the Sediment Behavior Analysis Report by G&G Associates, May 2004, (Sediment Behavior Report) further embankment failures are anticipated at decreasing frequency in future high river flow events.

The Sediment Behavior Report describes the effects of vegetation on soil loss using the Universal Soil Loss Equation (USLE) approach, which is an established means of estimating soil loss on newly vegetated slopes for both the agricultural and construction industries and is applicable to the reservoir surface slopes expected to be present after dam removal. Using the USLE method, the total volume of surface erosion is expected to be approximately 19,000 cubic yards, or about 1% of the total eroded volume of reservoir sediment.

#### *Revegetation Plan after 3 Years*

The proposed revegetation plan is adequate and appropriate because it mimics a natural vegetation process on newly exposed embankments. Nonetheless, PacifiCorp will accelerate revegetation as necessary by actively seeding appropriate areas and monitoring until performance standards are accomplished.

#### 4e. Sediment Deposition

***Question 4e: Deposition within the in-lieu site at the mouth of the White Salmon River (WSR) and Bonneville Pool. The draft report "Sediment Removal Investigation in the Lower White Salmon River", August 1998, by D.R. Gathard and Associates (1998 Gathard Report) discusses options for dredging this site. A 1999 draft revision to the Settlement Agreement indicated an amount not to exceed \$3 million be allocated towards dredging at the tribal in-lieu site. Why were these options not explored to greater detail and included in the Settlement Agreement, which is the basis for the proposed project? How will the project be effected if the Corps includes a condition of a DA permit that requires or states PacifiCorp is responsible for sedimentation impacts at the mouth of the WSR, including, but not limited to, navigation and full use of the site by Native Americans? Will the deposition of the sediment at the site effect the flood elevations at the Highway 14 bridge over the White Salmon River?***

Response 4e:

##### ***Sediment Removal at the In-lieu Site***

The in-lieu site is adjacent to an artificially deep water pool at the mouth of the WSR created by the construction of Bonneville Dam. An average of approximately 30,000 cubic yards of sediment arrived annually at the mouth of the WSR before construction of Condit Dam. Since dam construction most of this material has been trapped in the reservoir behind the dam. Removal of the dam will return this natural sediment transport to the mouth of the river.

If not for the dam, the lower WSR adjacent to the in-lieu site would have filled with sediment long ago due to the presence of Bonneville Pool and the railroad and highway berm at the WSR mouth. Moreover, because this natural annual sediment load will continue to arrive at the WSR mouth in the future after dam removal, periodic dredging might be required for the foreseeable future to maintain the lower WSR adjacent to the in-lieu site in its artificially deep condition.

In accordance with the Settlement Agreement, the costs of mitigation associated with all permits will be assessed to determine impacts to the total Project costs. It is expected that if dredging were a requirement of the Corps' permit, total costs would exceed the cost cap. If the total costs exceeded PacifiCorp's financial commitment and the other parties to the Agreement were unwilling or unable to take responsibility for the additional costs, it would result in PacifiCorp's withdrawal from the Agreement.

##### ***Flood Elevations at the Highway 14 Bridge***

The Gathard Report discusses the water surface elevations before and after Condit Dam removal. Water surface elevations at the mouth of the WSR beneath the highway and railroad bridges will not increase after dam removal as a result of sediment accumulation beneath the bridges. The width of the WSR at the mouth is constricted to approximately 100 feet by the bridges. The constriction increases the velocity of the river, which will

reduce sediment deposition after dam removal. Water depth at this location currently is approximately 30 feet. Sediment accumulation after dam removal will create a shallower cross section that will further increase water velocities but not water surface elevations. A 100-year flood analysis, assuming CR elevation at elevation 85, was conducted for comparison of pre- and post-dam removal conditions. The analysis showed that, although water surface elevations may be approximately 2 feet higher near the north end of the in-lieu site parking lot, water elevations at the bridge will be only slightly affected by sediment accumulation.

## **1. Navigation**

### ***Question 1: Will the predicted sediment deposition in the Bonneville Pool effect navigation on the Columbia River?***

Response 1:

#### ***Summary***

In the worst-case analysis, as much as 800,000 cubic yards of sand would settle in the CR near the mouth of the WSR. The average thickness of this material would be approximately 5 feet, but accumulations would range from near zero at the navigation channel to more than five feet near the Washington shore. Moreover, the navigation channel in this area is approximately 45 feet deep although the required depth for navigation is only 17 feet. Accordingly, dam removal will have no effect on navigation in the CR.

Removal of Condit Dam will erode between 1.6 and 2.2 mcy of sediment from the reservoir. As discussed in item 4e above, some of that sediment will be trapped in the pool at the mouth of the WSR, and the amount will depend in large measure on the elevation of the Bonneville Pool at the time of dam removal. Under typical river conditions approximately 550,000 cubic yards of the eroded sediment will be trapped in the in-lieu site. The remaining sediment, as much as 1.6 mcy, will enter the CR. Most, over 75%, of the sediment entering the CR will be suspended in the water column and settle downstream of the confluence. About half of the sediment entering the CR will be silt and clay. Nearly all of the clay will stay in suspension past Bonneville Dam. Most of the silt will settle in the CR somewhere between the WSR and Bonneville Dam. Neither clay nor silt will cause a significant increase in CR channel thalweg elevations. Average accumulation should be less than an inch within the Bonneville Pool.

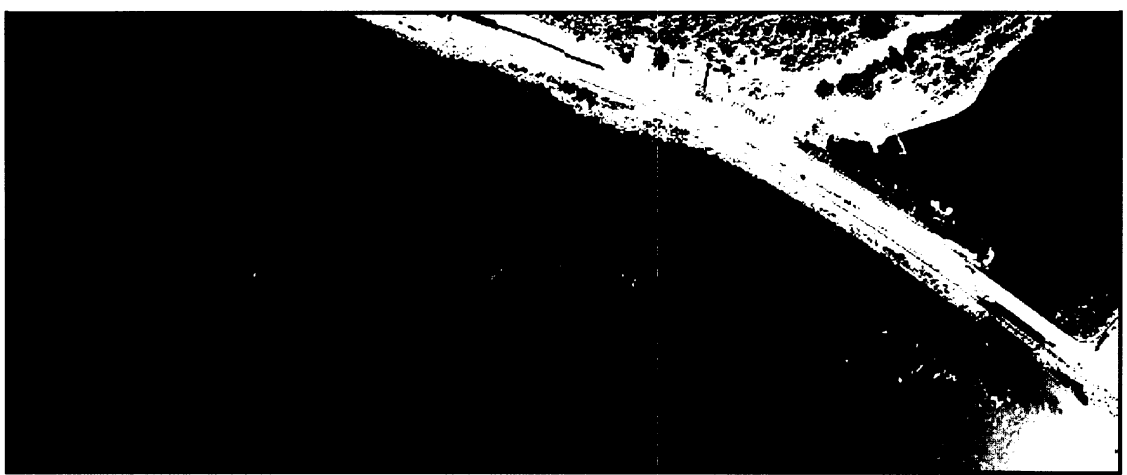
As little as 200,000 or as much as 800,000 cubic yards of sand could enter the CR. Most of the sand will deposit along the right bank of the river within the first mile downstream of the mouth. In order to estimate the distribution of sediment in the CR, sediment dispersal patterns may be estimated from aerial photographs of the mouth of the river.

As can be seen in Figure 1, below, the CR directs water coming from the mouth of the WSR along the right bank. The most likely area of sediment accumulation is shown in Figure 2. This area extends into the CR about 1500 feet, downstream about 1 mile, and

covers about 100 acres. The CR is about 4,000 feet wide at this location. Assuming 800,000 cubic yards of sediment is deposited in this area the average thickness would be about 5 feet. Most likely, the sediment would taper from thickest near the shore and diminish to zero near the middle of the river. Sediment elevations may temporarily reach river surface levels but higher spring flows should redistribute sediment uniformly along the shore.

The CR is about 45 feet deep near the center of the river in the shipping lane. Shipping lanes require a depth of 17 feet. No impacts to shipping will occur.

**Figure 1 River Current Directions at Mouth of WSR**



**Figure 2 Likely Sediment Deposition Area in CR**



## 2. Contingency Plan

***Question 2: Who will be responsible for the removal of accumulated sediments at the mouth of the WSR? The Corps has stated that it will not be responsible for removal of sediments released as a result of the removal of Condit Dam. What are the long term effects to this site if the sediments are not removed?***

**Response 2:**

Under the decommissioning proposal contained in the Settlement Agreement and submitted to FERC for its review and approval, PacifiCorp is not responsible for the removal of accumulated sediments at the mouth of the WSR. PacifiCorp has committed to contribute \$500,000 to an In-Lieu Site Enhancement Fund to be held and administered jointly by the Yakama Nation, the Confederated Tribes of the Warm Springs Reservation, the Confederated Tribes of the Umatilla Reservation, and Nez Perce Tribe (collectively "Tribes"). PacifiCorp has also committed to contribute \$1,000,000 to a Fishery Enhancement Fund to be held and administered by the Yakama Nation for purposes of enhancing, supplementing and conserving fishery resources in the WSR. If desired, these funds can be used by the Tribes and by the Yakama Nation, respectively, to dredge or otherwise address any accumulation of sediments at the mouth of the WSR.

By trapping both water and sediment, Condit Dam artificially forms Northwestern Lake and a deep-water area at the mouth of the WSR. Removal of the dam will restore the natural function of the river and result in the loss of both the lake and the deep-water river mouth. The Tribes and the parties to the Settlement Agreement all agree that restoration of a free flowing river justifies the loss of these artificial features.

In both the short and long terms, PacifiCorp anticipates that removal of Condit Dam will allow the mouth of the WSR to return to a natural, shallow-water state resembling the mouth of the nearby Klickitat River. To the extent deemed advisable, the Tribes and the Yakama Nation can use the proceeds of the In-Lieu Site Enhancement Fund and the Fishery Enhancement Fund, respectively, to dredge the mouth of the WSR or otherwise mitigate for the loss of the artificially deep river mouth. In addition, PacifiCorp is willing to coordinate with the Corps of Engineers regarding the timing of dam breach so that the Corps of Engineers may, if it so desires, temporarily lower the elevation of the Bonneville Pool and thereby reduce the immediate accumulation of sediment in the mouth of the WSR.

In the final analysis, shallow water is the natural condition for the mouth of the WSR and for the mouths of other tributaries that empty into the Bonneville Pool; PacifiCorp should not be responsible for maintaining an artificially deep river mouth after Condit Dam has been removed.

### **3. Impacts to Corps Related Facilities**

***Question 3: How will the project affect Corps facilities, including but not limited to, Underwood and Cooks in-lieu fishing sites, Spring Creek Fish Hatchery, Bonneville Lock and Dam and associated facilities, and additional treaty fishing areas constructed by the Corps? The Corps has stated in previous communications that any impacts to these facilities resulting from the removal of Condit Dam will be the responsibility of PacifiCorp.***

**Response 3:**

Impacts from sediment transported downstream after dam removal to all but the Underwood in-lieu site will be minor and of short duration. Minor changes in the CR suspended sediment levels will occur immediately after dam breach. Suspended sediment concentrations of WSR water entering the CR will be less than the concentrations in the river at the top of the in-lieu site due to settling in the in-lieu site. Silt particles will settle in the CR in the pool created by Bonneville Dam as discussed below. Most clay-sized particles will stay in suspension downstream of Bonneville Dam.

Fish facilities do not use CR water for fish rearing facilities.. Hatchery facilities will not be in operation at the time of the dam breach. Therefore, suspended sediment concentrations in the CR will not affect fisheries facilities.

Consideration of affects to fisheries was a major consideration in determining the timing of dam removal activities. The Columbia River Inter-Tribal Fish Commission was closely involved in decisions regarding timing and impacts of sediment releases. The Cooks in-lieu site is located sufficiently downstream of the confluence of the WSR and CR to be unaffected by accumulation of sand near the inlet. It is also downstream of the anticipated area of mixing and should experience the same suspended sediment concentrations as other locations on the CR. Anadromous fish runs and associated tribal fishing will be finished before removal activities begin.

As discussed above and in the Project Description, the Underwood in-lieu site, located at the mouth of the WSR, will most likely retain between approximately 400,000 and 675,000 cubic yards of sand and silt. Access to this artificially created site will likely be adversely affected.

No impact to the Bonneville Dam facilities is anticipated from either bed load or suspended sediment. Spring Creek National Fish Hatchery is located approximately one mile west of the WSR. Any sediment plume from dam removal or increased river flows would have no impact the facility. The hatchery utilizes water from springs located on the north side of State Route 14. The facility does have a water right on the CR, but it is not in use. In addition, when the dam is breached, all returning adults will have entered the hatchery and spawning will have been completed. All of the hatchery's production will be located in the incubation facility as eggs or sac fry.

The hatchery also has a facility on the WSR, Big White Ponds, located one and a quarter mile upstream from the confluence. The facility consists of a water intake structure, a quarter-mile of 36" steel pipeline, two 10' by 210' concrete raceways and one storage building. This facility is currently not in operation since the intake structure does not meet NOAA Fisheries' screen requirements. FWS is investigating options to bring the facility into compliance.

The storage building is located well above the flood plain and would not be impacted by dam removal. There could be minor impacts to the intake structure and ponds depending on flow rate and sediment load. PacifiCorp will develop and implement a plan to protect the raceways.

#### **4. Pipelines**

***Question 4: Two pipelines within Northwestern Lake would be effected by the removal of Condit Dam. How will these effects be mitigated?***

**Response 4:**

There are two pipelines located in the reservoir backwater that have been described in the 1998 R.W. Beck report titled "Condit Hydroelectric Project Removal, Summary Report Engineering Considerations." They include a 14" municipal water line located 1 mile upstream of the dam and a 26" gas pipeline located 2.1 miles upstream of the dam.

Based on the embedment of the gas line in the rock, the need for remediation on this line is remote. Riverbed scour in this area during dam removal will be less than what has occurred during historical flood events such as the 1996 flood. The pipeline will, however, be monitored during breaching and dam removal. To facilitate this, a monitoring and safety plan will be developed with the pipeline owner/operator.

Mitigation for the municipal water line is described in the Project Description dated June 4, 2004, section 2.3.2.1.2. This section describes the plan for a temporary water line to be installed prior to dam breaching, after which a new permanent water line will be constructed. Design of the temporary water line and the construction details of the new permanent line will be coordinated with the municipality.

## 5. Rare Plants

**Question 5: Multiple commenters noted the existence of rare plants within the emergent wetlands associated with the reservoir. Was a survey conducted to identify threatened or endangered plant species within the affected area? If so, what were these results?**

Response 5:

Surveys were conducted in the vicinity of the Condit Project during relicensing studies in 1990, which documented approximately 3.5 acres of palustrine wetlands located primarily along the shoreline of Northwestern Lake (PacifiCorp 1991). The federally threatened water howellia (*Howellia aquatilis*) and Nelson's checkermallow (*Sidalcea nelsoniana*), and federally endangered Bradshaw's lomatium (*Lomatium bradshawii*) could potentially occur in southwestern Washington, but were not found in these wetlands during relicensing studies. Further, surveys conducted during relicensing studies of the Lewis River between 1997 and 2000 did not find these species, although appropriate habitat was present (variety of wetlands with extended periods of flooding or saturation). Relicensing surveys at Condit in 1990 did document 5 state-listed sensitive plants, including Oregon bolandra (*Bolandra oregana*), diffuse stickweed (*Hackelia diffusa*), green-fruited sedge, yellow sedge (*Carex flava*), and Fremont's silk-tassel (*Garrya fremontii*). According to the Washington Natural Heritage Program (WNHP), species categorized as "sensitive" are species with populations that are vulnerable or declining, but are not threatened or endangered.

A plan for wetland mitigation is included in the Project Description for decommissioning the Condit Project (PacifiCorp 2004). The goal of this wetland mitigation plan is for new wetland areas to replace lost wetland areas affected during dam removal and restoration of the WSR. A total of 3.8 acres of fringe wetlands were delineated at Northwestern Lake in summer 2003 (CH2M HILL, 2003). In consultation with the Washington Department of Ecology and the Army Corps of Engineers, a survey will be conducted prior to Project decommissioning to provide a baseline for wetland restoration following dam removal. This baseline survey will provide an additional opportunity to document the presence of rare plants.

## **ATTACHMENT A**

**Access Roads, Work Areas and Staging Areas  
Tabulation & Locations**

**Aerial Maps**

**Haul Road Preliminary Geotechnical Assessment**

**Prepared by Squier Kleinfelder  
April 28, 2005**

# **Army Corps of Engineers** **Response to Public Comments on 404 Permit** **Condit Hydroelectric Project** **Access Roads, Work Areas and Staging Areas** **Tabulation & Locations**

The following table summarizes the work areas, access roads and staging areas and their associated descriptions and purposes.

| Sheet # | Designation                                  | Name                                            | Use                                                                                                  |
|---------|----------------------------------------------|-------------------------------------------------|------------------------------------------------------------------------------------------------------|
| 3, 4    | WA-1                                         | Work Area at Dam Site                           | Dam removal and dam access                                                                           |
| 3, 4    | AR-1                                         | Powerhouse Road to dam                          | Access to downstream side of dam to facilitate drain tunnel construction and to support dam removal. |
| 3       | AR-2                                         | Powerhouse Road to dam                          | Access to upstream side of dam.                                                                      |
| 3       | SA-1                                         | Staging Area adjacent to Powerhouse Road at dam | Staging area for work at dam site. PacifiCorp Property                                               |
| 3       | SA-2                                         | Staging Area at Powerhouse Road Bend            | Staging area for work at dam site.                                                                   |
| 2, 3    | AR-3                                         | Access Road to dam and SA-3                     | Access road to dam and SA-3                                                                          |
| 2, 3, 4 | AR-4                                         | Powerhouse Road to SA-3                         | Access to SA-3 via Tamarack Lane                                                                     |
| 2, 3    | SA-3                                         | Staging Area 3                                  | Staging area and stockpile materials                                                                 |
| 3, 4    | AR-5 (AR-6 has been connected to AR-5)       | Powerhouse Road to dam (Lower)                  | Access road to downstream side of dam and flowline.                                                  |
| 3, 4, 5 | WA-2                                         | Work Area for Flowline Removal                  | Remove flowline, approx. 1 mile                                                                      |
| 3, 4    | AR-6 (unlabeled, has been connected to AR-5) | Powerhouse Road to Flowline (Upper)             | Access to upper portion of flowline                                                                  |
| 5       | AR-7                                         | Powerhouse Road to Flowline (Lower)             | Access to lower portion of flowline                                                                  |
| 3, 4    | SA-4                                         | Staging Area for Flowline (Upper)               | Staging area for removal of flowline                                                                 |
| 5       | WA-3                                         | Penstock Removal                                | Remove two 9 foot diameter penstocks, each approx 650 feet long                                      |
| 5       | AR-8                                         | Access Road for Penstock Removal (Upper)        | Access to upper portion of penstocks                                                                 |
| 5       | AR-9                                         | Access Road for Penstock Removal (Lower)        | Access to lower portion of penstocks at the powerhouse                                               |
| 5       | WA-4                                         | Work Area for Surge Tank Removal                | Remove surge tank                                                                                    |
| 5       | WA-5                                         | Work Area for Tail Race Backfill                | Fill in tail race                                                                                    |
| 5       | AR-10                                        | Access Road for Tail Race Backfill              | Access road for tail race backfill                                                                   |
| 5       | AR-11                                        | Access Road for Tail Race Grading               | Access road for tail race grading around powerhouse                                                  |
| 5       | WA-6                                         | Work Area for Substation Removal                | Remove substation and reconnect to BPA lines                                                         |
| 5       | AR-12                                        | Access Road for Substation Removal              | Access road for substation removal                                                                   |

| Sheet #                                                                                  | Designation | Name                                                   | Use                                                                                      |
|------------------------------------------------------------------------------------------|-------------|--------------------------------------------------------|------------------------------------------------------------------------------------------|
| 3, 4, 5                                                                                  | WA-7        | Work Area for Powerline Removal                        | Removal of approx 1 mile of powerline from the powerhouse to the dam                     |
| 4                                                                                        | AR-13       | Access Road from Powerhouse to SA-5                    | Access road from powerhouse to staging area 5                                            |
| 4                                                                                        | SA-5        | Staging Area at Becker Site                            | Staging area for flowline materials and dam removal equipment.                           |
| 1                                                                                        | AR-14       | Graves Road to Lake                                    | Access road to lake for management of unstable slopes and large woody debris             |
| 2, 3                                                                                     | AR-15       | Cabin Road to Lower Lake                               | Access road to lower lake for management of unstable slopes and large woody debris       |
| 2                                                                                        | AR-16       | Cabin Road to Mid Lake                                 | Access road to mid lake for management of unstable slopes and large woody debris         |
| The following additional areas will also be utilized but are not shown on Aerial Sheets. |             |                                                        |                                                                                          |
| NA                                                                                       | AR-17       | Highway 141-A and Powerhouse Road                      | Primary access to Condit Hydroelectric Project area                                      |
| NA                                                                                       | AR-18       | Highway 141-A to Big White Fish Ponds                  | Access to Big White Fish Ponds                                                           |
| NA                                                                                       | WA-8        | Big White Fish Ponds                                   | Cleaning ponds of any sediment and woody debris                                          |
| NA                                                                                       | AR-19       | Northwestern Lake Road to Northwestern Lake Park       | Access to Northwestern Lake Park                                                         |
| NA                                                                                       | WA-9        | Northwestern Lake Bridge                               | Enable modifications to the bridge.                                                      |
| NA                                                                                       | WA-10       | Northwestern Lake (Entire Lake Below High Water Mark)  | Sediment stabilization, woody debris management, boat dock removal & coffer dam removal. |
| NA                                                                                       | WA-11       | Northwestern Lake Water Line Located 1 mile above Dam. | Work area for the reestablishment of the water below sediment level.                     |

## LARGE-FORMAT IMAGES

One or more large-format images (over 8½" X 11") go here. These images are available in E-Library at:

For Large-Format(s):

Accession No.:

20050927-0127

Security/Availability:



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9/24/05

Docket No.:

P2342-011

Parent Accession No.:

20050927-0126

Set No.:

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of

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Number of page(s) in set:

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# PACIFICORP

## Hydro Resources

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### Condit Hydroelectric Project - FERC No. 2342

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To: William C. Shallenberger, P.E.  
PacifiCorp  
Hydro Resources  
825 N.E. Multnomah, 1500 LCT  
Portland, Oregon 97232

April 28, 2005  
Project No. 53886.2

Subject: **Haul Road Preliminary Geotechnical Assessment  
Condit Dam**

#### INTRODUCTION

The removal of Condit Dam in Klickitat County, Washington will impose a need for hauling large quantities of concrete and other debris away from the dam site. The objective of this work is to provide a preliminary geotechnical assessment of the proposed temporary haul road alignments. Estimates of cut and fill amounts along with a discussion of earth moving equipment required for haul road improvements, comments on grade, as well as notes on stream crossings are also included in this summary.

#### SITE RECONNAISSANCE

The access road conditions at the Condit Dam Project Site were explored by visiting the site on April 4 through April 11, 2005 by a representative of Squier | Kleinfelder. Information and aerial photographs of the proposed access roads found in Appendix 5 of the report titled "Condit Hydroelectric Project, FERC Project No. 2342, Project Description" generated by PacifiCorp of Portland, Oregon dated June 4, 2004 provided a basis for site reconnaissance. Access roads 1 through 16, denoted AR-1 through AR-16 in Appendix 5 of PacifiCorp's June 4, 2004 report were the focus of this preliminary geotechnical assessment. The procedures used to observe the roadways, estimate distances and grade, and other field techniques are described in detail in the following paragraph.

Each roadway or potential roadway was found at the site by estimating the location based on aerial photographs. General existing road and shoulder conditions, stream crossings, and potential areas for road widening were photographed. Road lengths and section distances were measured using a Rolatape model 400 measuring wheel. Grades were estimated using a Seco

model 4200 hand level and a Lufkin extension rule over distances measured with the measuring wheel. General grade and changes in grade were measured and noted. Other road characteristics recorded include: width of existing roads and foot paths, stream crossings, some obstacles for road improvement equipment, and general soil and vegetation conditions along the proposed access roadways and shoulders. Widths, distance, grade, and stationing provided in this report should be considered approximate.

The information gathered in the field was tabulated in attached Table 1 and utilized to calculate anticipated cut and fill volumes as well as make general comments on the proposed road use and improvements.

## **SITE RECONNAISSANCE RESULTS**

Site reconnaissance results, anticipated cut and fill volumes, and general comments on the proposed road use and improvements for each haul road are summarized in attached Table 1.

We understand the preferred grade and width for the haul roads are 10 percent and 16 feet, respectively. However, grade may be as steep as 18 percent for a short distance. General comments provided on the proposed road use and improvements including our evaluation for cuts and fills are based on this understanding. Access roads for dozer and excavator equipment use were not evaluated based on the above haul road criteria.

## **LIMITATIONS**

The scope of the work presented herein consists of site reconnaissance of the proposed and existing haul roads that will be utilized in the dismantling of the Condit Dam and this letter report. The work was conducted in accordance with generally accepted local practices and included tasks that were considered necessary, in Squier | Kleinfelder's professional judgment, to enable us to complete this study based upon current local knowledge. The work was conducted to estimate potential cut and fill amounts as well as to identify types of earth moving equipment that may be required for active haul road use. Our conclusions are based on the data and observations described herein.

The scope of work for this project was approved by PacifiCorp. Please be aware that our scope of work was limited to those items specifically identified in the introduction of this technical memorandum. Geotechnical issues not specifically addressed in this document are beyond this specific scope of this effort and are not included in our evaluation. Since site activities and project plans beyond our control could change at any time after the completion of this report, our observations, findings, and opinions can be considered valid only as of the date of this report.

50856 KLEINFELDER

This letter report may be used only by PacifiCorp; their council; their representatives; and relevant regulatory agencies. Land or facility use, on and off-site conditions, regulations, or other factors may change over time, and additional work may be required with the passage of time. Any party other than the client who wishes to use this letter report shall notify Squier/Kleinfelder of such intended use. Based on the intended use of this letter report, Squier/Kleinfelder may require that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements by the client or anyone else will release Squier/Kleinfelder from any liability resulting from the use of this letter report by any unauthorized party, and client agrees to defend, indemnify, and hold harmless Squier/Kleinfelder from any claim or liability associated with such unauthorized use or non-compliance.

### PROFESSIONAL AUTHORIZATION

Please feel free to contact us concerning the information presented in this document. This memorandum has been prepared and reviewed by the undersigned. This memorandum is void if original seal and signature are not present.



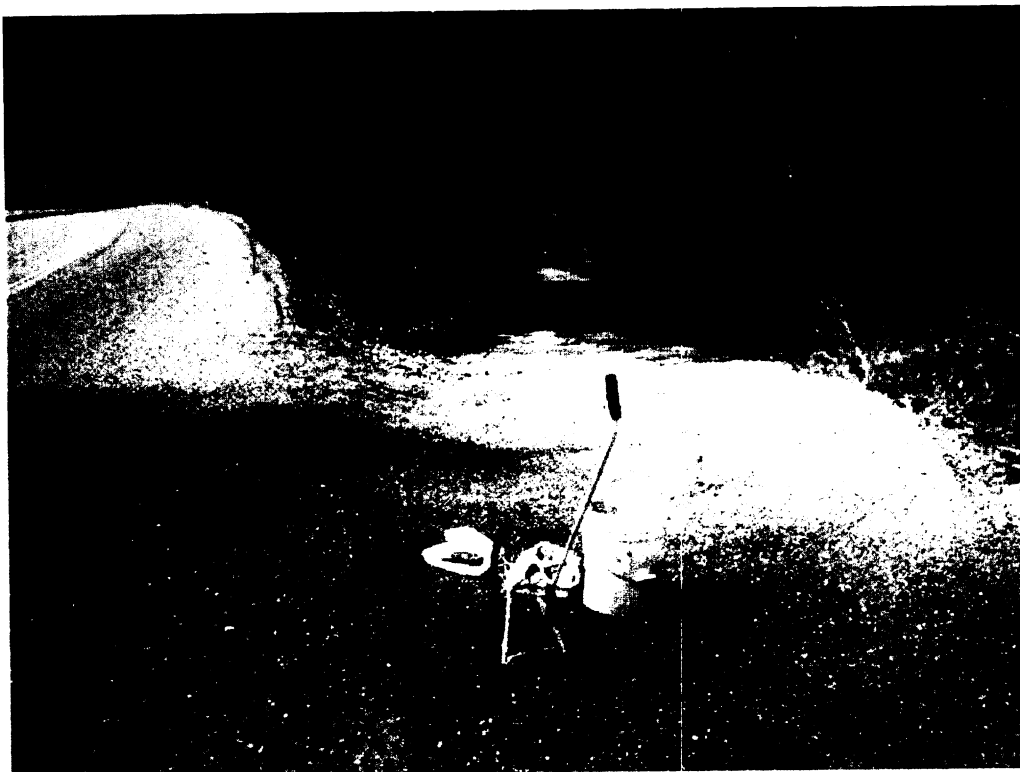
Travis T. Nguyen, P.E.  
Project Manager

### Attachments:

|                |                                          |
|----------------|------------------------------------------|
| Table 1        | Summary of Haul Road Site Reconnaissance |
| Photos 1 to 18 | Site Photos                              |



**Photo 1: AR-1, Looking upslope from flowline to Powerhouse Road**



**Photo 2: AR-2, From Station 6+95 to 5+20 looking downslope from Powerhouse Road**



**Photo 3: AR-3, Approximate Station 18+25 looking west from east along stream in wetlands area**



**Photo 4: AR-3, Approximate Station 5+00 looking east from west**

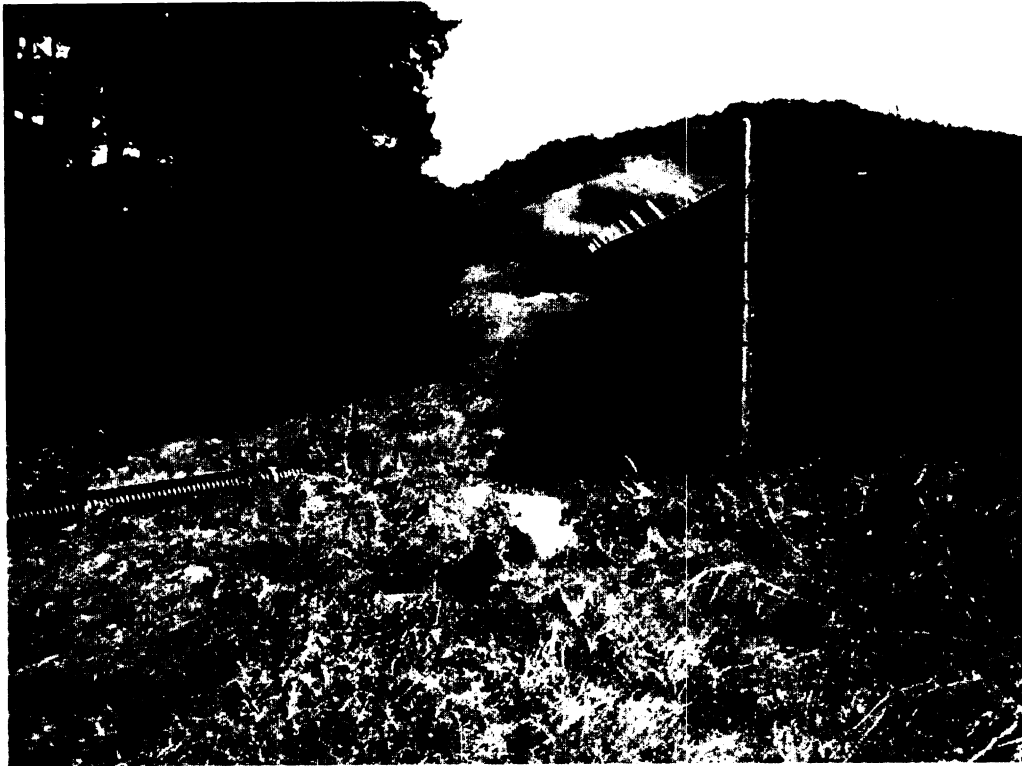


Photo 5: AR-4, Undeveloped area looking from Station 21+30 to 19+80 (west to east)



Photo 6: AR-6, Approximate Station 3+00, looking east from west

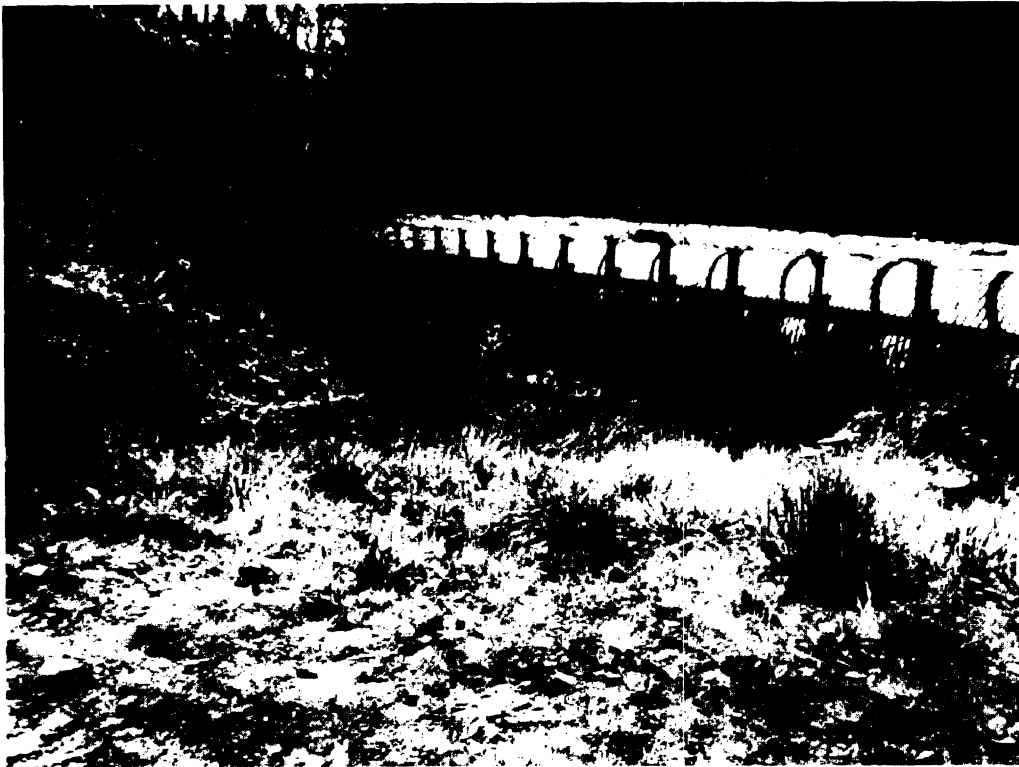
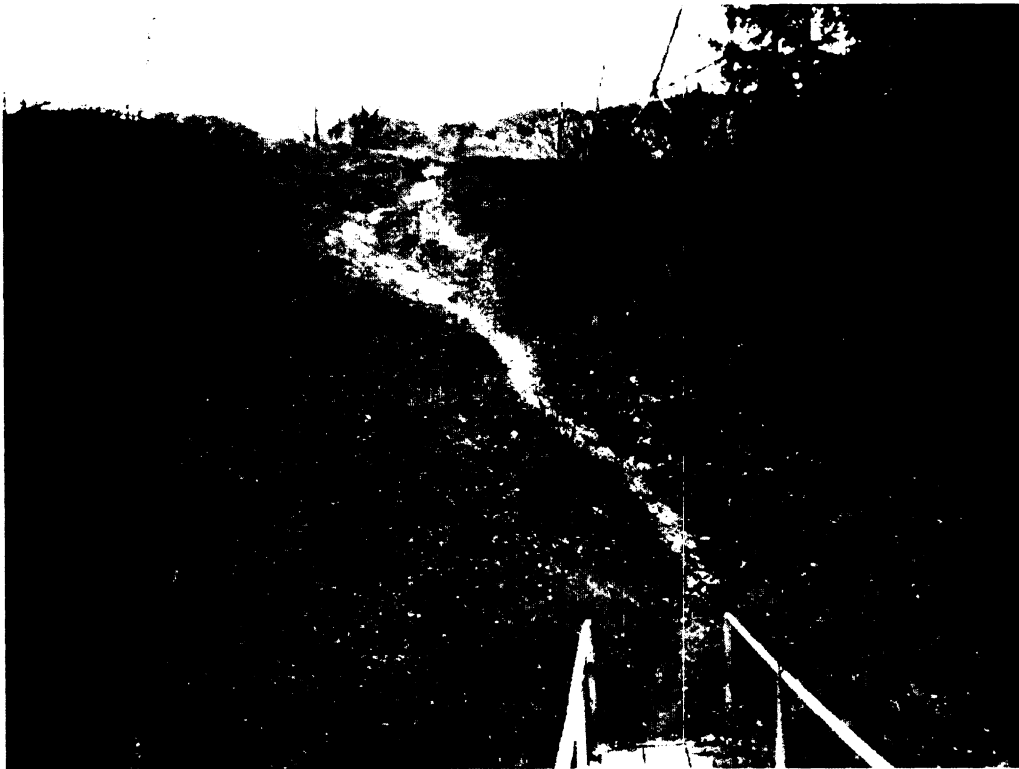


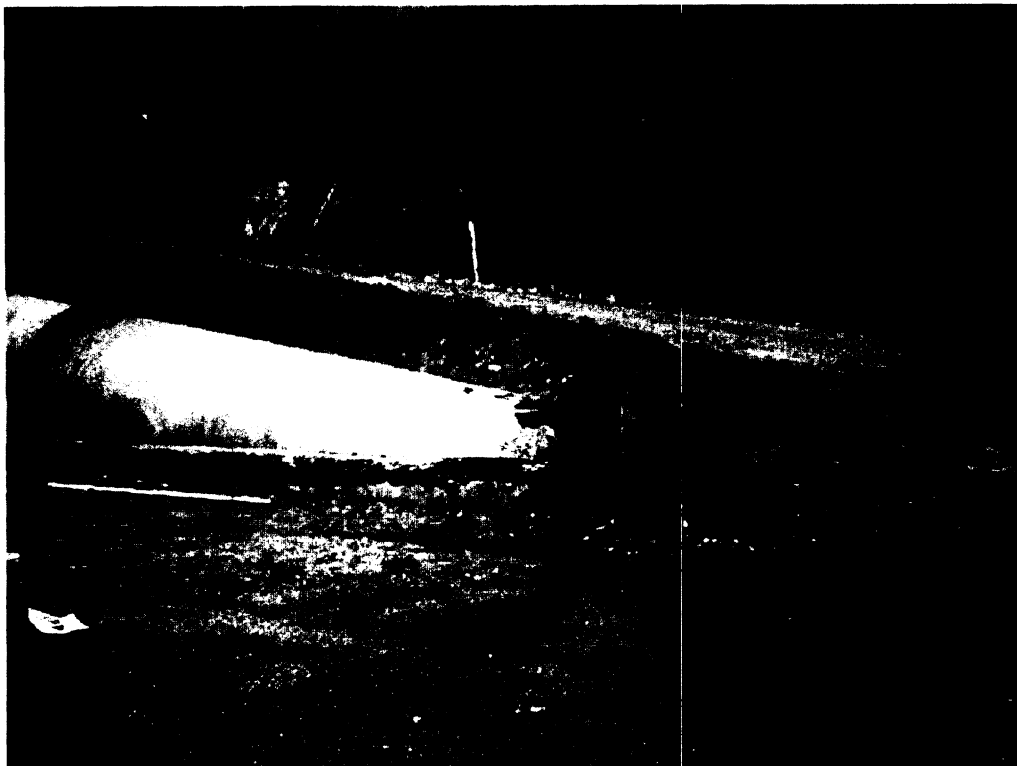
Photo 7: AR-6, Approximate Station 5+80, looking south toward flowline from north



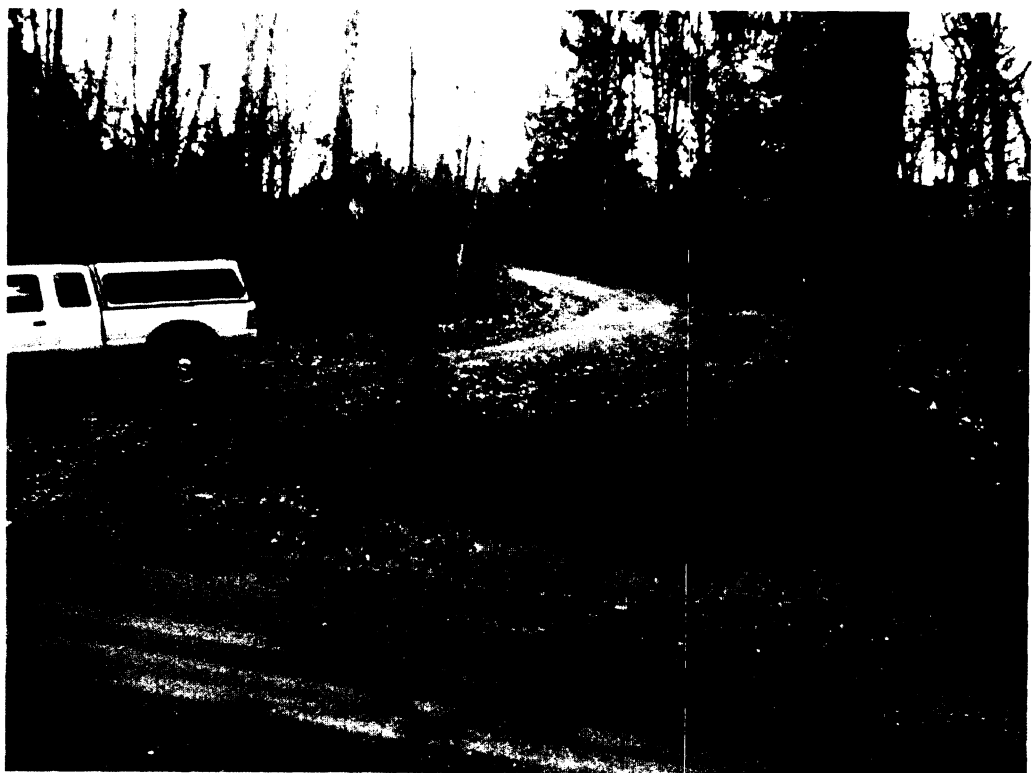
Photo 8: AR-7, Approximate Station 1+65, looking north from south



**Photo 9: AR-8, Approximate Station 1+40, looking east from flowline**



**Photo 10: AR-9, Approximate Station 9+80, looking from Powerhouse Building toward roadway**



**Photo 11: AR-13, Station 0+00, looking from Powerhouse Road eastward**



**Photo 12: AR-13, Gate at approximate Station 6+00, looking from Staging Area 5 westward**



**Photo 13: AR-14, Graves Road, looking east from west on gravel roadway**



**Photo 14: AR-15, Cabin Road, approximate Station 10+50, looking northeast from southwest**



**Photo 15: AR-15, Cabin Road, approximate Station 20+70, looking south from north**



**Photo 16: AR-16, Cabin Road, approximate Station 7+10 looking west from east**



Photo 17: AR-5, Approximate Station 12+00, Visible cobbles and boulders on east side of flowline

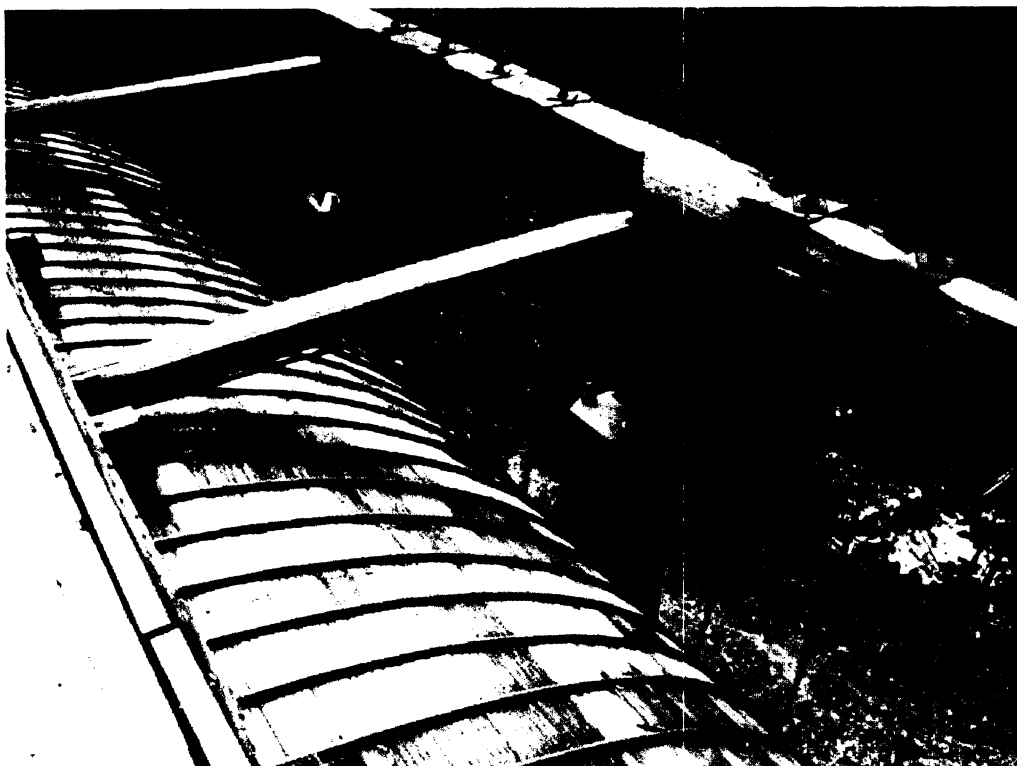


Photo 18: AR-5, Approximate Station 12+00, West side of flowline provides no work area

**ATTACHMENT B**

**Suitability Evaluation of  
*Northwestern Lake Sediment Characterization Study*  
Squier Associates, April 1994**

**Prepared by Squier Kleinfelder  
April 14, 2005**



# PACIFICORP

## Hydro Resources

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### Condit Hydroelectric Project - FERC No. 2342

To: William C. Shallenberger, P.E.  
Lead / Senior Engineer, Hydro Resources  
PacifiCorp  
825 N.E. Multnomah, 1500 LCT  
Portland, Oregon 97232

April 14, 2005  
Project No. 53886

Subject: **Suitability Evaluation of *Northwestern Lake Sediment Characterization Study*  
Squier Associates, April 1994**

Northwestern Lake was formed by the construction of Condit Dam in about 1912, with the first reservoir filling in 1913. Since the construction of the dam and formation of the lake, the natural transport of sediments by the White Salmon River has been disrupted and the sediments previously transported to the Columbia River are now deposited in the slack water of Northwestern Lake. It is our understanding that the current estimate of sediment that will erode has an upper limit of approximately 2.2 million cubic yards.

The removal of Condit Dam would initiate the discharge of the approximate 2.2 million cubic yards of sediment into the lower White Salmon River, a tributary of the Columbia River. As the U.S. Army Corps of Engineers (USACOE), Portland District stated in a letter dated December 15, 2004, "Because the sediment will settle out within the river systems, the project would result in unconfined aquatic disposal of sediments into the Lower Columbia River system". Unconfined aquatic disposal of sediments is regulated by the USACOE. The USACOE, Portland District has developed a framework for evaluating sediments and the suitability of disposing those sediments in the Columbia River. This framework is presented in the *Dredged Material Evaluation Framework (DMEF), Lower Columbia River Management Area (November 1998)*.

The sediments of Northwestern Lake, located behind Condit Dam were investigated with a program of borings in 1994. The results of that investigation were presented in a report prepared by Squier Associates, entitled "*Condit Hydroelectric Project (FERC Project No. 2342), Northwestern Lake Sediment Characterization Study, White Salmon, Washington,*" and dated

April 29, 1994. An additional investigation of the sediments was also conducted by Squier Associates in 1997. The results of that additional investigation are presented in a report entitled "*Additional Geotechnical Exploration and Laboratory Testing at the Condit Hydroelectric Project (Contract No. P018780)*" and dated November 20, 1997.

The objective of this work is to provide a rational basis for applying the existing data presented in 1994's *Condit Hydroelectric Project (FERC Project No. 2342) Northwestern Lake Sediment Characterization Study, White Salmon, Washington* (the 1994 Condit Study) to the DMEF. The DMEF provides a "Tiered Approach" to addressing sediments' suitability for open-water disposal. The following paragraphs provide a discussion for our Tiered Evaluation.

### **TIER I EVALUATION AND MANAGEMENT AREA RANKING ASSIGNMENT**

The DMEF Tier I uses existing information to conclude whether or not there is "enough information to determine if project meets exclusion ranking". However, in order to determine if the existing data is suitable, that data must first be compared to the framework of Tiers II and IIB. The comparison will be presented in a later paragraph of this technical memorandum.

Exclusionary Ranking is a Management Area Ranking that provides the least stringent characterization requirements. Projects from specific areas listed in the DMEF may be awarded the Exclusionary Ranking. Northwestern Lake currently is not one of the listed zones for Exclusionary Ranking. The Exclusionary Criteria also include sediments that will be used for beach enhancement and sediments whose final placement will be the same substrate as their origin. It is our understanding that the Northwestern Lake sediments do not meet either criterion.

Exclusionary Ranking is also awarded to locations whose sediments have at least 80 % sand retained on a number (No.) 230 sieve (i.e., less than 20% fines) and a Total Volatile Solids (TVS) content of less than 5.0 %. Mechanical sieve analysis of the sediments collected from the upstream portion of Northwestern Lake demonstrates that those sediments meet the criterion of having less than 20 % fines. A TVS discussion is provided later in this memorandum.

Consequently our current opinion is that the sediments from Northwestern Lake (as one discrete unit) do not meet the criteria for Exclusion Ranking. We believe that the Low Management Area Ranking is appropriate. The sediment source location meets the following criteria for Low Management Ranking.

- Low concentrations of chemicals of concern (COC),
- Some locations of higher percentages of fines, and
- Few sources of potential contamination

## VOLUME / SAMPLE RATIO

A key factor in evaluating the adequacy of the *1994 Condit Study* data set is to ascertain whether or not a sufficient number of samples were collected based on the sample per volume ratio guidelines subsequently established in the *DMEF*. As part of the *1994 Condit Study*, 45 geotechnical and 39 environmental samples were collected at various depths from 10 sample points. According to the *DMEF*, 22 samples should be collected from a homogenous sediment source of 2.2 million cubic yard volume in a Low Management Ranking Area. If that same sediment source was considered heterogeneous, based on the presence of fines and gravels, the *DMEF* requires 44 samples.

The *DMEF* allows for the creation of Dredged Material Management Units (DMMUs), which are subdivisions of a sediment-generating project site that represent sediments similar in nature. The Northwestern Lake sediments can be segregated into two DMMUs; the lower basin sediments and the upstream gravels (refer, Figure 1). The segregation into two DMMUs provides two Low Management Ranking Areas of homogenous sediments. The homogeneity of the sediments is supported by the 1994 mechanical sieve data.

Based on the information presented in the *1994 Condit Study*, the lower basin includes about 51 % of the sediments (1,122,000 cubic yards) and the upstream gravels include about 49 % of the sediments (1,078,000 cubic yards). Based on these DMMU assignments, 11 samples would be required from each of the homogenous Low Management Ranking DMMUs. Applying the DMMU segregation to the sample total for the 1994 event, the following numbers of samples were collected from each DMMU:

- Deep Pool (Lower Basin) Fine-grained DMMU = 23 geotechnical samples and 21 environmental samples
- Upper Reservoir Coarse-grained DMMU = 22 geotechnical samples and 18 environmental samples

Based on this understanding, the volume ratios would be considered appropriate.

## RECENCY GUIDELINE DISCUSSION

The *DMEF* provides recency guidelines for evaluating the length of time that an analytical set may be considered to validly represent a DMMU. It is our understanding that the recency guidelines are established for the dynamic Columbia River system. New sources and a flux of contaminants are anticipated in the Columbia River system.

The *DMEF* recency guideline for Low Management Ranking DMMUs is 7 years. The *DMEF*

recency guideline for Exclusionary Management Ranking is 10 years. The recency guideline time periods for sites with greater risk potential of experiencing the influx of contaminants from off-site or on-site sources decrease as the risk-level increases for the DMMUs Management Ranking.

A Site Reconnaissance of the upstream area for the White Salmon River was conducted on March 2, 2005 to confirm that no new sources of possible environmental contaminants have been developed since 1994. This site reconnaissance identified a new rock quarry just east of Highway 141 (about 0.5 miles east of the northern end of the Lower Basin of Northwestern Lake. This new activity could be considered a new source for fine sediment, but not environmental contaminants. No new sources that would introduce contaminants not identified in the 1994 Condit Study were discovered during the March 2, 2005 reconnaissance.

Based on the lack of new sources that could introduce new contaminants into the Northwestern Lake sediments, it is our opinion that a variance to the recency guidelines should be granted by the USACOE. This variance would provide an extension for the period of time that the laboratory data is considered representative of the sediments.

#### **TOTAL VOLATILE SOLIDS (TVS) AND TOTAL ORGANIC CARBON (TOC)**

The DMEF's Tier II is focused on the grain size (as discussed above) and an evaluation of Volatile Solids, a parameter not specifically addressed in the 1994 study. TVS is evaluated using Standard Method 2540 E, as listed in the 19<sup>th</sup> Edition of the Examination of Water and Wastewater (Franson 1995). The method is considered to be useful in approximating the amount of organic matter in sediments. The 1994 Condit Study evaluated Total Organic Carbon (TOC) using U.S. Environmental Protection Agency (EPA) Method 9060. The TOC analysis is a commonly used procedure for the indirect measurement of organic matter in most media, including soil, water, and sediment.

TVS does not equal TOC. A TVS measurement is the quantity of solids in water that are lost on ignition of the dry solids at 550°C. These solids are primarily carbon-based, however, other solids (typically nutrient-based) are possible. The TOC method involves the conversion of organic carbon to carbon dioxide by either catalytic combustion or wet chemical oxidation. The TOC measurement is the sum of organic carbons in sediments, which include the following:

- Nonvolatile organic carbon (sugars)
- Volatile organic carbons (mercaptans, alkanes, low molecular weight alcohols)
- Insoluble partially volatile (low molecular weight oils)
- Particulate carbonaceous matter (cellulose fibers)

- Carbonaceous material sorbed onto inorganics (oily matter on silt)

Based on this understanding, it is our opinion that although they are not equal, the two parameters (TVS and TOC) will generally provide estimations that will represent similar conditions. Sediments with high TVS values will have high TOC values and sediments with low TOC values will generally have low TVS values. This postulation should generally be valid unless a source area has anomalously elevated other nutrient-based (nitrogen, phosphorous, and potassium) solids. Excessive nutrients can be deleterious to water bodies since the nutrients support oxygen-depriving activities such as algae blooms.

Twelve sediment samples were collected from the Lower Basin fine-grained DMMU in 1994 and tested for TOC. The maximum TOC measurement was 23,000 milligrams per kilogram (mg/Kg), which is equivalent to 2.3 %. The average TOC for the Lower Basin fine-grained DMMU is 0.96 %. The average TOC for the Upper Reservoir Coarse-grained DMMU is 0.13 %.

The TVS criterion, as presented in the DMEF, is 5 %. Although there are no exact TVS measurements for these DMMUs, it can be assumed with confidence that the value would be less than 5 %. This postulating assumption is supplemented with polycyclic aromatic hydrocarbon (PAH) and volatile organic compound (VOC) analyses, which generally did not detect volatile or semivolatile analytes in the sediments.

## **TIER II EVALUATION**

The Tier II Evaluation in the *DMEF* uses the physical testing data for grain size and volatile solids. The two decision points for the Tier II analysis are:

- 1) Are the sediments greater than 80 % sand (or gravel)? and
- 2) Do the sediments have less than 5 % volatile solids?

According to the *1994 Condit Study*, sediments in the portion of Northwestern Lake referred to as the Upper Reservoir, have less than 20 % fines and less than 0.5 % organic matter. It is our opinion that these sediments would pass both decision points for Tier II. Accordingly, the next step would be proceeding to the 404/103 evaluation with no further testing required. For purposes of this *DMEF* Tiered Evaluation, the Upper Reservoir is considered to be that part of the lake that is north of the southern bank for the mouth of Buck Creek, located on the west side of the reservoir about 1 mile north of the dam (refer, Figure 1).

The sediments of the Lower Basin, that portion of the reservoir extending north from Condit Dam for about one mile, typically have less than 80% sand (or gravel) and about 1 % organic matter. Based on the *DMEF* Tiered Approach, these sediments should be chemically tested for

chemicals of concern (COC). The analytical testing for COCs is Tier II B.

## **TIER IIB EVALUATION**

As stated above, Tier IIB involves the analytical testing for COCs. The *1994 Condit Study* was accomplished under Sampling Plan approved by the Washington State Department of Ecology (DOE) and was modeled after the requirements of the Puget Sound Dredged Disposal Act (PSDDA). All analytical testing was completed using EPA Methods or approved Standard Methods. The quality assurance and quality control (QA/QC) protocols were accepted as valid.

Other points of the Tier II B Evaluation include the following:

- The *DMEF* provides a list of COCs that should be evaluated as part of a Tier IIB Evaluation because they "have been shown to be present in developed areas in the Pacific Northwest". The *DMEF* further provides that some COCs can be eliminated from further testing if information is obtained from a properly prepared Sampling and Analysis Plan indicates that the COCs are not an issue for that particular DMMU. The following lists compares the COCs identified in the *DMEF* with the COCs addressed in the *1994 Condit Study*.
- The *DMEF* lists 9 metals, the *1994 Condit Study* included those 9 metals plus four more.
- The *DMEF* lists individual and summed polycyclic aromatic hydrocarbons (PAHs), the *1994 Condit Study* included all the *DMEF* PAHs, except 2-methylnaphthalene. The compound 2-methylnaphthalene is associated with coal tar and its chemical properties suggest that it is easily soluble and does not readily sorb onto sediments. Accordingly, it should not be present in the Northwestern Lake sediments.
- The *DMEF* lists five forms of multiple chlorinated benzene-based volatile organic compound (VOCs), the *1994 Condit Study* included testing by EPA Method 8240, which has been replaced by EPA Method 8260. No VOCs were detected in the *1994 Condit Study*. However, in 1994, only chlorobenzene (a single chlorine benzene-based VOC) was tested for, but not the multiple chlorinated based VOCs. Chlorobenzene is used in some pesticide formulations and accordingly, could be considered a possible COC for the Northwestern Lake sediments. The multiple chlorinated benzene-based VOCs, such as 1,4-dichlorobenzene are complex synthetic chemicals typically associated with industrial activities. Since there are no industrial activities around Northwestern Lake, we do not expect to encounter these VOCs.
- The semivolatile organic compounds classified as phthalates and phenols are also listed

in the *DMEF*. Only pentachlorophenol was tested for in the *1994 Condit Study*. Phthalates and phenols are also synthetic chemicals typically associated with industrial processes. They are typically considered less toxic than most of the VOCs.

- The *DMEF* lists 8 organochlorine pesticides including total DDT, which is the sum of 4,4-DDT, 4,4-DDE, and 4,4-DDD, and polychlorinated biphenyls (PCBs). The *1994 Condit Study* included testing by EPA Method 8080 for organochlorine pesticides and PCBs. The *1994 Condit Study* also tested for chlorinated herbicides by EPA Method 8150 and a limited (2) testing for organophosphatic pesticides.

We have compared the *1994 Condit Study* data with the Screening Levels, Bioaccumulation Triggers, and Maximum Levels listed in the USACOE's *DMEF*. Two issues concerning contaminants were identified. The first issue was the presence of mercury in sediment samples above the *DMEF* Screening Level, but below the *DMEF* Bioaccumulation Trigger and the *DMEF* Maximum Level (refer, Table 1). It should be noted that, although background concentrations have not been established for mercury in the vicinity, the native element is prevalent in Cascadian volcanic terrains. The following table presents the 1994 results and the comparable *DMEF* action levels for mercury.

| Sample  | DMEF Mercury Screening Level | 1994 Detected Mercury Concentration | DMEF Mercury Bioaccumulation Trigger | DMEF Maximum Mercury Level |
|---------|------------------------------|-------------------------------------|--------------------------------------|----------------------------|
| B1A4-S1 | 0.41                         | 0.52                                | 1.5                                  | 2.3                        |
| B1A5-S3 | 0.41                         | 1.1                                 | 1.5                                  | 2.3                        |
| B4S-8   | 0.41                         | 0.71                                | 1.5                                  | 2.3                        |
| B4AS-8  | 0.41                         | 0.65                                | 1.5                                  | 2.3                        |
| B4S-11  | 0.41                         | 0.43                                | 1.5                                  | 2.3                        |
| B7S-4   | 0.41                         | 0.48                                | 1.5                                  | 2.3                        |

The second issue was based on the sum of 4,4'-DDT and it's related compounds (4,4'-DDD and 4,4'-DDE), referred to as Total DDT in the *DMEF*. Three detections exceeded the *DMEF* Screening level and one detection exceeded the Bioaccumulation Trigger and Maximum Level. The following table presents the 1994 results and the comparable *DMEF* action levels for Total DDT.

| Sample  | DMEF Total DDT Screening Level | 1994 Detected Total DDT Concentration | DMEF Total DDT Bioaccumulation Trigger | DMEF Maximum Total DDT Level |
|---------|--------------------------------|---------------------------------------|----------------------------------------|------------------------------|
| B1A2S-3 | 0.0069                         | 0.0074                                | 0.050                                  | 0.069                        |
| B1A3S-3 | 0.0069                         | 0.042                                 | 0.050                                  | 0.069                        |
| B4S-8   | 0.0069                         | 0.093                                 | 0.050                                  | 0.069                        |
| B5S-5   | 0.0069                         | 0.0107                                | 0.050                                  | 0.069                        |

Based on this evaluation, the sediments of the Lower Basin do not pass the Tier IIB evaluation stage and should not be proposed for unconfined aquatic disposal without additional testing. The *DMEF* Tiered Approach allows two separate actions at this point. The sediment evaluation can either move to Tier III Biological Testing or move to Tier IV Special Non-routine Evaluation. Special non-routine Evaluations include bioaccumulation testing or risk assessments or a combination of both.

## CONCLUSIONS

Based on this understanding, it is our opinion that the Upper Reservoir Coarse-grained DMMU should be considered fully characterized and should not require additional sampling and analysis. This designation would be in general accordance with an Exclusionary Management Ranking. We base this conclusion on the predominance of sand and or gravel (greater than 80 %) in the samples and low presence of organic materials and COCs. In addition, no apparent new source has been introduced into the upstream area that would provide new COCs, previously undisclosed.

The Lower Basin fine-grained DMMU does not pass the Tier I, Tier II, and Tier IIB evaluations at this time. This conclusion is based on the level of Total DDT encountered in one sample collected near the north end of the Lower Basin, just below where the Upper Reservoir would be considered to start. It is our opinion that additional testing should be undertaken in this portion of the reservoir.

## RECOMMENDATIONS

We recommend that a new phase of work be undertaken to provide additional sediment characterization data in order to supplement the findings of *Condit Hydroelectric Project (FERC Project No. 2342) Northwestern Lake Sediment Characterization Study, White Salmon, Washington (April 1994)*. The Supplemental Sediment Characterization would be conducted in general accordance to the framework requirements presented for open-water disposal of

sediments in the U.S. Army Corps of Engineers (USACOE's) *Dredged Material Evaluation Framework (DMEF), Lower Columbia River Management Area (November 1998)*. The proposed Supplemental Sediment Characterization would include the following tasks:

- Task 1: Squier I Kleinfelder will prepare and finalize a work plan for the Supplemental Sediment Characterization. Upon receipt of PacifiCorp's approval, the work plan will be submitted to USACOE for approval.
- Task 2: Squier I Kleinfelder will conduct site explorations consisting of at least 4 exploration points using direct push technology from a barge in Northwestern Lake's Deep Pool (Lower Basin) to obtain sediment samples for analysis. Approximately 3 samples will be developed from each exploration point. We currently anticipate the addition of 3 quality control samples. Laboratory analysis will be conducted according to an abbreviated program based on the *DMEF* requirements the US Army Corp of Engineers DMEF (Nov. 1998) Tier IIB guidelines. We propose the following analytical tests:
- Total Volatile Solids by Standard Method 2540 E (or equivalent)
  - Organochlorine Pesticides by EPA Method 8081
  - Mercury by EPA Method 7471
- Task 3: Squier I Kleinfelder will develop a report documenting the findings of Tasks 1 through 3 and present as a *DMEF* Tier IIB evaluation. We will develop a table comparing the analytical results to the 1994, *Northwestern Lake Sediment Characterization Study* data and the Screening Levels, Bioaccumulation Triggers, and Maximum Levels listed in the USACOE's *DMEF*. The *DMEF* Tier IIB submittal will be supplemental to the 1994 study and will reference the results of the 1994 study.

## LIMITATIONS

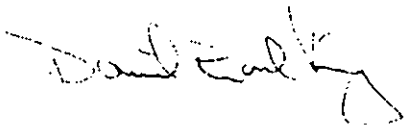
The scope of the work presented herein consists of the interpretation of existing data and documentation, including guidelines, for USACOE to evaluate and provide comment. The work was conducted in accordance with generally accepted local environmental practices and included such tasks as were considered necessary, in Squier I Kleinfelder's professional judgment, to enable us to complete this study based upon current local knowledge. The work was conducted, in part, to evaluate if the sediments of Northwestern Lake has, or potentially can have releases of COCs which would impact human health and the environment by the surface water and/or direct contact migration pathways. Our conclusions are based on the data and observations described herein and on current EPA regulations.

The scope of work for this project was approved by PacifiCorp. Please be aware that our scope of work was limited to those items specifically identified in the introduction of this technical memorandum. Environmental issues not specifically addressed in this document are beyond this specific scope of this effort and are not included in our evaluation. Since site activities and regulations beyond our control could change at any time after the completion of this report, our observations, findings, and opinions can be considered valid only as of the date of this report.

This report may be used only by PacifiCorp; their council; their representatives; and relevant regulatory agencies. Land or facility use, on and off-site conditions, regulations, or other factors may change over time, and additional work may be required with the passage of time. Any party other than the client who wishes to use this report shall notify Squier | Kleinfelder of such intended use. Based on the intended use of the report, Squier | Kleinfelder may require that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements by the client or anyone else will release Squier | Kleinfelder from any liability resulting from the use of this report by any unauthorized party, and client agrees to defend, indemnify, and hold harmless Squier | Kleinfelder from any claim or liability associated with such unauthorized use or non-compliance.

#### PROFESSIONAL AUTHORIZATION

Please feel free to contact us concerning the information presented in this document. This memorandum has been prepared and reviewed by the undersigned. This memorandum is void if original seal and signature are not present.



David Earl King, R.G.  
Senior Professional Hydrogeologist



Arlan H. Rippe, P.E.  
Senior Principal Consultant

for

cc: W. Brent Denham, P.E., PacifiCorp  
Gail Miller, PacifiCorp

### FIGURE 1

825 N.E. Multnomah, Suite 1500  
Portland, Oregon 97232  
(503) 813-5000



June 4, 2004

Via Regular Mail

Ms. Loree Randall  
Washington Department of Ecology  
P.O. Box 47600  
Olympia, Washington 98504-7600

**Re: Condit Hydroelectric Project, FERC Project No. 2342  
Submission of Project Description to Supplement Existing Information for  
SEPA and Section 401 of the Clean Water Act**

Dear Ms. Randall:

Enclosed is PacifiCorp's "Project Description" that supplements information that you have already received. This information is intended to assist Ecology in their supplemental environmental review under the Washington State Environmental Policy Act (SEPA) and in Ecology's review of the pending Section 401 application. At your request, we have sent two hard copies of the document as well as two compact discs.

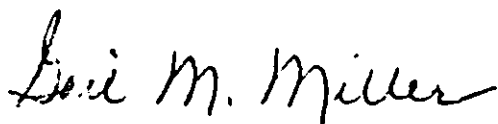
The enclosed Project Description was developed by PacifiCorp after extensive consultation with Ecology and is intended to clarify and refine PacifiCorp's proposal to remove Condit Dam. The Project Description is composed of the following elements:

- Project Scope
- Site Management Plans
  - Plan for Revegetation of Reservoir Area and Other Areas Disturbed by Construction Activities
  - Plan for Wetland Mitigation Within and Downstream of Former Reservoir Area
  - Sediment Assessment and Management Plan
  - Bank Stabilization Plan
  - Canyon and Woody Debris Management Plan
  - Upland (Non-reservoir Area) Stormwater and Erosion Control Plan
  - Blasting Plan
  - Dust Control Plan

- Spill Prevention and Containment Plan
  - Traffic Control Plan
  - Public Safety Plan
- Monitoring
- Appendices
  - Appendix 1 – Condit Settlement Agreement, September 1999
  - Appendix 2 – Summary Report Engineering Considerations (Removal Plan), May 1998
  - Appendix 3 – Initial Assessment, March 1997
  - Appendix 4 – RW Beck Letter to Mark Sturtevant regarding Concrete Disposal, July 1998
  - Appendix 5 – Access Roads, Work Areas and Staging Areas, Tabulation & Locations, April 2004
  - Appendix 6 – Land Requirements for Project Use, February 2001
  - Appendix 7 – Northwestern Lake Bridge Evaluation Report, March 2004
  - Appendix 8 – Evaluation of pH Effects Due to Pulverized Concrete, April 1998
  - Appendix 9 – Sediment Behavior Analysis Report, May 2004
  - Appendix 10 – Sediment Behavior Effects on Beneficial Uses, May 2004

I look forward to discussing this document with you and answering any questions you may have.

Sincerely,



Gail M. Miller  
PacifiCorp Project Manager

Enclosures

cc: See attached Distribution List  
File

# Project Description Distribution List

## Letter Only

|                                                                                                                                       |                                                                                                                               |                                                                                                                                          |
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# Condit Hydroelectric Project FERC Project No. 2342

## Project Description

June 4, 2004  
and, Oregon



PROJECT DESCRIPTION

CONDIT HYDROELECTRIC PROJECT  
FERC PROJECT NO. 2342

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PROJECT DESCRIPTION

CONDEE HYDROELECTRIC PROJECT  
FERC PROJECT NO. 2342

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1.0 SCOPE

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This removal plan for the Condit Hydroelectric Project (FERC Project No. 2342) (Project) supplements information contained in the Final Supplemental Final Environmental Impact Statement (FSFEIS) prepared by the Federal Energy Regulatory Commission (FERC) in June 2002 for the Project and referenced herein (see FERC document recorded as FERC FSFEIS 0103). The FERC FSFEIS was prepared to address the impacts of a removal method agreed upon in the Condit Hydroelectric Project Settlement Agreement (September 1999) (Settlement Agreement), which differed from the Project alternatives described in FERC's October 1996 FEIS. Additional information on this agreed upon removal method (Proposed Action) is provided below to facilitate the evaluation of the Proposed Action's potential impacts in accordance with the Washington State Environmental Policy Act (SEPA). In addition, the information is intended to assist the Washington Department of Ecology ("Ecology") in its review of PacifiCorp's request for certification of the Proposed Action under Section 401 of the Clean Water Act. The removal plan described below is subject to modification and adjustment by PacifiCorp as necessitated by further planning or regulatory review, *provided* the final removal plan is consistent with the Settlement Agreement and any FERC Order ultimately accepted by PacifiCorp.

### 1.1 PROPOSED ACTION DAM AND APPURTENANT FACILITIES REMOVAL IN ACCORDANCE WITH THE SETTLEMENT AGREEMENT

PacifiCorp proposes to remove the Project on the White Salmon River in accordance with the Settlement Agreement. Removal of the Project will enable the river and watershed to return to the conditions of a free-flowing river. Condit dam, originally constructed in 1913, currently accumulates sediments and blocks fish passage above and below the dam. Removing the dam will open approximately 19 miles of potential river habitat to spawning steelhead and salmon, and will restore connectivity to foraging, spawning, rearing and overwintering habitat for bull trout in the lower White Salmon River. The removal will also restore natural bed load movement processes in the river. This will result in an increased gravel supply for bull trout spawning habitat. Combined with a stable and natural flow regime, dam removal will result in increased salmonid (steelhead, salmon, and bull trout) production potential.

Dam removal will improve water quality by passing cooler water to downstream habitat areas during the summer and fall, consistent with natural riverine conditions. Benefits are also expected from the transport of large woody debris and from the natural distribution of the carcasses of post-spawned anadromous fish to downstream habitat areas. This will support an increase in the diversity and abundance of aquatic invertebrates.

Dam removal provides significant traditional and cultural resource benefits by restoring Yakama Nation access to and fishing from a usual and accustomed fish location blocked by the Condit dam for 80 years. The total recreational benefits and expenditures associated with the restored river are expected to approximate or exceed the limited benefits generated by the Project-induced flatwater boating and fishing within the dam reservoir.

The 1999 Settlement Agreement was entered into to resolve all issues in the proceeding for relicensing the Project by FERC. Under the Settlement Agreement, PacifiCorp, upon FERC approval, would continue to operate the Project under the terms of its existing FERC license until October 1, 2006, whereupon PacifiCorp would cease generating power at the Project, provided that PacifiCorp is not required to cease generating power until all required permits have been obtained and

any applicable permit appeal periods have expired or, if an appeal is filed, until all appeals have been resolved on terms and conditions consistent with the Settlement Agreement.

Certain conditions, as specified in Section 5 of the Settlement Agreement (Appendix 1), could preclude PacifiCorp from removing the dam and facilities at the end of the amended license term. Examples of these conditions include PacifiCorp's inability to: (1) obtain required permits consistent with the Settlement Agreement; (2) obtain required easements, rights-of-way, other interests in property, or third-party consent; or (3) obtain contracts to perform the removal and mitigation consistent with Settlement Agreement and required permits.

Commencement of the agreed upon construction schedule would occur no later than August 1, 2006, provided that PacifiCorp is not required to commence removal until all required permits have been obtained and any applicable permit appeal periods have expired or, if an appeal is filed, until all appeals have been resolved on terms and conditions consistent with the Settlement Agreement. Project removal would commence during October 2006. The demolition and removal of Condit dam and other Project facilities are estimated to take one year. There are no plans to remove the powerhouse.

Under Section 4.4 of the Settlement Agreement, the Settlement parties would consider commencing removal at an earlier date (October 2005 or earlier) if additional funding is available to PacifiCorp to implement the removal plan and all necessary permits and authorizations have been obtained. In either case, removal is scheduled to be completed by December 31, 2007.

*This summary of certain terms of the Settlement Agreement and the Removal Plan Summary referenced in the Settlement Agreement is provided for convenience only and is not intended to alter or supplement the Settlement Agreement or the Removal Plan. In the event of any inconsistency, the Settlement Agreement and Removal Plan prevails. For the complete text of the Removal Plan, please refer to Appendix 2.*

The existing Project is comprised of a concrete gravity dam, a 3-mile-long reservoir, a 13.5-foot-diameter wood-stave pipeline approximately a mile long, a surge tower, two short penstocks, and a reinforced-concrete powerhouse structure housing two double-runner, horizontal Francis turbines with an installed capacity of 14,700 kilowatts.

The Removal Plan by R.W. Beck (Removal Plan) (Appendix 2) describes the preferred method for removing the dam, removing appurtenant facilities, preparing the site for construction (including establishing staging, borrow, spoil areas and temporary access roads), managing sediment and woody debris behind the dam, and relocating or securing existing facilities within the Project area. These plans are further defined by this document, which includes the following management plans:

- Plan for Revegetation of Reservoir Area and Other Areas Disturbed by Construction Activities
- Plan for Wetland Mitigation Within and Downstream of Former Reservoir Area
- Sediment Assessment and Management Plan
- Bank Stabilization Plan
- Canyon and Woody Debris Management Plan
- Upland Stormwater and Erosion Control Plan
- Blasting Plan

PROJECT DESCRIPTION

- Dust Control Plan
- Spill Prevention and Containment Plan
- Traffic Control Plan
- Public Safety Plan

## 1.2 GENERAL DESCRIPTION OF DAM AND APPURTENANT FACILITIES REMOVAL

### 1.2.1 Hardware Removal and Tunneling

Removal of the dam is scheduled to commence in October 2006 at the request of federal and state resource agencies and the Yakama Nation to minimize adverse impacts on the fishery resources of the river. Prior to draining Northwestern Lake, the reservoir behind Condit dam, the hardware on the crest of Condit dam will be removed. The hardware on the dam crest includes a 167-foot-long Obermeyer spillway gate. Other gates will also be removed from the dam, including a 6-foot-wide, vertical, timber lift gate, and five, 10-foot-wide by 10-foot-high radial gates. A 12-foot-high by 18-foot-wide drain tunnel will be excavated near the base of the dam (at elevation 174 feet) to provide rapid reservoir drainage (Appendix 2). The tunnel size will allow an approximate maximum flow of 10,000 cubic feet per second (cfs) to pass through. At this tunnel size the reservoir pool is expected to lower to stream level within six hours.

One of the first stages of the Proposed Action is to construct a temporary access road to the spillway slab below the dam to permit construction of the reservoir drain tunnel. The wood stave pipeline below the dam will have to be left intact during the drain tunnel construction so that water flowing into the reservoir can be passed downstream while leaving the river level below the dam relatively low to facilitate tunnel construction. Therefore, the access road to the spillway slab will have to bridge over the wood stave pipe and be of sufficient construction to accommodate the construction equipment access needed to excavate the drain tunnel. Photo #1 of Appendix D of the R. W. Beck Report shows the proposed location of the access road. Once demolition of the dam has progressed downward to approximately elevation 235, a temporary access road will come off the dam and run along the east slope of the drained reservoir.

Concrete will be excavated from the tunnel (by drilling) and will be transported by truck to a disposal area. A rough-terrain crane will be used to load trucks with the excavated concrete. Access for this operation will occur using the temporary access road from the existing dam access road to the existing spillway apron deck.

Tunnel drilling will begin at the downstream face of the dam and continue through the dam until within 15 feet of the upstream water-face of the dam, whereupon both explosives and drilling will be used to remove the final 15 feet of concrete. Prior to the final blast of the 15 feet of concrete, PacifiCorp will float a barge-mounted clamshell crane to the dam to excavate sediment and debris from the upstream face of the dam in the area where the tunnel will daylight. Because of the large size of the tunnel, it is unlikely that it will plug up with woody debris. However, explosives will be lowered into the plugged area and blasted to open the tunnel, if necessary.

### 1.2.2 Concrete Dam Demolition

Once the reservoir is drained, dam excavation will begin in the dry and start at the east end. Beginning at the top of the dam, PacifiCorp will remove pieces of the dam in a series of top slicing cuts at ten-foot intervals. The two, upper, 10-foot horizontal cuts of the dam, as well as sections along the downstream and upstream faces in each cut, will then be blasted into large blocks (4-foot-

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deep by 6-feet-wide by 10-feet-high). Blasting will be limited to the use of 12 pounds of explosives per delay (delay time more than 8 milliseconds between detonations)<sup>1</sup>. These blocks will be loaded with either a crane or a highline yarder-type system onto trucks and then hauled-off the dam to the designated disposal area (See Appendix 2 for yarder drawing). PacifiCorp will drill and blast the inner portions of the dam into rubble that will be loaded onto trucks with an excavator and hauled-off the dam to the disposal area. As the top slice cuts proceed below elevation 225 feet, a crane will be deployed to the spillway slab to hoist concrete from the lower area. As the excavation reaches the level of the drain tunnel, center portions of the dam adjacent to the tunnel will be excavated down to the bedrock. The edges of the dam along the tunnel and the upstream and downstream faces will be left in place to keep the river flow out as the concrete is removed from within the edges of the dam. When the inner portions of the dam are removed down to the bedrock so that only the edges remain, the edges of the dam will be blasted into blocks and hoisted out of the river channel. It is estimated that dam removal will take approximately one year. See Section 2 of the Removal Plan (Appendix 2) and the Condit Hydroelectric Project Removal Initial Assessment prepared by R.W. Beck in March 1997 (Appendix 3) for options that were initially considered, but were ultimately rejected.

1.2.3 Concrete Removal, Storage, and Disposal

Approximately 29,059 cubic yards of concrete will be removed from the dam and about 2,532 cubic yards of steel reinforced concrete will be removed from the spillway and surge tank. Concrete material will be hauled to a nearby quarry site for recycling or to an onsite location where much of it will be buried. Concrete has no biodegradable material that will cause a toxic byproduct; therefore, PacifiCorp does not anticipate the need to use a liner or to monitor the concrete. Concrete rubble will be disposed over 2 to 3 acres at Site B (PacifiCorp's 8-acre parcel) or in the 40-foot deep, open pit quarry area designated as Site D.

Prior to demolition, PacifiCorp will conduct a marketing study to determine whether recycling is a viable alternative. If recycling is an option, then an alternative site may also be needed to meet space requirements. PacifiCorp will obtain any required permits for the use of any of these sites, and will perform any mitigation required by any applicable required permit after the completion of dam removal. See Section 1.2.4 of this document as well as the R.W. Beck Letter sent to Mark Sturtevant in July 1998 regarding concrete disposal (Appendix 4) for more detailed information.

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<sup>1</sup> This rate is in keeping with good practice followed by the U.S. Bureau of Mines to prevent vibration effects from becoming cumulative and to keep particle velocities well below values that would cause damage to the dwelling near the dam from air or earth vibrations. It is also consistent with Army Corps of Engineers blasting specifications to mitigate impacts to wildlife.

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### 1.2.4 Construction Staging and Disposal Sites

In order to implement the terms of the Settlement Agreement and perform the removal and associated restoration work described within the Project Description, temporary work areas and staging areas will need to be established and utilized. A tabulation of all the proposed locations for the Work Areas and Staging Areas is contained in Appendix 5. Appendix 5 also contains aerial mapping that defines the relative location of each of the areas. All locations were chosen to minimize potential impacts by establishing them within or near previously used access roads and work locations whenever possible.

Prior to utilizing any of the locations PacifiCorp will evaluate property ownership and easements and conduct a cultural resource assessment and wetland delineation.

The concrete removed from the dam and surge tank will be buried and covered on the 8-acre site owned by PacifiCorp that is located about 1,000 feet upstream of the dam. This parcel has been previously identified in earlier reports as Site B. The parcel is identified in Photo 8 of Appendix 5. It is identified as Staging Area 3.

Only 7 acres of Staging Area 3 will be utilized, given that the site is subject to well setback limitations. About 2 acres of the site will need to be cleared of vegetation. This area is well suited for concrete disposal and is a good site for the temporary storage of wood stave pipeline lumber. When work on this parcel is complete the area will be graded to naturally drain to the west and the entire site will be revegetated.

Staging Area 3 can be accessed via Tamarack Lane, a private road owned by SDS Lumber Company. This road is shown in Photo 7 of Appendix 5. To reduce the amount of traffic on Tamarack Lane, however, a second access road will be established along the eastern banks of the reservoir in the same alignment as the existing road, which has become over grown with vegetation. The alignment of this road is shown in Photo 6 of Appendix 5.

Although Staging Area 3 appears to be the most feasible, PacifiCorp may, if conditions change, utilize the other sites that were previously identified in the Land Requirements report (Appendix 6).

At the conclusion of the Proposed Action all disturbed areas will be regraded and revegetated consistently with the revegetation plan.

### 1.2.5 Upstream Cofferdam Removal and Disposal

Historic photographs and drawings show that a cofferdam system was used in the original construction of the dam and was left behind in the reservoir and subsequently flooded. This cofferdam will be removed by May 2007. This date was selected at the request of federal and state resource agencies and the Yakama Nation to minimize adverse impacts on fishery resources. It is hoped that this structure can be removed by blasting and the use of a logging highline yarder, but it may be necessary to construct an access road into the area so that other equipment can assist in this work. If necessary, this access road will come off the dam as demolition progresses downward to approximately elevation 235 and it will run along the east slope of the drained reservoir. The concrete, stones, boulders, and original timber members of the cofferdam will be excavated, placed onto trucks, and transported to one of the nearby spoil disposal areas being considered by PacifiCorp.

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Some of the timbers from the cofferdam, however, will probably be washed downstream as the structure is taken apart.

1.2.6 Wood Stave Pipeline and Wood and Steel Penstocks Removal and Disposal

The 5,100-foot-long, 13.5-foot-diameter wood stave pipeline located along the east bank of the lower White Salmon River and the two, 9-foot-diameter, 650-foot-long steel and wood stave penstocks will be removed from the site. Minor access road construction could be required to gain access to selected areas to facilitate demolition and removal. Recycling these wood products is preferable to permanent disposal. A total of 2 acres will be required to store the wood once it is dismantled and until it can be sold as top grade commercial lumber. The timber will need to be stored in the open, in well ventilated, loosely stacked piles to allow air-drying. PacifiCorp estimates that the dismantling and stockpiling work will take seven weeks. The access roads and staging areas associated with this activity are tabulated and shown in Appendix 5.

1.2.7 Concrete Surge Tank Removal and Disposal

The 40-foot diameter, 45-foot-high steel-reinforced concrete surge tank will be disassembled using conventional track mounted breakers along with drilling and blasting. The above grade portions of the existing concrete spillway that extends from surge tank to the river will be demolished. This material along with a portion of the concrete from the surge tank will be used to fill the subgrade portion of the spillway. At the conclusion of all demolition work the area will be graded to match the natural surrounding conditions and will be revegetated. Excess materials that are not used to fill the spillway channel will be trucked to the disposal site.

1.2.8 Power Facilities Removal and Disposal

As part of the removal activities, PacifiCorp will reconfigure the two 69 kilovolt (kV) transmission lines that terminate at the Project. The existing Condit to Bald Mountain 69 kV line and the Condit to Bingen 69 kV line will be reconfigured to form a Bald Mountain to Bingen 69 kV line. In addition, the power line that currently supplies power from the substation near the powerhouse to the dam will be removed. This work area is defined as WA-7 and is detailed in Photo 23 of Appendix 5.

PacifiCorp will not remove the Project powerhouse and associated parking area. The upper portion of the powerhouse tailrace retaining wall will, however, be removed and hauled to the disposal area. The tailrace will be filled in with approximately 2,000 cubic yards of rock. This work is being done to eliminate the potential for fish stranding in this deep section. The area that will be disturbed by this activity is shown in Photo 18 of Appendix 5 and is labeled work area 5 (WA-5). Rock will be hauled to the tailrace area utilizing the access road (AR-10) shown on Photo 19 of Appendix 5.

PROJECT DESCRIPTION1.2.9 Access Roads

Access roads throughout the Project area are necessary to perform the removal operations defined by the Settlement Agreement and the associated reclamation and monitoring activities. The locations of all access roads to be utilized are contained in Appendix 5. The roads that have been identified are primary existing roads that are currently maintained and in use to operate the facilities. These existing established and maintained roads provide access to the following work and staging areas.

- Dam
- Flowline
- Surge Tank
- Penstock
- Power House
- Substations
- Power Lines
- Reservoir
- Boat Docks
- Northwestern Lake Bridge
- Tamarack Lane to Staging Area 3.

Although most of the work areas can be accessed by utilizing established roads there are some areas that will require roads to be reestablished that were previously in use but have since become overgrown. This is the case with the access road east of the reservoir site that was historically used to travel north and south above the east shore of the reservoir. This road, shown in Photo 6 of Appendix 5, will be reestablished to allow access to Staging Area 3. It will also facilitate access to establish additional access roads within the reservoir footprint that could ramp down the tributary canyon to the existing cofferdams and to other reservoir areas that may require access for reservoir stabilization. The road will follow the existing alignment except for a short new section at the south near the current boat ramp. This new section will be added to avoid using the portion of the previously used road that winds through the wetland area that has been formed by the tributary. To facilitate this work a temporary bridge or culvert will be installed after the reservoir is drained that will cross the tributary near the current boat ramp.

In some locations roads do not exist and new temporary roads will need to be established. However, this typically only occurs for short distances (~200ft) when existing roads fall short of accessing the existing reservoir footprint. The exception to this is the new road that must be established to access the lower portion of the dam. This road was detailed in previous reports and is estimated to require between 2,000 and 3,000 cubic yards of fill material. Fill material for the access road will likely be acquired from one or more of the proposed spoil areas. The location of this road is detailed in Photo 2 of Appendix 5. Access to the lower dam area is vital to meet time lines for removal and to ensure fish passage. For this reason a second access road to the lower dam will also be utilized that, although longer, will be less steep and can be used for heavy hauling after the flowline is removed from service. This access road is shown in Photo 9 of Appendix 5.

In addition to the access roads tabulated in Appendix 5, access roads will be required within the current reservoir footprint to stabilize slopes prior to revegetation and for the management of woody debris. These roads have not been located at this time as the topography that will exist after reservoir draw down is not known. These temporary roads will be built in the remaining reservoir sediment and will be reinforced using imported materials. When these access roads are no longer needed all fill material used for the construction that is within the flood plain will be removed and all areas will

be revegetated. The temporary access road fill materials removed will be used as backfill for construction staging area reclamation and for filling in the tailrace.

### 1.3 SCHEDULE

| Time Period               | Action                                                                      |
|---------------------------|-----------------------------------------------------------------------------|
| August 2006               | Mobilization                                                                |
| August - October 2006     | Site layout - setup and clearing staging areas, set up barge in reservoir   |
| August - September 2006   | Construction of access roads including road to spillway slab below dam      |
| September 2006            | Construct drain tunnel                                                      |
| September - October 2006  | Remove Obermeyer gates, Tainter gate and radial gates                       |
| September - October 2006  | Install temp water line                                                     |
| September - October 2006  | Mt. Adams Orchard water supply relocation                                   |
| September - October 2006  | Northwestern Lake Bridge modification                                       |
| October 2006              | Remove debris from drain tunnel location                                    |
| October 2006              | Blast tunnel plug and drain reservoir                                       |
| November 2006             | Demolish headworks                                                          |
| November 2006 - July 2007 | Demolish dam                                                                |
| March - May 2007          | Remove wood stave pipeline and wood and steel penstocks. Surge tank removal |
| October 2006 - April 2007 | Cofferdam removal                                                           |
| March 2007 - March 2008   | Remove transmission line and substation                                     |
| February - April 2007     | Fill in tail race                                                           |
| August 2007               | Demobilization for dam removal activities                                   |

### 1.4 REFERENCES

Black and Veatch, September 1998. Condit Project Removal Study - Independent Review Draft.  
Prepared for PacifiCorp.

FERC, June 2002. Condit Hydroelectric Project, Project No. 2342 Final Supplemental Final  
Environmental Impact Statement. Record Number 0103.

CONDIT HYDROELECTRIC PROJECT  
FERC PROJECT NO. 2342

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R.W. Beck, May 1998. Condit Project Removal. Summary Report Engineering Considerations.  
Prepared for PacifiCorp.

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## 2.0 SITE MANAGEMENT PLANS

### 2.1 PLAN FOR REVEGETATION OF RESERVOIR AREA AND OTHER AREAS DISTURBED BY CONSTRUCTION ACTIVITIES

Northwestern Lake currently inundates approximately 92 acres of land, including the original channel of the White Salmon River for a length of 11,000 feet. Suitable substrate in the upland area within the footprint of Northwestern Lake will be revegetated following reservoir draining. The newly formed river channel is expected to average approximately 128 feet wide, and cover an area of approximately 30 acres, including approximately 4,800 linear feet of tributary streams and seeps that had been inundated by Northwestern Lake (i.e., Buck, Little Buck, Spring, and Mill Creeks, and at least thirteen other unnamed streams and seeps). As a result, approximately 62 acres of upland area will remain within the reservoir area adjacent to the restored river channel, of which approximately 25-30 acres is expected to include residual sediment capable of being revegetated (Figure 2-1). The remaining 35-40 acres are composed of rocky substrate mostly located within the steeply incised canyon within 2,000 feet upstream of the dam (CH2M HILL, 2003a).

According to pre-construction photos and pre-project bathymetry (1912), portions of the footprint upstream of 2,000 feet of the dam are flatter and expected to include residual sediment capable of supporting vegetative growth. Initial efforts will focus on erosion control and establishment of herbaceous cover. Subsequently, native herbaceous and woody vegetation is expected to colonize the stabilized riverbanks and floodplain.

The goals of the revegetation plan are to:

- Minimize the potential for long-term erosion and delivery of sediment to the river and streams caused by construction activities and the effects of dam removal.
- Minimize the colonization of noxious weeds within the former reservoir bed and other areas disturbed by construction activities.

The purpose of this management plan is to clarify what revegetation practices will be employed to assure consistency with the terms of the Settlement Agreement and the (FERC) staff recommendations contained in the FSFEIS.

#### 2.1.1 Site Assessments

Baseline conditions in the Project area represent pre-action or "background" conditions, and are useful in determining appropriate performance criteria to meet management goals and objectives. In consultation with Ecology and Army Corps of Engineers, a baseline survey will be conducted in the summer of 2004 or 2005. A report will be prepared from the survey that describes baseline conditions for herbaceous vegetation cover and density of woody vegetation in early successional riparian habitat in the vicinity of the Condit Project, which would provide performance criteria for revegetating areas of residual sediment within the Northwestern Lake footprint (Figure 2-1) as well as other areas disturbed by construction activities. Areas immediately adjacent to the reservoir would also be surveyed to document existing locations of noxious weeds. Within the monitoring period following dam removal, any Class A noxious weeds that become established would be controlled to be no greater than baseline conditions (vegetative cover per species). Preliminary observations of

baseline vegetation in uplands adjacent to the reservoir exhibit low occurrences of noxious weeds (e.g., Scot's broom Class B).

The characteristics of the site to be revegetated will not be known with certainty until after the reservoir is drained. A post-reservoir draining assessment will be conducted immediately after draining (October 2006) and repeated over the next several months to determine the schedule for revegetation. Actions to provide stable angles of repose of residual sediment (see Bank Stabilization Plan) and other factors that may affect substrate stability (see Canyon and Woody Debris Management Plan) will affect the timing of revegetation efforts.

Residual sediments soils will be tested for standard agronomic parameters (e.g., pH, extractable nutrients, cation exchange capacity, percent base saturation, soil texture, and percent organic matter). Sites suitable for seeding will be identified. Some areas may be better suited for specific seed mixes, depending on aspect and slope.

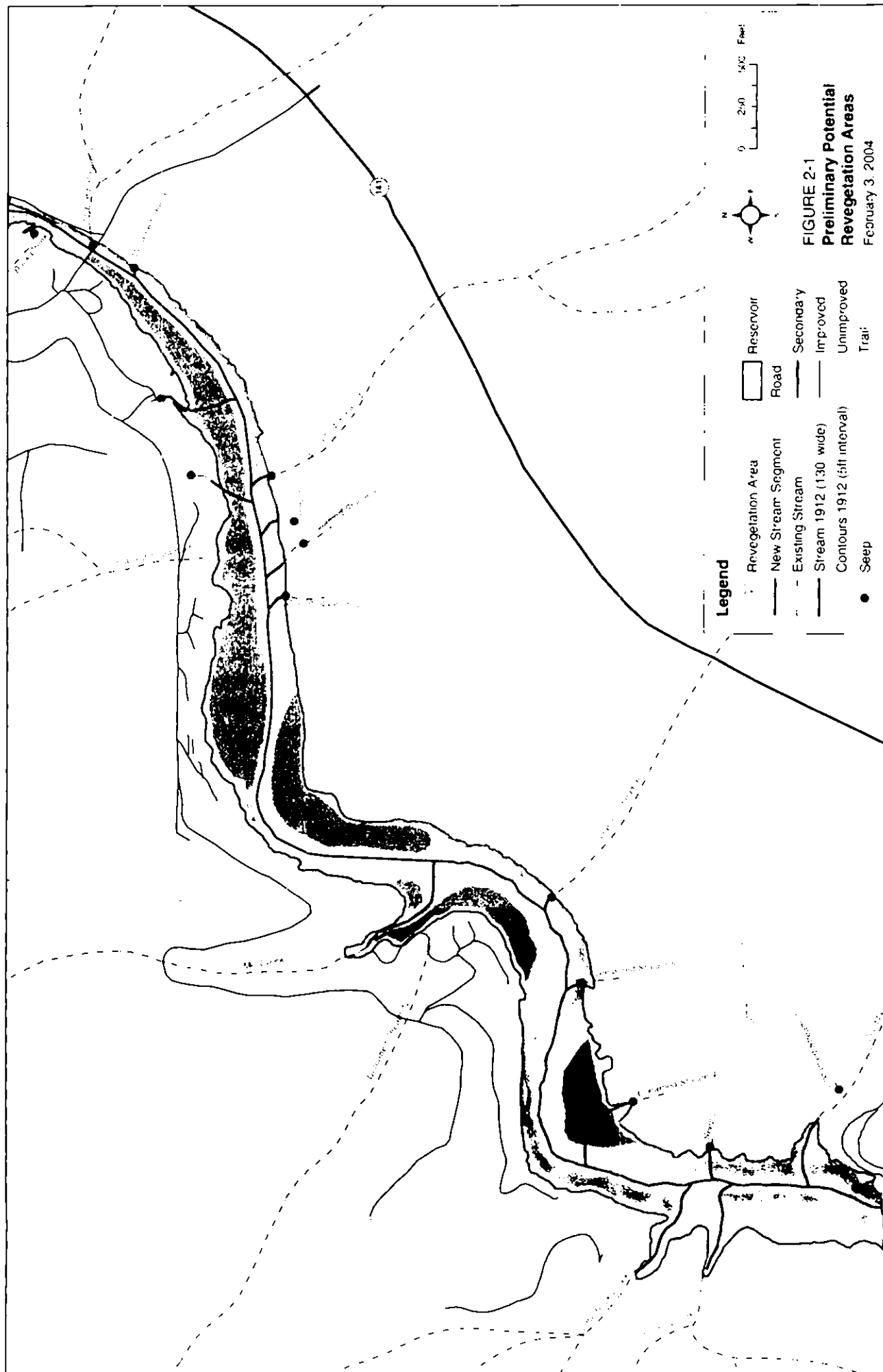
### 2.1.2 Revegetation Approach

During the post-reservoir draining assessment, areas for seeding (i.e., revegetation areas) will be identified. Seeding may occur in different revegetation areas of the reservoir footprint on a varying schedule depending on site factors affecting likely success. Because this action will occur primarily during the spring and fall of the first year after dam breaching, irrigation of the seeded area is not expected to be necessary.

**Contingency:** Should site-specific or weather conditions indicate the need, a water source that is properly permitted for irrigation use at these locations will be utilized to supply sufficient water to ensure success. In the event that a change of water use for a particular water right is necessary, necessary permits will be obtained from WDOE Water Resources. If a water source cannot be secured for this use water will be trucked to the site from an outside properly permitted source.

Seeding is expected to discourage surface erosion and minimize noxious weed establishment in advance of natural revegetation. Following the initial seeding during the spring of 2007, subsequent localized spot seeding may be necessary to accomplish performance criteria for revegetation. This work is expected to be completed by the fall of 2007. Subsequent reseeding will be conducted as needed with the goal of reaching the vegetative cover performance criteria by 2009.

A preliminary seed mix and seeding rate has been developed in consultation with Underwood Conservation District and Natural Resources Conservation Service office (Table 2-1), and will be reviewed for appropriateness following site assessments. In addition, 45 pounds per acre of barley (*Hordeum vulgare*) will be applied along with the seed mix as a cover crop to boost initial erosion control. Use of native seed is emphasized in the seed mix, particularly bunch grasses, which will accommodate natural regeneration of native woody species and stabilize soil surfaces. Use of several non-native species is included to enhance initial erosion control, weed control, and nitrogen fixation (e.g., legume components, redtop, and cover crop). Necessary application rates may be revised once site conditions are confirmed through the site assessment. Use of mulch, tackifier, and organic amendments will be used as necessary to control erosion and promote plant establishment. Consultation with WDOE Water Resources will determine any necessary permits for this work near waters of the state. Depending on the condition of the remaining formerly submersed plants (e.g., waterweed, algae, milfoil) by the spring following reservoir draining, some limited tillage may be needed to ensure proper seed-to-soil contact for successful seed establishment.



**FIGURE 2-1**  
**Preliminary Potential**  
**Revegetation Areas**  
February 3, 2004

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Table 2-1. Upland Revegetation Seed Mix (Preliminary)

| Common Name              | Scientific Name                                                         | Pounds Pure Live Seed (PLS) per acre |
|--------------------------|-------------------------------------------------------------------------|--------------------------------------|
| Barley (cover crop)      | <i>Hordeum vulgare</i>                                                  | 45.0                                 |
| Slender wheatgrass       | <i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i> var. <i>Revenue</i> | 14.0                                 |
| Idaho fescue             | <i>Festuca idahoensis</i> var. <i>Joseph</i>                            | 7.0                                  |
| Sheep fescue             | <i>Festuca ovina</i> var. <i>Covar</i>                                  | 14.0                                 |
| Mountain brome           | <i>Bromus marginatus</i> var. <i>Bromar</i>                             | 7.0                                  |
| Redtop                   | <i>Agrostis alba</i>                                                    | 0.6                                  |
| Blue wildrye             | <i>Elymus glaucus</i>                                                   | 10.5                                 |
| Big bluegrass            | <i>Poa ampla</i> var. <i>Sherman</i>                                    | 1.4                                  |
| Canby bluegrass          | <i>Poa canbyi</i> var. <i>Canbar</i>                                    | 1.4                                  |
| Canada bluegrass         | <i>Poa compressa</i> var. <i>Reubens</i>                                | 0.8                                  |
| White yarrow             | <i>Achillea millefolium</i>                                             | 0.4                                  |
| Alfalfa                  | <i>Medicago sativa</i> var. <i>Alfagraz</i>                             | 7.0                                  |
| Red clover               | <i>Trifolium hybridum</i>                                               | 2.8                                  |
| White Dutch clover       | <i>Trifolium repens</i>                                                 | 1.1                                  |
| Rocky Mountain penstemon | <i>Penstemon strictus</i>                                               | 2.1                                  |
| Noxious weed seed        |                                                                         | 0.0                                  |
| TOTAL                    |                                                                         | 120.0                                |

Seeding may be done using a combination of hand, truck, and or aerial application depending on access. Organic amendments, mulch, and tackifier will likely be applied using hydro-seed equipment. This action will follow appropriate best management practices (BMPs) to minimize additional disturbance of the area (see Upland Erosion and Sediment Control Plan).

### 2.1.3 Monitoring Plan

The goals, objectives, and performance criteria for revegetation of the reservoir area are summarized below. Monitoring will occur as described below until the performance criteria have been met.

#### Goals:

- Minimize the potential for long-term erosion and delivery of sediment to the river and streams caused by construction activities and the effects of dam removal.
- Minimize the colonization of noxious weeds within the former reservoir bed and other areas disturbed by construction activities.

#### Objectives:

- Establish vegetation on residual and stable sediments in the former reservoir area that may be subject to erosion, and other areas disturbed by construction activities.
- Assure revegetation includes a woody component representative of early succession riparian habitat of the area. A contingency plan for artificial regeneration will be implemented only if natural regeneration of woody species fails to entirely meet this objective.

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- Comply with Washington State noxious weed ordinance by controlling and minimizing noxious weed species to be no greater than baseline noxious weed conditions on nearby properties.

**Performance Criteria:**

- Two consecutive years' documentation plus confirmation at year 10 after dam breaching that established grasses and/or natural revegetation (excluding noxious weeds) provide cover of herbaceous vegetation and density of woody species on areas that were identified as suitable for revegetation during the post-reservoir drainage assessment and that remain suitable for revegetation of the former reservoir footprint, and in any other areas directly disturbed by decommissioning activities that reflects background conditions based on the baseline survey.
- Two consecutive years' documentation plus confirmation at year 10 after dam breaching of the composition of woody vegetation representative of early successional riparian habitat on areas that were identified as suitable for revegetation during the post-reservoir drainage assessment and that remain suitable for revegetation of the former reservoir footprint.
- Two consecutive years' documentation plus confirmation at year 10 after dam breaching of the presence of noxious weeds on areas that were identified as suitable for revegetation during the post-reservoir drainage assessment and that remain suitable for revegetation of the former reservoir footprint.

**Methods:**

2.1.3.1 Vegetation Cover

High resolution (one-half foot pixel) color infrared aerial photographs of the site will be taken in September 2007 and September 2009. Photos will be orthorectified. For purposes of aerial photo interpretation and sampling revegetation areas in the field, the footprint area will be stratified into major land cover types (e.g., river stream, upland, wetland, rock outcrop). Vegetation community signatures and associated percent cover will be estimated from the aerial photos. Representative plots in the revegetation areas will be sampled in the field in the fall 2007 and 2009 to verify aerial photo interpretations, and again in 2016 to confirm that performance objectives have been met. If the 2-year performance criteria are not met by the fall of 2009, monitoring will continue until the criteria are met. Field plot locations will be located in the field with a GPS (global positioning system). Half-square-meter quadrats will be used to determine total herbaceous percent cover and noxious weed presence (cover by species). Cover will be estimated within the quadrats placed along randomly located transects at a frequency to provide acceptable statistical variability (e.g., 90% binomial confidence intervals). Should performance criteria not be met in 2016, additional actions will be conducted as necessary to meet the criteria.

The performance standard for herbaceous cover will minimize long-term erosion. The standard will reflect the growing conditions of the sediments and soils that are submerged under Northwestern Lake. Actual plant cover resulting from revegetation may be considerably higher than baseline, particularly in depressions and drainage features where water is expected to collect. The density of woody vegetation will be estimated during each monitoring session using 10-meter radius plots centered on herbaceous quadrat locations. Woody vegetation will become established naturally, including native tree species present on site.

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PROJECT DESCRIPTION

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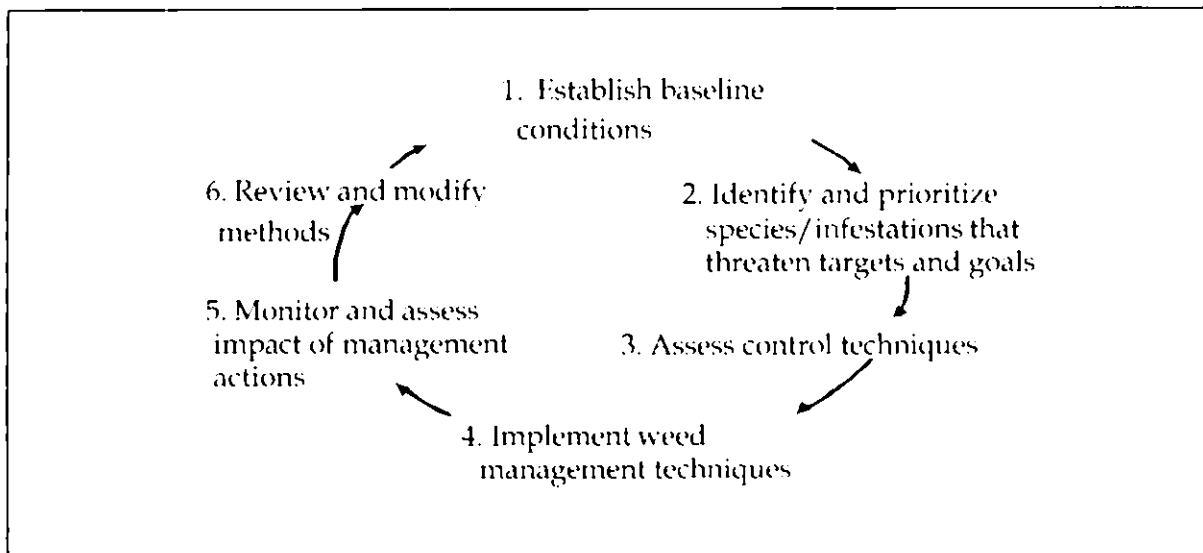
**Contingency:** In the unlikely event that woody species have not established to a density representative of early successional riparian habitat of the area (e.g., baseline) by the end of the growing season of 2009, appropriate tree species based on the results of the baseline survey will be selected from a local nursery and planted the next year to augment the woody component of the revegetated area. The planted trees will be monitored for survival for 2 years.

### 2.1.3.2 Noxious Weeds

During monitoring of the revegetation areas, the presence of noxious weeds will be determined and mapped to document the presence absence of Class A species.

Developing actions to manage noxious weeds will be based on an adaptive approach to weed management based on Tu et al. (2001) (see Figure 2-2):

- (1) Establish baseline conditions for noxious weeds during the baseline survey.
- (2) Identify noxious weed species and populations during monitoring of the revegetation areas. Locations of significant infestations of noxious weeds would be visibly marked in the field, identified using GPS, and mapped using GIS (geographic information system).
- (3) Determine which methods are available to control the noxious weed(s) identified onsite. Depending on the species and populations identified in (2), suitable control method(s) would be developed. More often than not, successful weed control requires the combination or sequential use of several methods (i.e., integrated weed management). All available control options should be considered: manual, mechanical, promoting competition from native plants, biocontrol, herbicides, prescribed fire, solarization, and other techniques. Each control option has advantages and disadvantages in terms of its effects against the target weed(s), impacts to untargeted plants and animals, risks to human health and safety, and costs. Tu et al. (2001) discusses the advantages and disadvantages for each method and provides examples of their use in natural areas.
- (4) Implement methods designed to move conditions toward performance criteria.
- (5) Monitor and assess the effects of management actions in terms of their effectiveness in moving conditions toward baseline conditions.
- (6) Reevaluate, modify, and restart the cycle, as necessary, to accomplish performance criteria.



**Figure 2-2. Adaptive Weed Management Approach (Adapted from Tu et al., 2001)**

#### 2.1.3.3 Photo Documentation

Fixed stations will be established to photo document upland revegetation in the former reservoir area. This method will also document the re-establishment of wetlands within the footprint area (see Section 2.2).

Method:

- Establish permanent photostations with metal stakes in a sufficient number to provide photo coverage of revegetation areas.
- Photographs are taken during each monitoring visit and documented by photopoint number.

#### 2.1.4 Schedule

This schedule will be followed until the performance standards are met for two consecutive years.

| Time Period                                  | Action                                             | Schedule                          |
|----------------------------------------------|----------------------------------------------------|-----------------------------------|
| June-July 2004                               | Baseline survey                                    | Once                              |
| December 2006 – May 2007                     | Post-removal draining assessments                  | Once monthly                      |
| September 2007                               | Aerial photography                                 | Once                              |
| December 2006 – Performance Criteria Met [?] | Hydroseeding                                       | Varies based upon site conditions |
| December 2006 – December 2009                | Monitor revegetation and presence of noxious weeds | Once annually for three years     |
| September 2009                               | Aerial photography                                 | Once                              |
| January 2010 – 2016                          | On-site meeting and Status Report                  | Once biennially                   |

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|           |                                                       |      |
|-----------|-------------------------------------------------------|------|
| June 2016 | Confirmation of Performance Criteria and Final Report | Once |
|-----------|-------------------------------------------------------|------|

2.1.5 References

CH2M HILL. 2003a. Condit Dam Removal Project, Conceptual Revegetation Framework. Prepared for PacifiCorp. CH2M HILL, Bellevue, WA. [April 28, 2003]

CH2M HILL. 2003b. Hillsides Revegetation Project, 2002 Pilot Monitoring Program Annual Report, Bunker Hill Superfund Site, Kellogg, Idaho. Prepared for US Environmental Protection Agency, Region 10 by CH2M HILL, Bellevue, WA. [April 2003]

CH2M HILL. 2003c. Wetland Delineation and Functional Assessment Report for the Condit Hydroelectric Project Removal. FERC Project No. 2342. Prepared for PacifiCorp. CH2M HILL, Bellevue, WA. [August 20, 2003]

Tu, M., C. Hurd, and J.M. Randall. 2001. Weed Control Methods Handbook, The Nature Conservancy. <http://tncweeds.ucdavis.edu/handbook.html>, version: April 2001 (accessed 1/19/2004).

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## 2.2 PLAN FOR WETLAND MITIGATION WITHIN AND DOWNSTREAM OF FORMER RESERVOIR AREA

The Proposed Action will result in permanent unavoidable impacts to a small number of mostly low-function wetlands currently present at Northwestern Lake. In addition, in the downstream reach of the White Salmon River between Condit dam and SR 14 at the Columbia River, unavoidable temporary impacts will occur to some low-function wetlands from scouring flows and sedimentation following draining of Northwestern Lake. Impacts to wetlands from the Proposed Action will be restricted to these specific areas, because all roads and staging areas necessary for this action will be sited to avoid impacts to wetlands outside of the Northwestern Lake footprint or sited above the riparian area downstream of the dam.

The riverine and slope wetlands associated with perennial streams and spring-fed seeps draining to Northwestern Lake, however, would be unaffected, and would likely provide the necessary water source to restore high-function riverine and slope wetlands in the area between the former lake shore and future river channel (CH2M HILL, 2003).

The goal of this wetland mitigation plan is for new wetland areas to replace lost wetland areas as a result of the Proposed Action. Post-dam removal conditions will be enhanced by allowing riparian wetlands to naturally establish and provide a net gain in wetland functions. This plan describes how after Northwestern Lake is drained, at least an equivalent acreage of new wetlands will establish naturally to provide greater functions than the wetlands that will be lost. In addition, wetlands temporarily affected downstream are expected to reestablish.

The purpose of this management plan is to clarify what wetland mitigation practices will be employed to assure consistency with the terms of the Settlement Agreement and FERC staff recommendations contained in the ESFEIS. PacificCorp believes that mitigation for wetlands lost during decommissioning is not required as a matter of law, as a matter of the Settlement Agreement, or as a matter of appropriate public policy. The Settlement Agreement expressly recognizes that dam removal and the restoration of fish passage provide the primary mitigation for impacts related to decommissioning. Nevertheless, given the small area involved (at most 4.8 acres), PacificCorp believes it is in the economic interest of its ratepayers and shareholders to accept one-for-one mitigation rather than expend substantial funds challenging the necessity of wetlands mitigation.

### 2.2.1 Site Assessments

Wetlands at Northwestern Lake and downstream along the White Salmon River were delineated in summer 2003. For more details, refer to the wetland delineation and functional assessment report (CH2M HILL, 2003). A total of 19 wetlands covering 5.7 acres were delineated at Northwestern Lake. Of these, 3.8 acres are lake fringe wetlands artificially maintained by operation of Condit dam; 0.9 acres are riverine wetlands independent of Northwestern Lake and associated with major streams (Spring, Little Buck, Mill, and Condit Creeks); and 1.0 acre are slope wetlands (hillside spring-fed seeps) independent of Northwestern Lake. Nearly all of the artificial lake fringe wetlands had low function (Category IV) and were dominated by emergent vegetation consisting largely of reed canary grass and yellow-flag iris, both listed as Class C weeds in Washington. The riverine wetlands and slope wetlands had higher function (Category II or III) and were dominated by forested vegetation consisting primarily of native red alder or western red cedar.

A total of three wetlands covering 1.0 acre were delineated along the lower White Salmon River downstream of Condit dam. Of these, 0.5 acre were lake fringe wetlands artificially maintained by

operation of the Bonneville dam on the Columbia River; and 0.5 acre was a riverine wetland associated with the free-flowing portion of the White Salmon River. The artificial lake fringe wetlands had low function (Category IV) and were also dominated by emergent vegetation consisting largely of reed canary grass and yellow-flag iris. The one riverine wetland downstream had slightly higher function (Category III) and was dominated by scrub-shrub vegetation consisting of red alder and willow.

Unavoidable permanent impacts to approximately 3.8 acres of artificial wetlands would result from removal of Condit dam and the draining of Northwestern Lake (Table 2-2). These wetlands are the result of the water surface elevation of the lake being unnaturally managed at a near-uniform level. The wetlands generally have low function (mostly Category IV) and are primarily dominated by reed canary grass and yellow-flag iris, both of which are listed as Class C Weeds on the Washington State Noxious Weed List (WSNWCB, 2004).

Of the 3.8 acres of wetlands likely to be impacted at Northwestern Lake, the majority (3.2 acres) was narrow, emergent, lake fringe wetlands (Table 2-2). Wetland 2, which was the largest at Northwestern Lake, also included a small 0.6-acre area of forested wetland. Interestingly, Wetland 2 is located at the narrow upstream end of the reservoir where the topography is relatively broad and flat. It is unclear at this time whether some portion of this wetland might remain following dam breaching. After the reservoir is drained, the only source of water other than from precipitation would be a small intermittent tributary stream that enters the southwestern part of Wetland 2.

A total of 17 streams or seeps were observed entering the reservoir. All were perennial except for one intermittent stream observed at Wetland 2. The major streams are Spring Creek, Little Buck Creek, Mill Creek, Buck Creek, and Condit Creek. Three perennial spring-fed seeps were observed.

In the downstream reach of the White Salmon River between Condit dam and SR 14 at the Columbia River, temporary impacts to 1.0 acre of low-function wetlands (one riverine wetland and two fringe wetlands) could result from scouring flows and sedimentation following draining of Northwestern Lake. However, the river flow during draining of Northwestern Lake is expected to be less than one quarter of that experienced during the 1996 floods.

Baseline conditions in the Project area represent pre-action or "background" conditions, and are useful in determining appropriate performance criteria to meet management goals and objectives. In consultation with Ecology and the Army Corps of Engineers, a baseline survey will be conducted in the summer of 2004. A report will be prepared from the survey that describes baseline conditions for vegetation composition of existing wetlands at Northwestern Lake and downstream of the dam. Areas immediately adjacent to the reservoir would also be surveyed to document potential locations for wetland creation should the contingency plan be necessary (see Section 2.2.4).

Table 2-2. Summary of Wetland Impacts Areas, Classes, and ratings

Summary of Wetland Impacts—Areas, Classes, and Ratings (from CH2M HILL, 2003)

| Wetland ID        | Total Impacted Acreage | Acreage by Cowardin Class |     |     | Acreage by Hydrogeomorphic Class** |          |       | DOE Rating Category for Eastern Washington |                                  | WSDOT Functional Assessment       |                            |
|-------------------|------------------------|---------------------------|-----|-----|------------------------------------|----------|-------|--------------------------------------------|----------------------------------|-----------------------------------|----------------------------|
|                   |                        | PEM                       | PFO | PSS | Lake Fringe                        | Riverine | Slope | Based on Functions                         | Based on Special Characteristics | Functional Assessment Description | Rating Category (H/M/L)*** |
| Northwestern Lake |                        |                           |     |     |                                    |          |       |                                            |                                  |                                   |                            |
| 2                 | 1.6                    | 1.0                       | 0.6 | --  | 1.6                                | -        | -     | III                                        | N/A                              | Likely                            | High                       |
| 3                 | 0.8                    | 0.8                       |     | -   | 0.8                                | -        |       | III                                        | N/A                              | Likely                            | High                       |
| 7                 | 0.1                    | 0.1                       | -   | -   | 0.1                                | -        | -     | IV                                         | N/A                              | Not Likely                        | Moderate                   |
| 9                 | 0.8                    | 0.8                       | -   | -   | 0.8                                | -        | -     | IV                                         | N/A                              | Not Likely                        | Moderate                   |
| 11                | 0.2                    | 0.2                       | -   | -   | 0.2                                | -        | -     | IV                                         | N/A                              | Not Likely                        | Moderate                   |
| 12                | 0.1                    | 0.1                       |     | -   | 0.1                                |          | -     | III                                        | N/A                              | Likely                            | High                       |
| 17                | 0.0*                   | 0.0*                      | -   | -   | 0.0*                               | -        | -     | IV                                         | N/A                              | Likely                            | Moderate                   |
| 18                | 0.0*                   | 0.0*                      | -   | -   | 0.0*                               | -        | -     | IV                                         | N/A                              | Not Likely                        | Moderate                   |
| 19                | 0.2                    | 0.2                       | -   | -   | 0.2                                | -        | -     | IV                                         | N/A                              | Not Likely                        | Moderate                   |
| 20                | 0.0*                   | 0.0*                      | -   | -   | 0.0*                               | -        | -     | IV                                         | N/A                              | Not Likely                        | Moderate                   |
| 23                | 0.0*                   | 0.0*                      | -   | -   | 0.0*                               | -        | -     | IV                                         | N/A                              | Not Likely                        | Moderate                   |
| 24                | 0.0*                   | 0.0*                      | -   | -   | 0.0*                               | -        | -     | IV                                         | N/A                              | Not Likely                        | Moderate                   |
| 25                | 0.0*                   | 0.0*                      | -   | -   | 0.0*                               | -        | -     | IV                                         | N/A                              | Not Likely                        | Moderate                   |
| Total             | 3.8                    | 3.2                       | 0.6 | -   | 3.8                                | -        | -     |                                            |                                  |                                   |                            |
| Downstream        |                        |                           |     |     |                                    |          |       |                                            |                                  |                                   |                            |
| 15                | 0.5                    | -                         | -   | 0.5 | -                                  | 0.5      | -     | III                                        | N/A                              | Likely                            | High                       |
| 16                | 0.3                    | 0.3                       | -   | -   | 0.3                                | -        | -     | IV                                         | N/A                              | Likely                            | Moderate                   |
| 22                | 0.2                    | 0.2                       | -   | -   | 0.2                                | -        | -     | IV                                         | N/A                              | Likely                            | Moderate                   |
| Total             | 1.0                    | 0.5                       | -   | 0.5 | 0.5                                | 0.5      | -     |                                            |                                  |                                   |                            |

\* 0.0 indicates where wetlands were delineated but represented less than 0.05 acre, and is therefore rounded to zero

\*\* Hydrogeomorphic class highlighted in bold used for DOE Rating.

\*\*\* Rating Category for WSDOT Functional Assessment added for clarification, defined by number of function categories provided. High = 11-14; Moderate = 6-10; Low = 0-5

## 2.2.2 Wetland Mitigation Approach

### 2.2.2.1 Reservoir Area Wetland Establishment

The existing riverine and slope wetlands associated with the tributaries and/or seeps are expected to remain unaffected by draining Northwestern Lake. Furthermore, after Northwestern Lake is drained, new high-function riverine and slope wetlands associated with the tributaries and spring-fed seeps are expected to develop in the area between the existing lake shoreline and the future channel of the free-flowing White Salmon River (Figure 2-3).

Functions associated with the wetlands that will be impacted are demonstrably low (Category IV), and the replacement wetlands are expected to be one or two functional categories better. Wetlands that establish next to tributaries (e.g., Mill Creek, Little Buck Creek, and Spring Creek) over time are expected to achieve the complexity, native-dominated vegetation, and higher functions of their upstream reference wetlands that were rated as Category II wetlands.

New wetlands will be allowed to establish naturally, relying on abundant upstream and upslope sources of seeds and propagules for natural regeneration. Numerous perennial streams and seeps currently drain into Northwestern Lake. Northwestern Lake currently inundates the lower segments of most of these streams and seeps. After Northwestern Lake is drained, these streams and seeps will reestablish channels through the accumulated sediments and should support development of riverine scrub-shrub wetlands.

A preliminary evaluation indicates that 3.8 acres of wetlands are likely to develop naturally within the reservoir area following dam breaching. The extent of riverine wetlands was estimated by connecting the known tributaries and seeps to the 1912 river alignment and assigning a conservative field-estimated width to each stream. The preliminary results show that approximately 2.5 acres of riverine wetlands are likely to result from tributaries alone (Table 2-3). In addition, the mainstem of the White Salmon River could develop varying amounts of wetlands along its banks, each of which extends for approximately 2 miles. Furthermore, if the actual width of riverine wetlands established along several major streams is greater than estimated, the total area would be even greater. Also not included in this estimate of wetland development are two unnamed streams that were identified in the GIS stream data but have not yet been verified in the field (Unnamed Stream 11 and 12). Finally, based on geology and soils, it is likely that additional seeps, which may currently be inundated by the reservoir, could support additional wetlands. Collectively, this information provides reasonable assurance that there will be no net loss of wetland area or function.

### 2.2.2.2 Downstream Wetland Establishment

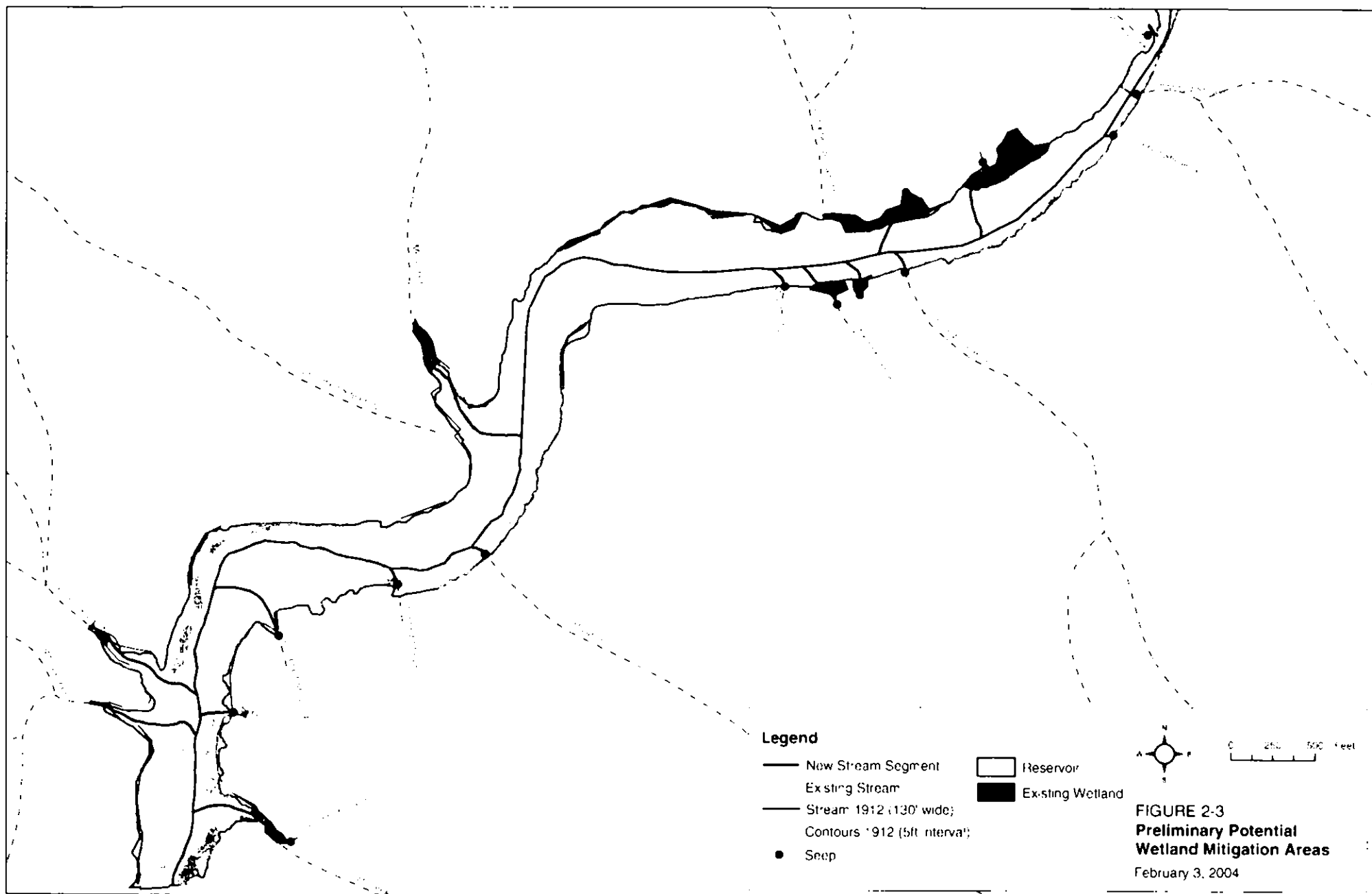
Substantial opportunities for natural wetland establishment also exist downstream of Condit dam, an area to which sediment transport has been largely blocked since construction of the dam over 90 years ago. Fine sediment transported downstream is expected to fill the voids between cobbles and form sediment bars that should provide suitable substrate for new riverine and fringe wetland development. It is likely that more wetlands will develop downstream than currently exist.

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Table 2-3 Summary of Estimated Wetland Areas to be Established

| Stream or Seep    | Estimated Length (feet) | Estimated Width (feet) | Estimated Acreage |
|-------------------|-------------------------|------------------------|-------------------|
| Spring Creek      | 560                     | 15                     | 0.19              |
| Seep 2            | 200                     | 3                      | 0.01              |
| Condit Creek      | 438                     | 25                     | 0.25              |
| Little Buck Creek | 650                     | 50                     | 0.75              |
| Unnamed Stream 4  | 540                     | 6                      | 0.07              |
| Unnamed Stream 5  | 108                     | 6                      | 0.01              |
| Unnamed Stream 6  | 100                     | 6                      | 0.01              |
| Mill Creek        | 740                     | 60                     | 1.02              |
| Unnamed Stream 2  | 134                     | 6                      | 0.02              |
| Unnamed Stream 8  | 132                     | 6                      | 0.02              |
| Unnamed Stream 1  | 491                     | 6                      | 0.07              |
| Seep 1            | 146                     | 3                      | 0.01              |
| Seep 3            | 146                     | 6                      | 0.02              |
| Unnamed Stream 10 | 287                     | 6                      | 0.04              |
| Unnamed Stream 3  | 54                      | 6                      | 0.01              |
| Unnamed Stream 9  | 42                      | 10                     | 0.01              |
| TOTALS            |                         |                        | 2.52              |



PROJECT DESCRIPTION

### 2.2.3 Monitoring Plan

#### 2.2.3.1 Objectives and Performance Criteria

The goals, objectives, and performance criteria for wetland mitigation within and downstream of the former reservoir area are summarized below.

|                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Goals:</b></p> <ul style="list-style-type: none"> <li>New wetland areas to replace lost wetland areas will result from dam removal and restoration of the White Salmon River within and downstream of former reservoir area.</li> </ul>                                                                                                                                                                           |
| <p><b>Objectives:</b></p> <ul style="list-style-type: none"> <li>Establish at least 4.8 acres of new wetland area following dam breaching. This area will include at least 3.8 acres within the Northwestern Lake footprint and 1.0 acre downstream of the dam site.</li> <li>Implement a contingency plan for artificial wetland development if natural regeneration fails to entirely meet this objective.</li> </ul> |
| <p><b>Performance Criteria:</b></p> <ul style="list-style-type: none"> <li>4.8 acres of wetland conditions (including hydrologic and hydrophytic plant community indicators but excluding hydric soil indicators) will exist within the footprint of the former Northwestern Lake and downstream of the dam footprint by year 3 and at year 10 after dam breaching.</li> </ul>                                          |

#### 2.2.3.2 Monitoring Methods

Monitoring will occur until performance criteria have been met. Monitoring newly establishing wetlands will occur once annually during the late growing season after vegetation has had a full summer to develop (August-September).

Routine delineation of the newly established wetlands will be conducted 3 years after dam breaching (late 2009). Wetlands will be delineated according to the Corps of Engineers Wetlands Delineation Manual (DOA, 1987) and the Washington State Wetlands Identification and Delineation Manual (DOE, 1997), with the addition of the items described below. The purpose of the routine delineation is to verify that the required acreage of wetlands meets the performance criteria. Vegetation and hydrology will be the primary criteria used because development of hydric soils is unlikely within the monitoring period. Boundaries of newly established wetlands will be mapped to calculate the area of wetlands established. If the required acreage for wetland replacement (4.8 acres) has not been met by 2009, then the contingency plan will be implemented (see Section 2.2.4).

##### 2.2.3.2.1 Identify Establishing Wetland Areas

In the spring after draining the reservoir, areas with the potential to establish wetlands (Potential Areas) will be identified (e.g., areas associated with tributary streams, seeps, and shallow slopes at the river's edge). These Potential Areas will be revisited during subsequent monitoring events.

PROJECT DESCRIPTION

Potential areas would be marked on the aerial photo base map described in Section 2.1.3.1, which would be used to document and display monitoring data.

*2.2.3.2.2 Wetland Vegetation*

The development and composition of hydrophytic vegetation within Potential Areas will be assessed. Parameters for assessing wetland vegetation include percent cover of different plant species and establishment of vegetation communities.

Methodology

To document the presence of wetland (hydrophytic) vegetation in Potential Areas in support of an eventual wetland delineation, plant cover by species observed in half-meter plots randomly located along one representative transect in each Potential Area would be recorded. The average percent cover for all species encountered would be reported based on the sampling plots. The wetland would be considered to have a hydrophytic plant community if greater than 50 percent of the dominant species ( $\geq 20$  percent plant cover) have a wetland indicator status (WIS) of obligate (OBL), facultative wet (FACW), or facultative (FAC).

*2.2.3.2.3 Photo Documentation*

Establish fixed photo stations to photo document wetland establishment in the former reservoir area and downstream areas. Photos document surface hydrology and vegetation structure and allow comparisons between monitoring events.

Methodology

Permanent photostations will be established and marked with metal stakes in a sufficient number to provide photo coverage of most Potential Areas. Photographs will be taken during each monitoring visit and documented by photopoint number.

2.2.4 Contingency Plan

In the event that at least 4.8 acres of wetlands have not naturally established at Northwestern Lake and downstream of the dam site by year 3 of dam breaching, PacifiCorp will implement the following contingency plan:

- Determine the area of wetlands still needed to achieve 4.8 acres through routine delineation, as described in Section 2.2.3.2.
- Identify a suitable site within the vicinity of the Project area (within the Northwestern Lake footprint, if possible), to be reviewed and approved by Ecology and the U.S. Army Corps of Engineers.
- Once a suitable site has been selected, as necessary, develop grading, BMPs, and planting plans.
- Implement actions to develop a wetland(s) on the site.
- Monitor wetland to verify its establishment for 2 consecutive years.
- Details and monitoring procedures will be included in a plan developed in consultation with Ecology upon implementation of the Contingency Plan.

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It is not feasible to develop additional details for the contingency plan in advance of dam breaching for several reasons. The size of the area needed, which is a key criterion in identifying an alternative site, is not known. Site conditions within the reservoir area will not be known until after reservoir draining. The best-suited sites for natural or artificial wetland establishment are likely near the future river channel or tributaries, with relatively flat slopes. Although potential sites will be documented during the baseline survey, the characteristics of such sites will not be known until monitoring following reservoir draining. Monitoring will determine if adequate wetland establishment will occur naturally or whether more active involvement will be needed.

2.2.5 Schedule

This schedule will be followed until the performance standards are met for two consecutive years.

| Time Period                   | Action                                                | Schedule        |
|-------------------------------|-------------------------------------------------------|-----------------|
| June-July 2003                | Existing wetland delineation                          | Completed       |
| June-July 2004                | Baseline survey                                       | Once            |
| December 2006 – December 2009 | Identify and monitor wetland establishment areas      | Once annually   |
| January 2010 – 2016           | On-site meeting and Status Report                     | Once biennially |
| June 2016                     | Confirmation of Performance Criteria and Final Report | Once            |

2.2.6 References

CH2M HILL. 2003. Wetland Delineation and Functional Assessment Report for the Condit Hydroelectric Project Removal. FERC Project No. 2342. Prepared for PacifiCorp. CH2M HILL, Bellevue, WA. [August 20, 2003]

DOA (Department of the Army Environmental Laboratory). 1987. *Corps of Engineers Wetlands Delineation Manual*. Technical Report Y-87-1, U. S. Army Engineer Waterways Experiment Station, Wetlands Research Program, Vicksburg, MS.

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## 2.3 SEDIMENT ASSESSMENT AND MANAGEMENT PLAN

The goals of the Sediment Assessment and Management Plan are to:

- Outline the methods that will be taken to manage the release of the accumulated sediment in Northwestern Lake.
- Describe other work activities that will be taking place within the lake and their associated sediment management plans.

### 2.3.1 Background

The purpose of this management plan is to clearly define the sediment management practices that will be employed to assure consistency with the terms of the Settlement Agreement and FERC staff recommendations contained in the FSFEIS.

Both the Settlement Agreement and the FSFEIS recommend breaching the dam in October of 2006 by utilizing a 12-foot-high by 18-foot-wide drain tunnel, located near the base of the dam (at elevation 174 feet), which will provide rapid reservoir drainage. Rapid drainage will allow sediments to be flushed from the reservoir during the initial opening of the tunnel and through natural processes thereafter.

### 2.3.2 Methods and Sequencing

The following sections summarize the key activities of the Proposed Action and describe the sediment assessment and management practices to be utilized for each.

#### 2.3.2.1 Pre-Dam Removal Activities

Prior to October 2006 many activities must be performed to prepare for the dam breaching and the subsequent removal process. These are described below along with their respective sediment management practices.

##### *2.3.2.1.1 Access Road to Spillway*

###### **Description**

One of the first stages of the Proposed Action is to construct an access road to the spillway slab below the dam to permit construction of the reservoir drain tunnel. The wood stave pipeline below the dam will be left intact during construction of the 12' x 18' drain tunnel construction so that river flow from the reservoir can be diverted around the base of the dam leaving the river level below the dam relatively low to facilitate tunnel construction. Therefore, the access road to the spillway slab will have to bridge over the wood stave pipe and be of sufficient strength to accommodate the construction equipment needed to excavate the drain tunnel. The access road will be constructed during August of 2006 and the first part of September 2006 to enable the drain tunnel to be constructed in time for dam breaching in October 2006. The access road to the spillway will remain in place after dam breaching and will then be utilized to access the main portion of the dam. The proposed location of the access road is shown in photo #1, page 6 of Appendix D from the R.W. Beck Report (Appendix 2).

###### **Sediment Management**

In order to mitigate any adverse effects of this activity, PacifiCorp will follow the BMPs required by the final general NPDES permit for storm water associated with construction activity. It is

anticipated that these BMPs will include erosion control fencing, slope stabilization and revegetation. Since this activity will be performed near the water a Spill Prevention and Containment Plan will also be implemented.

#### *2.3.2.1.2 Install Temporary Water Supply*

##### **Description**

There is currently a 14" municipal water line located in the reservoir 1 mile upstream of the dam beneath the sediment of the lake. In order to assure service is not interrupted by a potential failure during dam breaching, a new temporary High Density Polyethylene (HDPE) pipeline will be installed across the lake with a cable support system in October of 2006. After the reservoir is drained and sediment has been eroded in this area of the pipeline, a new permanent water line will be installed below the pre-dam thalweg, low enough to be protected from river scour. It is anticipated that the new water line construction will occur in March 2007 and will be completed prior to the beginning of the rainy season in the fall.

##### **Sediment Management**

In order to mitigate any adverse effects of this activity, in-water work will be performed utilizing silt curtains for trenching and any required cofferdams. Work occurring on the stream banks of the river will be stabilized with erosion control mats and silt fencing and will follow the requirements of any required general NPDES permit for storm water associated with construction activity. Since these activities also involve equipment working in or near the water the BMPs contained in the Spill Prevention and Containment Plan will be utilized.

#### *2.3.2.1.3 Northwestern Lake Bridge*

##### **Description**

Northwestern Lake Bridge, located 1.8 miles upstream from the dam, will be modified to enable it to withstand the long term scouring action of the new river channel. While the final design will be coordinated with the county for permitting purposes, a predesign report has been prepared by DCI Engineers and is contained in Appendix 7. This report details the sheet pile system that is proposed to be installed prior to draining the reservoir to assure long term stability for the structure.

Field geotechnical investigations and design coordination would occur during 2005 and construction work would start in September 2006 to enable completion prior to reservoir draining.

##### **Sediment Management**

In order to mitigate any adverse effects of this activity, in-water work will be performed utilizing silt curtains for driving sheet pile. Work occurring on the banks of the river will be stabilized with erosion control mats and silt fencing and will follow the requirements of any required permits. Since these activities also involve equipment working in or near the water, the BMPs contained in the Spill Prevention and Containment Plan will be utilized.

#### *2.3.2.1.4 Mt. Adams Orchard Water Supply Relocation*

##### **Description**

Mount Adams Orchard currently operates an orchard directly east of the dam site. The orchard utilizes a water right for 0.7 cfs (314.2 gpm) for irrigation. This water is currently withdrawn from Northwestern Lake. A new intake and pump system will be designed and installed in coordination with Mt. Adams Orchard personnel to assure the needs of the orchard are met. The system will be located immediately downstream of the dam in a location that will allow reliable operation and

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PROJECT DESCRIPTION

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access. The intake will be screened using a screen configuration that meets current WDFW criteria for irrigation diversions. To help mitigate any impacts from construction of the new irrigation diversion, work will be performed after the dam is breached and will be completed prior to the spring irrigation season.

**Sediment Management**

In order to mitigate any adverse effects of this activity the BMPs contained in the Stormwater Erosion Control Plan and the Spill Prevention and Containment Plan will be utilized, as appropriate, for this activity.

*2.3.2.1.5 Drain Tunnel Construction***Description**

A new outlet tunnel will be constructed using drilling and blasting techniques to create a 12-foot-high by 18-foot-wide hole at the lowest possible elevation in the dam. Tunneling will begin at the downstream face of the dam and continue through the dam until reaching within approximately 15 feet of the upstream face of the dam. Concrete materials from the tunnel will be kept away from the river and will be hoisted out of the canyon using a skip hung from the crane. A pH study was conducted, and it concluded that the pH in the river may initially rise, but within 24 hours it will drop to a level within state standards. The pH report is attached as Appendix 8.

**Sediment Management**

In order to mitigate any adverse effects of this activity, the BMPs contained in the Stormwater Erosion Control Plan, Blasting Plan and the Spill Prevention and Containment Plan will be utilized for this activity.

*2.3.2.1.6 Weir & Gate Removal***Description**

Prior to dam breaching, all non-essential mechanical items on the dam will be removed. This work will be performed utilizing barge-mounted cranes that will be set in the reservoir in September 2006. They will be used to remove the 167ft Obermeyer Spillway gates, 6ft wide vertical lift Tainter gate and the five 10ft wide by 10ft high radial gates.

**Sediment Management**

These activities are not anticipated to generate sedimentation issues or water quality impacts, as they will be performed in the dry. They will, however, be performed under the BMPs for spill prevention.

*2.3.2.1.7 Removal of Woody Debris Upstream of Tunnel***Description**

Prior to the blast that opens the final 15 feet of the drain tunnel in October 2006, PacifiCorp will float a barge-mounted clamshell crane to the dam to excavate sediment and debris from the upstream face of the dam in the area where the tunnel will be opened. This will assure the drain tunnel does not become blocked by woody debris that has accumulated directly in front of the tunnel. The cranes will remove the woody debris and move it to the boat ramp area, where it will be stored until it can be used for habitat enhancement. Sediment will be deposited in the reservoir immediately upstream of the removal area. In the event the woody debris cannot be used onsite it will be disposed of offsite. At this time it is estimated that the onsite storage area will occupy an area of approximately 25ft x 25ft, but this area could be larger or smaller, depending on the amount of debris encountered.

**Sediment Management**

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To avoid any potential impacts that may come from this activity, which may cause an increase in lake and river turbidity levels, the work will be done in late September 2006 within the time period approved for reservoir sediment removal activities just prior to dam breaching. BMPs for spill prevention will be utilized.

*2.3.2.1.8 Water Sources for Construction Activities*

Project removal activities will require water for dust suppression on access roads, for demolition activities, and for incidental uses, such as hydroseeding. While the total quantity required will vary depending on weather conditions encountered during removal, it is estimated that water sources would be established that can provide 30 gpm or more. PacifiCorp will submit applications to receive a "Change in Use" and a "Change in point of use" for some of the existing water rights that are currently held by PacifiCorp for the Project and ancillary facilities. In the event this cannot be accomplished, water for the project would be obtained by utilizing other water rights in the area that could be established for this use. One potential alternative source would be the City of White Salmon's public water supply.

*2.3.2.2 Dam Breaching and Removal**2.3.2.2.1 Dam Breaching and Sediment Management***Description**

In October 2006, the final 15ft of the tunnel will be breached by blasting out the remaining concrete. Within hours the reservoir will drain, causing substantial amounts of the sediment and woody debris currently trapped behind the dam to be flushed downstream.

A hydraulic and sediment erosion analysis for the period following dam breach has been conducted by G&G Associates. The results of these analyses are contained in the report entitled *Condit Dam Sediment Behavior Analysis*. The executive summary for this report is directly quoted below. The full version of the document is contained in Appendix 9

**Condit Dam Sediment Behavior Analysis****Executive Summary**

PacifiCorp's Condit Dam is on the White Salmon River (WSR), approximately three miles upstream from

PacifiCorp's Condit Dam is on the White Salmon River (WSR), approximately three miles upstream from its confluence with the Columbia River (CR). The dam forms a 92-acre reservoir known as Northwestern Lake. PacifiCorp has agreed to remove the dam in order to provide fish access to and from the watershed upstream of the dam. This report analyzes the behavior of 2.4 million cubic yards of sediment accumulated in the reservoir after the dam is breached and removed, as well as the effects of sediment on water quality in the White Salmon and Columbia Rivers.

PacifiCorp proposes to quickly move as much sediment as possible out of the reservoir by rapidly draining it through an opening blasted in the base of the dam. Absent unanticipated obstructions, the reservoir should drain completely in approximately six hours. The remainder of the dam would then be removed over the following year, along with structures on the bed of the reservoir, including a

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cofferdam used in the construction of the dam. PacifiCorp proposes to breach the dam in the late autumn, so that the bulk of sediment effects would occur during the late-autumn-to-spring rainy season, when PacifiCorp expects fewer adverse effects on beneficial uses such as aquatic life and recreation.

**Erosion Processes**

Approximately 75% of the accumulated reservoir sediment is comprised of small particles that will rapidly erode and travel downstream suspended in the water column. Sediment will erode from the reservoir through three principal processes:

*River Channel Formation.* When the dam is breached, the WSR will begin to re-form a river channel through the reservoir sediments. This process will result from sediment embankment failures and continuous vertical erosion as the river cuts down through the sediments and undermines sediment slopes. Initial erosion from this process will be extremely high, but it will gradually decline to essentially zero after a stable river channel forms within approximately one year.

*Surface Erosion And Upland Conveyance Formation.* After the reservoir drains, the surface of the remaining sediment will be bare and relatively smooth. Runoff from rain and melting snow (including runoff from upland areas that drain through the reservoir area) will erode the surface of the sediment and create minor drainage conveyances across it to the river. Erosion from this process will occur intermittently for approximately three to five years, until upland conveyances are stable and sufficient vegetation is established to control surface erosion to approximately the same degree as similar nearby upland areas.

*Floodplain Formation.* After the WSR has established a stable channel through the reservoir sediments, progressively higher floods will erode embankments and surfaces that were not reached by previous floods. This erosion process will last indefinitely, but both the frequency and magnitude of erosion caused by the process will decline substantially over time. For example, simulations using actual WSR flow records over a 30-year period show that only two floodplain-widening floods are likely to occur after the fifth year.

**Water Quality Effects in the White Salmon and Columbia Rivers**

With respect to the effects from the project, each of the three erosion processes will be the dominant project effect for a specific period after the dam is breached. During approximately the first twelve months after the dam is breached, river channel formation will be the principal source of erosion. For water quality purposes, this period can be further divided into the initial six hours after the dam is breached, when the draining of the reservoir will cause downstream WSR flows to be very high, and the remainder of the period, when downstream flows will be essentially the same as river flows coming into the former reservoir area.

From approximately twelve months after the dam is breached until three to five years after the breach, surface erosion will be the principal source of erosion except during the periodic events when river flow is higher than previous flows. During these higher flow events, floodplain formation will be the principal source of erosion from the former reservoir area. Although flood plain formation continues on indefinitely, erosion from this source after 5 years will be extremely infrequent.

The water quality effects in the White Salmon and Columbia Rivers during each of these periods and subperiods is summarized in the following discussion. Note, however, that future river flows and other variables cannot be precisely predicted. The following descriptions of total suspended solid (TSS) and nephelometric turbidity unit (NTU) levels are based on analysis and judgment using the best information available.

*Rapid Draining of the Reservoir—Approximately 6 Hours after Dam Breach*

Absent an unanticipated obstruction of the opening created in the base of the dam, the reservoir should drain in approximately six hours. During this period, downstream TSS concentrations and turbidity, expressed as NTUs, will be extremely high. The average TSS concentration in the WSR downstream of the dam is likely to be approximately 150,000 parts per million (ppm), but could range from 100,000 ppm to 250,000 ppm. Average turbidity is likely to be approximately 76,250 NTUs, but could range from 50,830 to 127,090 NTUs.

A deep pool at the mouth of the WSR, created by Bonneville Dam, will trap most of the larger sediment particles, causing the pool to fill rapidly, but also initially substantially reducing the amount of sediment that enters the Columbia River. Approximately three miles downstream from the mouth, after the WSR and CR waters have mixed completely, the average TSS concentrations and turbidity level over the first six-hour period should fall to 3,500 ppm and 1,770 NTUs, respectively. Further settling in the remaining 20 miles of the pool formed by Bonneville Dam should reduce these values to 1,575 ppm and 790 NTUs.

Because the remaining sediment in suspension at this point would consist almost entirely of very small particles, essentially no further settling would occur in the Columbia River downstream of Bonneville Dam, where flow velocities are higher than upstream of Bonneville Dam. However, some additional dilution of the sediment would occur from tributary flows and the longitudinal spreading of the sediment as it moves downstream at different velocities.

*River Channel Formation—First Year after Dam Breach*

Immediately after the reservoir has drained, TSS concentrations in the WSR will remain high but flows in the WSR downstream of the dam will return to approximately the flows entering the reservoir. This will dramatically improve water quality in the CR because WSR flows will then be a much smaller proportion of the total flow in the CR. At the point of complete mixing, approximately three miles downstream of the mouth of the WSR, the likely average TSS concentration in the CR would fall from 3,500 ppm to 294 ppm, and the likely average turbidity would fall from 1,770 NTUs to 139 NTUs. At Bonneville Dam, these values would be 156 ppm and 69 NTUs. Some additional reduction in the values would occur downstream because of dilution by tributary flows.

Although river channel formation would cause TSS and turbidity levels in the WSR downstream of the reservoir to remain relatively high for several months after the dam is breached, the levels would decline very rapidly for approximately the first week. After the first week the levels will decline more gradually over approximately the next twelve months but will be punctuated by higher levels during higher flow

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events, river obstruction removal activities, and occasional slope failures until a stable channel is formed, at which time erosion from this source would cease. The likely average TSS concentration in the WSR below the reservoir would fall to 30,000 ppm after 7 days, 6,000 ppm after 30 days, and 3,000 ppm after 90 days. These concentrations would likely result in the following TSS and turbidity values in the Columbia River:

- At a point in the CR of complete mixing approximately three miles downstream of the mouth of the WSR, levels would be 16 ppm and 4 NTUs after 7 days, 3 ppm and 1 NTU after 30 days, and 2 ppm and .5 NTU after 90 days.
- At Bonneville Dam, the values would be 8 ppm and 2 NTUs after 7 days, 1 ppm and .3 NTUs after 30 days, and 1 ppm and .2 NTUs after 90 days.

Thus, turbidity increases should be relatively small downstream of Bonneville Dam after approximately 4 to 5 days and downstream of the immediate vicinity of the mouth of the WSR after approximately 7 days, except for brief higher turbidity events resulting from periodic high flows and construction activities.

Surface Erosion/Upland Contour Formation - Approximately 3 to 5 Years After Dam Breach

Erosion from surface erosion and upland contour formation would occur intermittently with precipitation runoff. After a stable river channel formed, this would be the principal source of erosion from the former reservoir area, except for intermittent erosion from flood flows.

The magnitude of this source of erosion would decline gradually as vegetation and drainage conveyances became established within the former reservoir area. During the first year after the breach of the dam, likely daily average (during precipitation events) TSS and turbidity levels in the WSR from this source would be 22 ppm and 6 NTUs. Peak TSS and turbidity levels, associated with heavy rain fall or rapid snow melt, could be as high as 158 ppm and 70 NTU. After mixing with the Columbia River, however, peak TSS values would be only 1 ppm, and turbidity would be essentially zero.

In the third year after dam breach, peak TSS and turbidity levels in the WSR would fall to 50 ppm and 20 NTUs, and likely average values to 7 ppm and 2 NTUs. After mixing with the Columbia River, even peak values of TSS and turbidity would be nearly zero. Once vegetation was sufficiently established, after three to five years, depending on actual climate conditions, surface erosion and upland contour formation would no longer contribute TSS and turbidity in excess of other nearby areas.

Floodplain Formation

Once a stable river channel formed within the former reservoir area, within twelve months after the dam breach, high TSS and NTU levels would occur only with successively higher floods that would erode embankments and undermine sediment slopes that had not yet been reached by the river. Erosion from this source could initially cause average TSS and turbidity levels to increase by as much as 6000 ppm and 3,040 NTUs in the WSR, 40 ppm and 10 NTUs after mixing with the Columbia

River near the mouth of the WSR, and 18 ppm and 5 NTU at Bonneville Dam. Each event would cause these levels to exist for only approximately one day before levels declined to normal for the river.

However, the frequency of occurrence and magnitude of these increases would decline over time, as increasingly higher floods are required and decreasing amounts of sediment remain accessible within the former reservoir area. Five years after breaching the dam, these values would fall to approximately 3,000 ppm and 1,510 NTUs in the WSR, 20 ppm and 5 NTUs after mixing with the Columbia River, and 9 ppm and 2 NTUs at Bonneville Dam.

Beyond five years after breaching the dam, it is likely that only a few floods in the following 25 years would be sufficiently high to cause floodplain erosion within the former reservoir area. Moreover, because there is an 86 percent chance that the 7Q10 high flow (highest 7-day average flow expected to occur in a 10-year period) would occur for at least one day during the first five years after the dam is breached, these floods are likely to be in excess of the 7Q10 high flow.

#### **Summary of Water Quality Effects**

As a result of the breach and removal of Condit Dam, natural processes (including normal river flow, upland contour formation, and infrequent floodplain formation) are expected to cause the majority of the sediment that accumulated behind the dam to move downstream and settle in the mouth of the WSR, in the Bonneville Pool, or in the Pacific Ocean. These processes are expected to impact water quality through increased total suspended sediment and turbidity levels.

Following dam breach, normal river flow is expected to cause substantial erosion as a new river channel is established in the former reservoir area. For approximately twelve months following dam breach, this channel formation process should lead to turbidity exceedances in the White Salmon and Columbia Rivers downstream of Condit Dam. Thereafter, for approximately three to five years following dam breach, the process of upland contour and conveyance formation should be the principal contributor to increased turbidity and should cause periodic turbidity exceedances in the White Salmon and Columbia Rivers downstream of Condit Dam.

Beyond five years after dam breach, it is expected that neither channel formation nor upland contour formation will cause significant increases in turbidity. Thereafter, only an extremely infrequent (several times in 25 years) short-term flood event will mobilize former reservoir sediment and cause brief increases in turbidity when background turbidity will likely be high.

These findings were used by G&G Associates to identify potential impacts to beneficial uses that are associated with dam removal. The report containing the analysis titled *Sediment Behavior Effects on Beneficial Uses* is contained in Appendix 10. The executive summary for this report follows.

## **Sediment Behavior Effects on Beneficial Uses**

### **Executive Summary)**

An investigation of the sediment erosion process associated with removal of Condit Dam, Condit Dam Sediment Behavior Analysis Report (Sediment Report), indicates that removal will increase sediment and turbidity in the White Salmon River (WSR) and the Columbia River (CR) downstream of the dam.

Removal of the dam will release between 1.6 and 2.2 million cubic yards (mcy) of reservoir sediment into the WSR. Approximately 673,500 cubic yards of this sediment will be trapped at the mouth of the WSR. Approximately 1.5 mcy of sediment will move into the CR as suspended sediment and bedload. Most of this, 1.2 mcy, will settle in the slack-water pool created by Bonneville Dam. The small particle sizes of the remaining 286,000 cubic yards will allow almost all this sediment to remain suspended in the water column to the mouth of the CR. Most of this small-sized sediment, however, will be eroded from the reservoir within the first few days after the dam is breached.

The amounts of sediment eroded from the reservoir will be extremely high immediately after the dam is breached. These amounts will decline rapidly throughout the following week and then more gradually thereafter. Precipitation, dam removal activities, and other events, however, will cause short-term increases in erosion. After approximately the first year, erosion will occur only intermittently during storm events, and after three to five years, erosion of reservoir sediments will occur only during rare, extremely high floods.

The water quality criterion for turbidity is 5 Nephelometric Turbidity Units (NTUs) above background, or 10 percent above background when background exceeds 50 NTUs. Turbidity levels in the WSR downstream of the dam will likely continuously exceed this criterion for approximately a year after the dam is breached, and then will occasionally exceed the criterion at a declining magnitude and frequency thereafter. Beyond three to five years after the dam is breached, the only exceedances of the criterion in the WSR would likely occur during rare, extremely high floods.

Water draining from the reservoir shortly after the dam is breached will represent nearly 6 percent of the likely flow of the CR, compared to 0.6 percent of the CR flow that the WSR would normally comprise at this time of year. Higher flows from the WSR will cause turbidity levels in the CR to be relatively high for the approximately six hours required for the reservoir to drain. Once the reservoir has drained and WSR flows return to normal, however, turbidity levels in the CR will fall dramatically (by more than 90 percent).

Downstream of Bonneville Dam, initial turbidity levels are anticipated to be 600 to 800 NTUs but will fall below 70 NTUs by the end of the first day and below the turbidity criterion within 4 to 5 days. Thereafter, relatively small, short-term exceedances of the criterion may occur during the next approximately 90 days. Within Bonneville Pool just downstream of the approximately three-mile area within which the WSR and CR mix, initial turbidity levels are anticipated to be approximately 1700 NTUs but will fall below 140 NTUs by the end of the first day

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and below the turbidity criterion by the end of the first week. Thereafter, relatively small, short-term exceedances of the criterion may occur with decreasing frequency for up to 3 to 5 years.

The effects on designated beneficial uses due to higher turbidity in the WSR and CR from removal of the dam were reviewed. Aquatic life uses are discussed in a separate letter attached to this document. The beneficial uses reviewed in this report are: primary contact recreation; domestic, industrial, and agricultural water supply; stock watering; wildlife habitat; fish harvesting; commerce and navigation; boating; and aesthetic values.

No permanent adverse effects on designated beneficial uses are anticipated in either the WSR or the CR. The removal of the dam, however, may result in temporary adverse effects on some uses, particularly those in the WSR.

Potential adverse effects on designated beneficial uses in the WSR may occur on a sustained basis through the first year after the dam is breached. Thereafter, the only potential adverse effects would coincide with intermittent high river flows. Beyond five years after the dam is breached, no adverse effects are anticipated because any remaining reservoir sediments would be mobilized only during rare, extremely high floods, when background suspended sediment and turbidity levels would be very high.

Potential adverse effects on designated beneficial uses in the CR might occur on a sustained basis for less than a week. Intermittent potential adverse effects on designated beneficial uses in the CR, however, may occur below Bonneville Dam for short periods during the first 90 days after the dam is breached and within the Bonneville Pool for short periods during the first two years after the dam is breached. Thereafter, no potential for adverse effects in the CR is anticipated.

PacificCorp's fisheries biologist provided an assessment of the effects of the breaching and removal of Condit Dam on aquatic species other than those that are addressed in the U.S. Fish and Wildlife Service Biological Opinion (USFWS 2002) or the Final Supplemental Final Environmental Impact Statement (FSFEIS) (FERC 2002), or that will be addressed in the biological opinion to be prepared by NOAA Fisheries. Aquatic species that are not addressed in the biological opinions tend to be more tolerant of environmental perturbations and may not experience the same level of mortality or adverse effects. Suspended sediments may periodically affect aquatic species in the Columbia River, particularly on the north bank, for up to one year. The natural movement of bedload and sediments will be restored through the removal of the dam and the corresponding lake. This action will have short term adverse effects on aquatic life in the White Salmon River downstream of the dam and in the Columbia River for approximately three miles downstream of the mouth of the White Salmon River. Mortality could occur to some individuals of some species, but the resulting action will provide greater long-term benefits in terms of ecosystem function and aquatic habitat diversity, benefiting the overall health of the aquatic community. The complete assessment has been included as an appendix to Appendix 10 of this report.

### **Sediment Management**

In order to verify the accuracy of the sediment behavior predictions, the monitoring plan outlined in section 3.0 will be implemented. Sediment within the reservoir area will be managed consistently with the Settlement Agreement and this Project Description.

### 2.3.2.3 Revegetation, Natural Erosion & Sedimentation

Revegetation, natural erosion and sedimentation issues are covered in the Plan for Revegetation of Reservoir Area and Plan for Wetland Mitigation within and Downstream of Former Reservoir Area.

### 2.3.3 Monitoring Plan

***Objectives***

- Monitor the effectiveness of the initial dam breach on sediment transport.
- Monitor location, volume, surface slopes, and surface grain size of sediment retained on upland areas after the dam is breached. Perform topographic surveys to determine the retained sediment volumes and locations, as compared to original pre-dam contours. This data will be available and used to update future sedimentation transport models and to document the recovery rate.
- Monitor water quality parameters down stream of the project to provide scientific and academic information for future dam removal projects.

***Performance Criteria:***

- The sole performance criteria for these objectives will be accurate and well documented monitoring data and testing that is performed in accordance with standard sampling and analytical practices. This data will be used along with up-to-date flow data to calibrate future sedimentation transport models and to provide predictive analysis of the sediment transport rate of the White Salmon River with the dam removed.

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## 2.3.3.1 Sediment Management and Water Quality Monitoring Schedule

The following table is a summary of the proposed sediment assessment and water quality parameters to be monitored along with the location and schedule.

| Time Period                                                            | Parameter                       | Locations                                                                                                                                                                             | Schedule                                                                                                                                         |
|------------------------------------------------------------------------|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| September 2006 – September 2016                                        | Turbidity                       | Establish three new water quality monitoring sites. One below the In-Lieu site at the mouth of the White Salmon River, one below the dam and one above the reservoir.<br><br>(Note 1) | Continuous Data Logging                                                                                                                          |
| October 2006 (Dam Breach)<br>November 2006 (4 weeks)                   | Turbidity                       | Columbia River<br>Booneville Pool<br><br>(Note 2)                                                                                                                                     | Continuous Data Logging Turbidity and Location by GPS. Boat shall take readings 8 hrs per day. (Estimated 2,000 pts per day on 100 ft intervals) |
| September 2006 – until bank stabilization performance criteria are met | Turbidity                       | Columbia River near Bonneville Dam at Warrendale                                                                                                                                      | Continuous Data Logging                                                                                                                          |
| September 2006 – until bank stabilization performance criteria are met | Total Suspended Solids (TSS)    | Powerhouse                                                                                                                                                                            | Monthly utilizing flow weighted composite grab sample comprised of one sample per week                                                           |
| September 2006 – May 2007                                              | pH                              | Powerhouse                                                                                                                                                                            | Continuous in order to capture potential effects from blasting concrete                                                                          |
| May 2007 until bank stabilization performance criteria are met         | Topographic<br>Sediment mapping | Entire reservoir basin                                                                                                                                                                | As areas become stable and once annually                                                                                                         |
| May 2007                                                               | Soil classification             | Reservoir basin                                                                                                                                                                       | Prior to revegetation                                                                                                                            |
| October 2007 until performance criteria are met                        | Photo<br>Documentation          | Map reservoir contours                                                                                                                                                                | Quarterly                                                                                                                                        |
| May 2006 until all other performance criteria are met                  | Fish Passage                    | Northwestern Lake bridge to mouth of Columbia River                                                                                                                                   | Monthly and as conditions change                                                                                                                 |

**Note 1** PacifiCorp will establish the specific locations, equipment and procedures for each of these locations with guidance from the USGS and Underwood Conservation District. PacifiCorp anticipates that an agreement will be reached with one of these groups to maintain and record the data

at each of these sites for a term lasting until at least September 2016. In the event an agreement cannot be reached with these entities, PacifiCorp will contract with an independent testing firm to perform the monitoring and data recording.

**Note 2** Longitudinal and transverse sections will be recorded along with statistically significant amounts of random sampling. In order to develop the final sampling plan and the daily testing and monitoring schedule for the boat, a statistician will be consulted to determine the most statistically significant sampling plan for the Bonneville pool. This plan will be completed and made available for input by Ecology 90 days prior to the start of testing.

### 2.3.3.2 Monitoring Methods

#### 1) **Turbidity**

Turbidity will be monitored above the reservoir, downstream of the dam at the powerhouse, below the In-Lieu site at the mouth of the White Salmon River, within the Bonneville Pool in the Columbia River, and near Bonneville Dam at Warrendale.

#### 2) **Total Suspended Solids (TSS)**

Total Suspended Solids samples will be collected weekly at the powerhouse and will be used to generate a monthly composite sample that is proportional to the flow at the time of sampling as measured at the downstream USGS gauging station. The composite sample will be tested to determine the average monthly TSS concentration.

#### 3) **pH**

A pH monitor with data logging will be installed below the dam at the powerhouse.

#### 4) **Sediment Mapping**

Each area of the reservoir shall be topographically mapped in sufficient detail to determine if the soil type within each area is currently stable when compared to its physical soil properties. This mapping shall also be performed at intervals and accuracies that are consistent with the objectives contained in the Sediment Assessment and Management Plan.

#### 5) **Soil Classification**

The characteristics and distribution of soil types within the reservoir cannot be fully observed until the reservoir is drained and safe entry can be made. As soon as possible after dam breaching, soil types in each area of the reservoir will be classified and the physical properties will be determined. The internal angle of friction in each area will be used to assess slope stability and compared to mapped slope conditions.

#### 6) **Photo Documentation**

Fixed photo stations will be established to photo document slope stability and sediment transport in the former reservoir area. The photo stations (consistent with the Revegetation Plan) shall be located and be in sufficient number to provide photo coverage of all embankment types. Photographs shall be taken during each monitoring visit and documented by photo point number.

#### 7) **Fish Passage**

The river channel from the head of Northwestern Lake to the mouth of the Columbia River including entering tributary areas shall be inspected to identify potential physical barriers that

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could affect fish passage. The criteria used to categorize a physical fish passage barrier are defined in the Canyon and Woody Debris Management Plan. As potential blockages are identified, they shall be removed as soon as practicable. The removal of these blockages will occur utilizing the appropriate BMPs for the activity.

2.3.4 References

Condit Settlement Agreement, September 1999.

FERC, June 2002. Condit Hydroelectric Project, Project No. 2342 Final Environmental Impact Statement. Record Number 0103.

G&G Associates, October 2003. Sediment Behavior after Breaching Condit Dam

PacifiCorp, August 2001. Response to Additional Information Regarding PacifiCorp's Estimation of Erosion Rates Related to Proposed Dam Removal.

R.W. Beck, May 1998. Condit Hydroelectric Project Removal, Summary Report Engineering Considerations. Prepared for PacifiCorp.

R.W. Beck, March 1997. Condit Hydroelectric Project Removal, Initial Assessment. Prepared for PacifiCorp, Columbia River Inter-tribal Fish Commission and Yakama Indian Nation.

Squire Associates, April 1, 1998. Evaluation of pH Effects Due to Pulverized Concrete from the Condit Hydroelectric Project.

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PROJECT DESCRIPTION**2.4 BANK STABILIZATION PLAN**

From the construction of Condit dam in 1913 through 1997, it is estimated that more than 2.4 million cubic yards of sediments have been trapped in the Project reservoir. The composition of the sediment material in the reservoir is gravel, silt and sand with an unknown quantity of woody material. While most of this material will wash downstream when the dam is breached, some of the material is projected to remain and will make up the new river banks.

This section of the site management plan is specific to stabilization associated with these newly formed river banks and slopes formed by the sediment that will remain within Northwestern Lake after the dam is breached.

The goals of the Bank Stabilization Plan are to:

- Identify and protect the public from unstable banks;
- Establish the criteria to determine if banks & slopes are stable and suitable for public access;
- Identify methods used to determine if slopes are unstable and determine if these slopes should be actively managed to insure they reach a stable state in a controlled time frame; and
- When slopes become stable, document their condition and release them to receive vegetative cover as soon as practicable in accordance with the Revegetation Plan.

**2.4.1 Site Assessment**

In October 2006, Condit dam will be breached by utilizing a 12-foot-high by 18-foot-wide drain tunnel that will be excavated near the base of the dam (at elevation 174 feet) to provide rapid reservoir drainage. The tunnel size will allow an approximate maximum flow of 10,000 cubic feet per second (cfs) to pass through the dam. The reservoir pool is expected to lower to stream level within six hours.

During the rapid drawdown the saturated sediment within the entrenched canyon will become unstable and the slopes will fail. The sediment will then be eroded away and will be transported downstream. If the newly exposed and eroded slope is unstable the process will continue until the bank becomes stable by reaching its natural angle of repose.

These slopes will become increasingly stable with time as they flatten out and fluid pressure within the sediment is drained. This will ultimately leave the slopes in a stable condition. Stability of the slope will be determined by the angle of the face of the slope and the type of material contained in the embankment. If the surface of the slope is flatter than the natural angle of repose for the type of material contained in the embankment, the embankment will be stable.

In order to assure that the drawdown/stabilization process is successful and to assess whether any artificial material such as woody debris has retarded the process of embankment failure, all the slope conditions within the reservoir will be measured. An assessment of slope conditions will be made to determine whether active management will be required. This will begin as soon as the dam is breached and it becomes safe to enter the basin. The assessment will involve visually observing the slopes within the reservoir to determine if evidence of slope instability exists, such as scarping or bulging conditions.

When the slope is visually assessed to be stable, the physical properties of the soil in each area will be compared to the current surface contours to determine if the slope has reached a stable angle of repose

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and has become suitable for revegetation. Surface contours will be generated and mapped using a total station or reflectorless EDM. Where sediment slopes are steeper than expected, meaning steeper than the natural angle of repose for the sediments in question, PacifiCorp will attempt to determine the cause of the steeper-than-expected-slopes. If the cause is "natural" (i.e., rock cliff or other feature preexisting dam construction), PacifiCorp will leave the slope alone. If the steeper-than-expected-slope is "artificial" (i.e., caused by woody debris accumulated in the sediment, caused by compaction of sediment or accumulation of clay that is not expected to remain stable over the long-term, or caused by other dam-related condition), PacifiCorp will actively dislodge the steeper-than-expected-slope (through the use of water cannons, blasting charges, or mechanical means) until the slope is no greater than the expected angle of repose.

The final method used to actively dislodge the steeper-than-expected slopes at each location will be chosen by the onsite engineer with geotechnical engineering input. The method chosen will be based on worker safety, available access, potential environmental impacts and the over all progress required to reach the project objectives in the prescribed timelines.

Since PacifiCorp anticipates that embankments will be less stable during the reservoir drawdown process than at any time after the drawdown, the primary method of bank stabilization will involve physically removing artificial barriers that hinder the embankment failure process. If required, the sediment will be mechanically graded to leave the slope in a stabilized condition. Materials that are removed to increase slope stability will be handled in accordance with the Sediment Assessment and Management Plan and the Woody Debris Management Plan. If grading is required, some sediment may be allowed to move into the stream bed for transport downstream. In order to minimize impacts from active slope management, the work will occur as soon as practicable in order to be consistent with the Sediment Assessment and Management Plan.

PROJECT DESCRIPTION2.4.2 Monitoring Plan***Objectives***

- Identify and map sediment and reservoir conditions as they become stabilized to enable hydroseeding to occur as soon as practical.
- Monitor and document the stability over a period of time to demonstrate achieving the established performance criteria.

***Performance Criteria:***

- Active dislodging of artificially steeper-than-expected-slopes and hydroseeding will be complete before the first anniversary of the breaching of the dam.
- Two consecutive years' evidence that substantially all sediment remaining in the former reservoir area is at or below the expected angle of repose for the type of sediment in question, unless the sediment is at a higher angle of repose due to natural conditions.

2.4.2.1 Soil Classification

The characteristics and distribution of soil types within the reservoir cannot be fully observed until the reservoir is drained and safe entry can be made. As soon as possible after dam breaching, soil types in each area of the reservoir will be classified and the physical properties will be determined. The internal angle of friction in each area will be used to assess slope stability by comparing it to mapped slope conditions.

2.4.2.2 Mapping

A physical review of each area of the reservoir shall be conducted and soil types mapped in sufficient detail to determine if the soil type within each area is currently stable as compared to its physical soil properties. This mapping shall also be performed at intervals and accuracies that are consistent with the objectives contained in the Sediment Assessment and Management Plan.

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Fixed photo stations will be established to photo document slope stability in the former reservoir area.

- The photo stations (consistent with the Revegetation Plan) will be located and in sufficient numbers as to provide photo coverage of all embankment types.
- Photographs will be taken during each monitoring visit and documented by photo point number.

2.4.3 Contingency Plan

In the event that slope instability is identified and the performance criteria have not been achieved, a slope stability evaluation will be made which determines the best course of action given the conditions at that time.

If the instability is of a magnitude large enough to potentially affect fish passage or pose an unreasonable public safety risk, the slope will be actively stabilized by mechanically reducing the angle of the slope during a time period that is consistent with minimizing potential impacts from turbidity.

2.4.4 Schedule

This schedule will be followed until the performance standards are met for two consecutive years.

| <b>Time Period</b>                              | <b>Action</b>                                             | <b>Schedule</b>                                        |
|-------------------------------------------------|-----------------------------------------------------------|--------------------------------------------------------|
| October 2006 – May 2007                         | Visual site assessment & active management where required | Weekly                                                 |
| May 2007                                        | Identify soil types & physical properties                 | Prior to revegetation                                  |
| May 2007 until Performance Criteria Are Met     | Map reservoir contours                                    | As areas are revegetated and once annually at year end |
| October 2007 until Performance Criteria Are Met | Photo reference points                                    | Quarterly                                              |

2.4.5 References

Condit Settlement Agreement. September 1999.

FERC, June 2002. Condit Hydroelectric Project, Project No. 2342 Final Supplemental Final Environmental Impact Statement. Record Number 0103.

G&G Associates, October 2003. Sediment Behavior after Breaching Condit Dam.

R.W. Beck, May 1998. Condit Hydroelectric Project Removal, Summary Report Engineering Considerations. Prepared for PacifiCorp.

CONDIT HYDROELECTRIC PROJECT

PROJECT DESCRIPTION

FERC PROJECT NO. 2342

R.W. Beck, March 1997. Condit Hydroelectric Project Removal, Initial Assessment. Prepared for PacificCorp, Columbia River Inter-Tribal Fish Commission and Yakama Indian Nation.

Squire Associates, April 1, 1998. Evaluation of pH Effects Due to Pulverized Concrete from the Condit Hydroelectric Project.

PROJECT DESCRIPTION

CONDIT HYDROELECTRIC PROJECT  
FERC PROJECT NO. 2342

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PROJECT DESCRIPTION**2.5 CANYON AND WOODY DEBRIS MANAGEMENT PLAN**

This section of the site management plan is specific to large woody debris materials that have accumulated in the reservoir sediment since its dam construction in 1913. Estimates made in 1997 indicate the sediment volume was approximately 2.4 million cubic yards. A portion of this volume is actually large woody debris. Because the volume of woody debris is unknown, PacifiCorp can only make assumptions as to its actual volume. For discussion and planning, however, PacifiCorp assumes that one percent of the sediment volume will be large woody debris. This will mean that 24,000 cy of woody debris is assumed to be contained in the sediment.

Most of this 24,000 cy of woody debris will be washed down stream along with the sediment during the initial reservoir draining. The remainder will be left behind in the sediments that will be eroded down stream on subsequent high flow events. PacifiCorp proposes to allow this large woody debris to be released over time along with the sediment within which it is contained. According to the USFWS Biological Opinion, although the gradient and confined channel will preclude large accumulations of large woody debris, some will collect, at least temporarily, below the dam and is beneficial in the creation of backwater zones and niches for juvenile fish and the production of macroinvertebrates. However, intervention in this process will occur if woody debris is causing unstable slope conditions, as defined in the Bank Stabilization Plan, or if woody debris is found to be adversely affecting fish passage.

The goals of the Canyon and Woody Debris Management Plan are to:

- Identify under what conditions large woody debris will remain in place versus being dislodged or relocated.
- Establish the criteria and methods used to dislodge and relocate large woody debris should it be required.
- Identify the criteria used to monitor whether large woody debris is adversely affecting fish passage.

**2.5.1 Debris Management**

In October 2006, Condit dam will be breached as described in the Bank Stabilization Plan and the Sediment Assessment and Management Plan. This process will mobilize large woody debris trapped in the sediment and transport it down the White Salmon River to the Columbia River.

Some woody debris will remain in the reservoir basin along with the sediment in which it is contained. This woody debris may cause blockages in the stream banks and hinder slopes from reaching natural stable conditions, which is defined as the slope being flatter than the angle of repose expected for the specific sediment type.

When this condition exists the preferred action will be to mechanically remove the woody debris using equipment such as dozers and excavators and move the woody debris to a storage area until it can be recycled or utilized for habitat enhancement.

If the debris is in a location that is unsafe to access with equipment, or if doing so would cause adverse environmental impacts, the materials will be dislodged manually or with explosives and allowed to mobilize downstream. Since this material would then be washed downstream where it could cause potential physical fish passage issues, an assessment of the stream below the action area will be made after the reservoir is drained. If the woody debris has accumulated or positioned itself where it is creating a physical fish barrier, it will be remobilized or removed at the downstream location.

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When the reservoir is drained it is anticipated that the woody debris that is washed down the canyon will settle out in the In-Lieu site along with the reservoir sediment. Although it is highly unlikely, some debris could become lodged in the narrow portion of the river located under Highway 14 and the railroad bridge. PacifiCorp will monitor the accumulation of debris in this area in cooperation with the railroad and the highway department on a weekly basis for six months following dam breach and remove any build up of debris that creates an adverse hydraulic condition or has the potential to jeopardize the structure.

2.5.2 Monitoring Plan***Objectives***

- Identify and dislodge woody debris that is inhibiting bank stabilization.
- Identify and dislodge or remove large woody debris that is creating physical fish passage barriers.

***Performance Criteria:***

- Active dislodging of large woody debris that exists within the reservoir that is hindering the formation of naturally stable banks shall be complete before the first anniversary of the breaching of the dam.
- Two consecutive years' evidence that large woody debris from the reservoir is not creating physical fish passage barriers.

2.5.3 Identification of Physical Fish Passage Barriers Caused by Large Woody Debris

Woody debris that accumulates in the White Salmon River shall be visually inspected to identify the potential impact the barrier could have on migrating fish species. This inspection shall use the physical features of the site and the debris along with the river hydrology at the time. The inspection and determination of the need for action shall be based on the obstruction in question creating a physical blockage, creating conditions causing it to act as a physical blockage, or creating a velocity or gradient barrier as described below. PacifiCorp, in consultation with the Washington Department of Fish and Wildlife, will use the following criteria to determine if a passage barrier exists.

Physical Blockage

When large wood accumulates it can potentially create a physical blockage requiring fish to jump over the obstruction. The ability of a fish to pass such an obstruction is the product of the fish's jumping ability, the height of the obstruction, and the depth of the jump pool below the barrier. It has been suggested that the ratio between jump height and jump pool depth for ideal jumping conditions should be 1:1.25 (Stuart 1962). Other suggested criteria are that the pool depth should be 1.5 times the jump height or that a minimum of a 2-foot depth pool should be provided (ODFW 1999). This suggests that a fish encountering a debris jam requiring a 1-meter jump would need a jump pool depth of 1.25-1.5 meters below the obstruction. Typical jump heights incorporated into the design of culverts and fish ladders are generally 1-foot, although 6-inches is suggested for juvenile and resident fish, which tend to be weaker swimmers and jumpers than

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adult anadromous salmonids (ODFW 1999). Adult salmon are adapted to environments that require jumping ability. Maximum jump heights, taking appropriate jump pool depth into account, for adult Pacific salmon range from 4-13 feet, with steelhead (*Oncorhynchus mykiss*) being the most capable (USFS 2001). This ability diminishes with reducing pool depths below the barrier. Assessment of successful passage at a potential jump-height barrier can only be verified through field observations during migration.

Velocity Barriers

Water velocities may prevent upstream passage of adult juvenile salmon and resident fish. Large woody debris could accumulate and cause conditions that are hydraulically unfavorable for passage. Upstream passage of weak swimming fish (juvenile salmonids) typically is considered impaired at flows greater than 1-2 feet per second (fps) (ODFW 1999, NMFS 2000). Adult salmon and steelhead are capable of passing upstream in velocities of 8 fps, but this ability diminishes with distance traveled (Bell 1991). If maintaining upstream passage beyond a single burst event, 1-4 fps is a more suitable standard (Bates 1993). Salmonids typically use a burst and rest pattern when encountering high velocities during upstream passage (ODFW 1999). Large wood may cause an increase in velocity by constricting flow, but may also provide velocity breaks allowing for rest between stretches of upstream migration. Flow measurements can be collected at potential velocity barriers to verify observed conditions.

Gradient Barriers

Channel gradient may also hinder upstream passage of salmonids, requiring burst speed sustainability that may be greater than the capability of the species of interest. For adult anadromous salmonids the following distance/gradient relationship applies (USFS 2001):

- > 225 ft at 12% gradient
- > 100 ft at 16% gradient
- > 50 ft at 20% gradient
- > 25 ft at 24% gradient

2.5.4 Schedule

This schedule will be followed until the performance standards are met for two consecutive years.

| Time Period                                               | Action                                                                                          | Schedule                                                                                                            |
|-----------------------------------------------------------|-------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| October 2006 - May 2007                                   | Visual site assessment & active management of woody debris as they relate to bank stabilization | Weekly                                                                                                              |
| October 2006 until all other performance criteria are met | Fish passage evaluation and record keeping                                                      | Monthly and immediately following any observed bank failure or storm event with flows equal to or in excess of 7Q10 |

2.5.5 References

FERC, June 2002. Condit Hydroelectric Project, Project No. 2342 Final Environmental Impact Statement. Record Number 0103.

PROJECT DESCRIPTION

R.W. Beck, May 1998. Condit Hydroelectric Project Removal. Summary Report Engineering Considerations. Prepared for PacifiCorp.

R.W. Beck, March 1997. Condit Hydroelectric Project Removal. Initial Assessment. Prepared for PacifiCorp, Columbia River Inter-tribal Fish Commission and Yakama Indian Nation.